Chapter 13: Infrastructure

A. INTRODUCTION

This chapter analyzes the potential impacts of the proposed project on the City's infrastructure systems. As defined by the *New York City Environmental Quality Review (CEQR) Technical Manual*, the City's "infrastructure" comprises the physical systems supporting its population, including water supply, wastewater treatment, and stormwater management. Other infrastructure elements, such as solid waste management, energy and transportation, are addressed separately under CEQR and are assessed in separate chapters of this environmental impact statement (EIS).

With respect to water supply, according to the *CEQR Technical Manual*, actions that could significantly impact City water supplies or local water pressure require a detailed impact assessment. This would include large developments (e.g., those that use more than one million gallons per day) or actions taking place in locations that have weaknesses in the local water distribution system (i.e., an impact could occur by creating a large draw of water in a location where water pressure is low or locations near pressure boundaries). The proposed project is a large park development; thus, an analysis of potential impacts on water supply is appropriate.

With respect to wastewater treatment, the *CEQR Technical Manual* states that a detailed analysis of wastewater treatment is needed for proposed projects that have the potential to generate large increases in sewage flows with the potential for significant adverse impacts on sewage treatment. This chapter therefore analyzes the proposed project with respect to the volumes of wastewater in relation to the State Pollutant Discharge Elimination System (SPDES) permitted capacity of the Oakwood Beach and Port Richmond Water Pollution Control Plants (WPCPs), which serve the area of the project.

The *CEQR Technical Manual* also states that a detailed analysis of stormwater management is warranted if a proposed project involves certain types of industrial activities (e.g., manufacturing, processing, or raw materials storage), or actions that would greatly increase the amount of paved area, or areas that would be served by a separate storm system and that would involve construction activities, or construction of a new stormwater outfall). The proposed project would create additional impervious surfaces on the project site and would alter existing on-site stormwater management systems. Thus, an analysis of potential impacts on stormwater runoff is appropriate for the proposed project. The impact analysis presented below is based on the guidance of the *CEQR Technical Manual*. However, it is recognized that the proposed project has the objective of implementing sustainability objectives. To that end, at the end of this chapter is a description of possible sustainability initiatives that could be implemented by the proposed project. In addition, beyond the standard infrastructure systems typically installed in the City, the proposed project would initiate sustainability measures with respect to on-site infrastructure systems.

B. EXISTING CONDITIONS

WATER SUPPLY

New York City's water supply system comprises three watersheds—the Croton, Delaware, and Catskill. The water source originates as far north as the Catskill Mountains. Currently, the New York City Department of Environmental Protection (DEP) provides approximately 1.3 billion gallons of water per day to the five boroughs of New York City and Westchester County. This consumption is equivalent to about 136 gallons per-person per-day. From the upstate watersheds, water is conveyed to the city via a system of reservoirs, aqueducts, and water tunnels that begin as far as 125 miles north and west of the City. Within the City, a grid of water pipes distributes water to customers.

The Delaware and Catskill systems supply all five boroughs and typically deliver about 90 percent of the city's drinking water. These water systems collect water from watersheds in the Catskill Mountains and deliver it to the Kensico Reservoir in Westchester County. Water is delivered to the city via three tunnels, Tunnel Nos. 1, 2, and 3. Tunnel No. 1 carries water through the Bronx and Manhattan to Brooklyn; Tunnel No. 2 travels through the Bronx, Queens, Brooklyn, and then through the Richmond Tunnel to Staten Island; and Tunnel No. 3 goes through the Bronx and Manhattan, terminating in Queens.

Because the project site has a long history as a municipal solid waste landfill, it has very limited water service, mostly around its periphery. This would include water and sewer service along Arthur Kill Road and Richmond Avenue. There is also a water main that extends into the site along Muldoon Avenue.

The project site is currently occupied by a municipal landfill experiencing final closure construction. Based on the City's CEQR Technical Manual and an estimate of current on-site employment, the existing water demand on the project site is limited and estimated at approximately 2,825 gpd (there are currently 113 employees on site, who are assumed to generate a water demand at a rate of 25 gpd per employee). With regard to water demand for air conditioning, many of the buildings currently on the project site are vacant or a small accessory buildings or trailers. Those that are still used by DSNY are not assumed to have centralized cooling units for air conditioning that would generate a water demand.

Other existing uses of water on the site include approximately 300,000 gallons per month at the leachate treatment plant for dilution of processed chemical, wash downs and sanitary uses. Other facilities including the landfill gas recovery plant, the waste transfer station, and Plant 2 wash down areas also use water. There are also water lines that come to the site for fire protection.

WASTEWATER TREATMENT

The project site is within the service areas of the Oakwood Beach and Port Richmond WPCP, which discharge treated wastewater flows (or effluent) into Raritan Bay and New York Harbor, respectively. SPDES permits issued by the New York State Department of Environmental Conservation (DEC) regulates the discharge from the WPCPs. The Oakwood Beach WPCP is permitted to treat an average daily flow of 40 mgd, and the Port Richmond WPCP is permitted to treat an average daily flow of 60 mgd. The average daily flow rate per-month for the last 12 months at the Oakwood Beach WPCP (December 2006 through November 2007) was 30.1 mgd (see Table 13-1). The average daily flow rate per month at the Oakwood Beach WPCP for the last 12 months (December 2006 through November 2007) was 30.2 mgd. As shown in the table, both WPCPs are operating well within the limits of their permitted capacities.

Table 13-1
Monthly Flows at Oakwood Beach WPCP and Port Richmond WPCP

Year	Month	Flow (mgd)	
		Oakwood Beach WPCP	Port Richmond WPCP
2006	December	29	28
2007	January	30.3	31
	February	25.3	27
	March	31.3	35
	April	41.5	44
	May	32.2	36
	June	30.6	28
	July	30.6	30
	August	31.9	30
	September	26.8	24
	October	26.3	26
	November	25.3	24
12-month average		**30.1**	**30.2**
Permitted Flow Rate		**40.0**	**60.0**

Source: DEP, February 2008.

The existing uses on the project site are assumed to generate wastewater at a rate that is equivalent to the water demand. The, sanitary wastewater treatment demands are limited and estimated at approximately 2,825 gpd of sanitary sewage. It is also recognized that the project site has a leachate treatment plant that is used for the treatment of leachate and discharges to the Arthur Kill. However, this facility is for the treatment of leachate, not sanitary wastewater.

There are pumping stations on the project site that convey the wastewater on the site to the DEP collection system. For example, sewage is moved from Plant 2 to a pumping station at the DSNY Staten Island Waste Transfer Station then to the pumping station in New Springville before it is conveyed to the WPCP. There is also a small package treatment plant at DSNY's District 3/ Borough Shop Garage. That package plant has a treatment capacity of 7,000 gpd and currently treats approximately 2,000 gpd.

STORMWATER

Stormwater management is an essential component of Fresh Kills Landfill, and stormwater management infrastructure is therefore located throughout the project site. The stormwater management system at Fresh Kills Landfill has been designed to minimize infiltration through the landfill's final cover, to detain all landfill-generated stormwater runoff on the site and to facilitate the removal of suspended sediments and the associated pollutants prior to any discharge to local waterways. Figure 13-1 provides a map of the existing stormwater system at Fresh Kills Landfill.

The final cover and grading of the landfill sections is carefully engineered to ensure positive drainage and to direct storm flow. With the Fresh Kills stormwater management system, the stormwater runoff that develops on the landfill sections is directed into stabilized swales on the top plateau and sideslopes. These systems convey the water to downchutes, pipes, and rip-rap lined swales, which in turn convey the runoff to the stormwater basins. The stormwater basins reduce the rate of stormwater discharge from the site and allow sediment to settle out before the stormwater is released to local waters. Specific components used in the construction of the drainage systems vary for each landfill section. For example, Sections 2/8 and 3/4 employ

underground downchute pipes to convey stormwater from swales to stormwater basins while Sections 1/9 and 6/7 will use gabion downchutes and drop-inlet boxes.

This stormwater management system was installed by DSNY in accordance with a DEC-approved stormwater management and pollution control plan and has a SPDES permit. In addition to the stormwater management infrastructure, erosion and sediment control measures are practiced across the site, particularly on the landfill sections, which greatly reduce the potential for impacts on the receiving surface waters that flow through Fresh Kills.

C. THE FUTURE WITHOUT THE PROPOSED PROJECT

2016

By 2016, without the proposed project, the project site would remain a closed landfill and demands on infrastructure would gradually diminish as post-closure construction, maintenance and monitoring decreases. A summary of conditions is presented below.

WATER SUPPLY

In the future without the proposed project, conditions for overall water supply to New York City are not expected to change significantly. The City has initiated a comprehensive water conservation program that seeks to reduce water use by implementing a metering program and requiring that all new fixtures in the City, including those in existing and new structures, be of low-flow design (Local Law No. 29, 1989). Other measures—including leak detection programs, water meters, and locking fire hydrant caps—are aimed at further reducing the City's water needs and will serve to reduce water demand and flows to sewage facilities. As demonstrated by the reduction in both total water consumption and per capita consumption, the water conservation program has been successful. DEP projects that over the next decade, the savings from these conservation measures will exceed any increase in water demand from consumers and expects small declines or no net change with respect to water demands.

With respect to the project site it is expected that on-site water demands would diminish over time as on-site employment declines.

WASTEWATER TREATMENT

Without the proposed project, sewage flows would gradually decrease at the project site. DEP expects the Oakwood Beach and Port Richmond WPCPs to remain within their SPDES permit limits. In 2006 DEP developed preliminary projections for each of its WPCPs over the next several decades. For 2015 (the nearest available year for the projections), the projected flow at the Oakwood Beach WPCP is about 32 mgd, and the projected flow at the Port Richmond WPCP is about 34 mgd. (the nearest available year for the projections). Thus, both WPCPs are expected to be operating within their SPDES permits limits which are 40mgd and 60mgd respectively.

STORMWATER

In the future without the proposed project, no significant changes in the Fresh Kills Landfill stormwater collection system described above are expected by 2016. It is expected that some modifications in the system would occur over time with the completion of final closure

construction at Landfill Sections 6/7 and 1/9 and the ongoing monitoring and maintenance programs.

2036

WATER SUPPLY

By 2036, conditions for overall water supply in New York City are not expected to change significantly. As noted above, the City has initiated a comprehensive water conservation program. In the future without the proposed project, demand on the City's water supply from the project site, which is limited today, is not expected to change significantly.

WASTEWATER TREATMENT

In the future without the proposed project, DEP expects the Oakwood Beach and Port Richmond WPCPs to remain within their SPDES permit limits. By 2035 (the nearest available year for the projections), the projected flow at the Oakwood Beach WPCP is 36 mgd, and the projected flow at the Port Richmond WPCP is 37 mgd. This projection assumes all expected development and growth within the service areas of these WPCPs. Thus, in the long term, both WPCPs are expected to be operating well within their SPDES permits limits which are 40mgd and 60mgd respectively.

STORMWATER

In the future without the proposed project through 2036, it is assumed that the Fresh Kills Landfill stormwater collection system would not substantially change although modifications could occur with the ongoing monitoring and maintenance program.

D. THE FUTURE WITH THE PROPOSED PROJECT

INTRODUCTION

For both the 2016 and the 2036 analysis years, it is expected that some level of utility service upgrade would be necessary to serve the proposed project although this upgrade should be more extensive in 2036 than 2016. This would be achieved by the project through a combination of new connections to the grid (e.g., new water supply and sanitary sewer connections) and the implementation of the sustainability measures of the proposed project. Much of this would be determined during the design of individual capital projects and the development of the necessary site engineering plans at that time. Overall, however, it is expected that the proposed project could provide adequate utility and service connections without any significant adverse impacts on existing utility services for the area. To the extent that any upgrades to local infrastructure are necessary, this is not expected in the short-term. If such improvements are necessary, future site-specific engineering designs would address those improvements. A more detailed description follows for the 2016 and 2036 analysis years.

2016

WATER SUPPLY

With the proposed project, there is a modest amount of recreational programming anticipated through 2016 and a limited amount of commercial/recreational programming. There will also be a need for irrigation for more heavily used areas. The proposed development program would, however, generate a limited amount of water demand. Table 13-2 presents that projected demand for the 2016 analysis year.

Table 13-2
Projected Water Demands with the Proposed Project: 2016

Use	Number of Units	Unit Rate (gpd)	Total Demand (gpd)
Building use and general consumption	6,500 visitors per day	10 per visitor	65,000
Irrigation use	38 acres	Various*	46,250
Total	**N/A**	**N/A**	**111,256**

Notes:
Rates are from the Metcalf & Eddy Wastewater Engineering 2003. The 2001 *CEQR Technical Manual* does not provide rates that are specific to parks and therefore was not used.

*Irrigation values range on the use (greenhouse, artificial turf and grass) from 785 to 1,571 gpd/acre.

Source: AKRF, February 2008.

The projected water demand of 111,256 gpd would be an insignificant demand on the City's current water supply system. It would not be large enough to overburden the City's water supply nor would it impact the system's ability to reliably deliver water. It would also not be expected to affect local water pressure. There may be some temporary use of water for irrigation particularly during construction.

In addition, since the project site is not generally connected to the City's water supply grid, it would be necessary to extend water supply lines into the project site to serve the 2016 programmed uses. This would include, for example, extension of water lines for DPR satellite offices, comfort stations, drinking fountains, and the recreational center in South Park. Each of these areas and facilities would be provided with adequate water supply for fire protection.

WASTEWATER TREATMENT

For the purposes of this analysis, sanitary sewage generation is conservatively assumed to be equal to the potable water demand. Water dedicated to irrigation evaporates and does not enter the sewer system. Therefore, the additional sanitary flow with the proposed project is expected to be approximately 65,000 gpd. Depending on the location of the facility, this additional sanitary wastewater would be conveyed to either the Oakwood Beach or Port Richmond WPCPs. Conservatively assuming that all sanitary sewage would be directed to just one of these facilities based on the projected additional capacity at these WPCPs, the added sanitary demand would still not exceed the permitted capacities of either plants in 2016. It is therefore concluded that sanitary sewage generated from the proposed project would not cause any significant adverse impacts to this infrastructure system.

In addition, as with water supply, since the project site is not widely served by lateral sanitary lines, it is expected that sanitary lines would need to be extended into the site in order to provide sanitary services to comfort stations, DPR facilities and the South Park recreational center.

STORMWATER

The overall scope of the development for the proposed park involves grading and landscaping/enhancement at the site for the purposes of creating a multi-use park area. In addition, proposed park roads, parking, and paths would be constructed according to final designs developed for each capital project and in accordance with the overall design approaches presented in Chapter 1 "Project Description." Park elements would not significantly alter runoff patterns since the surface cover would remain largely vegetated as in the No Build conditions, but with some added impervious cover for park buildings and structures and parking. Like the current and future land cover at Fresh Kills, the vegetative cover that is proposed with the project would both control erosion and allow for substantial evapotranspiration. The greatest change in the proposed hydrology at the site would be the introduction of impervious surfaces with the proposed park roadways which would add several miles of roadways by 2016.

The details of the proposed stormwater management system would be developed as each park and road capital project moves forward and is further developed, and designed within the framework of the overall Stormwater Management Plan developed for this GEIS. To avoid stormwater impacts from increases in impervious surfaces and to protect receiving waters, individual stormwater best management practices (BMPs) would be used to enhance proposed park features and provide water quality treatment and quantity management, particularly for the road runoff. Multi-functional source control BMPs such as bioretention and pocket wetlands that not only provide water quality treatment of stormwater runoff, but also provide aesthetic and natural resource benefits. The general objectives of the proposed stormwater management system are to:

- Continue to collect and handle all on-site runoff without off-site or downstream impacts.
- Maximize pervious surfaces and minimize the introduction of new impervious surfaces, reusing existing structured surfaces where feasible;
- Provide natural systems for stormwater management (e.g., created runoff swales, pocket wetlands, vegetated treatment swales, planter boxes) and minimize the use of hard infrastructure (e.g., inlets and pipes), particularly for handling runoff from roads and parking areas;
- Minimize impacts to natural stormwater management features at the site such as freshwater and tidal wetlands as minimize any potential impacts to local water quality; and
- Utilize the existing DSNY stormwater basins, to the extent feasible, without adversely impacting the DSNY stormwater management system—if modifications are necessary, they would be designed in accordance with DSNY and DEC specifications.

Since the proposed project is located directly along the coastal waterways of Richmond and Main Creeks, it is not expected to result in any impacts on downstream flooding. In addition, runoff is expected to be controlled on-site and would not adversely impact surrounding neighborhoods or open spaces. In sum, it is concluded that the proposed project could manage any increase in site-generated runoff while contributing positively to the local wetland systems.

The stormwater management projects proposed as part of the park would be designed to complement and enhance the aesthetic and ecological purposes of the proposed park, while also meeting the above-described stormwater management objectives with the intent to improve upon current hydrologic and water quality management provided by the existing stormwater infrastructure. To achieve these goals, the approach would utilize a mix of traditional

conveyance and storage measures (including the existing downchutes and large-scale detention basins) and smaller controls selectively located throughout each sub drainage area that would be designed to enhance hydrologic and water quality functions as well as benefitting aesthetic and landscape qualities of the park By utilizing stormwater controls, runoff flows would also be routed through multiple levels of treatment prior to discharge off the site thereby protecting local water quality. In addition, any modification or reuse of stormwater basins for park-generated stormwater runoff would be subject to the reviews of DSNY and the approval of DEC.

2036

WATER SUPPLY

Table 13-3 presents the projected water demand from the Fresh Kills Park project by 2036.

Table 13-3
2036 Expected Water Demand with the Proposed Project

Use	Number of Units	Unit Rate (gpd)	Total Demand (gpd)
Building use and general consumption	17,000 visitors per day	10 per visitor	170,000
Irrigation use	160 acres	Various*	113,958
Total	**N/A**	**N/A**	**283,958**

Notes:
Rates are from the Metcalf & Eddy Wastewater Engineering 2003. The 2001 *CEQR Technical Manual* does not provide rates that are specific to parks and therefore was not uses.
*Irrigation values range on the use (greenhouse, artificial turf and grass) from 785 to 1,571 gpd/acre.
Source: AKRF, February 2008.

By 2036, the proposed project would have its more intensive uses in place such as restaurants and larger comfort stations. Thus, the increased in water supply demands is greater, but not to a level that is expected to adversely impact the DEP water supply system. By 2036, the anticipated water demand is estimated at approximately 283,958 gpd of water, which would not overburden the City's water supply system. This minor increase in demand would not be large enough to significantly impact the City's water supply system or the ability of the conveyance system to deliver water reliably.

As with the 2016 build year, it is expected that the development of the 2036 program would require extending water service into the site from various locations. The majority of the supply would be required at the Point and Creek Landing, where the intensively programmed uses are proposed. The increased amount of landscaped area experiencing heavy use such as event lawns would also require more irrigation in the summer months. In addition, each of the facilities would need to be provided with adequate water service for fire protection.

WASTEWATER TREATMENT

For CEQR, wastewater treatment demands are conservatively assumed to be equal to the potable water demand. Water dedicated to irrigation evaporates and does not enter the sewer system. Based on this assumption, the additional sanitary sewage flow with the proposed project would be about 170,000 gpd in 2036. This added flow would not cause either the Oakwood Beach or Port Richmond WPCPs to exceed their design capacity or SPDES permit flow limits, even if all the project generated wastewater was conveyed to one of these treatment plants (both could potentially serve portions of the project site). Therefore, it is concluded that sewage generated from the proposed project would not cause any significant adverse impacts to infrastructure systems. As with

water supply, discussed above, it is expected it would be necessary to extend sanitary sewer service into the project site at a number of locations but particularly into the Point. This would require engineering design and infrastructure improvements to connect the Point, where the more intensive programmatic uses are proposed, to DEP's sanitary sewer system.

STORMWATER

As described above, the details of the proposed stormwater management system would be developed as each park capital project and segment of road design is further developed. Since the proposed project would be located directly along the coastal waterways of Richmond and Main Creeks, it is not expected that the project would result in any impacts on downstream flooding. Moreover, runoff is expected to be controlled on-site and would not adversely impact surrounding neighborhoods or open spaces. In addition, to avoid stormwater impacts from increases in impervious surface to the receiving waters, individual stormwater BMPs would be used to enhance proposed park features, provide water quality treatment and runoff volume control, particularly for the road elements. In sum, by 2036, it is concluded that the proposed project could manage all increased in site-generated runoff while contributing positively to the local wetlands.

SUSTAINABILITY MEASURES OF THE PROPOSED PROJECT

INTRODUCTION

Although the proposed Fresh Kills Park project is not expected to impact local infrastructure, provided below are a number of sustainability measures that are being explored to minimize demands for water and wastewater treatment and possibly reduce the need to extend water and sewer lines into the more remote areas of the project site where utility connections and extensions would be difficult to provide. They will also provide additional benefits from education, meeting plaNYC 2030 goals and resource conservation.

WATER SUPPLY

The proposed Fresh Kills Park has environmental sustainability goals for managing and reducing demands on water supply. To this end, it is anticipated that a set of sustainability strategies could be implemented that would reduce water demands and maximize water re-use within the park. These strategies include:

- Waterless urinals and composting toilets in remote comfort stations (no water supplied);
- Water conservation measures and low flow fixtures throughout the park;
- Grey water recycling systems in larger buildings; and
- Rainwater harvesting on buildings.

Provided below are a series of calculations that demonstrate how each technology or water saving measures could contribute to reducing water demand and dependency on the DEP supply. The examples given are for Phase 2 (2036), but the same principles would be applied to Phase 1 (2016).

Table 13-4 provides a comparison of water use under conventional fixtures technologies as compared with and low flow fixtures. Cumulatively, these measures could account for a significant reduction in water demands, estimated at a reduction of approximately 40 percent over conventional systems.

Table 13-4
Potential Water Saving Demands with Low Flow Fixtures

Parameter	Conventional Fixtures	Low Flow Fixtures
Visitors	17,000 visitors per day	17,000 visitors per day
Assume each visitor uses the bathroom	17,000 uses per day	17,000 uses per day
Showers use (1%)	170 shower use per day	170 per day
Assume 3 trip female water closet	40,800 gal/day	28,050 gal/day
Assume 2 trip male urinal, 1 trip male water closet	30,600 gal/day	22,950 gal/day
Assume 3 uses of the faucet	31,875 gal/day	6,375 gal/day
Shower use	2,125 gal/day	1,530 gal/day
Total water use in bathrooms	105,400 gal/day	58,905 gal/day
Food preparation, etc.	64,600 gal/day	46,512 gal/day
TOTAL WATER USE	**170,000 gal/day**	**105,417 gal/day**
Source: *Fresh Kills Preferred Utility Scenario*, Ove Arup & Partners (January 2008).		

Rainwater capture water reuse could also be provided. For example, rainwater harvesting could be implemented through the use of the building roofs to collect rainwater. It is assumed to be possible to capture 80 percent of rainwater from buildings under normal circumstances. This equates to 7,867 gallons per day for Phase 1 (2016) and 19,707 gallons per day for Phase 2 (2036). This water could then be used for irrigation, toilet flushing, maintenance, and other custodial uses.

Greywater systems could also be used in larger buildings and larger comfort stations. By re-using faucet wastewater, shower water, and kitchen water (with oil and grease traps and filters necessary at each sink), an estimated 51,000 gallons per day could be re-used in Phase 2 (2036). The water uses would be the same as those for rainwater.

As stated above, these measures and technologies could be implemented in Phase 1 (2016) and Phase 2 (2036). Their cumulative effect could be to reduce water demand by approximately 50 percent in 2036 with low flow and reuse technologies.

WASTEWATER TREATMENT

Wastewater generation is directly linked to water use. By reducing water demand, the volume of wastewater produced is significantly reduced. Table 13-5 presents a summary of solutions and values for reducing wastewater processed offsite.

Table 13-5
Potential Wastewater Reduction Technologies

	Wastewater (gallons/day)	
	2016 (Phase 1)	**2036 (Phase 2)**
Baseline scenario wastewater to be processed*	65,000	170,000
Strategies/technologies for reducing demand from grid		
LEED/Green building principles	40,307	105,417
Greywater systems	19,500	51,000
Constructed wetlands	0	0
Total wastewater to be processed after implementation of all reduction strategies*	19,500*	51,000*
Notes: * This could be reduced to zero or negligible if constructed wetlands are built. Demands presented in this table are not equivalent to wastewater demands calculated using CEQR criteria.		
Source: *Fresh Kills Preferred Utility Scenario*, Ove Arup & Partners (January 2008).		

Greywater treatment (i.e., reuse of faucet water from kitchens or bathrooms) is part of a solution to reducing wastewater; approximately 20 percent of wastewater could be recycled greywater used for irrigation and other purposes. As well as demand reduction, there is the potential to

reduce demands on municipal WPCPs. One advanced technology with the greatest potential to reduce that demand is constructed wetlands. This is an ambitious approach, but has the potential to almost completely close the loop on processing wastewater within the park. Such solutions, however, would be long-term and subject to further review and approval by DSNY, DPR, and would likely require the approval of DEC and other agencies.

CONCLUSIONS

The following analysis concludes that, although the proposed project would create new demand for water and treatment of sewage, the existing municipal services could handle these increases in demand and no significant adverse infrastructure impacts are expected to result from the proposed project. In addition, the proposed project would initiate site wide sustainability measures for water and wastewater which would reduce the need for infrastructure and utility supply. These measures are described above.

To summarize, the following conclusions apply to the proposed project:

- While DPR may need to extend water lines into the project site to serve the proposed facilities, the added water demands of the proposed project are expected to be limited and total approximately 283,958 gallons per day (gpd) by 2036. This demand is not expected to overburden the City's water supply system. In addition, it is anticipated that sustainability strategies will be implemented on the site to further reduce water demand.
- While DPR may need to extend sanitary sewer lines into the project site to serve the proposed facilities, there would be adequate wastewater treatment capacity at the Oakwood Beach and Port Richmond WPCPs to handle the increased sanitary flows from the proposed project. Thus, it is concluded that no significant adverse impacts would occur on the City's wastewater treatment facilities
- To avoid stormwater impacts from proposed increases in impervious surfaces, particularly with respect to the proposed roads, and to avoid impacts to receiving waters within and adjacent to the proposed park, existing stormwater basins may be modified and individual stormwater BMPs would be constructed to provide stormwater management as well as to support the parks natural features.
- Because the proposed project has a long history as a municipal solid waste landfill, it does not have a lot of direct access to the local infrastructure. For example, water and sewer service is essentially limited to City streets around the periphery of the proposed park, including Richmond Avenue, Arthur Kill Road, the streets in the Travis neighborhood, and water service along Muldoon Avenue. For this reason, water supply lines and sanitary sewer lines would need to be extended into the site, or upgraded, particularly for the long term program and to serve the more intensively programmed areas of the proposed park, such as the Point. In addition, alternative means of water supply and sanitary disposal may be used in the more remote areas of the park.
- The proposed park has environmental sustainability goals and would implement measures that would reduce demands on water supply, recycle used water, and reduce demands for sanitary sewer service. ✷

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SOLID WASTE MANAGEMENT UNIT BOUNDARY
50 DRAINAGE SWALE
DOWNCHUTE
CULVERT
BASINS

BASIN D
BASIN A
3/4
BASIN E
BASIN Q
BASIN F
6/7
BASIN B1
BASIN C1
BASIN
BASIN J
BASIN
BASIN B2
BASIN C2
2/8
BASIN R
BASIN H
BASIN P
1/9
BASIN
BASIN

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FRESH KILLS PARK • GEIS

Existing Landfill Stormwater Management System
Figure 13-1