11

Water and Sewer Infrastructure

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

Introduction

The Applicant, Queens Future, LLC, is proposing to redevelop approximately 78 acres of underutilized, largely asphalt surface parking areas (the Development Site), located west of Seaver Way and adjacent to Citi Field with a major mixed-use development. The Development Site is bounded by Seaver Way to the east, the MTA Corona rail yard to the south, Grand Central Parkway to the west, and the Whitestone Expressway to the north.

As described in **Chapter 1, Project Description**, the Queens Future Project is anticipated to comprise up to approximately 3.7 million square feet (sf) of new construction, with destination entertainment that includes a music hall, hotel, a gaming facility,[1] convention and meeting space, restaurant and retail space, and office and community facility space. The Proposed Project would also include public park space—at least 20 acres of the Development Site would be improved with landscaping and other amenities for public recreation—improved connections to the Mets-Willets Point No. 7 Train NYCT Subway Station, and other public realm improvements in addition to structured parking facilities to accommodate up to 13,750 spaces (the Proposed Project).

According to the *2021 CEQR Technical Manual*, discretionary actions that would increase density or change the drainage conditions of a site may warrant a water and sewer infrastructure analysis. Specifically, development that would result in an exceptionally large demand for water (more than 1 million gallons per day [mgd]) or that is in an area that experiences low water pressure requires an analysis of potential impacts on the water supply system. Based on average water consumption levels,

[1] The inclusion of a gaming facility is contingent upon receiving a gaming license from the New York State Gaming Commission.

the Proposed Project is not expected to exceed the threshold of 1 mgd that would require a preliminary infrastructure assessment of water supply. Hydrant flow tests for Seaver Way indicate that the Project Area is not within a low-pressure area for water flow. Therefore, an analysis of water supply is not warranted. However, this chapter will disclose the water demand for the Proposed Project.

Additionally, a sewer infrastructure analysis would be warranted for developments that are located in separately sewered areas and which exceed incremental development thresholds (above the predicted No-Action condition) of 100 residential units or 100,000 sf of commercial, public facility, and institution and/or community facility space in a park, mixed-use, or commercial zoning district. The Development Site is located in the Flushing Bay and Creek drainage area and is served by sanitary sewers in a separately sewered area. Therefore, because the Proposed Project would result in more than 100,000 sf of commercial use, a preliminary wastewater and stormwater infrastructure assessment is required.

Principal Conclusions

The Proposed Project would result in a total daily water demand of approximately 0.91 mgd. Although the Proposed Project does not exceed the threshold of 1 million gallons per day that would require a preliminary infrastructure assessment of water supply or affect the 72-inch trunk water main, the Applicant will undertake further analysis of the local distribution system to the Queens Future Project in coordination with NYCDEP.

Because the With-Action condition exceeds the threshold of 100,000 sf of commercial development within a separately sewered area, an analysis of the Proposed Actions' potential impacts on the City's wastewater and stormwater conveyance and treatment system is provided below.

Sanitary sewage generated by the Proposed Actions would discharge to the Bowery Bay Wastewater Resource Recovery Facility (WRRF), which has a State Pollutant Discharge Elimination System (SPDES)-permitted dry weather flow capacity of 150 mgd. The average monthly flow to Bowery Bay WRRF over a 12-month period is 101 mgd. The Proposed Actions have the potential to result in a total generation of 0.68 mgd over the No-Action total sewage generation. This incremental increase in sanitary flow would represent approximately 0.45 percent of the Bowery Bay WWRF's SPDES-permitted capacity. The projected increase in sanitary sewage would not cause the Bowery Bay WWRF to exceed its operational capacity or SPDES-permitted capacity.

Flows from the Proposed Project, which would contribute to an exceedance of the capacity of the 24-inch sanitary main and the 37th Avenue Pump Station, could result in a potential significant impact to sewer infrastructure. Additional analysis will be undertaken between the Draft EIS (DEIS) and Final (FEIS) of the hydraulic capacity of the 24-inch sewer and of the capacity of the 37th Avenue pump station. If it is confirmed that the flow levels in the With-Action condition would exceed operating capacity to an extent considered significant consistent with *CEQR Technical Manual* guidance, a significant adverse impact would occur.

The Project Area is served by four storm sewer systems—two New York State Department of Transportation (NYSDOT) outfalls and two separate New York City Department of Environmental Protection (NYCDEP) outfalls. All four outfalls serve the Flushing Bay. The *CEQR Technical Manual* indicates that a proposed development that increases total volume flows by 2 percent or more over existing conditions in a drainage area of concern could be subject to a review by NYCDEP. The total stormwater runoff volumes to Outfall #1 (NYSDOT outfall) and Outfall #4 (NYCDEP outfall) decrease

between existing and proposed conditions and do not warrant further review. The total stormwater runoff volumes to Outfall #2 (NYCDEP outfall) and Outfall #3 (NYSDOT outfall) have the potential to result in a flow volume increase of over 2 percent and therefore the With-Action Flow Volume Calculation Matrix were reviewed by NYCDEP. Stormwater best management practices (BMPs) would be required in accordance with the NYCDEP Unified Stormwater Rule (USWR) guidelines, which includes requirements for bringing the Development Site into compliance with the allowable stormwater release rate. To achieve the release rate, stormwater could be managed by utilizing one or a combination of detention techniques. Green technologies and subsurface detention could be implemented to retain or release stormwater with slowed discharge rates to control peak runoff rates. Therefore, the Proposed Project would not result in any significant adverse stormwater impacts.

Methodology

This analysis begins with a description of the water supply and wastewater and stormwater conveyance systems. The water demand, sewage generation, and stormwater runoff are then calculated for the existing, No-Action, and With-Action conditions. As described in **Chapter 1, Project Description**, Area of Development A and Area of Development B include land uses that generate water demand and sanitary sewage flows. Water demand and sewage generation rates for Area of Development A were determined by water loading rates derived from similar facilities. Water demand and sewage generation rates for Area of Development B are from the *CEQR Technical Manual*. Stormwater runoff was determined by NYCDEP flow matrix calculations. Information was gathered on the Bowery Bay WRRF and the 37th Avenue Pump Station to determine the potential for adverse impacts to the existing sewer infrastructure.

Existing Conditions

Encompassing approximately 78 acres, the Development Site is traversed by the MTA No. 7 Line, which runs east to west on elevated tracks along Roosevelt Avenue. The Development Site contains approximately 53 acres of surface parking lots that accommodate a total of 7,423 spaces. The parking lots within the Development Site are used for events held at Citi Field. The parking lot located south of Roosevelt Avenue (also known as Southfield Lot) has up to 1,795 spaces designated as paid commuter parking on business days. There are temporary pop-up events, such as outdoor movie nights and carnivals, that operate in the parking lots of Citi Field on a seasonal basis under temporary agreements. None of these events have long term contracts, nor are there other standing businesses within the Development Site. The Project Area extends slightly beyond the Development Site; these additional areas include roadways and landscaped areas adjacent to the Grand Central Parkway and the Whitestone Expressway.

Water Supply

There are NYCDEP water mains in Shea Road, Roosevelt Avenue, Seaver Way and on the south side of the parking field south of Roosevelt Avenue. A 12-inch water main runs east-west within Roosevelt Avenue. A 72-inch trunk water main is located south of Roosevelt Avenue on the south side of the existing surface parking lots on the Development Site. The 72-inch trunk water main is about 15 to 20 feet north of the southern property line of the existing surface parking lot. A NYCDEP 8-inch water main is also located on south side of the parking lots south of Roosevelt Avenue before connecting

midblock to the water main in Roosevelt Avenue. Another 12-inch water main runs east-west within Shea Road starting from the northeast corner of the Development Site at Seaver Way and then continues west underneath the Grand Central Parkway. Within Seaver Way there is a 12-inch water main roughly between 34th and 35th Avenues, and then between 35th Avenue and Roosevelt Avenue is a 20-inch water main constructed in 2020.

Citi Field (the Mets) currently maintains a series of 8-inch water mains on site (not mapped by NYCDEP) that run to the east of the Development Site and to the south of Citi Field and connect to the existing water mains in Seaver Way and Roosevelt Avenue.

Sanitary Sewage

The Development Site is within the service area of the Bowery Bay WRRF, which is located on the East River in Astoria, Queens. The existing sewer system within the Bowery Bay WRRF service area is a combined sewer system that collects both sanitary sewage and stormwater runoff. At the Bowery Bay WRRF, wastewater is treated by physical and biological processes before it is discharged into the Upper East River. A SPDES permit issued by the New York State Department of Environmental Conservation (NYSDEC), which establishes limits for effluent parameters (i.e., suspended solids, fecal coliform bacteria, and other pollutants), regulates the quality of the treated wastewater (effluent). Since the volume of flow to a WRRF affects the level of treatment a facility can provide, the maximum permitted capacity for the Bowery Bay WRRF is 150 mgd. The average monthly flow over the latest 12-month period for which data are available is 101 mgd,[2] which is well below the maximum permitted capacity.

To avoid flooding the WRRFs, "regulators" are built into the combined sewers to act as relief valves. These are chambers set to divert two times the average design dry-weather flow into the interceptor; during storms, if a greater amount of combined flow reaches the regulator, the excess is directed to outfalls into the nearest waterway. During such overflow periods, a portion of the sanitary sewage entering, or already in, the combined sewers discharge untreated into the waterway along with stormwater and debris washed from streets. This untreated overflow is known as combined sewer overflow (CSO). During a significant storm event, CSOs within the Bowery Bay WRRF service area discharge to the East River and Flushing Bay.

The Development Site is in an area of Queens that has separate systems for sanitary sewage and stormwater. Currently, the sanitary for the site is collected within an NYCDEP 36-inch sanitary main that was installed in 2011. It begins at Seaver Way and 35th Avenue then flows from east to west and crosses through the northern and western parking lots of Citi Field. This sewer connects to a 24-inch sewer at a manhole (connection to the 24-inch pipe is about 20-feet below existing grade) just east of the Grand Central Parkway. The 24-inch sewer then continues west, under the Grand Central Parkway, to the NYCDEP 37th Avenue pump station (on 114th Street). The sanitary flow continues west through a force main to a manhole on 111th Street and flows by gravity to 108th Street in a combined sewer system. The system then passes through chambers and flows north on 108th Street to Ditmars Boulevard. During dry weather, the combined sewer flows west on Ditmars Boulevard towards the Bowery Bay WRRF. During CSO events, the combined sewer flow discharges to the north through CSO BB-008.

[2] Twelve-month period through March 2017.

The pump station has the capacity to pump up to 5 mgd into a 20-inch force main, which discharges into a 36-inch gravity sewer at the intersection of 37th Avenue and 111th Street. The 36-inch sewer was installed to collect flows from the area, including east of Seaver Way. There are 12-inch sanitary force mains around Citi Field that collect flow from the stadium, combine on the northwest side of the stadium, and tie into the 24-inch sanitary main east of the Grand Central Parkway.

In addition, NYCDEP 24- and 16-inch sanitary sewers are located at the northern end of Seaver Way, near 34th and 35th Avenues. No sanitary sewer exists in Roosevelt Avenue. The MTA station drains to an on-site individual subsurface sewage treatment system (septic) that is located in the parking field east of the MTA station, just south of Roosevelt Avenue, west of Seaver Way, east of the Passerrelle Bridge, directly below the Mets-Willets Point NYCT No. 7 Train Subway Station.

Stormwater

Conveyance System

The Development Site currently drains into four separate storm sewer networks owned, operated, and maintained by NYCDEP and by NYSDOT. The NYCDEP system primarily serves Seaver Way, Citi Field, and a portion of Roosevelt Avenue between Seaver Way and the MTA station. The NYSDOT system serves the majority of the Development Site and a portion of Roosevelt Avenue (see **Figure 11-1** and **Figure 11-2**):

- **Existing Drainage Area #1:** A large part of the Citi Field parking lots, portions of Shea Road, the bus parking lot north of Shea Road, and portions of Roosevelt Avenue all drain to a NYSDOT 72-inch diameter storm sewer which outfalls to Flushing Bay (Outfall #1).
- **Existing Drainage Area #2:** The western part of the south parking lot (south of Roosevelt Avenue) and the western part of Shea Road drain to the NYSDOT storm system within Shea Road. The 48-inch NYSDOT storm sewer flows west into a 22-foot-0-inch by 8-foot-6-inch box sewer that flows north, underneath 114th Street. The box sewer connects to two 10-foot-6-inch by 9-foot-2-inch box sewers that discharge into the Flushing Bay (Outfall #2).
- **Existing Drainage Area #3:** A small section of Shea Road, just west of Seaver Way, drains to the NYSDOT 30-inch storm sewer, which outfalls to Flushing Bay (Outfall #3).
- **Existing Drainage Area #4:** The remaining site drains to an NYCDEP storm sewer. This area generally includes the area to the north of the stadium, the eastern part of Citi Field itself and adjacent parking lot, and the eastern part of the south parking lot (south of Roosevelt Avenue). The existing NYCDEP 48-inch storm sewer flows north, underneath Seaver Way and ties into the existing 7-foot by 5-foot box sewer north of 36th Avenue. North of 34th Avenue, the box sewer increases in size to 7.5-feet by 5-feet to the outfall (Outfall #4) in Flushing Bay. These box sewers and outfall were installed in 2017. Additional drainage improvements will be implemented as part of the Willets Point Project Phase 1 Development (discussed below, under the No-Action condition)

Figure 11-1 Existing Drainage Areas

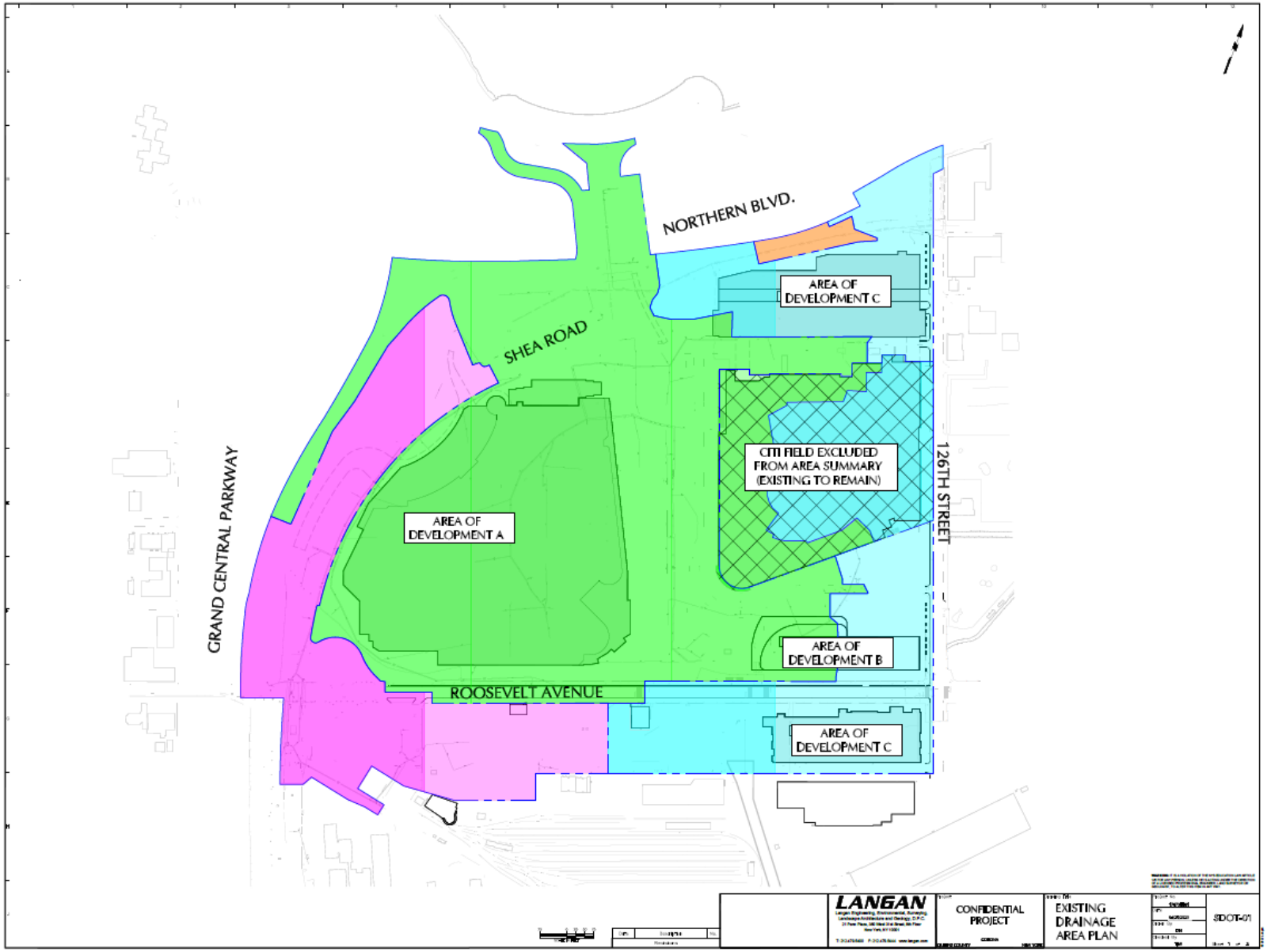


Figure 11-2 Development Site Outfall Locations



Water Consumption and Sanitary Flows

Under existing conditions as surface parking, the Development Site does not generate demand for drinking water or water for air conditioning. For purposes of analysis, the amount of sanitary sewage is calculated as all water demand generated by the existing uses on the Development Site except water used by air conditioning, which is typically not discharged to the sewer system. Under existing conditions, the Development Site does not generate any wastewater. The MTA station and buildings drain into an on-site subsurface sewage treatment system located in the parking lot east of the MTA station and south of Roosevelt Avenue.

Stormwater Flows

As described above, the Development Site consists approximately 78 acres of underutilized, largely asphalt surface parking areas with associated walkways and landscaping improvements. **Table 11-1** summarizes the surfaces and surface areas as well as the weighted runoff coefficient (the fraction of precipitation that becomes surface runoff for each surface type). The existing surface coverage is divided into four areas, based on which outfall they affect.

Table 11-1 Existing Surface Coverage

Affected Outfall	Surface Type	Roof	Pavement and Walkways	Grass and Soft Scape	Total
Outfall #1	Area (%)	0%	87%	13%	100%
	Surface Area (sf)	0	1,953,632	307,919	2,261,550
	Runoff Coefficient1	1.00	0.85	0.20	0.76
Outfall #2	Area (%)	0%	50%	50%	100%
	Surface Area (sf)	0	485,949	376,461	862,410
	Runoff Coefficient1	1.00	0.85	0.20	0.57
Outfall #3	Area (%)	0%	87%	13%	100%
	Surface Area (sf)	0	29,642	4,399	34,041
	Runoff Coefficient1	1.00	0.85	0.20	0.77
Outfall #4	Area (%)	1%	93%	7%	100%
	Surface Area (sf)	7,365	1,028,691	74,004	1,110,060
	Runoff Coefficient1	1.00	0.85	0.20	0.81

Notes:
1 Runoff coefficients for each surface type as per NYCDEP

The NYCDEP Flow Volume Calculation Matrix was completed for the existing and the With-Action conditions. The calculations from the Flow Volume Calculation Matrix help to determine the change in wastewater and stormwater flow volumes to the sewer systems from existing and With-Action conditions and include four rainfall volume scenarios with varying durations. As discussed above, the Project Area is served by four sewer systems. The Flow Volume Calculation Matrix for each system under existing conditions are included in **Table 11-2**, **Table 11-3**, **Table 11-4**, and **Table 11-5**.

As shown in **Table 11-2**, the Outfall #1 direct drainage rainfall volume under existing conditions could range between 0 mgd and 2.868 mgd. The site does not generate any sanitary flow to the Bowery Bay WWRF under existing conditions.

Table 11-2 NYCDEP Flow Volume Matrix – Existing Conditions – Outfall #1

Rainfall (inches)[1]	Duration (hours)	Total Area (acres)[2]	Weighted Runoff Coefficient[3]	Runoff Volume to Flushing Bay (mg)[4]
0.00	3.80	51.91	0.76	0
0.40	3.80	51.91	0.76	0.43
1.20	11.30	51.91	0.76	1.29
2.50	19.50	51.91	0.76	2.68

Notes:
1 Storm event rainfalls per NYCDEP Volume Calculation Matrix.
2 Total surface area onsite within subcatchment area.
3 Runoff coefficients for surface type area as per NYCDEP.
4 Stormwater runoff derived from NYCDEP Volume Calculation Matrix.

As shown in **Table 11-3**, the Outfall #2 direct drainage rainfall volume under existing conditions could range between 0 mgd and 0.76 mgd.

Table 11-3 NYCDEP Flow Volume Matrix – Existing Conditions – Outfall #2

Rainfall (inches)[1]	Duration (hours)	Total Area (acres)[2]	Weighted Runoff Coefficient[3]	Runoff Volume to Flushing Bay (mg)[4]
0.00	3.80	19,79	0.57	0
0.40	3.80	19.79	0.57	0.12
1.20	11.30	19.79	0.57	0.37
2.50	19.50	19.79	0.57	0.76

Notes:
1 Storm event rainfalls per NYC DEP Volume Calculation Matrix.
2 Total surface area onsite within subcatchment area.
3 Runoff coefficients for surface type area as per NYCDEP.
4 Stormwater runoff derived from NYC DEP Volume Calculation Matrix.

As shown in **Table 11-4**, the Outfall #3 direct drainage rainfall volume under existing conditions could range between 0 mgd and 0.04 mgd.

Table 11-4 NYCDEP Flow Volume Matrix – Existing Conditions – Outfall #3

Rainfall (inches)[1]	Duration (hours)	Total Area (acres)[2]	Weighted Runoff Coefficient[3]	Runoff Volume to Flushing Bay (mg)[4]
0.00	3.80	0.78	0.77	0
0.40	3.80	0.78	0.77	0.01
1.20	11.30	0.78	0.77	0.02
2.50	19.50	0.78	0.77	0.04

Notes:
1 Storm event rainfalls per NYCDEP Volume Calculation Matrix.
2 Total surface area onsite within subcatchment area.
3 Runoff coefficients for surface type area as per NYCDEP.
4 Stormwater runoff derived from NYCDEP Volume Calculation Matrix.

As shown in **Table 11-5**, the Outfall #4 direct drainage rainfall volume under existing conditions could range between 0 mgd and 1.40 mgd.

Table 11-5 NYCDEP Flow Volume Matrix – Existing Conditions – Outfall #4

Rainfall (inches)[1]	Duration (hours)	Total Area (acres)[2]	Weighted Runoff Coefficient[3]	Runoff Volume to Flushing Bay (mg)[4]
0.00	3.80	25.48	0.81	0
0.40	3.80	25.48	0.81	0.22
1.20	11.30	25.48	0.81	0.67
2.50	19.50	25.48	0.81	1.40

Notes:
1 Storm event rainfalls per NYCDEP Volume Calculation Matrix.
2 Total surface area onsite within subcatchment area.
3 Runoff coefficients for surface type area as per NYCDEP.
4 Stormwater runoff derived from NYCDEP Volume Calculation Matrix.

No-Action Condition

As described in **Chapter 1, Project Description**, absent the Proposed Actions, it is assumed that the Development Site would continue in its existing conditions; it would remain as a paved parking area.

To the east of the Development Site, Willets Point Phase 1 and Phase 2 are planned to be completed in the 2030 No-Action condition. Willets Point Phase 1 is part of the larger Willets Point Development Plan, which was first approved in 2008 and modified in 2021. Willets Point Phase 1 would result in the construction of approximately 892,635 gross square feet (gsf) of residential space containing 1,100 affordable units, 23,756 gsf of retail space, 3,159 gsf of community facility space, and a 128,000-gsf public school with 650 seats. The site for Willets Point Phase 1 will also include 0.87 acre of open space and accessory parking.

A Final Second Supplemental Environmental Impact Statement (FSSEIS) for Willets Point Phase 2 was published on February 23, 2024 for a 17-acre parcel adjacent to the Phase 1 project site discussed above. Willets Point Phase 2 would result in the construction of approximately 1,190,000 gsf of residential space containing an additional 1,400 affordable residential units, 60,000 gsf of retail space, 215,000 gsf of hotel space (with 250 rooms), and a 500,000 gsf soccer stadium (with 25,000 seats). It will also include 2.77 acres of open space. According to the Willets Point Phase 2 FSSEIS, in the Phase 2 With-Action condition, the Willets Point project site would generate 1,433,970 gpd of water (approximately 1.4 mgd), which is an increase of 726,779 gpd (approximately 0.7 mgd) over the Willets Point Phase 2 No-Action condition. This represents an approximately 0.07 percent increase in demand on the water supply system compared to the City's average daily water use of approximately 1.1 billion gpd. In the Phase 2 With-Action condition, the Willets Point project site would generate 887,325 gpd, an incremental 467,020 gpd of sewage over the Willets Point Phase 2 No-Action condition. This incremental volume in sanitary flow to the sewer system will represent approximately 0.46 percent of the average daily flow to the Bowery Bay WWRF.

Currently, this redevelopment area has no connection to the City's sanitary sewer system and is serviced by septic tanks. As part of Willets Point Phase 1, a Drainage Proposal has been approved by NYCDEP identifying the sewer improvements to serve the development. Per the Approved Plan (Project no. DPQ-014/2021, approved by DEP February 9, 2023), the principal improvement will be a 24-inch sanitary sewer along Seaver Way, extending from Roosevelt Avenue to 34th Avenue, which

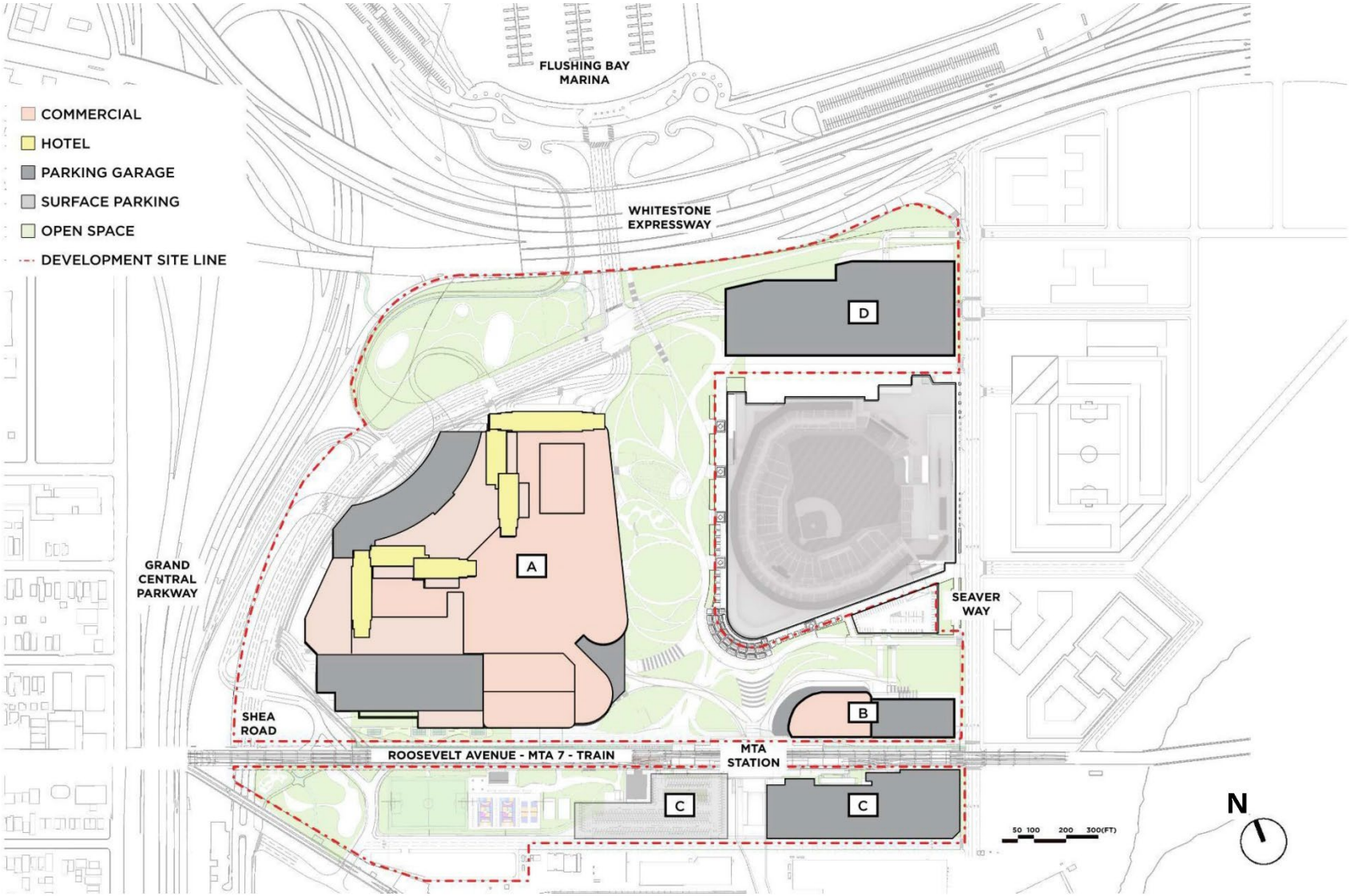
conveys flow to the existing 36-inch gravity sewer that flows west across the northern parking lot of Citi Field to the 37th Avenue Pump Station, which services the Bowery Bay WRRF. In addition, 18-inch sanitary sewers will be constructed along 38th Avenue and 127th Street to connect the Willets Point Phase 1 development parcels with the sanitary sewer along Seaver Way.

The approved Drainage Proposal for Willets Point Phase 1 also includes new storm sewers. The principal storm sewers for Willets Point Phase 1 will be a 7.5-foot by 4.5-foot box sewer along Seaver Way from Willets Point Boulevard to 35th Avenue, connecting to the storm sewers that convey flows to the outfall at the end of Seaver Way. In addition, storm sewers will be constructed along the future mapped streets in the Willets Point Phase 1 development area (38th Avenue, 39th Avenue, and 127th Street) to connect the Willets Point Phase 1 development parcels to the Seaver Way sewer. With these improvements, all stormwater from the Willets Point Phase 1 would be conveyed to the Seaver Way outfall. The stormwater replacement would increase the stormwater capacity of the outfall on Seaver Way.

With-Action Condition

The With-Action condition is intended to replace the underutilized portions of the Development Site with up to 2,300 hotel rooms, 3,641,000 gsf of commercial space (including gaming facilities, restaurants, amenities, office space, a convention space and music venue, and office space), and 25,000 gsf of community facility space in Areas of Development A and B. The Project would also include at least 20 acres of public park space, amenity space for the hotel, and structured parking facilities to accommodate up to 13,750 spaces in Areas of Development C and D (see **Figure 11-3**).

Figure 11-3 Proposed Project Site Plan



Source: SHoP Architects, Field Operations

Water Demand

The Proposed Project is expected to have a total water demand of 907,379 gpd. As the total water usage anticipated of the Proposed Actions would result in less than one mgd, the Proposed Actions would not have a significant adverse impact on the City's water supply or system water pressure.

The water demand generated by the With-Action condition for Area of Development A is 704,131 gpd. The proposed public park space and landscaped areas would require a peak demand of 124,828 gpd during the summer months. The water loadings for each land use within Area of Development A and the irrigation for the park and landscaped areas were determined by the plumbing engineer and the landscape architect, respectively, based on experience operating these uses. Water consumption and wastewater generation rates applicable to Area of Development B were derived from the *CEQR Technical Manual* and are provided in **Table 11-6**.

Table 11-6 With-Action Water Demand and Sewage Generation Rates

	Rate			
Land Use	**Domestic[1]**	**Units**	**Air Conditioning[1]**	**Units**
Retail	0.24	gpd/sf	0.17	gpd/sf
Office	0.10	gpd/sf	0.17	gpd/sf
Community Facility[2]	0.10	gpd/sf	0.17	gpd/sf

Notes:

1 Consumption rates obtained from the *2021 CEQR Technical Manual* Table 13-2 "Water Usage and Sewage Generation Rates for Use in Impact Assessment."

2 Community Facility space is assumed to consume water and generate domestic wastewater at the *CEQR Technical Manual* rates for commercial office space.

As shown in **Table 11-7**, the Proposed Actions in Area of Development B is expected to have a total water demand of 78,420 gpd.

Table 11-7 With-Action Water Demand for Area of Development B

Land Use	**Area (sf)**	**Dwelling Units/Seats**	**Domestic Water/Wastewater Generation (gpd)**	**Air Conditioning Water Generation (gpd)**
Retail[1]	150,000	-	36,000	25,500
Office	37,000	-	3,700	6,290
Community Facility	25,000	-	2,500	4,250
Water Consumption Subtotals			42,200	36,040
Total Water Consumption			78,240	

Note: 1. Retail land use includes restaurant space (118,000 gsf).

The Proposed Project would not affect or connect to the 72-inch trunk water main located south of Roosevelt Avenue. The Proposed Project does not require relocating or exposing the 72-inch trunk water main pipe. Although the Proposed Project does not exceed the threshold of 1 million gallons per day that would require a preliminary infrastructure assessment of water supply or affect the 72-

inch trunk water main, the Applicant will undertake further analysis of the local distribution system to the Queens Future Project in coordination with NYCDEP.

Sanitary Sewage

Sanitary Sewage Generation

The Proposed Project is expected to generate approximately 675,918 gpd of daily sewage under the With-Action condition. The sewage generated by the With-Action condition for Area of Development A is 633,718 gpd. The sewage for each land use within Area of Development A was determined by the plumbing engineer and is based on experience operating these uses. The sewage generated by the With-Action condition for Area of Development B is 42,200 gpd. The sewage generation from Area of Development B was derived from the wastewater generation rates provided in the *CEQR Technical Manual* and is provided in **Table 11-7**. This increase in wastewater generation would be approximately 0.45 percent of the Bowery Bay WWRF capacity of 150 mgd.

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 reduce sanitary flows to the Bowery Bay WRRF and 37th Avenue Pump Station.

Sanitary Sewer Improvements

There would be two privately owned pump stations serving the proposed development - one serving the public comfort station and MTA employee restroom and one serving the proposed "Taste of Queens" food hall within Area of Development B. Currently, MTA's sanitary sewer from the subway station discharges into septic tanks. The site improvements would provide public benefit by eliminating the need for the septic tanks currently serving the MTA subway station as well as providing a public comfort station.

The Proposed Project would not result in any changes to the 12-inch sanitary force mains around Citi Field. As part of the Proposed Project, the existing 36-inch sanitary main would first be relocated by the Applicant. The Proposed Actions within Area of Development B, the parking areas associated with Area of Development C, and the existing MTA property would then connect to a proposed sanitary force main (installed by the Applicant) that would connect to the relocated 36-inch sanitary main, and then flow into a 24-inch pipe continuing west, under the Grand Central Parkway, to the 37th Avenue Pump Station by gravity. Area of Development A would be serviced by sanitary laterals that connect to the 36-inch sanitary main.

Flows from the Proposed Project, which would contribute to an exceedance of the capacity of the 24-inch sanitary main and the 37th Avenue Pump Station, could result in a potential significant impact to sewer infrastructure. Additional analysis will be undertaken between the DEIS and FEIS of the hydraulic capacity of the 24-inch sewer and of the capacity of the 37th Avenue pump station. If it is confirmed that the flow levels in the With-Action condition would exceed operating capacity to an extent considered significant consistent with *CEQR Technical Manual* guidance, a significant adverse impact would occur.

Stormwater

Stormwater Calculations

The With-Action condition consists of the addition of ten proposed buildings as well as new streets, sidewalks, and publicly accessible open space. **Table 11-8** summarizes the surface areas and weighted runoff coefficient for the With-Action conditions.

Table 11-8 With-Action Surface Coverage

Affected Outfall	Surface Type	Roof	Pavement and Walkways	Other	Grass and Soft Scope	Total
Outfall #1	Area (%)	38%	39%	0%	23%	**100%**
	Surface Area (sf)	871,502	895,533	0	515,835	**2,282,870**
	Runoff Coefficient[1]	1.00	0.85	0.85	0.20	**0.74**
Outfall #2	Area (%)	0%	63%	0%	37%	**100%**
	Surface Area (sf)	0	537,880	0	324,705	**862,585**
	Runoff Coefficient[1]	1.00	0.85	0.85	0.20	**0.61**
Outfall #3	Area (%)	0%	46%	0%	54%	**100%**
	Surface Area (sf)	0	48,174	0	57,042	**105,216**
	Runoff Coefficient[1]	1.00	0.85	0.85	0.20	**0.50**
Outfall #4	Area (%)	41%	53%	0%	6%	**100%**
	Surface Area (sf)	412,518	549138	0	55,733	**1,017,389**
	Runoff Coefficient[1]	1.00	0.85	0.85	0.20	**0.85**

Notes:
1. Runoff coefficients for each surface type as per NYCDEP

The NYCDEP Flow Volume Calculation Matrix was completed for the With-Action conditions. The calculations from the Flow Volume Calculation Matrix help to determine the change in wastewater and stormwater flow volumes to the sewer systems from existing and With-Action conditions and include four rainfall volume scenarios with varying durations. The summary tables of the Flow Volume Calculation Matrix are provided for each sewer system in **Table 11-9**, **Table 11-10**, **Table 11-11**, and **Table 11-12**.

As shown in **Table 11-9**, depending on the rainfall volume and duration, the With-Action stormwater flows decrease between 0 and 0.04 mgd. The Proposed Actions result in a decrease in stormwater runoff from existing conditions and does not warrant further review from NYCDEP.

Table 11-9 NYCDEP Flow Volume Matrix – Existing and With-Action Conditions – Outfall #1

Rainfall (inches)[1]	Duration (hours)	Total Area (acres)[2]	Weighted Runoff Coefficient[3]	Total Volume to Flushing Bay (mg)[4]			
				Existing Condition	With-Action Condition	Increment	Percent Change
0.00	3.80	52.40	0.74	0	0	0	0
0.40	3.80	52.40	0.74	0.43	0.42	-0.01	-2.32%
1.20	11.30	52.40	0.74	1.29	1.27	-0.02	-1,55%
2.50	19.50	52.40	0.74	2.68	2.64	-0.04	-1,50%

Notes:
1 Storm event rainfalls per NYCDEP Volume Calculation Matrix.
2 Total surface area onsite within subcatchment area.
3 Runoff coefficients for surface type area as per NYCDEP.
4 Stormwater runoff derived from NYCDEP Volume Calculation Matrix.

Table 11-10 compares the estimated stormwater flows under existing and With-Action conditions using the NYCDEP Flow Volume Calculation Matrix for Outfall #2. As shown in the table, depending on the rainfall volume and duration, the With-Action increment would be between 0 and 0.05 mgd. Typically, an increase of flow volume of 2 percent or more at the site over existing conditions would warrant further review by NYCDEP, in which the implementation of best management practices (BMPs) would help mitigate the increase.

Table 11-10 NYCDEP Flow Volume Matrix – Existing and With-Action Conditions – Outfall #2

Rainfall (inches)[1]	Duration (hours)	Total Area (acres)[2]	Weighted Runoff Coefficient[3]	Total Volume to Flushing Bay (mg)[4]			
				Existing Conditions	With-Action Condition	Increment	Percent Change
0.00	3.80	19.80	0.61	0	0	0	0
0.40	3.80	19.80	0.61	0.12	0.13	0.01	8.33%
1.20	11.30	19.80	0.61	0.37	0.39	0.02	5.40%
2.50	19.50	19.80	0.61	0.76	0.81	0.05	6.57%

Notes:
1 Storm event rainfalls per NYCDEP Volume Calculation Matrix.
2 Total surface area onsite within subcatchment area.
3 Runoff coefficients for surface type area as per NYCDEP.
4 Stormwater runoff derived from NYCDEP Volume Calculation Matrix.

As shown in **Table 11-11**, depending on the rainfall volume and duration, the With-Action increment would be between 0 and 0.04 mgd.

Table 11-11 NYCDEP Flow Volume Matrix – Existing and With-Action Conditions – Outfall #3

				Total Volume to Flushing Bay (mg)[4]			
Rainfall (inches)[1]	Duration (hours)	Total Area (acres)[2]	Weighted Runoff Coefficient[3]	Existing Condition	With-Action Condition	Increment	Percent Change
0.00	3.80	2.42	0.50	0	0	0	0
0.40	3.80	2.42	0.50	0.01	0.01	0	0
1.20	11.30	2.42	0.50	0.02	0.04	0.02	100%
2.50	19.50	2.42	0.50	0.04	0.08	0.04	100%

Notes:
1 Storm event rainfalls per NYCDEP Volume Calculation Matrix.
2 Total surface area onsite within subcatchment area.
3 Runoff coefficients for surface type area as per NYCDEP.
4 Stormwater runoff derived from NYCDEP Volume Calculation Matrix.

As shown in **Table 11-12**, depending on the rainfall volume and duration, the With-Action stormwater flows decrease between 0 and 0.04 mgd. The Proposed Actions result in a decrease in stormwater runoff from existing conditions and do not warrant further review from NYCDEP.

Table 11-12 NYCDEP Flow Volume Matrix – Existing and With-Action Conditions – Outfall #4

				Total Volume to Flushing Bay (mg)[4]			
Rainfall (inches)[1]	Duration (hours)	Total Area (acres)[2]	Weighted Runoff Coefficient[3]	Existing Condition	With-Action Condition	Increment	Percent Change
0.00	3.80	23.35	0.85	0	0	0	0
0.40	3.80	23.35	0.85	0.22	0.22	0	0
1.20	11.30	23.35	0.85	0.67	0.65	-0.02	-2.98%
2.50	19.50	23.35	0.85	1.40	1.36	-0.04	-2.85%

Notes:
1 Storm event rainfalls per NYCDEP Volume Calculation Matrix.
2 Total surface area onsite within subcatchment area.
3 Runoff coefficients for surface type area as per NYCDEP.
4 Stormwater runoff derived from NYCDEP Volume Calculation Matrix.

Stormwater Management Improvements

NYSDOT has provided guidance on the design requirements for the drainage areas that would connect to their existing stormwater systems. NYSDOT requires that the discharge rates from 1-, 10-, and 100-year storms to any of the NYSDOT network cannot exceed the current discharge rates to the network. Therefore, if the hydrologic analysis determines that the proposed discharge rates would increase, detention systems would be required to attenuate this flow to match the existing discharge rates.

Because the proposed area of disturbance would exceed one acre, NYSDEC would require a Stormwater Pollution Prevention Plan (SWPPP). Stormwater discharging to the NYSDOT systems

would be treated according to NYSDEC standards and would follow the SPDES Permit that would be obtained.

All stormwater on redeveloped portions of the Development Site that are proposed to connect to the NYCDEP stormwater system would be detained and treated in accordance with NYCDEP stormwater requirements and certified via a new Site Connection Proposal application.

As shown in **Table 11-9** and **Table 11-12**, the total stormwater runoff volumes to Outfall #1 and Outfall #4 decrease between existing and proposed conditions and do not warrant further review.

The Flow Volume Matrix calculations do not reflect the use of any stormwater source control BMPs to mitigate stormwater runoff volumes to the sewer systems. Stormwater BMPs would be required in accordance with the NYCDEP Unified Stormwater Rule (USWR) guidelines, which includes requirements for bringing the Development Site into compliance with the allowable stormwater release rate.

The USWR increases on-site stormwater detention requirements, updates release rates for developments discharging to the City's sewer system, and requires a retention-first approach to stormwater management practice (SMP) design. The water quality volume (WQv) requirement aims to manage and reduce runoff from small, frequent storms that can significantly impact the quality of receiving waterbodies. The NYCDEP Stormwater Design Manual defines the WQv as the runoff volume from the 90th percentile rain event. Runoff reduction (RR) criteria aim to maintain a minimum level of RR during small storms, which is generally always met when treating the entire WQv. If site constraints make it impossible to treat the WQv, then a minimum Runoff Reduction Volume (RRv) for all newly constructed impervious areas must be met. The sewer operations volume (Vv) and maximum release rate (Qdrr) requirements are associated with the 10-year event, and work in tandem to maintain optimal flow rates in the City's sewer system.

To achieve the release rate, stormwater could be managed by utilizing one or a combination of detention techniques identified in the manual. Green technologies and subsurface detention could be implemented to retain or release stormwater with slowed discharge rates to control peak runoff rates.

Therefore, the Proposed Project would not result in any significant adverse stormwater impacts.