

**A. PROJECT IDENTIFICATION****PROJECT BACKGROUND**

The City of New York, with the New York City Department of Parks & Recreation (DPR) as lead agency, is proposing park roads within the larger Fresh Kills Park, specifically within the proposed East Park. East Park is approximately 482 acres in size and is City-owned property under the jurisdiction of the New York City Department of Sanitation (DSNY). The boundaries of the East Park are defined to the east by Richmond Avenue; and to the west and south by Main and Richmond Creeks. Fresh Kills Park was the subject of a comprehensive environmental review that was completed with the Final Generic Environmental Impact Statement (FGEIS) released on March 13, 2009. This Supplemental EIS (SEIS) is being prepared to analyze in greater detail the potential impacts of the East Park road system, its alignment within the proposed East Park, and potential alternatives. The project site is located in the southwest portion of Staten Island, within Staten Island Community Board 2 (see Figures 1-1 and 1-2).

During the latter half of the 20th century, Fresh Kills Landfill operated as the City's principal municipal solid waste landfill, receiving household and municipal solid waste between 1948 and 2001. A state law enacted in 1996 mandated that solid waste landfill operations cease at Fresh Kills by December 31, 2001; landfilling subsequently ended on March 22, 2001. After that date, Fresh Kills Landfill was temporarily used only for the disposal of materials from the attacks of September 11, 2001. With the cessation of disposal operations at Fresh Kills Landfill, final closure and post-closure activities are underway.

Large portions of Fresh Kills are defined by four landfill sections—3/4, 2/8, 6/7, and 1/9. The majority of East Park is occupied by Landfill Section 6/7 and its landfill infrastructure systems (see Figures 1-3a and 1-3b). The four landfill sections are regulated as Solid Waste Management Units (SWMUs) by the New York State Department of Environmental Conservation (DEC). Approximately 987 acres or 46 percent of all of Fresh Kills is regulated by DEC and managed by DSNY as SWMUs. DSNY completed closure construction at Landfill Sections 3/4 in 1996 and at 2/8 in 1997. Final closure design has been approved by DEC and closure construction is underway at Landfill Section 6/7. At Landfill Section 1/9, final closure design has been approved by DEC and preliminary closure construction has begun.

Fresh Kills includes not just the landfill sections but also the lands around the landfill sections. Some of these have facilities once used by DSNY when the site was still receiving solid waste. There are also buffer areas for the local community. This includes land occupied by the environmental control, maintenance and monitoring systems that will remain active for at least 30 years after closure construction is complete. The monitoring systems were installed by DSNY in accordance with designs approved by DEC. DEC regulates activities in these environmental compliance buffer areas around the SWMUs. The portions of East Park that are outside the landfill section include lands to the west between the base of the landfill and the shorelines of

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Main and Richmond Creeks. These areas are occupied by DSNY haul roads and by tidal wetlands along the creeks. To the east, these lands include DSNY stormwater drainage basins and wetlands, as well as an earthen berm fronting Richmond Avenue.

Converting Fresh Kills Landfill into a park is the result of many years of design collaboration and community input for the purpose of creating new public access and waterfront recreation. The design process involved numerous City and State agencies, including DPR, DSNY, the New York City Department of City Planning (DCP), the Mayor's Office for Economic Development and Rebuilding, the New York City Department of Environmental Protection (DEP), the New York City Department of Transportation (NYCDOT), and the New York City Department of Health and Mental Hygiene (DOHMH). State agencies involved in this process have included the DEC, the New York State Department of Transportation (NYSDOT), and the New York State Department of Health (NYSDOH).

Fresh Kills Park is an extensive and complex planning and development project, one of the largest in the history of the City of New York. It has five key planning areas: North Park, South Park, West Park, the Confluence, and East Park, which is the subject of this SEIS. Upon completion, Fresh Kills Park will: be the City's second-largest park (after Pelham Bay Park in the Bronx, which covers 2,765 acres), be three times the size of Central Park, more than double the size of the Staten Island Greenbelt, and provide seven miles of roads. Park development will occur in multiple phases through 2036 with designs that are expected to evolve over time.

This SEIS has been prepared to describe and analyze the proposed East Park Roads component of the Fresh Kills Park project. It is supported by a number of technical and engineering studies that have been prepared relative to the design of the proposed circulation system.

There are many design and engineering studies that were prepared to support this SEIS analysis and which provide the basis for the technical analysis framework. These include "*Landfill Section 6/7 Alternative Final Cover Design Report (Draft)*" (Geosyntec Consultants for the Department of Sanitation New York, June , 2009), *Fresh Kill Park Conceptual Roads Report* (Arup for DPR, September 2007), *Fresh Kills Park Bridge Alternatives Report* (Arup for DPR, November 2007), *Fresh Kills Park Road Alternatives Report*, (Arup for DPR, January 2008), *Fresh Kills Park Roadway Package 100 Percent Schematic Documents* (Arup for DPR, January 2008), and *Fresh Kills Park Stormwater Management Part I: Meeting New York State Criteria* (Geosyntec for DPR, February 2008), *Fresh Kills Park Stormwater Management Plan Part II: Meeting Additional Criteria and Project Goals* (Geosyntec for DPR, March 24, 2008). In addition, this SEIS contains additional road design drawings (see Appendix B) and supplemental landfill engineering analyses.

## **DESCRIPTION OF PROPOSED PROJECT**

### *PROJECT SUMMARY*

The proposed East Park Roads that are the subject of this SEIS are all located within the East Park planning area of Fresh Kills Park (see Figure 1-4). The proposed project is comprised of three components:

- A modified grading plan for the final cover at Landfill Section 6/7 that would be completed by 2011;

- Completion and operation by 2016 of the Yukon Avenue connection as a two-lane road, crossing Landfill Section 6/7 and connecting on the east with a new intersection at Richmond Avenue; and
- Consideration of various options for the longer-term completion of the East Park Road system, which could include two- or four-lane roads across East Park with new connections at Richmond Hill Road, Yukon Avenue, and Forest Hill Road, or a two-lane loop road around the base of the landfill with connections at Richmond Hill Road, Yukon Avenue, and Forest Hill Road.

### *PROJECT PHASING*

Within the context of the larger Fresh Kills Park project, development of the East Park road system will proceed in three phases, including: 1) construction of final cover at Landfill Section 6/7 for the purposes of creating a potential road base across the landfill section (this modified phasing plan reflects the completion sequencing of the work and is subject to adjustment because of field conditions)—this phase is assumed to be completed by 2011; 2) construction and opening of the Yukon Avenue Connection across the landfill by 2016; and 3) completion of the East Park Road network by 2036. The analysis years presented in this SEIS correspond to the analysis years presented in the FGEIS. These years are not the completion years for road construction (i.e., road construction could be completed earlier), but they are analysis years by which selected components of the project have been projected to have been completed and are therefore appropriate for analyzing traffic, air quality, and noise conditions (for example).

### *COORDINATION WITH DSNY LANDFILL INFRASTRUCTURE*

Fresh Kills Park is a large, multi-phased project. In accordance with agreements between the City and State of New York and the permits and approvals issued to the City, DSNY is expected to complete final closure at Landfill Section 6/7 and then continue to operate and maintain the landfill environmental control systems, and perform the required monitoring and maintenance in accordance with the Fresh Kills Landfill Post-Closure Monitoring and Maintenance Operations Manual (see the description below), for a period of at least 30 years. Among the DSNY facilities at Landfill Section 6/7 that must remain in operation during this period are the leachate and landfill gas collection infrastructure and the environmental monitoring systems. These systems are integral to the protection of public health and the environment around the landfill into the indefinite future, and are expected to remain in operation through at least 2036 (and possibly beyond). A full description of infrastructure in East Park is provided in Chapter 13, “Infrastructure.”

### **PERMITS AND APPROVALS**

There are many City, State, and Federal land use and environmental approvals that are necessary to construct the proposed East Park roads. The City regulations needed include amending the City map to map a public place that would serve as the right-of-way for proposed roads and a zoning map amendment to assign a zoning district (M1-1) to the areas being mapped as public place. These mapping and zoning actions are part of a larger ULURP action for Fresh Kills Park. At the State level, approvals necessary for the proposed project include modifications to the approved Fresh Kills Landfill Final Closure Plan; Part 360 landfill closure approvals for end use; and permits for activities in wetlands and protection of waters. Federal approvals would apply to constructing structures over or in navigable waterways or activities in wetlands as delineated in accordance with U.S. Army Corps of Engineers (USACE) procedures.

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The principal objectives of the above-mentioned environmental regulations are to protect natural resources, air quality, and water quality conditions for the benefit of the environment and public health. These regulatory requirements will therefore provide minimum standards for public health and environmental protections as the project site becomes publicly accessible. A complete listing of all agencies involved in the approval of the proposed park is provided at the end of this chapter. As a multi-phased construction project, the role of each agency will depend on the particular segment of road construction and the applicability of regulations to ongoing construction and development activities.

A State legislative action was previously approved for the alienation of parkland along these segments of proposed road corridors passing through mapped parkland (Chapter 659 of the 2007 Laws of the State of New York).

### **ENVIRONMENTAL REVIEW PROCESS**

This SEIS has been prepared in conformance with applicable laws and regulations, including Executive Order No. 91 of 1977 and the Rules of Procedure for City Environmental Quality Review (CEQR). It has also been prepared in conformance with Article 8 of the Environmental Conservation Law (the State Environmental Quality Review Act [SEQRA]) and its implementing regulations found in Part 617 of Title 6 of the New York Codes, Rules, and Regulations (6 NYCRR Part 617) and follows the guidance of the *CEQR Technical Manual* (October 2001) and the National Environmental Policy Act (NEPA).

DPR, as lead agency, prepared this SEIS with the assistance of other City agencies. The SEIS contains a description of the proposed project and its related actions including the project site and its environmental setting. It examines the short- and long-term environmental impacts of the proposed project for the three analysis years, and identifies and discloses any significant adverse environmental impacts. This SEIS also presents and analyzes alternatives to the proposed project, identifies the irreversible and irretrievable commitments of resources, and describes the mitigation measures necessary to minimize, eliminate, or avoid significant adverse environmental impacts that could occur with the proposed project. As described below, implementation of the proposed project requires multiple discretionary actions. This SEIS has been prepared to address the environmental issues and impacts related to decision-making regarding these actions.

## **B. FRESH KILLS SITE AND REGULATORY HISTORY**

### **SITE HISTORY**

#### *PRE-DEVELOPMENT AND EARLY HISTORY*

Early maps of this area of Staten Island (early 18th century) show the settlement of Richmondtown, then known as “Cuckold’s Town,” and located to the east of the Fresh Kills. However, the map does not give any indication of settlements at Fresh Kills itself, which is indicated primarily as coastal wetlands. Structures near the project do not appear until 1776, when the map shows several of them surrounding the marshland.

The area continued to grow towards the end of the Revolutionary War. The area to the north of the Fresh Kills is described as being “well settled” by the late 18th century. During this time, the Fresh Kills area evolved into a community as more structures appeared.

Because Staten Island grew as an agricultural center during the 18th century, it is likely that the land within Fresh Kills and adjacent to the marshes was used at this time as cultivated farmland. The marshes at Fresh Kills were also extremely valuable to Staten Island farmers, as they provided salt hay for livestock, which was a major cash crop during the 18th and early 19th centuries.

Throughout the 19th and 20th centuries, the Fresh Kills area became increasingly developed. One of the most significant developments within the project site during the 19th century was the construction of the Fresh Kills Bridge, which allowed people to cross the western side of Staten Island without having to go out of their way to travel around the marshland. The bridge was built in the vicinity of the modern Richmond Avenue in 1851 by the Plank Road Company, which dates from 1853. A new bridge was later constructed in 1896.

Throughout the late 19th and early 20th centuries, many of the farms and domestic residences which had characterized the Fresh Kills area were replaced with commercial buildings. Because the marshy areas provided a great deal of moist clay, many brick yards were constructed in the area south of the Fresh Kill and Richmond Creek. The first of these brick yards appear in the late 19th century.

The 1898 Robinson atlas indicates that two additional brickworks, the New York Anderson Pressed Brick Company and Robert Colgate Bridge Manufactory, were operating along the western side of the project site at that time. Both brickyards contained railroad tracks that stretched all the way to the Arthur Kill shoreline, presumably to load bricks onto cargo ships. Just south of these brick yards, the E.P. Benedict Artificial Granit Company was also in operation within the project site. By 1907, both the Anderson and Colgate brick companies appear to have been consolidated into the Rossville Brick Company, while the former Wood and Kiernan property was now the property of the Richmond Brick Company.

An 1898 atlas is also the first to depict Meadow Road, a small stretch of road that ran north-south along the periphery of the marshland in the southern portion of what is now the East Mound, or Landfill Section 6/7, and connected to what is now Richmond Avenue via another small road, Meadow Lane.

#### *SOLID WASTE DISPOSAL AND LANDFILLING*

A 1917 atlas for the area also shows that a garbage disposal plant had been established within the project site on what was referred to as Lake's Island. This garbage disposal plant was originally meant to be located on nearby Prall's Island. However, during a 1916 real estate dispute in which 15 armed men took control of Prall's Island, the location of the dump was moved to Lake's Island. Community members protested the establishment of the plant. Nevertheless, the plant was approved and ultimately constructed. The disposal plant was not governed by today's sanitary and environmental standards. In 1918, in an attempt to determine the source of foul odors emanating from the plant, the Commissioner of the Department of Street Cleaning, the precursor to the Department of Sanitation, ordered the 15 unloaded barges of garbage dumped at sea.<sup>1</sup>

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<sup>1</sup> Ocean dumping was not banned until 1934, when the U.S. Supreme Court ruled it a nuisance that spoiled the shorelines of Long Island and New Jersey.

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Talk of reclaiming the marshland around Fresh Kills for a full-scale urban landfill increased in the 1920s and 1930s. The location was naturally conducive to such purposes because barges carrying solid waste from across the City could be transported directly to the landfill via its network of creeks and waterways. Newspapers carried stories about the proposed landfill, spear-headed by City Construction Coordinator Robert Moses, as early as 1938. As with the Lake's Island plant, the proposed Fresh Kills Landfill was met with criticism from Staten Island's citizens and community activists, who felt that it would be a "potential health menace and an annoying source of disagreeable odors." However, the City of New York defended the proposal by promising to "take a swampy area full of mosquitoes and odors no better than those from refuse and transform it into fertile soil that can be made into beautiful parks."

The City moved forward with its plan to place a light layer of fill over the marshes and used dirt generated by the cutting down of the tall hills surrounding the site. Other materials were used as fill, including dirt excavated during the construction of roads, subways, and buildings, clean sand, and raw garbage. The land was obtained through condemnation, which is supported by historic deeds showing that the Treasurer of City of New York took control of many of the tax blocks and immediately granted them to the City.

By 1948, to address its increasing solid waste disposal needs, the City operated Fresh Kills Landfill as a network of municipal solid waste landfills that were developed to serve the dual purposes of municipal solid waste disposal and land reclamation. At the time, the filling of tidal wetlands for the purposes of creating developable land was encouraged, considered a benefit to the City, and unregulated. However, in the decades that followed, Fresh Kills became the City's principal facility for the disposal of collected household and municipal waste.

The City's original intention was to operate the landfill for no more than two years, after which time the land would be suitable for industrial development, open park space, and possibly even an airport. Dubbed "Operation Fresh Kills," the City intended to "reclaim" more than 1,800 acres of former wetlands over the course of a decade using 20 percent of New York City's daily garbage as fill. In a report released by the City in November 1951, the potential for the landfilling operation for land reclamation was outlined. The report recognized that centuries of landfilling in New York City had created substantial waterfront land, and that Fresh Kills had that potential as well. The report cited the reclamation that occurred with the 1939 World's Fair at the site of the former Corona dump and the grading that was performed to create Flushing Meadow Park. That plan anticipated the completion of the sanitary landfilling project in about 1968, after which redevelopment could take place. Future envisioned uses included hundreds of acres of parkland, residential and industrial development along the Arthur Kill for a comprehensive mixed-use development. Access would be improved with the completion of the West Shore Expressway.

However, as the decades moved on, the City continued to push back the landfill's anticipated closure through the end of the 20th century. In addition, the landfill's acreage kept increasing as more and more solid waste was brought in from across the City. In 1952, the landfill's area was doubled and additional underwater land was acquired five years later so that landfilling could continue. At that time, the creeks and waterways comprising Fresh Kills were dredged and widened and the bulkheads lining them were straightened not only to improve conditions at the landfill, itself, but to better prepare the site for future industrial development.

As the mid-20th century continued, other major development projects took place within the landfill vicinity. Beginning in the 1950s and lasting through the mid-1970s, the West Shore Expressway was constructed through the center of the project site. The Expressway is one of

Staten Island's main thoroughfares, running between the Outerbridge Crossing to the south and the Staten Island Expressway and Goethals Bridge to the north. The road had been planned since 1947 but the final section, between Arthur Kill Road and Victory Boulevard, was not opened until 1976.

#### *LATE 20TH CENTURY TO THE PRESENT<sup>1</sup>*

By the late 20th century, Fresh Kills had become the largest landfill in the world and was the principal recipient of New York City's domestic and municipal refuse. At its peak, Fresh Kills received as much as 29,000 tons of trash per day. While the City had a number of operating landfills in the latter half of the 20th century, many were closed as new landfill and environmental regulations came into effect. However, the opening of Fresh Kills predated the existence of Federal and State regulations pertaining to the design and operation of solid waste landfills. With the promulgation of new federal statutes, such as the Resource Conservation and Recovery Act (RCRA) in the 1970s, federal guidelines were established for the siting, design, operation, closure, and monitoring of landfills. In addition, RCRA required states to perform an inventory of their landfills to determine the level of compliance with the new regulations. Following the passage of the Environmental Conservation Law (ECL) of New York State in 1973, stringent new regulations were adopted governing the state's landfills. These new regulations included, in 1978, 6 NYCRR Part 360, Solid Waste Management Facilities. To ensure that landfills throughout the state were in compliance with these new regulations, municipalities were required to apply for permits for their landfills. DEC oversees these requirements. These regulations required permit applications to contain detailed technical data on landfill operations and the potential for impacts on the surrounding environment, including the surface and groundwater, and air quality resources.

DEC recognized that bringing existing landfills into compliance with new regulations would not occur immediately. To enable the Fresh Kills Landfill to come into compliance with the Part 360 regulations for solid waste management facilities, DEC entered into three consent orders with DSNY, beginning in 1980, with a second Consent Order in 1985, both of which had the objectives of reducing the impacts at the landfill as an interim measure while long-term measures were developed. A third Consent Order was executed in 1990 between DEC and the City and is in effect today, as subsequently amended (a detailed description of the Consent Order history is provided below under "Regulatory History.") The 1990 Consent Order allowed DSNY to continue operating the Fresh Kills Landfill while the City made environmental and operational improvements to bring the landfill into compliance with the requirements of the State regulations under Part 360. For example, although deep groundwater at the site is partially protected by a thick natural clay layer beneath the Fresh Kills Landfill, the landfill lacked a structural liner and other environmental controls required by regulation to protect local groundwater and surface water. As a result, Fresh Kills Landfill began to incorporate a number of contemporary landfill design requirements. In addition, DSNY prepared and submitted to DEC a Part 360 permit application for Fresh Kills Landfill. However, the application was withdrawn and DEC terminated its review when a state law was passed in 1996 requiring the

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<sup>1</sup> For additional details on the site history with respect to the Consent Orders and amendments that govern activities at Fresh Kills Landfill, see the discussion below under "Regulatory Approvals" as provided in this chapter.

landfill to cease accepting solid waste by December 31, 2001. This law was passed after many decades of local opposition to the landfill, which included lawsuits and other mechanisms to close the landfill that were brought by local residents, community groups, and their representatives. Today, Fresh Kills Landfill continues to be governed by the 1990 Consent Order requirement for landfill closure construction and post-closure environmental monitoring and maintenance.

With the mandated closure of the landfill, Fresh Kills Landfill received its last barge of solid waste on March 22, 2001. Subsequently, although the landfill ceased to accept solid waste, landfill closure needed to be completed in accordance with a DEC-approved Closure Plan under the Consent Order. Landfill closure construction and post-closure activities include installation of final cover, the long-term operation of the necessary environmental controls and long-term maintenance and monitoring practices. While Fresh Kills Landfill was officially closed on March 22, 2001, however, after the World Trade Center attack of September 11, 2001, then-Governor Pataki issued an emergency order to temporarily suspend the City's obligation to cease the acceptance of solid waste material at Fresh Kills Landfill for the purposes of receiving materials from the World Trade Center site.

## **REGULATORY HISTORY**

### *CONSENT ORDERS*

Table 1-1 provides a chronological listing and summary of the Fresh Kills Landfill Consent Orders and modifications that began in 1980 between DEC and the City of New York, acting through DSNY (Appendix H provides a more detailed description of the Consent Order content). As described above, Fresh Kills Landfill operated as a major municipal landfill for several decades prior to the enactment of Federal and State laws regulating the management, handling, and disposal of solid waste materials. After these laws took effect, Fresh Kills, as an existing municipal solid waste facility, was in non-conformance with the standards of the new regime, particularly with respect to managing the impacts of the landfill on local groundwater and surface waters, air quality, and wetlands. At the same time, however, Fresh Kills was an essential solid waste disposal facility for the City of New York, and one of the largest municipal landfills in the country.

In 1980, to address these environmental requirements, the City consented to the issuance by DEC of an Order on Consent. The Consent Order addressed alleged violations of New York State Environmental Conservation Laws and regulations pertaining to solid waste management, water resources and tidal wetlands. In addition, the Consent Order addressed the requirements of the State Pollutant Discharge Elimination System (SPDES). The 1980 Consent Order outlined a series of remedial actions to reduce landfill impacts. In 1985, a second Consent Order added new requirements relative to practices at the landfill and measures to reduce environmental impacts, and the need for environmental monitoring.

In 1990, a third Consent Order was entered into between the City and State, which superseded the two prior consent orders. The 1990 Consent Order (DEC Case No. D290018903) prescribed additional investigations, studies, reports, and designs to be completed by DSNY and submitted to DEC for review, comment, and approval for the purpose of bringing Fresh Kills into regulatory compliance. Among the requirements of the 1990 Consent Order were preparation of the following, most of which are necessary components of an application for a permit under Title 6 of the New York State Codes, Rules, and Regulations Part 360 (Solid Waste Management Facilities):

**Table 1-1  
Fresh Kills Landfill Consent Order History**

Year	Reference/Source	Principal Objectives
1/17/2002	1990 Consent Order Modification #8	Allowed for the temporary use of Landfill Section 1/9 for the acceptance of material from the site of the World Trade Center attacks and authorized DEC Region 2 office to extend the milestone dates of Appendix A-15 subjects for up to two months upon written request of DSNY.
4/27/2000	1990 Consent Order Modification #7	Required cessation of waste disposal by 1/1/02, added Compliance Schedule Appendix A-15 governing the closure and post closure care of the landfill and submittal of appropriate plans and reports therefore, including a post-closure monitoring and maintenance operations manual, final cover design and construction reports for Sections 1/9 and 6/7, annual landfill closure progress reports, a closure and post-closure registration report, closure construction certification reports, and a final landfill closure plan.
1998	1990 Consent Order Modification #6	Added requirements for leachate collection and treatment at closed Sections 2/8 and 3/4, extended milestone deadlines for completion of leachate control at open Landfill Sections 6/7 and 1/9 so that DSNY commenced collection and treatment of leachate for all four landfill sections 1/15/98. Note: DEC issued a Notice of Milestone Deficiency 3/6/95 alleging that the closure plan for Landfill Sections 2/8 and 3/4 was inadequate in that it did not provide for leachate collection and treatment.
7/26/1995	1990 Consent Order Modification #5	Extended the milestone date by one year for submittal of a complete 6 NYCRR Part 360 solid waste management facility permit application from 3/15/95 to 3/15/96 based on changes in federal and state regulations, the need to incorporate data from ongoing environmental and health studies, a desire to maximize public input into scoping and preparation of the DEIS, and the need to decide whether leachate controls at Sections 2/8 and 3/4 would be required.
7/15/1994	1990 Consent Order Modification #4	Added requirement to build enclosed barge unloading facility as per requirement in <i>Township of Woodbridge v. City of New York</i> , (D. N.J.), made minor administrative modifications to requirements for document repository. Note: In an Order dated September 16, 1997, New Jersey District Court Judge Barry eliminated the requirement to build an enclosed barge in the <i>Woodbridge</i> litigation. Accordingly, this requirement was also eliminated from the 1990 Consent Order in Modification No. 7.
11/18/1993	1990 Consent Order Modification #3	Extended milestones for the submission of studies and design reports in several subject areas; extended the milestone for the cessation of leachate recirculation and the commencement of leachate collection and treatment at the Veterans Avenue Leachate Treatment Plant (the initial phase of the larger facility); heightened the requirements for laboratory verification of data submissions; limited the area of waste that could be exposed during disposal operations.
1992	1990 Consent Order Modification #2	Limited the maximum elevation for Landfill Section 3/4 to 170 feet, required the cessation of solid waste disposal at Landfill Section 3/4 as soon as the Main Creek Bridge was completed or by November 30, 1992, whichever came first, limited the amount of solid waste that could be placed in Landfill Section 3/4 until that time, required DSNY to submit weekly reporting of barge operations and progress reports on the Main Creek Bridge construction, required a Final Acceptable Closure Plan for Landfill Section 3/4, and required DSNY to contribute up to \$750,000 to DEC, which committed \$250,000 to conduct an air monitoring program to characterize the specific air emissions from the landfill and their contribution to the ambient air on Staten Island.
1990 (Sept.)	1990 Consent Order Modification #1	Addressed matters raised by the public during the course of the public outreach program mandated by the April 1990 Order on Consent, added requirements for yearly public meetings, a public document repository, public review of future Consent Order modifications, expedited submission of a contingency plan, and prohibited the knowing acceptance for disposal of incinerator ash; limited the average tonnage disposed of at Fresh Kills to 27,000 tons per day (tpd), and required notification to DEC when it exceeded 25,000 tpd.
1990 (April)	1990 Consent Order	Addressed continued alleged violations of environmental laws at Fresh Kills Landfill related to the absence of a solid waste management permit, continued leachate discharges to local waters, unregulated activities in tidal wetlands and adjacent areas while recognizing DSNY obligations to move forward with remedial measures with a Part 360 permit submission that would upgrade the landfill, and would be comprised of multiple investigations, studies, reports and designs, to be provided to DEC for review and acceptance (e.g., operations and maintenance plan, final cover design, closure plan for all landfill sections, leachate mitigation plan for sections 1/9 and 6/7, waste report for unloading facilities, hydrogeological investigations, water and sediment reports, landfill gas migration investigation, slope stability investigation, geotechnical analysis report, and monitoring system installation plans and specifications), with a schedule for submission of all reports and implementation of Interim Operating Requirements, an Environmental Benefits Plan, and preparation of a City-wide Solid Waste Management Plan as well as ongoing monitoring and public outreach
1985	1985 Consent Order	Addressed continued alleged violations of environmental laws in the operation of Fresh Kill Landfill related to the absence of a solid waste management permit, leachate discharges to local waters (estimated at 1.5 million gallons per day to surface and groundwater), conducting unregulated activities in tidal wetlands and adjacent areas and noncompliance with Federal rules related to solid waste management facilities and practices, including reporting and planning requirements relative to landfill operations and cover management, examination of alternative methods of solid waste disposal, a management plan for leachate collection, storage, treatment and disposal, site landscaping, remedial measures for daily cover, waste management to protect surface waters, limitation on salvage operations and receipt of waste from municipal sewage treatment facilities, control of landfill gasses, installation of drainage control structures and management of runoff, preparation of an EIS including an examination of alternatives such as resource recovery, establishment of 50-foot perimeter buffer areas, elevation controls, installing security against illegal dumping, fire prevention control, and an environmental monitoring program for all City landfills
1980	1980 Consent Order	Authorized the operation of Fresh Kills Landfill in absence of a solid waste management permit, acknowledged leachate discharges to local waters (estimated at 4 million gallons per day to surface and groundwater), and conducting unregulated activities in tidal wetlands and tidal wetland adjacent areas and including emergency measures relative to daily cover of solid waste material, management of solid waste material and interim measures to improve operations at the landfill as well as identified restricted activities including filling of wetlands and areas of shallow groundwater

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- Operations and maintenance plan;
- Landfill cover design;
- Leachate management for Landfill Sections 1/9 and 6/7;
- Improvements to the waste transport and unloading facilities;
- Hydrogeological investigations;
- Surface water and sediment investigations;
- Landfill gas migration mitigation;
- A local solid waste management plan;
- Slope stability investigations; and
- Environmental benefits projects.

Through the early 1990s, the City operated and the State regulated Fresh Kills under this Consent Order. Strong local opposition to the landfill continued throughout this time. On June 2, 1996, two weeks after DEC determined that DSNY's application for a Part 360 permit, as required by the Consent Order, was administratively complete and could therefore commence formal review, the State Legislature passed a law barring the disposal of waste at the Fresh Kills Landfill after January 1, 2002. In light of the legislative mandate to close the landfill, on September 15, 1996, DSNY formally requested that DEC suspend its review of the Solid Waste Management Facility permit application. Consent Order Modifications 6 and 7 were subsequently executed with Modification 7 setting forth a compliance schedule for landfill closure (Appendix A-15). Deliverables under Modification 7 included a Closure and Post-Closure Registration Report, a Section 6/7 Final Cover Design Report, a Section 1/9 Final Cover Design Report, Closure Construction Certification Reports, a Post-Closure Monitoring and Maintenance Operations Manual, and a Final Closure Plan.

In January 2001, DSNY submitted to DEC the Landfill Section 6/7 Final Cover Design Report and in January 2002, DSNY submitted the Landfill Section 1/9 Final Cover Design Report. (DSNY had previously submitted Closure Construction Certification Reports for Landfill Sections 2/8 and 3/4.) In accordance with the modified Consent Order, DSNY also submitted to DEC a Post-Closure Monitoring and Maintenance Operations Manual for the landfill on December 13, 2002. Finally, DSNY submitted a Final Closure Plan for the landfill on June 5, 2003. With the exception of the Closure Construction Certification Reports for Landfill Sections 1/9 and 6/7 and Annual Landfill Closure Progress Reports, all activities required under Appendix A-15 of the Consent Order have been completed and approved by DEC.

Currently, a ninth modification to the 1990 Fresh Kills Consent Order is being discussed between NYSDEC and the City. It is expected that it will: 1) require DPR to complete this SEIS and issue a Statement of Findings by a date certain that will fall in the year 2009; 2) formally establish dates for completion of final cover construction for Sections 6/7 and 1/9; and 3) authorize DSNY to modify the approved 6/7 final cover design to incorporate a road embankment design (in the proposed Yukon Avenue and Forest Hill Road segments) so that potentially constructing a future road across Landfill Section 6/7 would not require future disturbance a final cover.

### *FRESH KILLS LANDFILL PERMITS*

The current Tidal Wetlands permit (DEC ID: 2-6499-00029/000248) was issued May 26, 2004, and expires May 26, 2014. The current SPDES permit, regulates discharges from the Leachate

Treatment Plant to the Arthur Kill and from stormwater basin outfalls (DEC ID: 2-6499-00029/00037, SPDES ID: NY 020 0867) and does not have an expiration date.

At the landfill, DSNY operates three flare stations (six flares) and a landfill gas recovery plant in connection with the landfill gas management and processing at Fresh Kills. DSNY has a Title V Air permit to cover all sources of air emissions at the landfill including these activities. The current Title V Air permit (DEC ID: 2-6499-00029/00151) was issued August 16, 2006, and expires August 15, 2011.

## **C. OVERVIEW OF FRESH KILLS PARK COMPREHENSIVE VEHICULAR CIRCULATION PLAN**

### **OVERVIEW**

The Fresh Kills Park vehicular circulation plan must address a number of unusual challenges for traffic planning and roadway design, not the least of which includes the presence of extensive landfill infrastructure along with freshwater and tidal wetlands in the off-mound low-lying areas. The intent of the vehicular circulation plan at Fresh Kills Park is to integrate the roads into the natural setting while providing local traffic relief, access to the park, and limiting environmental impacts to the extent possible. In the spirit of U.S. National Parks and Scenic Byways, Fresh Kills Park roads are proposed to be an integral feature of the park experience—an attraction in and of themselves. Distinctive paving materials, appealing alignments, and broad landscaped corridors would differentiate the proposed “Park Roads” from standard city streets and would cue motorists that they have entered the park. Moreover, a graceful layout through the varied topography can enable drivers to appreciate the scenic views of the site’s natural areas. The road design and materials are also proposed to be as sustainable as possible and the latest technologies will be incorporated with respect to sustainable materials, and roadway design.

Vehicular travelers are expected to be of two types. The first would be through travelers, traveling to or from the West Shore Expressway (i.e., diverted traffic). Although these drivers would appreciate the park setting, they would be primarily seeking reliable and unconstrained flow through the park. The second type of traveler would be park users, destined for the park.

The Fresh Kills Park vehicular circulation plan is designed to provide new east–west connections between Richmond Avenue on the east and the West Shore Expressway on the west, and a high level of interconnectivity among park elements, while taking advantage of the existing topography, within wide landscaped corridors.

The design guidelines for the proposed Fresh Kills road system take into account not only engineering criteria, but ecological, sustainability and aesthetic standards, Park functionality, and landfill protection principles. The design process includes use of the City’s *High Performance Infrastructure Guidelines* (New York City Department of Design and Construction and the Design Trust for Public Space, October 2005).

### **DESIGN GUIDELINES FOR THE FRESH KILLS PARK ROAD SYSTEM**

#### *OVERVIEW*

To the extent possible, Fresh Kills park roads would meet the following goals:

- Provide access to the park.

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- Site roads above flood level and the wetland buffer wherever possible and avoid negative impact on wetlands, mature trees, and other ecological resources.
- Provide scenic views of park natural features while limiting the visual and physical intrusion of the road in the landscape.
- Design the roads in conjunction with a landscape corridor that could serve as a robust habitat and stormwater treatment system.
- Buffer pedestrian paths and bikeways with native plantings integrated with the stormwater management design.
- Create a consistent system—in terms of geometries, widths, materials, edging, lighting, signage and markings—that identifies the road as a park feature.
- Improve traffic flow and reduce potential for pollution from start-stop activity.
- Use sustainable and durable materials.

*ENGINEERING DESIGN GUIDELINES*

Project specific road standards reflect the particular context in which the project would operate and in keeping with established safety standards. Consequently, separate design criteria are to be applied to the West Shore Expressway Service Roads and Ramps (see Table 1-2) and the proposed East Park park roads (see Table 1-3), both of which are presented below:

**Table 1-2**  
**West Shore Expressway Service Roads and Ramps Design Criteria**

Design Speed	45 mph
Lane Width (service roads)	12' minimum for two-lane operation
Lane Width (ramps)	15'
Shoulder Width (service roads)	4' left, 10' right
Shoulder Width (ramps)	3.5' left, 6.5' right
Grade	6.0% maximum, 0.5% minimum, 6.0% maximum
Horizontal Curvature	711' minimum radius (e = 4%)
Superelevation	4% maximum
Stopping Sight Distance	360' minimum (horizontal and vertical)
Lateral Clearance	1'-6" minimum
Vertical Clearance	14'-6" minimum
Travel Lane Cross Slope	1.5% minimum, 2.0% maximum
Rollover	4% maximum between travel lanes, 8% maximum at edge of travel way
Control of Access	Maintain full access control to the West Shore Expressway
<b>Source:</b> Fresh Kills Park Conceptual Roads Report, prepared by ARUP et. al for DPR, September 6, 2007	

**Table 1-3  
East Park Road Design Criteria**

<b>Design Speed</b>	<b>35 mph</b>
Lane Width	11' for four-lane operation 12' for two-lane operation, provide for bypass
Shoulder Width	2' minimum, 6' desirable
Median Width Bridge Roadway Width	0' minimum, 4' desirable Same as approach roadway on new bridges, reduced median and shoulders on existing bridges
Grade	8.0% maximum, 0.5% minimum
Horizontal Curvature	371' minimum radius (e = 4%)
Superelevation	4% maximum
Stopping Sight Distance	250' minimum (horizontal and vertical)
Lateral Clearance	1' – 6" minimum
Vertical Clearance	14' – 6" minimum
Travel Lane Cross Slope	1.5% minimum, 2.0% maximum
Rollover	4% maximum between travel lanes, 8% maximum at edge of travel way
<b>Source:</b> Conceptual Roads Report, Fresh Kills Park, Arup et. al., September 6, 2007.	

The typical four-lane park road section includes 11-foot travel lanes, a flush four foot textured median, and 6-foot outside shoulders, which may also be textured. The shoulders contribute to improved sight distance along the inside of curved roadway segments and help keep the roadside clear of hazards.

The pavement structure has not been designed, but is expected to be a flexible asphalt surface, binder and base courses supported by a granular embankment course founded on a suitably prepared embankment. Special attention would be needed to prepare the embankment across the landfill and to integrate sustainable materials and principles.

Side slopes of 1 on 4 or flatter are to be provided wherever possible; however, site conditions necessitate fairly extensive use of 1 on 3 (and 1 or 2) slopes to minimize intrusion into wetlands and landfill impacts. Swales and ditches will be incorporated to prevent landfill and other site runoff from encroaching on the roadway pavement.

*PARK ROAD CROSSINGS*

The proposed park roads would pass through a variety of park uses, including passive and active recreation areas, and waterfront development. Pedestrian/bicycle crossings would be required at a number of locations in order to ensure safe passage over roadways. The safety of pedestrians, cyclists, DPR and DSNY maintenance workers, and motorists is a paramount concern in the design of crossings. Among the features that would be considered are traffic control measures (such as stop signs and signals), controlled crossings, grade-separation, signage, pullouts, and protective devices on a site-specific basis. The inclusion of such measures would be in accordance with the AASHTO Roadside Design Guide (3rd Ed., 2006) and the Federal Manual of Uniform Traffic Control Devices (MUTCD, 2003 Ed.). For example, the decision of whether signals are to be installed to control traffic would be analyzed in accordance with Warrants 1, 2, 3 And 4 in MUTCD chapter 4C.

*LIGHTING*

Appropriate lighting for the roads would be determined as part of the design process in coordination with NYCDOT and NYSDOT.

*ROADWAY OPERATIONS AND MAINTENANCE*

Road management and maintenance at Fresh Kills Park will require a special maintenance program that is expected to be far different from typical City street maintenance programs. For example, at Fresh Kills Park, road maintenance is expected to involve monitoring landfill settlement to ensure that the critical landfill infrastructure is not compromised. The geotechnical properties of the site itself require special road design and maintenance practices. DPR, DSNY, NYCDOT, and the City's Department of Design and Construction (DDC) will continue to collaborate on design of the park roads and maintenance practices and programs will also be determined in conjunction with these agencies.

*JUSTIFICATION AND DESIGN FOR SEPARATE LANDFILL SERVICE ROADS*

With the proposed project the public roads would be separated from landfill service roads. This is appropriate given the separate levels of functionality and traffic volumes for the two road systems. In addition to public roads, the East Park project includes multipurpose paths around the base of the landfill sections that would be about 20-foot-wide paved surfaces. This also provides a dual advantage and purpose as the multi-purpose paths would allow for active recreational pursuits such as biking and rollerblading and would be designed for heavier duty DSNY vehicles such as the landfill gas condensate collection vehicles. Since the multipurpose path would need to accommodate both active recreation and DSNY activities, it would be designed for a different level of finish than other segments of the service roads, such as the Yukon service road. For the Yukon service road, while it is also appropriate to have the service road separate from the public roads (i.e., the Yukon Connection), no multipurpose recreational trail is proposed in connection with the Yukon Service Road. Thus, this service road would be designed more in the style of a hiking trail, but also would need to meet the design requirements of DSNY with respect to their ongoing maintenance and monitoring functions at Fresh Kills.

It is anticipated that the multipurpose trail and the Yukon service roads could adequately accommodate both the vehicular and pedestrian traffic from both the proposed recreational activities and DSNY maintenance traffic. DSNY needs for maintenance access are limited and the level of daily activity is not significantly different in terms of traffic from the regular DPR maintenance in City parks which includes collection of trash, landscape maintenance, and security patrols, for example.

The landfill service roads provide access to various components of the landfill environmental protection systems, which are located throughout the entire Fresh Kills Landfill. Although each of the individual landfill environmental protection systems may only be accessed on a regularly-scheduled periodic interval, the combination of all the activities associated with multiple systems results in a requirement for nearly continuous access throughout the site. Consequently, it is essential to establish dedicated landfill service roads that are separate from the Fresh Kills Park East Park roads system. It is recognized, however, that multi-use paths within the park circulation system are compatible with landfill service roads. For instance, service vehicles would travel at low speeds on shared paths, and partial blockage of multi-use paths for landfill operational requirements could be done while still accommodating foot or bicycle traffic. Some examples of the landfill environmental protection infrastructure elements that require operation or monitoring, the types of vehicles used and the frequency of the use are presented in Table 1-4, below.

Given the above, with the proposed project, no additional landfill service roads would be necessary. Some relocation of the service road east of Landfill Section 6/7 and north of the proposed Yukon Connection would be required in order to provide the proposed Richmond Hill Road Connection with a parallel DSNY service road (see Figure 1-9a.)

**Table 1-4  
DSNY Landfill Service Road Use**

Infrastructure element	Location	Activity	Vehicle used, Approach Technique	Frequency, Duration
Hydraulic monitoring well	Perimeter of West and East mounds	Test water level	Light truck, drive	Monthly, 1 day
Piezometer	Perimeter of North and South mounds	Testing water level	Light truck, drive	Monthly, 1 day
Ground Monitoring Wells	Entire Site Perimeter	Sampling, pump maintenance	Light truck, drive/foot	Quarterly, 4 to 10 weeks
Leachate Recovery Well	Top of North and South Mounds	Maintenance only	Light truck, drive	As needed
Leachate Pumping Stations	Southwest corner of Section 6/7 and perimeter of Section 6/7 and 1/9	Maintenance only	Light truck, drive	Daily, Ongoing
LFG Condensate Tanks	Base of landfill mounds, all four mounds	Empty tanks of liquid	Heavy articulated truck (5,000 gallon tanker), drive	Daily to Twice a week
LFG Condensate Monitoring Well	All four mounds	Sampling and pump maintenance	Jeep, on foot	Daily
LFG Extraction Well	Entire landfill surface, All four mounds	Sampling and adjustment, Maintenance	Jeep, on foot	Daily, Ongoing
LFG Migration Monitoring Well	Entire Site Perimeter	Sampling	Light truck, drive	Monthly to quarterly, 1-3 days
LFG flares operation and maintenance	Landfill gas flare stations located at Sections 2/8, 3/4 and 6/7	Monitoring and operation	Light truck, drive	Ongoing
Stormwater basin outfall monitoring	Stormwater basin outfalls located along the perimeter of Sections 1/9 and 6/7	Sampling and maintenance	Light truck, drive	Monthly 1 - 2 days
Surface water and sediment sampling	Arthur Kill, Fresh Kills Creek, Richmond Creek, Main Creek	Water sampling	Boat	Annual, 1-2 days
Landfill cover	All four mounds	Surface emissions monitoring with hand-held gas meters	Jeep, on-foot	Quarterly, 5 - 10 days

**Source:** Field Operations, April, 2008.

*LANDFILL ROAD CROSSING DESIGN GUIDELINES*

With respect to roadway design over the landfill sections, the objective is to not compromise the function or integrity of the existing landfill cover, infrastructure, and environmental systems. The design must provide protection consistent with that provided by the current landfill closure cover design, meeting both DEC and DSNY requirements. Thus, all elements of roadway infrastructure needs to be designed to the satisfaction of DSNY and DEC. Both agencies need to approve all designs through final detail and construction.

Another fundamental goal of the proposed park road design is to avoid interference with DSNY landfill service roads. Where this cannot be avoided, it is proposed to either relocate the landfill service road or allow the park roadways to also support landfill service road functions. It is expected that portions of active landfill service roads that need to be modified or relocated would be designed to be continuous and consistent with the adjoining undisturbed segments and would be designed to the satisfaction of DSNY, DEC, and DPR.

Final road design would ensure that construction is consistent with the long-term protections and maintenance of the landfill closure structures and environmental control systems. Ultimately, the road design must satisfy the following design guidelines:

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- Continuity of the landfill’s final cover and leachate cutoff wall, which control infiltration and leachate migration must be maintained to prevent additional leachate generation and migration away from the landfill sections;
- Landfill environmental protection systems, among them leachate control and collection systems, must not be damaged and their functions not compromised;
- Stability of the landfill final cover and roadway slopes must be assured;
- Any landfill infrastructure that may be affected by road elements must be reconstructed or replaced in accordance with DSNY and DEC requirements;
- Dynamic loading on the landfill foundation by vehicles traveling on the roadway must be considered in the design analyses (this is also provided in Chapter 13 “Infrastructure”); and
- A specific plan for monitoring the landfill environmental control features during and following construction.

Fresh Kills Landfill infrastructure must also remain accessible to DSNY until the landfill post-closure process is complete. Thus, access for landfill monitoring maintenance and repair activities will continue for many decades to come (see also Chapter 13, “Infrastructure”).

Ultimately, the design package for the proposed roadway system will address:

- Geotechnical suitability;
- Final engineering designs;
- A Project Management Plan, to describe systematic procedures for monitoring and documentation that will be performed during construction of the roadway features; and
- An Operations and Maintenance Plan to establish systematic procedures for the post-construction monitoring of the roadway, and landfill environmental protection systems, which is consistent with the operations currently performed as part of the on-going post-closure care and maintenance of the site.

As with every construction project in New York City, the process for design review and approval will provide all individual agencies several opportunities to participate in this multi-year roadway design and to the multi-year construction project.

### *GUIDELINES FOR PARK ROAD CONSTRUCTION*

Chapter 20, “Construction,” provides a detailed analysis of the proposed park road construction program. Provided in greater detail in that chapter are data on:

- Description of excavation and fill operations (“cut and fill”) on the landfill, including a quantified amount of excavation from each significant activity;
- Description of the management, storage, transport and disposal of excavated material, including specific locations and management methods to be used;
- Description of fill operations and other activities in wetlands (this is also provided in Chapter 10 “Natural Resource”);
- Description of surcharge and embankment construction;
- Description of restrictions to increased public access to landfill areas; and
- Description of the planned timing and phasing of the construction of the roads particularly as it relates to the final closure of Landfill Section 6/7.

## **PROPOSED FRESH KILLS PARK ROAD SYSTEM<sup>1</sup>**

### *INTRODUCTION*

The purpose of this description is to describe the overall Fresh Kills Park circulation system. The proposed Fresh Kills Park primary road system is comprised of the West Shore Expressway (Route 440) Corridor, and the Confluence Loop Park Road, each of which is described below. This vehicular circulation is one element in the parks access program and would be used to provide access both into and across the park (see Figures 1-4a, 1-4b, 1-4c, 1-4d, and 1-4e).

### *PROPOSED WEST SHORE EXPRESSWAY ACCESS IMPROVEMENTS*

The West Shore Expressway is part of the regional highway network. It runs north/south through the Fresh Kills Park site within a 400-foot-wide right-of-way under NYSDOT jurisdiction. The proposed project would include modifications within the West Shore Expressway corridor between Arthur Kill Road on the south and Victory Boulevard on the north to provide regional access to and across the park. These improvements would include new and extended service roads, additional ramps, and ramp relocations. The West Shore Expressway mainline would not be affected beyond the adjustments needed to accommodate new or modified ramp termini.

### *PROPOSED CONFLUENCE LOOP PARK ROAD*

The proposed internal loop around the park's central area is the Confluence Loop Park Road. It is the primary hub and vehicular circulation element within the proposed park. It links the entire system, providing the means to access all areas of the park and the West Shore Expressway.

The Confluence Loop Park Road alignment is the result of both natural and manmade conditions. It is defined primarily by existing DSNY roads and bridges—including two existing bridges across Main and Richmond Creeks, referred to herein as the Main Creek and Richmond Creek Bridges. Currently these bridges provide access for DSNY haul and maintenance operations to the north, east, and south and west landfill sections. Under the proposed project they would be modified to become part of the park road system.

## **EAST PARK ROAD SYSTEM**

### *OVERVIEW*

The East Park Road System is proposed to provide the opportunity for vehicular connections to Richmond Avenue. Such connections would not only provide a new gateway into the park, but would link Richmond Avenue on the east with the West Shore Expressway on the west. A discussion of the potential connections under consideration is presented below. Three are being considered, one at Yukon Avenue, one at Forest Hill Road and one at Richmond Hill Road. For

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<sup>1</sup> Sources: Sources used in this description include the *Conceptual Roads Report*, Fresh Kills Park, Phase 3A, Task 8.3, prepared by Arup et al., for DPR (September 6, 2007); the *100 Percent Schematic Report* and the *Fresh Kills Park Road Alternatives Report*, prepared by Arup et al., for DPR (January 2008); the *Fresh Kills Park Bridge Alternatives Report*, Phase 3A Tasks 8.4.3 and 8.4.5, prepared by Arup for DPR (November 2007); and "Contract Drawings for the Construction of the NB/SB West Shore Expressway Service Roads and Vicinity" (40 percent submission), HDR/Daniel Frankfurt for DPR, (September 11, 2008).

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the completed East Park Road circulation system, DPR is examining various options in alignment and design. These options could include two- or four-lane roads across East Park with new connections at Richmond Hill Road, Yukon Avenue, and Forest Hill Road, or a two-lane loop road around the base of the landfill, also with connections at Richmond Hill Road, Yukon Avenue, and Forest Hill Road. A brief description of these options follows.

### *YUKON AVENUE CONNECTION*

By 2016, the proposed project would extend Yukon Avenue west into the park from its existing intersection with Richmond Avenue. From this intersection, the park road would extend across East Park to connect with the Confluence Loop Park Road near the Richmond Creek Bridge. This proposed park road would cross Landfill Section 6/7. For the purposes of this SEIS, this connection is referred to as the Yukon Avenue Connection. Total length of the Yukon Avenue Connection Park Road is about 2,600 linear feet.

### *FOREST HILL ROAD CONNECTION*

The Forest Hill Road Connection is a longer-term connection under consideration with multiple alignments proposed. Assuming the Forest Hill Road Connection is in place, it is assumed to be completed and operational sometime after 2017. The proposed project would extend Forest Hill Road west into the park from its existing intersection with Richmond Avenue. From Richmond Avenue, this park road would extend west across East Park to connect with the Confluence Loop Park Road. This proposed park road would traverse wetlands, Landfill Section 6/7, and DSNY service roads. It is anticipated that a viaduct/culvert structure would provide a space for the proposed park road over the wetlands. For the purposes of this SEIS, this connection is referred to as the Forest Hill Road Connection. Total length of this road segment is about 4,420 linear feet.

It is anticipated the roadway would be partially built on fill, requiring a 54" concrete culvert as the primary conveyance of stormwater while utilizing 10-foot-wide pre-fabricated archways with natural bottoms or a viaduct to provide habitat connectivity with the wetlands system that is present in this area (see also Chapter 23, "Impact Avoidance and Mitigation Measures").

### *RICHMOND HILL ROAD CONNECTION*

The Richmond Hill Road Connection is a longer-term connection under consideration with multiple alignments proposed. Assuming the Richmond Hill Road Connection is in place, it is assumed to be complete d and operational sometime after 2017. The Richmond Hill Road Connection would extend from the intersection of Richmond Avenue/Richmond Hill Road west into the park where, under one option, it would connect at its southern terminus with the Yukon Avenue Connection. Once in the park, the Richmond Hill Road connection quickly turns south, passing through an existing DSNY retention pond and stormwater basin B1 located between sediment basins A and B2. To provide the required stormwater and habitat connectivity across the road, a 10-foot-wide, pre-fabricated archway with a natural bottom would be installed. For stormwater Basin B1, a 60-inch concrete culvert would be required to maintain the overall system hydraulics. The alignment crosses the basins twice, as it shifts to the east and then runs adjacent to the existing berm, and again across Basin B1 where it meets the Yukon Avenue Connection. Total length of this road segment is about 4,990 linear feet.

## DESCRIPTION OF PARK VEHICULAR CIRCULATION: 2011, 2016 AND 2036

With the above described proposed park roads in place, the proposed project would improve local vehicular circulation patterns as well as access to the park. The goal of the overall Fresh Kills Park circulation system is to bring vehicles to the center of the site, where they connect with the Confluence Loop Park Road, from which the West Shore Expressway and all five park areas are accessible. As stated above, one of the main objectives of the park road system is to provide connectivity, specifically providing connections between Richmond Avenue, which runs along the east boundary of the project site, and the West Shore Expressway, a state highway with regional interstate connections that runs through the site. The proposed connection would be open to the public and City vehicles (including DSNY), but not open to commercial and truck traffic. The description of the proposed traffic circulation, presented below, is provided for the two analysis years, 2016 and 2036.

### 2011

In 2011, certain road segments west of Landfill Section 6/7 are assumed to be under design and nearing construction.

### 2016

- By 2016, a new park road entrance would be operating at the Yukon Avenue/Richmond Avenue intersection (see Figure 1-4c). From there, this Yukon Avenue Connection would provide access to the Confluence Loop Park Road, Creek Landing, and the West Shore Expressway (see Figure 1-4b). This segment of road would extend over Landfill Section 6/7.
- From the West Shore Expressway, northbound drivers would reach the park or Richmond Avenue/Yukon Avenue by exiting the highway via a proposed ramp just north of Arden Avenue. This ramp connects with the proposed West Shore Expressway northbound Service Road. In turn, the service road intersects with the Loop Park Road, providing access to other parts of the park. In addition, a new entrance ramp from northbound Service Road into the mainline is proposed approximately 1,800 feet north of the off ramp to better serve departing park patrons and neighboring traffic.
- From the West Shore Expressway, southbound drivers would reach the park and Richmond Avenue/Yukon Avenue by exiting from the highway at the existing ramp just north of Victory Boulevard. Drivers would continue south across Victory Boulevard and onto a segment of road that is currently only open to DSNY and authorized vehicles accessing the Staten Island Waste Transfer Station. Under the proposed project, this service road would allow public access and would connect with the Confluence Loop Park Road. Drivers seeking to reach the Richmond Avenue/Forest Hill Road intersection would turn east, pass under the West Shore Expressway bridges, travel across the Main Creek Bridge, follow the east leg of Loop Park Road, and continue east to Richmond Avenue.
- The Fresh Kills Park project would also construct a ramp from the southbound service road to the Expressway beginning at a location just south of Arden Avenue and connecting with the West Shore Expressway southbound main line. Construction of this access ramp would require that the existing exit ramp to Arthur Kill Road be relocated to north of Arden Avenue.

### 2036

For the 2036 circulation program, under consideration are various options for completion of the East Park Road system, which could include two- or four-lane roads across East Park with new

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connections at Richmond Hill Road, Yukon Avenue, and Forest Hill Road, or a two-lane loop road around the base of the landfill with connections at Richmond Hill Road, Yukon Avenue, and Forest Hill Road. Circulation patterns under these options are described below.

- The Forest Hill Road Connection would provide access to the Confluence Loop Park Road at the center of Fresh Kills Park via either the Richmond Creek or Main Creek Bridges (see Figure 1-4c). (Alternatively, rather than crossing Landfill Section 6/7, this park road segment would connect to a two-lane East Loop Park Road around the base of Landfill Section 6/7.) To reach the southbound West Shore Expressway, drivers would continue west to the Confluence Loop Park Road south leg, across the Richmond Creek Bridge, under the West Shore Expressway, and turn left onto the West Shore Expressway southbound service road. Drivers would continue south on the Service Road past Arden Avenue to a proposed ramp entrance into the West Shore Expressway mainline, or stay on the Service Road to reach local destinations (e.g., Arthur Kill Road). Within the park, there would be a 30-space parking lot located in the Marsh that would be accessible from the south leg of Loop Park Road.
- By 2036, a new park road entrance would be operating at the Richmond Hill Road/Richmond Avenue intersection (see Figures 1-4d and 1-4e). This proposed connection would also provide access to the Confluence Loop Park Road at the center of Fresh Kills Park via either the Richmond Creek or Main Creek Bridges. This proposed Richmond Hill Road Connection would also reach the southbound West Shore Expressway, drivers would continue west across the Yukon Avenue Connection to the Confluence Loop Park Road south leg, across the Richmond Creek Bridge, under the West Shore Expressway, and turn left onto the West Shore Expressway southbound service road. Drivers would continue south on the Service Road past Arden Avenue to a proposed ramp entrance into the West Shore Expressway mainline, or stay on the Service Road to reach local destinations (e.g., Arthur Kill Road). To reach the northbound Expressway, drivers would make a right turn at the Confluence Loop Park Road to access the service road on the east side of the Expressway that crosses Victory Boulevard to the northbound main line. (Under another road option, the Richmond Hill Road Connection intersects immediately to the west with the East Loop Park Road around the base of Landfill Section 6/7.)

## **D. EAST PARK ROADS: PROJECT PURPOSE AND NEED**

### **ADDRESSING TRAFFIC NEEDS**

#### *INCREASING REGIONAL CONNECTIVITY*

There is an undeniable need to ease traffic congestion on Staten Island. Traffic in the western/middle section of Staten Island is particularly heavy; moreover, congestion is only expected to increase as western Staten Island continues to develop. In response to growing community concerns regarding local traffic, the City of New York created the Staten Island Transportation Task Force which is a multi-agency task force led by representatives from NYCDOT and DCP (also represented are local community boards, NYSDOT, the MTA and Port Authority). Formed in 2006, the Task Force is charged with exploring multiple short-term and long term opportunities and solutions for improving transportation and circulation across Staten Island. The Staten Island Transportation Task Force has identified the construction of the Fresh Kills Park roads as one of its key recommendations for relieving local traffic congestion in addition to increasing transit and alternative transportation modes for the area.

Located on the eastern edge of the site, Richmond Avenue is one of the principal arterials for north-south vehicular traffic through western Staten Island; traffic is heaviest in the stretch between the Staten Island Expressway and Arthur Kill Road. Richmond Avenue serves one of the busiest commercial hubs in the borough, providing access to the Staten Island Mall and other large retailers, and also provides regional transportation connections to the Staten Island Expressway and the West Shore Expressway via Victory Boulevard to the north and to the Korean War Veterans Highway to the South.

### *MINIMIZING LOCAL TRAFFIC IMPACTS*

In light of the lack of operational capacity along Richmond Avenue, alternative travel routes that reduce congestion along Richmond Avenue are needed. During the course of the preparation of the FGEIS and this SEIS (including the SEIS scoping hearing), comments were made by local representatives and the general public with respect to the need for not only including new east/west public roads as part of the Fresh Kills Park project, but for expediting construction of those roads. With no public through road across Fresh Kills, there is a major local need for a shorter travel distance across (rather than around) the approximately 4-square-mile, 2,200 acre Fresh Kills site. Fresh Kills currently presents a significant void in the local street grid, and a significant obstacle to local drivers seeking to reach the West Shore Expressway (WSE) and the regional highway system. While the proposed park would be served by publicly accessible roads for automobile and transit access into the park, the connections to the WSE would simultaneously provide a through road across the site, thereby providing some measure of local traffic relief.

By way of background, in 2001, with the official closing of Fresh Kills Landfill, the office of the Staten Island Borough President, through the New York City Economic Development Corporation commissioned a study of alternatives for providing vehicular access across Fresh Kills.<sup>1</sup> Among the findings of that study were that roads through the park could provide traffic relief on local streets. In implementing new east/west connections that would provide access to the West Shore Expressway and a bypass to the congested Richmond Avenue corridor, it was the conclusion of those studies that intersections along Richmond Avenue would experience reductions in vehicular congestion if new roads were to be constructed across Fresh Kills. These improved traffic flows were determined to be directly linked to a shift in traffic patterns from the Richmond Avenue corridor (currently via Arthur Kill Road and Victory Boulevard) to roads across Fresh Kills. Thus, with park roads, not only would congestion be reduced at local intersections, but vehicle miles traveled would be reduced with the potential for accompanying air quality benefits.

Based on that report, it is concluded that proposed roads can reduce overall trip time in the network with both more direct (shorter) travel paths and reduced travel times between points of origin and destination. Overall, the 2001 report concluded that these benefits would occur at

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<sup>1</sup> Fresh Kills Landfill Traffic Planning Study “Alteration Mapping and Cost Estimate,” (December 11, 2001), “Fresh Kills Landfill Traffic Planning Study Final Traffic Engineering Analysis Report (December 2001), Fresh Kills Landfill Traffic Planning Study “Highway Network Modeling and Sketch Plan Evaluation” (December 2001). Prepared by URS Corporation for the Staten Island Borough President’s Office.

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multiple locations in the local travel network, but particularly along Arthur Kill Road, Drumgoole Road West, Richmond Avenue, Richmond Hills Road, and Forest Hill Road.

The proposed park roads would also eliminate the need for vehicles to travel through the quiet residential neighborhoods adjacent to the Fresh Kills Park site. For example, the existing road network requires that vehicles traveling from Richmond Avenue at Richmond Hill Road to the West Shore Expressway currently have to drive approximately 2,000 feet northeast on Richmond Avenue and make a left turn at the congested Travis Avenue intersection and then head about 1 mile west on Travis Avenue to the intersection with Victory Boulevard. At Victory Boulevard the driver would again have to make a left turn, and then travel approximately one mile through the commercial core of the Travis neighborhood to reach the ramps of the West Shore Expressway. Thus, this total diversion is about 2.4 miles to get around the Fresh Kills property and along the way potentially need to stop at 8 signalized intersections. With the use of the proposed Fresh Kills Park roads, the travel distance is about half that with only 2 signalized intersections to reach the southbound or northbound lanes of the West Shore Expressway. It is estimated that about 330 vehicles in the weekday AM peak hour and about 520 vehicles in the Saturday midday peak hour would use the Richmond Hill Road connection to avoid locally congested intersections and therefore take a more direct path between the West Shore Expressway and Richmond Avenue.

For drivers currently traveling from Richmond Avenue at Forest Hill Road to the West Shore Expressway, the limited road network requires traveling south on Richmond Avenue for a distance of about 3,000 feet to Arthur Kill Road. Here, the Korean War Veteran's Highway is accessible by the often-congested intersection with Arthur Kill Road. As such, many drivers instead turn west along Arthur Kill Road for a distance of about 2 miles to reach northbound or southbound entrances to the West Shore Expressway at the Arthur Kill Road. Along the way drivers would potentially need to stop at 5 signalized intersections adjacent to the residential neighborhood of Arden Heights. The proposed extension of Forest Hill Road into Fresh Kills Park with connections to the West Shore Expressway would reduce the travel distance by about half with only two signalized intersections in order to reach the Expressway.

It is estimated that about 300 vehicles in the weekday AM peak hour and about 430 vehicles in the Saturday midday peak hour would use the Forest Hill Park Road connection to avoid locally congested intersections and take a more direct path between the West Shore Expressway and Richmond Avenue. It is therefore concluded that the proposed park roads are needed to reduce the through traffic in local, residential neighborhoods.

Lastly, by reducing travel time from the congested Richmond Avenue corridor to the West Shore Expressway, the proposed roads would also provide the benefit of emergency access to and across the site as well as economic and community benefits with improved circulation.

### *PROVIDING PARK ACCESS*

Another goal of the proposed park roads is to provide access into the park and to the various uses distributed through the park. The primary roads are designed to provide vehicular access to those uses which will generate the greatest demand, such as the recreational center proposed for the Confluence. It is estimated that the proposed park roads would handle approximately 610 weekend PM peak hours trips at the Forest Hill Road Connection and nearly 400 weekend PM peak hours trips at the Richmond Hill Road connection that would otherwise need to use local roads to travel around the park in order to reach the central recreational areas in the Confluence (these estimates are for fall 2036 build-out of Fresh Kills Park).

## CONCLUSIONS

The proposed park road connections between Richmond Avenue and the West Shore Expressway would provide access to a regional highway as well as access to all areas of the park. With the proposed project, these connections include:

- A connection between the Confluence Loop Park Road and Yukon Avenue;
- A connection between the Confluence Loop Park Road and Forest Hill Road; and
- A connection between the Confluence Loop Park Road and Richmond Hill Road.

The City has proposed to construct approximately seven miles of new park roads within Fresh Kills Park in order to relieve local traffic congestion and provide access to the park with new connectivity between Richmond Avenue on the east and the West Shore Expressway on the west. With the proposed project approximately two miles of roads would be constructed.

The plan for roads across Fresh Kills is responsive to the well founded and clearly expressed wishes of the broad Staten Island community. Construction of these roads is supported by the Staten Island Transportation Task Force, the local community, local Community Boards, and the Staten Island Borough President. The Staten Island Transportation Task Force, a group formed by the Mayor to address the borough's growing traffic congestion, has identified the construction of the Fresh Kills Park roads as one of its key recommendations for relieving local traffic congestion in addition to transit enhancements, alternative transportation modes, and other road improvement projects that are being implemented and considered for the area.

With respect to the project purpose and need as it relates to transportation and pedestrian circulation, the proposed park roads are needed to:

- Create connections between Richmond Avenue and the West Shore Expressway to reduce local traffic congestion along major arterials and minimize through traffic in residential neighborhoods.
- Provide access to the park and the various park uses.

In addition to providing vehicular access, the proposed roads would provide opportunities for transit, bike and pedestrian access into the park for the purposes of creating public access (recognizing that with such a large site multiple forms of access are necessary at multiple locations). The purpose of the Fresh Kills Park project as a whole is to remove the access barriers to the community by constructing park and transportation connections, thereby minimizing the site's adverse impact as an obstacle to the local transportation network, a condition that has existed for many decades. Additionally, the City seeks to minimize any off-site traffic impacts caused by the proposed park, which will become a regional attraction. To that end, a network of roads, transit access, multi-use paths, and footpaths are proposed across East Park.

## **E. EAST PARK ROADS: DESCRIPTION OF THE PROJECT SITE, CURRENT AND FUTURE CONDITIONS**

### **BLOCKS AND LOTS**

The project site is all City-owned land comprising Blocks 2520, Lot 1. The property is under the jurisdiction of DSNY.

## **CURRENT ZONING AND MAPPED PARKLANDS**

### *ZONING*

East Park has one City zoning district, R3-2 (see Figure 1-5). This zoning district covers all of Landfill Section 6/7. Open space and recreational facilities are allowed in the R3-2 districts. Where the site is mapped parkland, the zoning designations do not apply.

There is also a City special zoning district mapped over a portion of the project site (the waterfront), the City's Natural Area District (NA-1). The NA-1 District connects with the William T. Davis Wildlife Refuge to the north and LaTourette Park to the east.

The NA-1 District extends across Staten Island east to the Todt Hill, Dongan Hill, and Emerson Hill neighborhoods and also covers portions of LaTourette and New Springville as well as the William T. Davis Wildlife Refuge. This Special Zoning district was created in the 1970s to preserve the unique natural landscapes and topography of Staten Island. The district supports the protection of the Staten Island Greenbelt and the surrounding natural features including steep slopes, rock outcrops, creeks, wetlands, and native woodlands. District regulations protect the local landscape by mandating a site design for new development that fits into these natural conditions and minimizes modification to existing natural features. Under these regulations, all new developments and site alterations within this district must be reviewed and approved by the New York City Planning Commission (CPC). Natural features are protected by limiting modifications in topography; preserving tree, plant, and marine life, and natural watercourses; and requiring clustered development to maximize the preservation of natural features.

### *MAPPED PARKLAND*

Portions of the project site are currently mapped as parkland (e.g., the waterfronts of Richmond Creek and Main Creek). Along Main Creek the parkland mapping extends north to the William T. Davis Wildlife Refuge. Along Richmond Creek the parkland mapping extends east to Richmond Avenue. The upland limits of the parkland mapping are generally defined by the currently mapped East Park Drive. Although mapped as parkland, the areas are not developed with recreational facilities and are not publicly accessible.

As stated above, because the proposed roads would, in part, pass through existing mapped parkland on the project site, a State legislative action was approved for the alienation of parkland along proposed road corridors (Chapter 659 of the 2007 Law, State of New York).

## **CURRENT LAND USES, STRUCTURES AND OPERATIONS**

### *LAND USES*

The project site is all City-owned land, nearly all of which is under the jurisdiction of DSNY. In addition to the landfill and its associated infrastructure (e.g. drainage basins), there is undeveloped land, including landfill buffer lands and a constructed berm fronting on Richmond Avenue. Richmond Creek and Main Creek form the west boundary of the site.

### *FRESH KILLS LANDFILL OVERVIEW*

There are four landfill sections at Fresh Kill, Landfill Sections 3/4, 6/7, 2/8 and 1/9. These landfill sections and the acreage they cover is provided in Table 1-5 and are shown on Figure 1-4. The project site, is within Landfill Section 6/7.

**Table 1-5**

**Landfill Sections and Closure Construction Status at Fresh Kills Landfill**

Landfill Section	Area (acres) <sup>1</sup>	Closure Status <sup>2</sup>
3/4	142	Construction Complete
2/8	139	Construction Complete
6/7*	305	Approved Design, Construction Underway
1/9	401	Approved Design, Construction Underway
<b>Total</b>	<b>987</b>	
<b>Note:</b> * East Park site.		
<b>Sources:</b>		
<sup>1</sup> Fresh Kills Landfill Post-Closure Monitoring and Maintenance Operations Manual, DSNY, December 2002.		
<sup>2</sup> DSNY, December 2007.		

The landfill sections, or SWMUs, at Fresh Kills were once used by DSNY for the landfilling of municipal and household solid waste. These landfill sections are regulated by DEC as SWMUs because they contain solid waste. In accordance with RCRA, the SWMUs are defined by areas where waste was placed after 1980. In addition to the SWMUs, the project site contains accessory DSNY facilities, such as drainage basins, and landfill gas migration and groundwater monitoring wells that are part of the Fresh Kills environmental control system and post-closure monitoring program (see the discussion below under the “Post-Closure Monitoring and Maintenance”). These environmental control systems and the monitoring and maintenance program for Fresh Kills Landfill are being implemented by DSNY under supervision by DEC. Under the monitoring and maintenance obligations, monitoring data is collected by DSNY and submitted on a regular basis to DEC for review. Lands that contain the environmental monitoring facilities are within the Fresh Kills environmental compliance boundary (i.e., the lands outside the SWMUs that serve as a buffer between the SWMUs and surrounding properties).

Final closure construction is underway at Landfill Section 6/7 in accordance with a DEC-approved design. Final closure construction includes a final cover designed to minimize water infiltration and gas releases with a soil/geomembrane layer and vegetative cover that minimizes erosion. There is also a comprehensive network of drainage structures to collect surface water runoff.

Details on the landfill infrastructure at the site of the proposed project are provided in Chapter 13, “Infrastructure.”

#### *POST CLOSURE MONITORING AND MAINTENANCE OPERATIONS MANUAL<sup>1</sup>*

##### *Regulatory Requirements*

In accordance with the requirements of the State of New York including 6 NYCRR Part 360 and the Order on Consent between DEC and DSNY, a Post-Closure Monitoring and Maintenance Operations Manual (the Manual) was prepared for Fresh Kills Landfill to provide all information necessary to effectively monitor and maintain Fresh Kills for the entire post-closure period. Under the requirements of the Post-Closure Manual, the City is required to perform a variety of

<sup>1</sup> The source for the information provided below is the *Fresh Kills Landfill Post Closure Monitoring and Maintenance Operations Manual*, prepared by Roy F. Weston of New York, Inc. for DSNY, December 3, 2002. This is a summary description. A more detailed description of the Manual is provided in the Fresh Kills Park FGEIS.

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measures to ensure that closure and post-closure monitoring and maintenance of the landfill occurs in compliance with 6 NYCRR Part 360. Elements of the Manual include the following:

- A description of the environmental control system monitoring program with the sampling locations and methodologies, recordkeeping and reporting requirements for all environmental monitoring activities;
- A description of types, location and frequency of all facility maintenance activities including maintaining the integrity and effectiveness of any final cover, making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, maintaining the appropriate vegetative growth; preventing runoff from eroding or otherwise damaging the final cover; maintaining the leachate collection system; maintaining the landfill gas control and monitoring systems; and recordkeeping and reporting requirements.
- A description of personnel requirements including minimum qualifications, staffing, contact information, and equipment needs;
- A description of contingency plans that are necessary for responses to conditions that include, but are not limited to, major erosion, significant differential settlement, and fire; and a summary of any corrective measures that may be performed;
- Financial assurance that the City will remain in compliance with these obligations; and
- A description of the planned uses of the property during the post-closure period.

### *DSNY FACILITIES ADJACENT TO THE PROJECT SITE*

DSNY operates a number of essential solid waste and sanitation management facilities at Fresh Kills that support ongoing solid waste management services and operations for the Borough of Staten Island. As depicted in Figures 1-3a and 1-3b, these include the Staten Island Waste Transfer Station as well as two local Sanitation District Garages (Districts 2 and 3) that are located adjacent to, but outside, the boundaries of the proposed park. The DSNY District 2 garage is adjacent to the project site, off Richmond Avenue near Richmond Hill Road, and serves DSNY's Staten Island Sanitation District 2.

### **FUTURE CONDITIONS AT THE PROJECT SITE WITHOUT THE PROPOSED PROJECT**

Closure of Landfill Section 6/7 is underway in accordance with a DEC-approved design and will continue in the future with or without construction of the proposed project. A phasing plan for the approved final closure of Landfill Section 6/7 is shown on Figure 1-6. That plan includes four sequences of closure construction covering about 60-80 acres per phase, the four phases being implemented in a counterclockwise direction around Landfill Section 6/7. Final landfill closure construction was to be completed by 2010 at Landfill Section 6/7. It is expected to take nearly 1,000,000 cubic yards of soil to construct the final cover at Landfill Section 6/7 overall. As part of that final cover construction, the vegetation and drainage systems are also installed. As of January 2009, Phases 1 and 2 are complete.

While the closure construction in Section 6/7 would be completed and the monitoring and maintenance program for Fresh Kills Landfill ongoing, in the future without the proposed East Park Roads project, there would be no public roads provided in East Park. In the future without the proposed Fresh Kills Park, it is also assumed that DSNY would have continued use of the landfill closure and maintenance facilities for at least 30 years.

## F. SEIS FRAMEWORK FOR ENVIRONMENTAL ANALYSIS

The proposed East Park Roads project and its related discretionary actions are the subject of this SEIS. Under CEQR/SEQRA, environmental impacts of a proposed project (or action) are measured against a background of “No Build” conditions, which is referred to in this document as the “Future Without the Proposed Project.” No Build conditions are the conditions that are expected to exist in the future when project construction would be complete and/or when the project would be in operation, assuming however that the proposed project does not occur.

For this project there are three major phases to the project and, therefore, three analysis years when each phase is expected to be complete. The three years are 2011, 2016 and 2036 for both the No Build and Build conditions. These three year analysis years reflect the endpoints for each of the following project phases:

- By 2011, completion of the modified final cover plan at Landfill Section 6/7;
- By 2016, completion of construction and operation of the Yukon Avenue Connection park road; and
- By 2036, completion of construction and operation of the Forest Hill and Richmond Hill Road Connection park roads.

With respect to the future No Build conditions assumed in this SEIS, in the absence of an approved modification, it is assumed that DSNY would move forward with construction of its approved final cover design at Landfill Sections 6/7. In addition, DSNY would also have all environmental monitoring facilities in place and would continue to implement its Fresh Kills Landfill environmental maintenance and monitoring program through the 2016 and 2036 analysis years. Additional No Build assumptions include:

- Build out of Fresh Kills Park through the 2016 and 2036 analysis years as described in the Fresh Kills FGEIS (March 2009); and
- Build out of Fresh Kills Park park roads west of East Park through the 2016 and 2036 analysis years as described in the FGEIS including the connections and ramps associated with the West Shore Expressway.

The essential purpose of CEQR/SEQR is to provide decision makers including the Lead Agency (DPR), and involved agencies at the City, State, and Federal levels (as appropriate) with an examination of the full range of environmental issues and impacts at the earliest time possible to inform their decisionmaking during the development of a project, in this case the Fresh Kills Park East Park Roads project. The project concept, however, must be sufficiently defined to be capable of undergoing a meaningful examination.

DPR issues an FGEIS in March 2009 that comprehensively examined the impacts of the Fresh Kills Park project. in its entirety, including the proposed East Park and its park road/circulation system. That FGEIS serves as the backdrop to this SEIS.

The proposed East Park Roads project involves the construction of approximately two miles of new public roads and is therefore a long-term project with several decades of build-out, involving multiple options and alignments and the associated actions and approvals. Segments of the Yukon Avenue and Forest Hill Road Connections to Richmond Avenue must cross Landfill Section 6/7 which is currently in the process of final closure construction under an approved closure plan design. However, there are significant fiscal and environmental benefits to modifying the southern phases of the landfill closure program at this time, as opposed to

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retrofitting the closed landfill to accommodate the proposed roads at a future date (see also Chapter 22, “Alternatives,” under “Alternative Phasing [Reconstructed Final Cover]”). This SEIS has been prepared to examine the impacts of this action (modification of the landfill closure design to incorporate a roadbed) and its related future actions of constructing the proposed park roads. The full set of actions addressed in this SEIS are as follows:

- 1. Modifications of the final closure design for the southern phases of the closure plan for Landfill Section 6/7 to accommodate a range of contemplated possible future park road segments across Landfill Section 6/7. The proposed Alternative Final Cover would modify the grading of the landfill to create a 60-foot-wide embankment upon which a road could be constructed in the future without disruption of the final cover. The 60-foot-wide corridor allows for options and flexibility in future road design (e.g., road width) while committing to nothing. In addition to providing a fully compliant final cover for the landfill, it would also provide a stable subgrade for future roads of up to four travel lanes.

The advantages of this approach are as follows:

- a. It keeps options open for the future.
  - i. Although current projections of traffic volumes for the park roads, based on typical methods of traffic modeling, indicate that two lanes (not including intersections, which must be wider to accommodate turning lanes) may be adequate, roads are typically planned for a useful life of at least 20 years post construction completion. Traffic volumes over the next 20+ years can be expected to change. Staten Island is the fastest growing county in the State and, moreover, traffic increases could outpace projected population growth based on current trends. Thus, an informed decision cannot reasonably be made at this juncture for roads that are not scheduled to commence construction until 2016 and beyond. In the future, when the decision to build the road is made, it is likely that additional environmental review, in particular, of traffic conditions, will have to be undertaken, based on conditions existing at that time.
  - ii. If in the future, it becomes clear that one or both of the longer-term proposed connections to Richmond Avenue is infeasible (i.e., too expensive or environmental impacts too great), the option to add capacity to other connections might help alleviate local traffic congestion.
- b. Quite apart from roadbuilding, the 60-foot-wide roadbed would accommodate additional possible uses, such as bike and pedestrian ways and utility corridors adjacent to the road and it might allow for shifts in the alignment of a two-lane road.
- c. This approach has much less of an impact than if installing a final cover under the current approved closure design (which does not account for a road) and needing to be remove it in the future, as follows.
  - i. If no embankment were constructed as part of the final cover, significant environmental impacts would occur in the future when the final cover was disturbed to construct a road.

- ii. If only a two-lane embankment (e.g., 38 feet wide) were to be constructed, but a four-lane road was eventually found to be preferable, removal of a 22-foot-wide strip of final cover would create far more damage to landfill infrastructure, natural resource, and traffic conditions. The benefits of the availability at that point in time of two additional lanes of road embankment (60-feet-wide) would be very clear. Conversely, unnecessarily closing off future options at this juncture is not long-term planning, which is essential for a project of this size.

Modification of the approved landfill closure design, requires approval from DEC for the City to amend the approved closure plan. In addition to providing an appropriate final cover for Landfill Section 6/7, this element of the proposed project creates a road embankment across Landfill Section 6/7 for the proposed road segments of the Yukon Avenue and Forest Hill Road Connections. It is proposed to implement this action in 2009/2010 with completion of Landfill 6/7 final cover construction by 2011. The proposed modification to the final cover design is described in detail in the report, "Landfill Section 6/7 Alternative Final Cover Design Report (Draft, Geosyntec Consultants for the Department of Sanitation New York, June, 2009).

- 2. Approvals to construct the Yukon Avenue Connection as a two-lane park road (2016) across Landfill Section 6/7 within the width of the previously described road embankment and an additional road segment running between the base of the landfill and Richmond Avenue (this segment provides the physical connection to Richmond Avenue). It is expected that the two-lane road Yukon Avenue Connection would meet the near term traffic demands (with widened improvements at the proposed Richmond Avenue intersection in order to provide adequate turning lanes at the intersection.) Preliminary road designs for this connection are presented in Appendix B of this SEIS. Discretionary actions related to this phase of the proposed East Park Roads project include approval of the road design across Fresh Kills and the new intersection at Richmond Avenue (DPR, NYCDOT, and DEC), minor grading modification to lands between stormwater basins B1 and B2 and protection of waters permits (DEC), and possible additional federal wetlands approvals (USACE). This phase of the project is expected to be implemented and operational between 2011 and 2016.
- 3. Approvals to complete the East Park Road system. DPR recognizes that there are many decisions yet to be made between now and the post 2016 first phase build year for these segments of the proposed roads. As a result, DPR is seeking at this time to ensure that options continue to be investigated. Thus, there are the contemplated options for completing the East Park Road system as analyzed in this SEIS include the following:
  - a. Connections to Yukon Avenue, Forest Hill Road, and Richmond Hill Road as four-lane park roads;
  - b. Connections to Yukon Avenue, Forest Hill Road, and Richmond Hill Road as two-lane park roads;
  - c. A two-lane East Park loop road around the base of Landfill Section 6/7 (following the existing DSNY haul road) with two-lane connections to Richmond Avenue and Forest Hill Road and a four-lane park road within the Yukon Avenue Connection. (This option is derived from the Staten Island Borough Presidents Alternative as presented in the Fresh Kills Park FGEIS, March 2009); and

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- d. Widening the Yukon Avenue Connection from two lanes to four lanes as the east/west connections across Fresh Kills.

For these long-term phases of construction, a segment of the Forest Hill Road Connection option would cross Landfill Section 6/7 within the road embankment that is assumed to have been previously constructed under the modified final closure plan. Connections between the base of the landfill east to Richmond Avenue would then complete the road connections to Richmond Avenue/Forest Hill Road. To the north, a road segment would be completed between the above-described Yukon Avenue Connection and the Richmond Avenue/Richmond Hill Road intersection. This segment of the proposed road would be entirely off Landfill Section 6/7, but within the Fresh Kills property and would traverse existing DSNY drainage basins and buffer/monitoring areas east of Landfill Section 6/7. In addition, other options include widening the Yukon Avenue Connection from two lanes to four lanes and providing a two lane East Park Loop road around the base of Landfill Section 6/7 with connections to Richmond Avenue and Forest Hill Road.

Discretionary actions related to this long-term phase of completing the East Park Roads project include actions related to approval of road designs across the landfill (DEC, DSNY, and DPR), off-landfill road segments and new intersections on Richmond Avenue at Richmond Hill Road and Forest Hill Road (DEC, DPR, and NYCDOT), as well as approval for modifications to Landfill Section 6/7 stormwater basins and protection of water permits (DEC) and any additional federal approvals related to wetlands (USACE). This phase of the project is not expected to be implemented until after 2016, but before 2036.

This SEIS has been prepared to examine the full and cumulative range of impacts associated with the above described project phases and actions. It has been prepared for the purposes of informing decision makers as to the potential environmental impacts of the modified final cover plan, and the East Park Roads project, to the extent that a number of park road designs and options are under consideration at this time, particularly for the longer term phase (after 2016). Thus, this SEIS comprehensively examines the full range of impacts with the proposed East Park roads including a completed road network, some segments of which may not commence construction for 10-20 years.

One long-term option presented in this SEIS examines 60-foot-wide, four-lane park roads for all proposed segments and phases of road design, which takes into consideration the significant growth factors of Staten Island and the local need to improve vehicular circulation in the vicinity of Fresh Kills Landfill. It is also recognized that a road of this width (with four travel lanes) is potentially providing an additional travel lane in each direction which is one more travel lane than what current traffic projections indicate otherwise be required for the free-flow segments of the park roads, recognizing that in all cases it is necessary to widen the roads at the intersections (e.g., at Richmond Avenue) so that the necessary turning lanes can be provided at each intersection.

The analysis of the park roads presented in this SEIS presents the reasonably expected and comprehensive environmental impacts of the proposed project while recognizing that final decisions on the long term designs are yet to be reached; thus, a range of options have been analyzed which also allows flexibility in future road designs. For example, a park road with two travel lanes in each direction could possibly be designed with slight road alignment modifications that could further reduce road impacts on wetlands.

For the short term actions (e.g., modification of the landfill cover and the Yukon Avenue Connection), environmental impacts have been minimized and there are no significant differences in the environmental impacts of preparing a road embankment across Landfill Section 6/7 for either a four-lane park road or a two-lane park road (see also Chapter 22 “Alternatives”). For long-term phases, such as the Forest Hill Road and Richmond Hill Road connections, this SEIS provides full disclosure of the range of impacts for a number of options (including alternative road alignments and widths) and their associated actions, recognizing that decisions on these segments of the road are many years away. However, defining for analysis purposes a road option that is 60 feet wide for this SEIS presents the maximum impact and allows for specific design decisions that could be made at a later date based on future more advanced road designs coupled with a review of permits and other approvals and decisions regarding each future park road segments. These future decisions will be based on balancing the environmental impact against the project’s purpose and need as well as the range of available alternatives and the mitigation.

There are a number of design and engineering studies that were prepared to support this SEIS analysis and which provide the basis for the technical analysis framework. These include “*Landfill Section 6/7 Alternative Final Cover Design Report (Draft)*” (Geosyntec Consultants for the Department of Sanitation New York, June , 2009), *Fresh Kill Park Conceptual Roads Report* (Arup for DPR, September 2007), *Fresh Kills Park Bridge Alternatives Report* (Arup for DPR, November 2007), *Fresh Kills Park Road Alternatives Report*, (Arup for DPR, January 2008), *Fresh Kills Park Roadway Package 100 Percent Schematic Documents* (Arup for DPR, January 2008), and *Fresh Kills Park Stormwater Management Part I: Meeting New York State Criteria* (Geosyntec for DPR, February 2008), *Fresh Kills Park Stormwater Management Plan Part II: Meeting Additional Criteria and Project Goals* (Geosyntec for DPR, March 24, 2008) and “*Fresh Kills Landfill Staten Island Borough President’s Office Evaluation of Roadway Alternative in East Park (Draft Report)*,” URS for the New York City Department of Transportation and the New York City Department of Design and Construction, February 2009. In addition, this SEIS contains additional road design drawings (see Appendix B) and supplemental landfill engineering analyses (see Appendix B).

## **G. EAST PARK ROADS: DESIGN ASSUMPTIONS**

### **EAST PARK DESIGN**

The proposed roads that are the subject of this analysis would extend across the 482-acre East Park. East Park is proposed to be a large, vegetated space with spectacular views and, since it fronts on Richmond Avenue, would also serve as the point of vehicular access to and across the park from the east. East Park would provide landscape enhancements with created and improved wetlands as well as lowland forest.

As described in the FGEIS, East Park is a mix of “Active Recreation-Field Sports” on the upper elevations of the mound and “Habitat with People” in the lower elevations. The stormwater basins east of the landfill section are planned for a mix of “Habitat with People.” This would include a hilltop field (23 acres) on the north portion of the closed landfill section. Immediately to the south would be recreational fields. These uses may be set within a created landscape of successional meadow (130 acres). At the base of the mound would be a mixed woodland community (187 acres) that would be created landscape. Footpaths would be located throughout East Park.

Ecological enhancements and facilities for public access are proposed for DSNY stormwater basins east of Landfill Section (B1 and B2) and the associated wetlands. Total acreage of the

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wetland restoration/enhancement is estimated at 13 acres. Facilities that would be within this part of East Park include an outdoor classroom (600 square feet) and a natural education center (4,000 square feet). A boardwalk would be constructed along the wetlands. In addition, about 28 acres of the existing wetlands (in the area south of basins B1 and B2) would be restored as tidal marsh.

Under the East Park proposal, the DSNY-constructed berm and drainage east of the landfill section are expected to provide an important opportunity for new landscapes as well as hiking and walking trails. Along the side-slopes and plateau of the landfill mound, new landscaped woodlands would be created, along with large meadows.<sup>1</sup>

A 12-mile-long recreational multi-purpose loop trail would extend around the base of the landfill section. This would be a 20-foot-wide paved path that would be open to a variety of active linear recreational pursuits. On the south end of East Park there would also be a 2-acre picnic-lawn area that would be accessible from this loop via footpaths. There would also be art features, including a flare station screen.

The proposed project vehicular circulation plan for East Park and the various road options are described below.

### **EAST PARK NON-VEHICULAR CIRCULATION PLAN**

In addition to the proposed vehicular access, East Park would provide miles of specially designed paths and trails for bicyclists, pedestrians, and hikers. As stated above, multi-use paths are designed to accommodate a mix of non-motorized activities such as walking, running, cycling, and horseback riding. These paths would be 20 feet wide and would form loops around the base of the closed landfill sections. (As stated above, an approximately 12-mile multi-use path is proposed around the base of Landfill Section 6/7 in East Park.) These paths would have signage, seating, and lighting along their length and would be the primary linear recreation paths in the park. They would also be accessible to emergency and maintenance vehicles. Since primary recreation paths would in many cases overlap with DSNY service roads, design and use of the paths would be coordinated between DPR and DSNY.

Footpaths and trails would also provide for separate activities for pedestrians and hikers in East Park. It is estimated that there would be several miles of such paths and trails in East Park.

### **PUBLIC TRANSIT PLAN**

It is expected that with the three proposed connections to Richmond Avenue, Metropolitan Transportation Authority (MTA)/New York City Transit (NYCT) could modify its existing bus routes to take advantage of new direct connections into the park. In addition, to accommodate the park-generated transit demand, NYCT could amend the existing bus service and expand bus routes to include new stops within the park, extending service into the site from Richmond Avenue via the Yukon Avenue, Forest Hill Road and Richmond Hill Road connections. In order to extend bus service into the park, the proposed park roads would need to satisfy the design requirements of NYCT for bus operations (e.g., bus stops, lane widths, turnarounds).

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<sup>1</sup> Details on the Landscape Plan for East Park are provided in the *Fresh Kills Park FGEIS* (March 2009).

To ensure that bus service is provided into the park and that transit is a viable and supported mode of transportation for park users from around the City, DPR would continue to work with MTA/NYCT to advance transit service and to install the necessary transit facilities as part of park implementation.

At this time it is proposed that the park roads provide bus access into and across the park. No stops or stations are proposed within East Park or along East Park roads. Rather, bus stop locations would be sited in the Confluence/Creek Landing areas where a greater density of recreational facilities is proposed.

### **PLAN TO AVOID IMPACTS TO LANDFILL INFRASTRUCTURE AND TO PROTECT PUBLIC HEALTH**

A key objective for the Fresh Kills Park project is to provide public access in a way that does not conflict with the health and safety of the park users, DPR staff, or the community as a whole. To that end, it is important to avoid and minimize impacts to landfill infrastructure and to properly design and implement any modifications that may be necessary to construct the proposed park roads. Much of the length of the proposed East Park roads is occupied by Landfill Section 6/7 or by landfill infrastructure such as stormwater management basins and monitoring wells. DPR and DSNY would therefore collaborate in the park road design; and utilize the extensive existing monitoring network and data collection systems with respect to landfill gas, groundwater, and surface water that is in place at Fresh Kills Landfill to protect the health of park users, visitors, and DPR personnel.

With these measures in place, the potential for human exposure to contaminants would be significantly minimized. In addition, the potential pathways for human exposure to pollutants would be regularly monitored and tested to ensure that public health and the environment are not at risk. Additional detail on the potential impacts of the proposed park on landfill infrastructure is provided in Chapter 13 “Infrastructure.”

Chapter 13, “Infrastructure,” and Chapter 23, “Impact Avoidance Measures and Mitigation,” present a conceptual approach to avoiding impacts or conflicts with the Post-Closure Care Plan that would be addressed during project design. This preliminary assessment addresses such issues as grading and filling activities in the vicinity of landfill systems, construction activities, security and fencing, landfill cover protections, drainage systems, and monitoring and maintenance access for landfill management personnel.

### **SOIL MANAGEMENT PLAN**

Development of the East Park roads is expected to require substantial volumes of soil and gravel to provide a road embankment as well as the landscaping along the road corridors. In developing the Fresh Kills Park soils strategy (see *Fresh Kills Park FGEIS*, March 2009), the following guidelines were established:

- Protection of public health and safety;
- Ecological enhancement utilizing native Staten Island soil types;

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- Compliance<sup>1</sup> with landfill closure and post-closure needs;
- Cost effectiveness and feasibility; and
- Environmentally sustainable soil sources and processing.

There are no soil standards in the State of New York that are directly applicable to soil cover for landfills when the end use proposed is parkland. New York State environmental regulations that apply to landfills include the 6 NYCRR Part 360, which governs Solid Waste Management Facilities. These regulations mandate the final closure and post-closure design, operation, maintenance, and monitoring of solid waste landfills in New York State and are implemented at Fresh Kills through the Consent Order. However, Part 360 does not provide criteria for soils to serve as final cover for a public park. Therefore, guiding the conceptual soil strategy for Fresh Kills Park is 6 NYCRR Part 375, the Brownfield Remediation Program (hereinafter referred to as subpart 375). Although not directly applicable to landfill reuse, or road construction, DEC regulators can rely on the science behind the regulations to guide their decision-making regarding DPR's use of soils in a former landfill when in the conversion to park uses. Thus, decisions as to types of soils that may be used for the proposed East Park Roads would be made on a case-by-case design basis. Such a "project by project" approach is also recommended by NYCDOHMH.<sup>2</sup>

### **PARK ROAD STORMWATER MANAGEMENT PLAN**

#### *OVERVIEW*

There are a number of proposed park features that, if constructed, would convert existing pervious surfaces to impervious surfaces. These include the proposed park roads, park structures and parking. Because impervious surfaces do not allow precipitation to infiltrate to the soil, precipitation first runs down a slope, and then infiltrates into soil, or is conveyed via a drainage swale or storm sewer system, to a receiving waterbody.

The stormwater management system proposed for the proposed East Park Roads would complement and enhance the aesthetic of the park while avoiding impacts to landfill infrastructure. The approach would include a mix of traditional conveyance and storage measures that would include Low Impact Development practices throughout each subcatchment (see Table 1-6). These stormwater management approaches would both reduce runoff and pollutant loadings by managing the runoff at the source, and promoting the use of natural systems to achieve stormwater quality requirements, and achieve volume control through both infiltration and evapotranspiration. BMPs such as bioretention and pocket wetlands can provide multiple benefits such as water quality treatment and wildlife habitat, aesthetic improvements and potential educational opportunities. Implementation of these measures would minimize the potential for significant adverse impacts to aquatic resources resulting from the discharge of stormwater from Fresh Kills Park. Implementation of the runoff control and drainage system

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<sup>1</sup> A full description of the Modified Landfill Section 6/7 Closure Plan is provided in "Landfill Section 6/7 Alternate Final Cover Design Report, Fresh Kills Landfill" (Geosyntec for DSNY, June 2009).

<sup>2</sup> Additional details on the Fresh Kills Park Soil Management Plan are provided in the *Fresh Kills Park FGEIS* (March 2009).

proposed for the park would require coordination and review between DPR and DSNY through both design and construction. Overall management goals for the stormwater plan are as follows:

- Provide water quality treatment, per DEC criteria, for all roadway impervious cover to the maximum extent practicable and as close to the generating source as possible.
- Treat runoff using distributed vegetated filtering systems that provide multiple site benefits such as habitat, aesthetics, and educational opportunities.
- Minimize the need for gray infrastructure elements such as pipes, gabion, concrete, and angular rock.
- Plan and design using adaptive management that accounts for changes to vegetation and runoff patterns to maximize the ecological potential and diversity of the site.

Generally, stormwater management design for the park road is designed to retain the flow patterns developed for the landfill stormwater design. Where road embankments interfere with drainage swales along the perimeter of the landfill or at downchutes, culverts would be installed beneath proposed roads to retain existing drainage patterns to sediment basins. Road runoff would be directed to existing swales, or new swales installed adjacent to proposed roads.

**Table 1-6  
List of BMPs for Proposed Park Features**

BMP	Proposed Park Feature
Bioretention cell	Pavement (parking lot), Athletic Fields (impervious) Drainage (junction)
Constructed wetland	Drainage (outfall)
Grass/vegetated filter strips	Slopes (gradual)
Grassed swale	Pavement (roads), Slopes (gradual), Athletic Fields (pervious),
Infiltration trench	Athletic Fields (impervious) Buildings Drainage (junction)
Infiltration basin	Drainage (outfall)
Pocket wetland	Pavement (roads), Drainage (junction)
Porous pavement	Pavement (paths), Pavement (roads), Pavement (parking lot),, Athletic Fields (impervious)
Raingarden	Pavement (paths), Slopes (gradual) Athletic Fields (pervious), Buildings
Riprap inlet filter ring	Drainage (outfall)
Riprap outlet protection	Drainage (junction), Drainage (outfall)
Slope stair stepping	Slopes (steep)
Stormwater Pond	Drainage (outfall)
Vegetated treatment swales	Pavement (roads), Athletic Fields (impervious), Drainage (junction)
<b>Source:</b> Draft Fresh Kills Lifescape Park: Stormwater Management Plan, Geosyntec, December 2007.	

In park road segments crossing wetlands (e.g., the Forest Hill Road Connection), either viaducts or culverts are proposed to convey stormwater and maintain connectivity on each side of the roadway.

The stormwater management plan for the East Park roads would utilize the existing stormwater management systems presently in place and retrofit the existing system with new BMPs to meet the needs of the new roadways. The future road segments on Landfill Section 6/7 would be designed with swales, which would direct road runoff to existing culverts and sediment basins. Future roadways outside of Landfill Section 6/7 would be directed to conveyance systems such as arched culverts, culverts and swales, with the objectives of maintaining the existing drainage flow patterns and interception of downchutes to stormwater basins A, B1, B2, C1, C2, R, and the retention area between Basins A and B1. The stretches of roadway crossing natural areas, such as Forest Hill Road and the north end of the Richmond Hill Extension, would require a

## **Fresh Kills Park East Park Roads SEIS**

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combination of soft and engineered BMPs, to provide site specific water quality treatment. These system may include:

- Catch basins and piping for conveyance;
- Grass/vegetated filter strips;
- Grassed swales;
- Infiltration trenches/basins; and
- Bioretention Cells.

Systems can be installed as part of the roadway geometry that over time will become an integral part of with the adjacent biohabitat.

### *SITE HYDROLOGY AND HYDRAULICS*

#### *Introduction*

To better understand how the stormwater basins function and the impacts of the proposed roadway systems, a hydrologic and hydraulic analysis was performed. The analysis utilized Technical Release 55 – Urban Watershed Hydrology for peak discharges and ponding, while using the energy equation for the sizing and understanding of existing and proposed culvert hydraulics. The following discussion explains how the proposed roads impact the hydrology and hydraulics of the existing drainage systems at Fresh Kills and how the proposed road design would mitigate the stormwater systems to maintain the original design intent of the existing system.

#### *Yukon Avenue Connection (2016)*

Starting from the intersection of Richmond and Yukon Avenue, the proposed Yukon Avenue Connection extends west along a DSNY road bed situated between stormwater Basins B1 and B2. Connecting the two basins B1 and B2 is a existing 60 inch concrete culvert. Under the proposed project this culvert would be increased in length, both north and south, to accommodate the future road fill, while maintaining hydraulic connectivity between the basins. Under this proposal, runoff from the Yukon Avenue Connection, in the segment between Richmond Avenue and the DSNY haul road (i.e., the base of Landfill Section 6/7), would sheet flow to Basins B1 and B2 as it does under existing conditions.

Once the Yukon Connection is on Landfill Section 6/7, runoff would sheet flow off the road, be collected in roadside swales and routed to the existing stormwater basins. The alignment of the proposed Yukon Connections is such that the park road would cut through multiple conveyance ditches. Therefore, with the proposed project these ditches would be realigned to maintain positive slope as part of the revised landfill closure plan. Similar to stormwater Basins B1 and B2, C1 and C2 to the west, are adequately sized to take the additional road runoff that would flow west with a relatively minor increase in impervious road surface area.

#### *Richmond Hill Connector (2036)*

Starting from the intersection of Richmond Avenue, the Richmond Hill Connector park road extends over the existing outlet channel to stormwater Basin A, bisects the large retention pond located between stormwater Basins B1 and A, parallels the berm along Richmond Avenue and bisects stormwater Basin B1, before intersecting the proposed Yukon Avenue Connector. The outlet channel for stormwater Basin A is combined with stormwater from the commercial lot

east of Richmond Avenue and flows north to the receiving wetlands. The emergency overflow from Basin A is routed south into the DSNY retention pond. In order to maintain the existing flow route, the channel running north from stormwater Basin A would be routed through a 60-inch concrete box culvert. Additionally, a proposed 700-ft segment of park road would require the filling of the north end of the retention pond. This would be mitigated using a 42-inch concrete pipe that is proposed to extend south, daylighting on the east side of the Richmond Hill connector road.

Further to the south, the connector road bisects the retention pond, leaving a 4.55-acre area located at the northeast end of the pond. To provide the required stormwater management and habitat connectivity across the connector roadway, a 10-foot-wide pre-fabricated archway with a natural bottom may be provided. As the park road continues south, the alignment shifts east and adjacent to the Richmond Avenue berm. In this road segment, multiple concrete culverts may be provided to maintain the existing drainage down the berm and under the connector road to both the retention pond and stormwater Basin B1.

Stormwater Basin B1 would be bisected by the Richmond Hill Connector road. Stormwater Basins B1 and B2 are hydraulically connected with a 60-inch reinforced concrete culvert running under the berm area between the basins, where the future Yukon Avenue alignment connects to Richmond Avenue. With the proposed Richmond Hill Road connector, this culvert would be maintained and increased in length as required by the new roadway improvements. The results of the analysis concluded that stormwater Basins B1 and B2, being connected with a 60-inch culvert, in fact act as one large detention pond. The basin is controlled at the north end by 12" x 6" – "V-Notch" weir structure and emergency spillway, both discharging to the retention pond. A 60-inch concrete culvert would be required to maintain the hydraulic connectivity and a level pool across the connector road. Additionally, the analysis results showed that with the roadway fill in place, the detention/retention volume of the overall system is adequate to store the 100-year storm event. Table 1-7 provides design details on this segment of the proposed roads.

**Table 1-7  
Culvert Crossing Station, Culvert Size  
Richmond Hill Connector**

Station	Culvert Size
177+11	60 inch Concrete Pipe
188+90	42 inch Concrete Pipe
202+90	Multi Barrel Concrete Pipe
205+00	Multi Barrel Concrete Pipe
215+00 to 208+00	42 inch Concrete Pipe
221+00	60 inch box culvert
<b>Source:</b> HDR, May 2009.	

*Forest Hill Road Connection (2036)*

The Forest Hill Road Connector is proposed to extend west from the intersection of Forest Hill Road and Richmond Avenue. From Richmond Avenue, the proposed road crosses over a wetland before reaching the landfill. The proposed road alignment bisects the wetland.

Close to the intersection with Richmond Avenue, catch basins would be required to handle the new intersection drainage. Stormwater from the intersection would be collected and routed to a roadside BMP prior to discharge to the wetland area. The existing wetland area drains via a perennial stream, a tributary to Richmond Creek, crossing the Forest Hill Road Connector at Station 142+00. At this location a 54-inch culvert is required to pass the 100-year stormwater runoff and potentially in extreme tidal events. The addition of habitat crossings, such as the natural bottom archways, would also help convey tidal inundation during a 100-year tidal surge (see also Chapter 23 “Impact Avoidance Measures and Mitigation”).

As the Forest Hill Road connection approaches Landfill Section 6/7, the grades of the existing haul road and the Forest Hill Road Connector will intersect at the proposed grade. A drainage ditch currently exists at station 134+50, just west and up the hill from the loop road. Under this proposal the ditch crossing would be relocated and utilized with a shallow pipe crossing to maintain existing drainage path to stormwater basin R.

On the landfill the majority of the proposed road runoff would be conveyed west to stormwater Basins C1 and C2. The proposed alignment does cut across existing ditches that would be re-routed as required to maintain positive slope. To maintain the existing flow paths, shallow culverts would be provided for the future conditions at the locations where a ditch presently cuts across the proposed road bed. Table 1-8 provides design details on this segment of the proposed roads.

**Table 1-8  
Culvert Crossing Station, Culvert Size  
Forest Hill Road Connection**

Station	Culvert Size
106+00	Outfall to stormwater basin C2
111+00	Landfill Ditch Crossing
124+80	Landfill Ditch Crossing
142+70	54 inch Concrete Pipe
146+00	42 inch Concrete Pipe

**Source:** HDR, May 2009.

**H. EAST PARK ROADS PROJECT PHASING FOR THE 2011, 2016 AND 2036 ANALYSIS YEARS**

**PROPOSED PROJECT: MODIFIED LANDFILL 6/7 CLOSURE PLAN (2011 ANALYSIS YEAR)**

By 2011 it is assumed that the grading and infrastructure improvements for the proposed roads would be installed on Landfill Section 6/7 in accordance with a modified final closure design (see Figure 1-6a, a draft closure phasing plan). This modified phasing plan reflects the completion for sequencing of the work and is subject to adjustment because of field conditions. Interim uses in the embankment corridors would include a meadow cover and walking trails.

As stated above, the final closure of Landfill Section 6/7 is being performed in accordance with the closure schedule established by the Consent Decree between the City and DEC. The approved closure work sequence is illustrated in Figure 1-6. As shown in that figure, the

sequence includes four phases having an area of approximately 60 to 80 acres each and progressing in a counter-clockwise direction around the Landfill Section 6/7 mound. Each phase of the closure is scheduled to be completed within a one-year period starting in 2007. As of January 2009, construction Phases 1 and 2 have been completed.

In order to accommodate the proposed grading necessary to implement the modified final closure plan in preparation for future road construction, an alternate final closure construction sequence is proposed, as shown in Figure 1-6a. This alternate sequence divides the remaining closure construction area into three phases, thus creating an overall five-phase closure sequence as opposed to the approved four-phase sequence. The three remaining phases are identified as Phase 3, Phase 4, and Phase 5. Phase 3 is approximately 35 acres, while Phases 4 and 5 have a combined area of approximately 112 acres.

This proposed modification to the closure plan would allow closure construction to continue throughout 2009 without encroaching into the area of the proposed Yukon Avenue Connection corridor where the modified closure plan is intended to be constructed. Phase 4 construction would include construction of the modified closure plan necessary to accommodate the Yukon Avenue Connection. Phase 5 construction would include construction of the modified closure plan necessary to accommodate the Forest Hill Road and Richmond Hill Road connections.

Although cut, fill, and waste relocation is currently required to accomplish Landfill Section 6/7 closure construction under the approved final closure plan, the mass grading necessary to achieve the objectives of this modified closure plan would require additional excavation and on-site waste relocation to prepare the embankment surface. In order to maintain the integrity of all landfill infrastructure; allow for ongoing monitoring and maintenance operations; and to provide an embankment upon which a future road could potentially be placed, this modified closure plan includes the following construction activities:

- Place surcharge along the Forest Hill Corridor to consolidate and strengthen the underlying waste material and reduce long term settlement along the future road corridor for a period of about 6 months;
- Increasing the barrier protection layer component of the cover system from two feet to four feet thick along the proposed road corridors;
- Modify the location of several stormwater conveyance swales;
- Relocate approximately 1,000 feet of landfill gas pipe and three gas wells; and
- Relocate a portion of the existing fire water main to a lower elevation.

Details of the specifics of these measures is provided in the report “Draft Alternative Final Cover Design Report, Fresh Kills Landfill Section 6/7” (Geosyntec Consultants for DSNY, May 2009). Measures to avoid or mitigate impacts due to the above activities would be achieved by extending established best management practices through the period of construction, as are in place under the approved closure plan. These measures are also explained Chapter 20 “Construction” and in Chapter 23, “Impact Avoidance and Mitigation.”

While the proposed modifications in closure phasing are important for preparing the site for potential future road alignments, as analyzed in detail in this SEIS, there are no adverse impacts from this modification should it be approved that cannot be mitigated (see Figures 1-7 and 1-7a). Thus, there are no unavoidable adverse impacts or unmitigated impacts resulting from this action. Should the roads not be constructed on top of the proposed modified grade, these modified grades would be integrated into the park and alternatively provide a useful foundation

for the establishment of internal park circulation system components such as paved secondary roads, paved multi-purpose trails, or unpaved trails.

**PROPOSED PROJECT: YUKON AVENUE CONNECTION (2016 ANALYSIS YEAR)**

*ROAD ALIGNMENT*

As described in greater detail above, under “Vehicular Circulation,” the Fresh Kill project would develop the Yukon Avenue Connection by 2016 in addition to the park road system to the west (see Figures 1-8 and 1-8a). The proposed project would extend Yukon Avenue west into the park from its existing intersection with Richmond Avenue. From this intersection, the park road would extend across East Park to connect with the Confluence Loop Park Road at a location near the Richmond Creek Bridge (see Figure 1-8). This proposed park road would cross Landfill Section 6/7 and the DSNY service road. The overall length of the Yukon Avenue Connection is about 2,600 linear feet. A typical section for a park road segment traversing Landfill Section 6/7 is shown on Figure 1-9. Details of the proposed design and its compatibility with the Landfill Section 6/7 infrastructure are provided in Chapter 13 “Infrastructure.”

*RICHMOND AVENUE/YUKON AVENUE INTERSECTION DESIGN*

Under existing conditions, the intersection of Yukon Avenue and Richmond Avenue is a T-intersection, with a southbound approach consisting of two exclusive left-turn lanes and four through lanes, a northbound approach consisting of four through lanes and a channelized right-turn lane, and a westbound approach consisting of one shared left- and right-turn lane. In 2016, with the proposed project mitigation measures (proposed mitigation measures are subject to NYCDOT review and approval), this intersection is proposed to be reconfigured to accommodate the park road entrance/exit at Yukon Avenue and Richmond Avenue, which is proposed to consist of one exclusive left-turn lane and one shared through-right lane (eastbound approach). The westbound approach of this intersection is proposed to be restriped to have one exclusive left-turn lane and one shared/through right lane. The northbound approach is proposed to consist of one exclusive left-turn lane, four through lanes, and a channelized right-turn lane. The southbound approach is proposed to consist of two exclusive left-turn lanes, three through lanes, and one shared through right lane. Figure 1-10 shows this proposed intersection.

**PROPOSED PROJECT: EAST PARK ROAD SYSTEM (2036 ANALYSIS YEAR)**

**INTRODUCTION**

By 2036, it is assumed that the East Park road system would be completed. At this time a number of options are under consideration for the completion of the East Park road system. These options include:

- Four-lane-wide road connections at Richmond Hill Road, Yukon Avenue, and Forest Hill Road (see Figures 1-11 and 1-11a). These four-lane roads would extend into the site and across Landfill Section 6/7 to reach the Confluence Loop Park Road and, in turn, access to the West Shore Expressway.
- Two-lane road connections, at Richmond Hill Road, Yukon Avenue, and Forest Hill Road, with the same alignment as described above. However, under this option the park roads are two-lane-wide only, widening only at the Richmond Avenue intersection to provide adequate turning lanes (intersection design is similar to the option described above).

- Yukon Avenue only as a two-lane road and carrying the 2036 projected traffic.
- A two-lane, two-direction loop road around the base of Landfill Section 6/7, providing access to the Confluence Loop Road as well as providing road connections at Forest Hill Road and Richmond Hill Road with an additional four-lane-wide road connection at Yukon Avenue that also provides a connection to Richmond Avenue and crosses Landfill Section 6/7.

Diagrams for each of these park road options is presented in Appendix B. A description of each of the options is provided below.

Background conditions common to each of these park road options is that East Park is completed by 2036, as described in the Fresh Kills Park FGEIS (March, 2009) as shown on Figure 1-12.

#### *EAST PARK ROAD SYSTEM—FOUR-LANE ROAD OPTION*

##### *Forest Hill Road Connection (2036)*

###### *Road Alignment*

This proposed project option would extend Forest Hill Road west into the park from its existing intersection with Richmond Avenue. From Richmond Avenue, this park road would extend west across East Park to connect with the Confluence Loop Park Road in the vicinity of the Richmond Creek Bridge (see Figure 1-4c). This segment of the proposed park road would traverse wetlands, Landfill Section 6/7, and cross DSNY service roads. It is anticipated that a viaduct/culvert structure would carry this segment of the proposed park road over the wetlands. For the purposes of this SEIS, this connection is referred to as the Forest Hill Road Connection. The overall length of the Forest Hill Road Connection is about 4,420 linear feet. Use of this park road would be limited to vehicles. A typical section for this segment of roadway traversing Landfill Section 6/7 is shown on Figure 1-9 (see also section is provided on drawings RD-C-30.42 in Appendix B).

Details of the proposed design and its compatibility with the Landfill Section 6/7 infrastructure are provided in Chapter 13 “Infrastructure.”

###### *Forest Hill Road/Richmond Avenue Intersection Design*

Under existing conditions, the intersection of Forest Hill Road and Richmond Avenue is a T-intersection, with a southbound approach consisting of an exclusive left-turn lane and four through lanes, a northbound approach consisting of four through lanes, (with the curbside lane operating as two moving lanes with a through lane and a right-turn lane), and a westbound approach consisting of one left-turn and one shared left- and right-turn lane. In 2036, with the proposed project, this intersection is proposed to be reconfigured to accommodate the park entrance/exit at Forest Hill Road and Richmond Avenue, which is proposed to consist of one exclusive left-turn lane, one through, and one right-turn lane (eastbound approach, see Figure 1-13). The westbound approach of this intersection is proposed to be restriped to have one exclusive left-turn lane and one shared through-right lane. The northbound approach is proposed to consist of one exclusive left-turn lane, four through lanes and one right-turn lane. The southbound approach is proposed to consist of one exclusive left-turn lane, three through lanes, and one shared through-right lane.

##### *Richmond Hill Road Connection (2036)*

###### *Road Alignment*

Under the proposed project option, the Richmond Hill Road Connection would extend west into the park from the intersection of Richmond Avenue/Richmond Hill Road and would then turn

south to connect at its southern terminus with the Yukon Avenue Connection (see Figures 1-4d and 1-4e). There already exists a short extension of Richmond Hill Road west of Richmond Avenue in the form of a 200-foot stub that currently operates as the driveway into a Duane Reade parking lot. The proposed project would modify this road segment to fit the proposed park road design. With the proposed extension, the overall length of this segment of park road is about 4,990 linear feet.

Once in the park, as stated above, the Richmond Hill Road connection quickly turns south, passing through existing DSNY stormwater basins and freshwater wetlands situated east of Landfill Section 6/7 and part of the landfill drainage system. The alignment crosses the basins twice, once as it shifts to the east and extend along the existing berm parallel to Richmond Avenue, and again at Basin B1 where it meets the Yukon Connection. At the basin crossings, it is anticipated that the proposed park road would be comprised of an embankment traversed by culverts designed to maintain hydraulic continuity. The segment of the road adjacent to the berm along Richmond Avenue would occupy the embankment of an existing DSNY dead-end service road that provides access to landfill monitoring facilities. As a four-lane road, the park road would require filling of certain wetlands and basins along its length as well as modifications of the DSNY drainage system. Details of the proposed design and its compatibility with the Landfill Section 6/7 infrastructure are provided in Chapter 13, “Infrastructure.”

### *Richmond Hill Road/Richmond Avenue Intersection Design*

Under existing conditions, the intersection of Richmond Hill Road and Richmond Avenue is a four-legged intersection, with a southbound approach consisting of an exclusive left-turn lane, three through lanes, and one shared through-right lane, a northbound approach consisting of an exclusive left-turn lane and four through lanes (with the curbside lane operating as two moving lanes with a through lane and a right-turn lane). The Richmond Hill Road eastbound approach to Richmond Avenue is an existing short segment of road (about 200 linear feet that currently terminates at the Fresh Kills property line). This short road segment carries little traffic and currently provides two shared left-through-right lanes and the westbound approach consists of three moving lanes operating as one left-turn, one shared left-through, and one right-turn lane. In 2036, with the proposed project, this intersection would be reconfigured to accommodate the park entrance/exit to Richmond Hill Road at Richmond Avenue (eastbound approach), which is proposed to provide one exclusive left-turn lane, one through and one right-turn lane (see Figure 1-14). The westbound approach of this intersection is proposed to be restriped to consist of one exclusive left-turn lane, one through lane, and one right-turn lane. The northbound approach is proposed to be restriped to consist of one exclusive left-turn lane, four through lanes and one right-turn lane. The southbound approach is proposed to consist of one exclusive left-turn lane, three through, and one shared through-right lanes.

## *EAST PARK ROAD SYSTEM—TWO-LANE ROAD OPTION*

### *Introduction*

The purpose of this option is to provide a narrower footprint two lane road (i.e., approximately 38 feet wide as compared to the four lane road option which is 60 feet wide). The alignment is essentially the same as the four-lane road option (see Figures 1-11 and 1-11a) The principal areas of comparison between these options are the physical geometric differences between a two-lane and four-lane park road design, and the resulting potential for landfill conflicts, environmental impacts, and park design conflicts. Road design criteria would meet the project objectives including:

- A 35 mph design speed;
- Two percent minimum cross slope across the entire roadway;
- Minimum Radius for Horizontal Curves: 408 feet (2 percent), 510 feet (-2 percent);
- Maximum Grade: 7 percent;
- Minimum Grade: 0.50 percent;
- Cross Slope: 2 percent, 1.5 percent minimum;
- Stopping Sight Distance (Horizontal and Vertical): 250 feet;
- Maximum Rate of Superelevation: 4 percent;
- Rollover: 4 percent between lanes, 8 percent between travel land and shoulder;
- Maximum Relative Gradient: 0.62 percent to 4 percent (NYCDDC standard practice); and
- Side Slope: 4:1 without guide rail, 2:1 with guide rail.

*Design Description*

The two-lane park road option assumes two 12-foot travel lanes, a 4-foot textured median, and 6-foot shoulders. The combination of median and shoulder widths would allow for passing stalled vehicles, so that a single stopped vehicle does not block an entire direction of travel. The shoulders would also contribute to improved sight distance along the inside of curved roadway segments and help keep the roadside clear of hazards. Similar to the four-lane proposal, under this option the roadway descends from Landfill Section 6/7 to an at-grade intersection with the landfill haul road, then continues east across the wetland.

With respect to the Forest Hill Road and Richmond Hill Road Connections, the road coverage associated with this two-lane option would differ from that under the four-lane option in terms of magnitude and extent. This provides certain advantages. For example, the smaller footprint of the two-lane alternative would provide a significant advantage in the segment along the berm along Richmond Avenue. While the base of the roadway embankment would be approximately 80 percent as wide as the four-lane at the basin crossings, along the berm the narrower two-lane width would require 50 percent less width into the Basin B1 and the associated wetlands.

The two-lane park road option would require a modified closure plan for Landfill Section 6/7 just like the four-lane option described above. Like the four lane option, there would also a need to avoid, minimize or mitigate impacts from the proposed roads with respect to the landfill infrastructure and wetlands. It is expected these measures could eliminate project impacts, although this option would occupy less area and therefore the impacts on landfill infrastructure, for example, may be reduced. This option would also achieve the project's goals and objective with respect to improving local traffic circulation, providing connectivity across Fresh Kills Landfill, and minimizing the impacts of the proposed Fresh Kills Park project on local streets.

Both the proposed four-lane road and the this two-lane park road design provide a connection with a short and direct route to the Confluence Loop Park Road. Views from the road on the viaduct and on the section across the landfill would be of significant park features. A viaduct along the Forest Hill Road Connection provides expanded views while reducing impacts on wetland.

Under both the four-lane option and this option, the Richmond Hill Road connection would serve as the northeastern gateway into the park from the local neighborhoods.

All of the park road design options provide access to park features and scenic views of park natural features. The two-lane option succeeds to a greater degree in limiting the visual and

physical intrusion of the park roads in the landscape. In so doing, the two-lane road is more consistent with park design intentions to provide access to the site and its features. In addition, the two-lane road affords greater opportunities for providing more room on side slopes for a landscape corridor with native plantings and beneficial stormwater management functions.

*Forest Hill Road Connection*

Under this option, the two-lane park road for the Forest Hill Road connection follows a similar horizontal alignment and profile as for the Four-Lane proposal. It would also have a similar intersection design.

The two-lane park road is similar to the four-lane road option in its geometry, with a sweeping and curvilinear alignment that minimizes interference with landfill infrastructure elements. It meets or exceeds the design criteria along its length and is entirely within the footprint of the Four-Lane option.

*Richmond Hill Road Connection*

Like the four-lane proposal, the two-lane park road option follows a similar alignment in the Richmond Hill Road Connection. The two-lane park road option exceeds the design criteria, except at the horizontal curve approaching the Richmond Avenue intersection, where a curve of a 300-foot radius is provided. Here, justification for retention of the non-standard horizontal curve is the same as for the four-lane proposal.

The two-lane alignment differs in the northern segment of the road from the four-lane proposal in that it allows for minimal impacts to the outletting swale from the emergency spillway of Basin A to the storage area between Basin A and Basin B1. In this option, the alignment passes between the garage and the swale. Since the desired profile is approximately  $\pm 10$  feet below the elevation of the parking lot and  $\pm 10$  feet above the elevation of the stream, a retaining wall is required on each side of the road along that segment of park road, which allows the stream to be retained (see also the discussion under “Environmental” below).

In both the four-lane and the two-lane options, as the road traverses the retention area between Basins A and B1, it severs the southern portion of the storage area, requiring a culvert or archway beneath the embankment to retain its hydraulic function. Similarly, culverts or archways are proposed to maintain the hydraulic connection at the north end of Basin B1.

At Richmond Avenue, the two-lane park road incorporates an eastbound to northbound left turn bay, a through lane and combined through/right turn lane at the eastbound approach to the intersection. The narrower roadway adds some flexibility to the eastbound approach as compared to the four-lane proposal, allowing for the approach angle and shoulder widths to be adjusted during detailed design to achieve the most favorable overall geometric balance.

*YUKON AVENUE CONNECTION (FOUR-LANE ROAD OPTION)*

This option is essentially a four-lane, two-way road across Landfill Section 6/7 along the Yukon Avenue Connections (widening the two lane road proposed in 2016). With this option, neither of the connecting roads to Richmond Hill Road or Forest Hill Road are provided. Road design criteria would meet the project objectives including:

- A 35 mph design speed;
- Two percent minimum cross slope across the entire roadway;

- Minimum Radius for Horizontal Curves: 408 feet (2 percent), 510 feet (-2 percent);
- Maximum Grade: 7 percent;
- Minimum Grade: 0.50 percent;
- Cross Slope: 2 percent, 1.5 percent minimum;
- Stopping Sight Distance (Horizontal and Vertical): 250 feet;
- Maximum Rate of Superelevation: 4 percent;
- Rollover: 4 percent between lanes, 8 percent between travel land and shoulder;
- Maximum Relative Gradient: 0.62 percent to 4 percent (NYCDDC standard practice); and
- Side Slope: 4:1 without guide rail, 2:1 with guide rail.

### *EAST PARK LOOP ROAD AND RICHMOND AVENUE CONNECTIONS*

#### *Introduction<sup>1</sup>*

This option (referred to as the “SIBPO Alternative in the FGEIS, March 2009), essentially calls for a two-lane, one-way road that loops around Landfill Section 6/7 and utilizes the alignment of the existing DSNY haul roads. In addition to being a one-way road in a counterclockwise direction around the landfill, this option also proposes a new segment of a four-lane road across Landfill Section 6/7 that would connect directly to Richmond Avenue at Yukon Avenue. Thus, under this option, the loop around Landfill Section 6/7 (referred to as the East Park Loop Road in this option) would have two-way connections at three intersections along Richmond Avenue, Richmond Hill Road, Yukon Avenue and Forest Hill Road (from north to south).

Figure 1-15 shows this alternative roadway alignment. Under this option, a typical two-lane section includes two 11-foot travel lanes, a two-foot left shoulder, and an eight-foot-wide right shoulder.

This option has been put forth for the purposes of determining if such an alignment could potentially have less of an impact on the landfill systems and on-site wetlands, and therefore could possibly be implemented sooner and for less cost than other options.

As described in greater detail below, this option would have impacts similar to the above options in many respects, although in some cases the impacts may be of a lesser magnitude. There are also specific design differences with respect to road geometry, landfill conflicts, environmental impacts, and park conflicts that are described in greater detail below.

#### *Design Description*

This park road option has two components, it creates a two-lane, one-directional loop around East Park and it extends Yukon Avenue westward across Landfill Section 6/7 toward Main Creek where it connects with the East Park loop drive near the Main Creek Bridge. The intersection geometry at the Richmond Avenue intersections with Richmond Hill Road, Forest

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<sup>1</sup> The description below is based on the report “Fresh Kills Landfill Staten Island Borough President’s Office Evaluation of Roadway Alternative in East Park (Draft Report),” URS for the New York City Department of Transportation and the New York City Department of Design and Construction, February 2009.

Hill Road and Yukon Avenue would be similar to that under the options described above. This option includes a four lane bi-directional extension of Yukon Avenue to the Main Creek Bridge that would bisect the Loop Road and create a Richmond Avenue intersection with Yukon Avenue in a four-way intersection with two approach lanes and two receiving lanes on the eastbound approach. This also creates a four-way intersection with the road Loop Road and reconfigures the Main Creek Bridge intersection from a four-way intersection. The East Park Loop Road typical section as proposed under this alternative includes two 11-foot travel lanes, a two-foot left shoulder, and an eight-foot-wide right shoulder.

### *Road Design Objectives*

The roads proposed under this option do not entirely meet the functional classification system described by AASHTO Policy on Geometric Design of Highways and Streets (2004). For the purpose of determining required supplementary design criteria, the system evaluated was classified as an "Urban Collector Road." Design criteria for the roads under this option are as follows:

- Design Speed: 35 mph;
- Two percent minimum cross slope across the entire roadway.
- Minimum Radius for Horizontal Curves: 408 feet (2 percent), 510 feet (-2 percent)
- Maximum Grade: 7 percent
- Minimum Grade: 0.50 percent
- Cross Slope: 2 percent, 1.5 percent minimum
- Stopping Sight Distance (Horizontal and Vertical): 250 feet
- Maximum Rate of Superelevation: 4 percent
- Rollover: 4 percent between lanes, 8 percent between travel land and shoulder
- Maximum Relative Gradient: 0.62 percent to 4 percent (NYCDDC standard practice)
- Side Slope: 4:1 without guide rail, 2:1 with guide rail

### *Design Speed*

Under this option, at locations where the minimum radius for 35 mph could not be accommodated, a lower maximum safe operating speed would be necessary with the appropriate signage (26 of the 71 curves proposed in this alternative are substandard for the proposed design speed in order to more closely follow the alignment of the existing haul roads).

### *Physical Constraints*

In general there are certain areas where minimal impacts to Landfill Section 6/7 including the existing and proposed gabion walls would occur under this option; therefore, minor realignments along with other design modifications would need to be identified and recommended to avoid these impacts.

### *Horizontal Stopping Sight Distance*

Stopping sight distance is affected by various factors including cut slopes and object heights. In the evaluation of the this park road option, the location and slope of Landfill Section 6/7 was considered first, including the introduction of a three-foot-wide drainage buffer strip of the two-foot shoulder with a proposed slope of 1 vertical to 3 horizontal. The road segments where the slope represents an obstruction is when the curve is to the left (i.e., towards the landfill mound).

As a result of this analysis, any gabion walls located on the mound side of the park loop road on horizontal curves to the left would reduce horizontal stopping sight distance and therefore the maximum safe operating speed is less than 35 mph. The smallest gabion wall height is two feet, six inches high. AASHTO's requirement for visibility is a two-foot object, therefore all gabion walls obstruct the driver's line of sight since they do not meet the required horizontal sightline offset requirements for the design speed.

### *Radius of Horizontal Curve*

The minimum required horizontal radius is determined by the road's functional classification, its design speed and the superelevation rate. Based on the AASHTO Policy on Geometric Design of Highways and Streets, the minimum required horizontal curve for a two percent superelevation rate (away from the landfill mound) at a 35 mph design speed is 408 feet when the curve is to the right and 510 feet when the curve is to the left (adverse cross slope).

Based on the two percent superelevation rate and 35 mph design speed as described above, there are a number of locations where the horizontal curves do not comply with the minimum radius required.

Based on the two percent constant superelevation rate away from the mound and the 35 mph design speed described above, there are 26 locations where horizontal curve radii are nonstandard for the design speed. The two percent roadway cross slope away from the mound results in adverse superelevation rates for curves to the left, which increases the potential for hydroplaning and loss of control in icy conditions, particularly in areas with flat longitudinal grades.

### *Vertical Geometry*

This park road option does not exceed the maximum allowable grade; however, it does not meet the minimum desirable grade of 0.50 percent at 37 of the 111 vertical tangents. In order to produce cross sections and determine possible impacts to the landfill facilities and due to the fact that existing service road grades did not follow a "smooth line," a profile was developed, which closely followed existing grades. In addition, 77 of the 88 grade breaks exceed the 0.62% maximum per AASHTO standards. There are no vertical curves provided at these locations to transition between changes in grade. The design criteria of NYCDDC was followed, which permits grade breaks of up to 4 percent. This criteria may be more applicable to low speed New York City streets with frequent intersections. In addition, there are several locations with nonstandard vertical stopping sight distances at crest and sag points, where no vertical curves are provided. This results in a maximum safe operating speed less than the 35 mph design speed at these locations.

### *Grading And Drainage*

In the evaluation of this roadway alternative, the location and slope of Landfill Section 6/7 was considered first, including the introduction of a drainage swale adjacent to the two-foot wide shoulder. The swale is proposed to have a 1 vertical to 3 horizontal slope, and have 1-foot minimum depth.

The principal objective of the stormwater management on the interior Loop Road would be to convey drainage across the Loop Road to the DSNY basins or to Main Creek in the northwestern segment or Richmond Creek in the southwester segment. It is assumed that this could be achieved in a series of roadside drainage swales, piping and BMP's. The vegetated swales would be located on the exterior of the loop road.

**Fresh Kills Park East Park Roads SEIS**

This option also provides two connections to the Forest Hill Road intersection off the proposed Loop Road and a connection to Richmond Hill Road. Similar to the Forest Hill Road Connection at the south end, this option crosses over the same wetland area. At the north end, the proposed park road crosses over the outlet channel of stormwater Basin A, similar to the Richmond Hill Connector. Thus, the channel crossing at stormwater Basin A needs to be mitigated as discussed per the Richmond Hill Road Connector option.

For connections to Forest Hill Road, this park road option crosses the wetland slightly north of the Forest Hill Road Connection alignment and then adds a second crossing further to south. Both crossings would need to convey stormwater, and allow for hydrological and habitat connectivity in the wetlands below the road. The existing wetland area drains via a perennial stream that flows south to Richmond Creek; it crosses the two proposed park roads at Station 104+15 and 149+20. At these locations 54 inch culverts are proposed in order to convey the 100 year stormwater runoff and provide relief in an extreme tidal event. The addition of habitat crossings, such as the natural bottom archways, would also serve a dual function of conveying tidal inundation during a 100-year tidal surge. Table 1-9 identifies the culvert design requirements for the road connections to Forest Hill Road under this option.

**Table 1-9  
Culvert Crossing Station, Culvert Size**

Station	Culvert Size
<b>Forest Hill Road Connection</b>	
100+90	42 inch Concrete Pipe
104+15	54 inch Concrete Pipe
149+20	54 inch Concrete Pipe
<b>Richmond Hill Road Connection</b>	
100+50	36 inch Concrete Pipe
105+00	60 inch box culvert
<b>Sources:</b> HDR, May 2009.	

*Utilities*

Under this option, there is no provision for fire protection along the loop park roads for use during vehicular and brush fires. The existing fire protection main along the Cross Park Roadway (i.e., the Yukon Avenue connection) may be utilized for fire protection along this segment. Street lighting would also be necessary; headlight sight distance is nonstandard at several low points if park road lighting is not provided.

*Proposed Pavement*

To avoid impacts to the existing Landfill Section 6/7 liner which is located approximately three feet below existing grade under the existing DSNY haul roads, a proposed pavement section for this option was developed assuming the existing (haul road) pavement structure remains in place. The proposed top of the new pavement would be typically located approximately four inches above the existing pavement surface. The following is recommended for these areas (and subject to DEC approval):

- For areas of overlay on existing pavement: Scarify existing pavement to be overlaid; truing and leveling as necessary between the existing and proposed pavement section; 2-inch wearing course; 2-inch binder course.

- For areas of new pavement: install 6 inches of flexible pavement; install 24 inches of selected base material wrapped with geogrid reinforcement.

A flexible pavement system over the haul roads, rather than rigid (concrete) or composite (asphalt overlay over unreinforced concrete base) could help to minimize future problems and maintenance requirements due to differential settlement over landfill haul roads. Due to the fact that the existing pavement beneath the haul road has consolidated differential settlement at the joint between the existing local haul road pavement and the new widened pavement could be a design issue.

A field investigation confirmed that some vents fall within the limits of pavement of this alternative roadway.

## **I. EAST PARK ROADS REQUIRED PROJECT APPROVALS**

### **OVERVIEW OF PROJECT APPROVALS**

There are numerous land use and environmental approvals that apply to the proposed project. The applicability of these regulations would vary depending on the specifics of each phase of road construction and design. The permitting must also recognize the current requirements of DSNY and its obligations to complete final closure as well as on-going environmental control, maintenance and monitoring through at least 2036. Involved and interested City, State, and Federal agencies are listed in Table 1-10.

To summarize the necessary approvals, at the state level, discretionary approvals that would apply to the proposed project include modifications to the Consent Order and possibly in the future, Part 360 regulatory end use approvals; permits for activities in wetlands and protection of waters. Federal approvals relate to constructing structures over or in navigable waterways or activities in freshwater or tidal wetlands (e.g., dredging or filling) as delineated in accordance with USACE methodologies. In addition to these approvals, as stated above, New York State legislative approval has already been granted for the alienation of a small portion the existing parkland (Chapter 659 of the 2007 laws of the State of New York) to accommodate the road rights-of-way.

Also listed in Table 1-10 are the agencies that have a regulatory role with respect to the proposed park (these are defined under CEQR/SEQRA as involved agencies), or an advisory role (these agencies are defined under CEQR/SEQRA as interested agencies). All involved and interested agencies were issued this DSEIS and were requested to comment on its content and conclusions. In accordance with CEQR/SEQRA regulations, DPR and DCP is coordinating the environmental review of the proposed Fresh Kills Park East Park Road project with all of these agencies.

**Fresh Kills Park East Park Roads SEIS**

**Table 1-10  
Involved and Interested Agencies**

<b>Agency</b>	<b>Principal Responsibility</b>	<b>Regulatory Role</b>
<b>New York City</b>		
New York City Department of Parks and Recreation	Lead planning and development agency and GEIS lead agency	GEIS Lead Agency, applicant for permits and park mapping and park construction
New York City Planning Commission	Planning, Zoning, and Coastal Zone Consistency	Issuance of City map and zoning amendments, coastal zone consistency
New York City Department of Design and Construction	Design and construction of capital improvements	Construction plans for roadways and infrastructure
New York City Department of Environmental Protection	Watershed management, hazardous materials, water and sewer main connections, septic systems, air quality, natural resources	Issuance of drainage plan for storm water management, best management practices, outlets, and sanitary sewer extensions, water supply connections, air quality permits (minor industrial source)
New York City Department of Health and Mental Hygiene	Advisory agency on public health issues	Advisory review of public health issues and approval of sanitary systems and drainage plans
New York City Department of Sanitation	Compliance with existing permits and closure operations and consent order, and solid waste management operations	Approval of activities potentially affecting closure operations or maintenance, use of DSNY facilities and regulatory compliance
New York City Department of Transportation	Design and operation of City Streets, advisory agency on traffic impacts and management	Road design and connections to existing City streets, parking, street lighting, and bicycle/pedestrian improvements as well as associated traffic and pedestrian mitigation.
New York City Public Design Commission	Review of art, architecture and landscape architecture proposed for City-owned property	Approval of capital projects
New York City Landmarks Preservation Commission	Approval or advisory agency for activities on or near sites of historic or archeological value	Advisory role in EIS process
New York City Office of Environmental Coordination	Coordinating agency for City Actions subject to CEQR	Advisory role in EIS process and coordination among City agencies
New York City Transit Authority	City bus and rail transportation	Advisory role in EIS process
Office of the Staten Island Borough President	Planning and environmental issues	Advisory role in EIS process
New York City Department of Cultural Affairs	Public art and cultural affairs funding and initiatives	Advisory role in EIS process
New York City Office of Environmental Remediation	Coordinating agency for City Actions related to environmental remediation	Advisory role in EIS process
<b>New York State</b>		
New York State Department of Environmental Conservation	Landfill management, hazardous materials, water quality, tidal wetlands, rare and endangered species, air quality, septic systems	Issuance of permits related to landfill closure (Part 360), activities in tidal wetlands or adjacent areas (Article 25), protection of waters (Article 15), or air emission permits (Part 201 and Title V of the Clean Air Act)
New York State Department of Health	Public health	Advisory review of public health issues
New York State Department of State	Coastal Zone Management	Coastal Zone Consistency for actions requiring Federal permits
New York State Department of Transportation	State Highways Access	Approval for work in a state right-of-way and connections to the West Shore Expressway (State Route 440)
New York State Office of Parks, Recreation and Historic Preservation	Designation and Protection of State and National Register Listed and Eligible buildings and places	Advisory role in federal permit review process pursuant to Section 106
<b>Federal</b>		
United States Army Corps of Engineers	Activities within wetlands (tidal or freshwater) and protection of navigable waters	Issuance of permits or authorizations (Section 404) for structures within navigable waters (Section 10)
United States Coast Guard	Structures over navigable waterways	Issuance of permits for structures over navigable waterways, to ensure no impacts on navigation
Environmental Protection Agency, Fish and Wildlife Service, National Marine Fisheries Service	Activities that affect wetlands and RT&E species	Advisory to Army Corps of Engineers during permit review

## CITY OF NEW YORK APPROVALS

City approvals for the Fresh Kills Park and East Park Roads that are subject to a Uniform Land-Use Review Procedure (ULURP) application<sup>1</sup> include the following:

- Amendment to the City map to establish as parkland those portions of this project site that are not currently mapped as parkland;
- Amendment to the City map to eliminate certain unbuilt paper streets (see description above);
- Amendment to the City map to map a public place to serve as the right-of-way for the future vehicular road system, which entails demapping a small portion of the existing mapped parkland;
- A zoning map amendment to assign a zoning district (M1-1) to the areas being de-mapped as park and simultaneously mapped as public place;
- A zoning map amendment to vacate the NA-1 zoning where it currently exists on the site; and
- A zoning text amendment to remove “Fresh Kills Park” from Section 105-941 of the current zoning text.

New York City departments and agencies that are involved and interested agencies in this regulatory and environmental review process are as follows:

- Department of Parks and Recreation (lead agency)
- Department of City Planning (involved, and assisting DPR)
- Department of Design and Construction (interested)
- Department of Environmental Protection (involved)
- Department of Health and Mental Hygiene (interested)
- Department of Sanitation (involved)
- Department of Transportation (involved)
- Public Design Commission (involved)
- Landmarks Preservation Commission (interested)
- New York City Office of Environmental Coordination (interested)
- New York City Office of Environmental Remediation (interested)
- New York City Transit Authority (interested)
- Office of the Staten Island Borough President (interested)
- Department of Cultural Affairs (interested)
- Staten Island Transportation Task Force (interested)

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<sup>1</sup> These actions are proposed as part of a comprehensive ULURP application that would include the proposed East Park roads. The environmental impacts of these actions were addressed in the Fresh Kills Park FGEIS.

## **STATE OF NEW YORK APPROVALS**

As described above, there are a number of state approvals necessary to move the project forward including Part 360 landfill regulatory approvals, modifications to the approved Final Closure Plan, and approvals and modifications to the Order of Consent for landfill closure; approvals for activities in tidal wetlands and adjacent areas; protection of waters; and access and construction of structures over a state highway (Route 440). State of New York departments and agencies that are involved and interested agencies in this process are as follows:

- Department of Environmental Conservation (involved)
- Department of State (involved)
- Department of Transportation (involved)
- Office Of Parks, Recreation And Historic Preservation (interested)
- Department Of Health (interested)

## **AUTHORITIES**

MTA/ NYCT is an interested agency in the project primarily for the purposes of providing transit service. The proposed project would also coordinate with MTA/NYCT for the provision of enhanced bus service to the proposed park via the proposed roads.

## **FEDERAL APPROVALS**

Federal approvals for the proposed project relate primarily to constructing structures over or in navigable waterways or activities in wetlands (e.g., dredging or filling) as delineated in accordance with USACE methodologies and federally listed rare, threatened, and endangered species consultation. Federal departments and agencies that are involved and interested agencies in this process are as follows:

- United States Army Corps of Engineers (involved)
- United States Coast Guard (involved)
- United States Environmental Protection Agency (interested)
- United States Fish and Wildlife Service (interested)
- National Marine Fisheries Service (interested)

## **J. ENVIRONMENTAL REVIEW AND THE PUBLIC PARTICIPATION PROCESS**

Pursuant to SEQRA and its implementing regulations, New York City has established rules for local environmental quality review, abbreviated as CEQR. CEQR provides a means for decision-makers to systematically consider the environmental effects of a proposed project along with other aspects of project planning and design, as well as a comparison with reasonable alternatives, and to identify, when practicable, mitigation measures that eliminate or reduce significant adverse environmental effects.

The City of New York adopted a local environmental review process under Executive Order 91 of 1977 from which the City Rules of Procedure for local environmental review were developed. The guidance for the City's methodologies for performing environmental review is presented in

the *City Environmental Quality Review Technical Manual* (October, 2001), which was used by DPR for the preparation of the DGEIS.

In accordance with the requirements of SEQRA, CEQR review adapts and refines the State rules to take into account the local circumstances in New York City. As stated above, it is the purpose of the GEIS and its supporting documents to address the issues relative to SEQRA for state agencies that are involved in this environmental review process.

In addition, the proposed project requires a number of federal approvals. The environmental review process at the Federal level is performed in accordance with NEPA. Beginning with scoping, DPR has coordinated with the Federal agencies and has applied federal criteria (e.g., USACE wetland delineations) where appropriate in order to ensure that a coordinated environmental review with federal agencies has been prepared as part of the GEIS that meets the coordinated review requirements of CEQR, SEQRA, and NEPA, insofar as possible.

Coordination with all City, State, and Federal agencies will continue through the preparation of the FSEIS, the statements of findings, and the permit review processes that are necessary to implement the proposed project.

A more detailed description of the environmental review process followed in the preparation of this SEIS follows.

***Establishing a Lead Agency:*** Under CEQR, the “lead agency” is the public entity responsible for conducting environmental review. Usually, the lead agency is also the entity principally responsible for carrying out, funding, or approving a proposed action or project. In accordance with the CEQR rules, DPR distributed a lead agency letter to all involved and interested City, State and Federal agencies in February, 2009. There were no objections and DPR is the lead agency for the preparation of this SEIS.

***Determination of Significance:*** DPR determined that the proposed project may have a significant adverse impact on the environment and issued a Positive Declaration in February 2009 requiring that an SEIS be prepared.

***Scoping:*** Once the lead agency issues a Positive Declaration, it must then issue a Draft Scope of Work for the SEIS. “Scoping,” is the process of identifying the environmental impact analyses, and methodologies to be used for the EIS, and the key issues to be studied. Under CEQR, environmental review for preparing an environmental impact statement requires a public scoping meeting at the outset of that process. In accordance with the City’s Rules of Procedure for preparing an EIS, a Fresh Kills Park Draft Scope of Work to Prepare a DGEIS was prepared and distributed to all involved and interested City, State and Federal agencies, the general public, elected officials and the local Community Boards 2 and 3 in February 2009. A public scoping meeting on that Draft Scope of Work was then held on March 25, 2009. Based on the comments received at that scoping meeting and in comments subsequently received in writing, modifications were made to the draft scope and a Final Scope of Work was issued by DPR on June 1, 2009. This Final Scope established the methodologies and the framework for analyses presented in this SEIS.

***Draft Supplemental Environmental Impact Statement (DSEIS):*** This DSEIS has been prepared in accordance with the Final Scope of Work (see Appendix A). The Lead Agency has reviewed all elements of the DSEIS, relying on other City State and Federal agencies to assist, as appropriate, in determining its completeness. Once DPR was satisfied that the DSEIS was complete for public

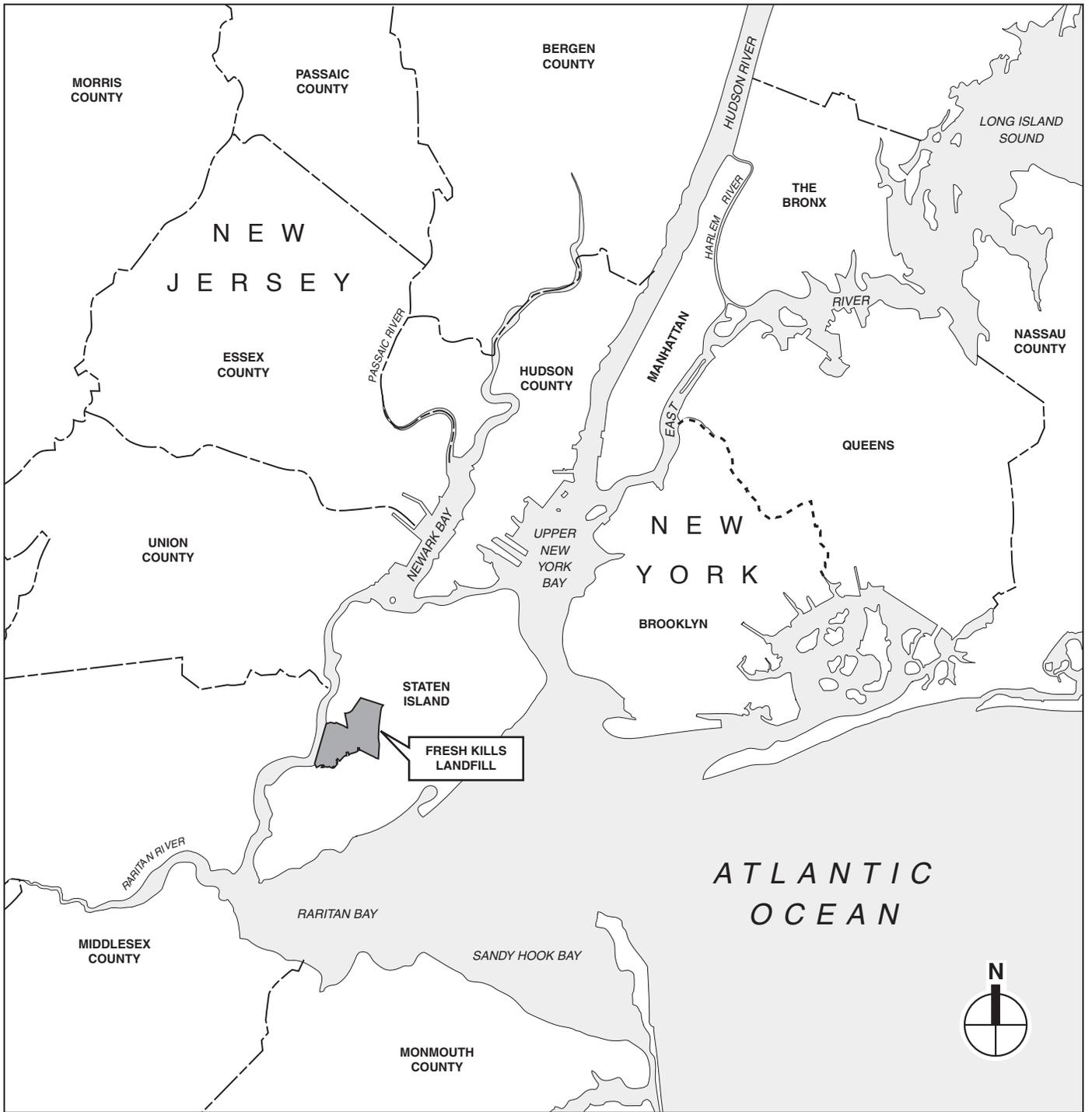
## **Fresh Kills Park East Park Roads SEIS**

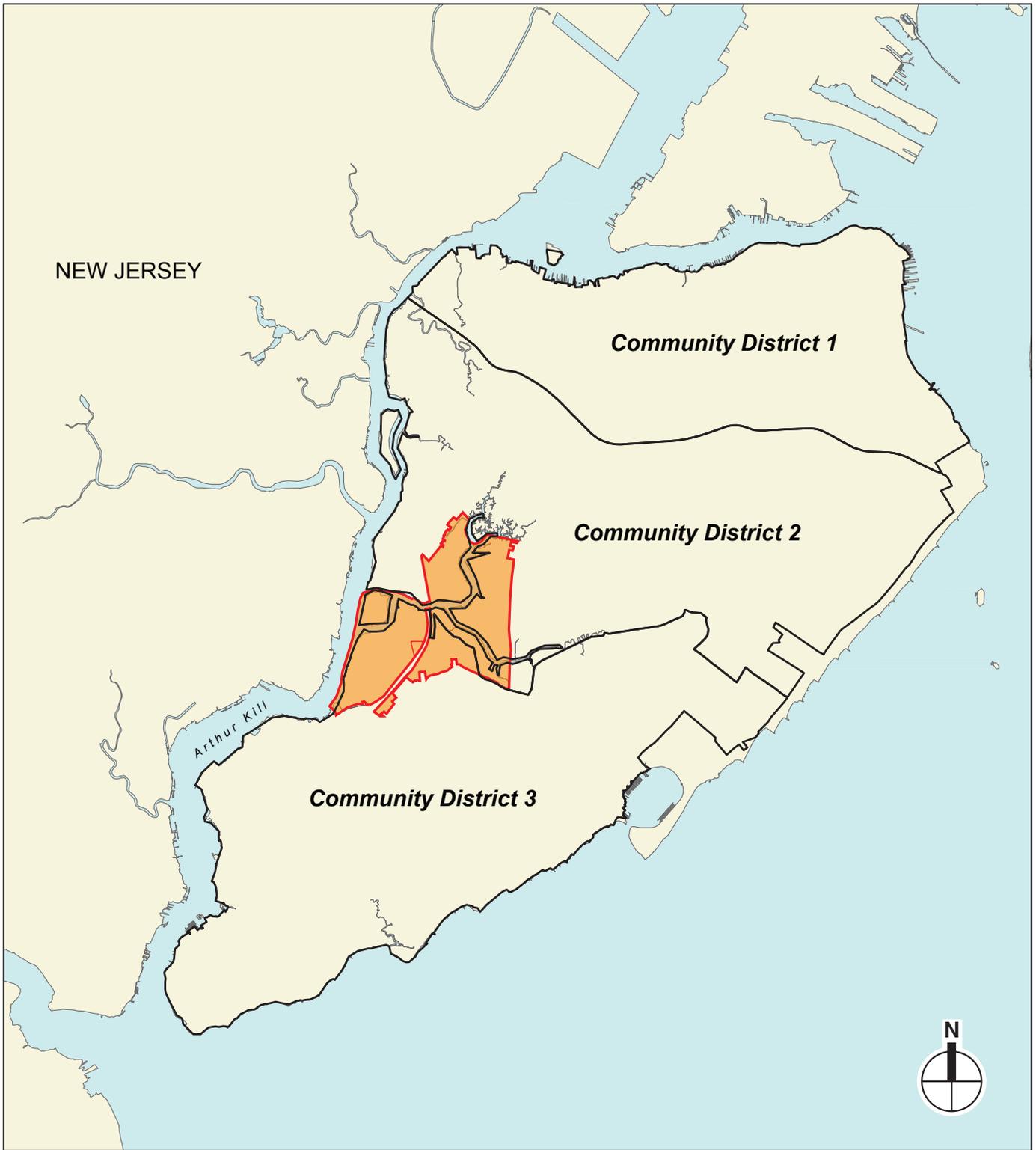
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review, it issued a Notice of Completion and circulated the DSEIS for public review. The Notice of Completion for this DSEIS was issued on June 5, 2009.

**Public Review:** Publication of the DSEIS and issuance of the Notice of Completion started the public review period. During this time, the public, interested and involved agencies and elected officials have the opportunity to review and comment on the DSEIS either in writing or at a public hearing convened for the purpose of receiving such comments. DPR will publish a notice of that hearing at least 14 days in advance, and will accept written comments for 10 days following the close of the hearing. All substantive comments received at the hearing become part of the record and will be summarized and responded to in the FSEIS.

**Final Supplemental Environmental Impact Statement (FSEIS):** After the close of the public comment period for the DSEIS, DPR will prepare an FSEIS. That FSEIS will incorporate relevant comments on the DSEIS as received in writing or at the public hearing. Based on those comments, the FSEIS will incorporate any necessary modifications to the DSEIS text, graphics, and tables that are necessary in response to those comments. DPR will then issue the FSEIS. As stated above, the FSEIS must be issued (with the Notice of Completion) at least 10 days before the Lead Agency (DPR) or an involved agency can make a decision on the proposed project and the related actions. \*





 *Fresh Kills Park Site Boundary*  
 *Community District Boundary*

0 1 2 MILES  
SCALE

Fresh Kills Park Site and Staten Island  
Community Districts 1, 2, and 3  
**Figure 1-2**



— Fresh Kills Park Site Boundary

- · - Solid Waste Management Units

① Landfill Section 3/4

② Landfill Section 2/8

③ Landfill Section 6/7

④ Landfill Section 1/9

⑤ DSNY Staten Island Waste Transfer Station and Crushing and Screening Facility

⑥ DSNY Construction Staging Area

⑦ DSNY Staten Island District 2 Garage

⑧ Stormwater Basins

⑨ DSNY Construction Operations Area

⑩ DSNY Landfill Gas And Purification System

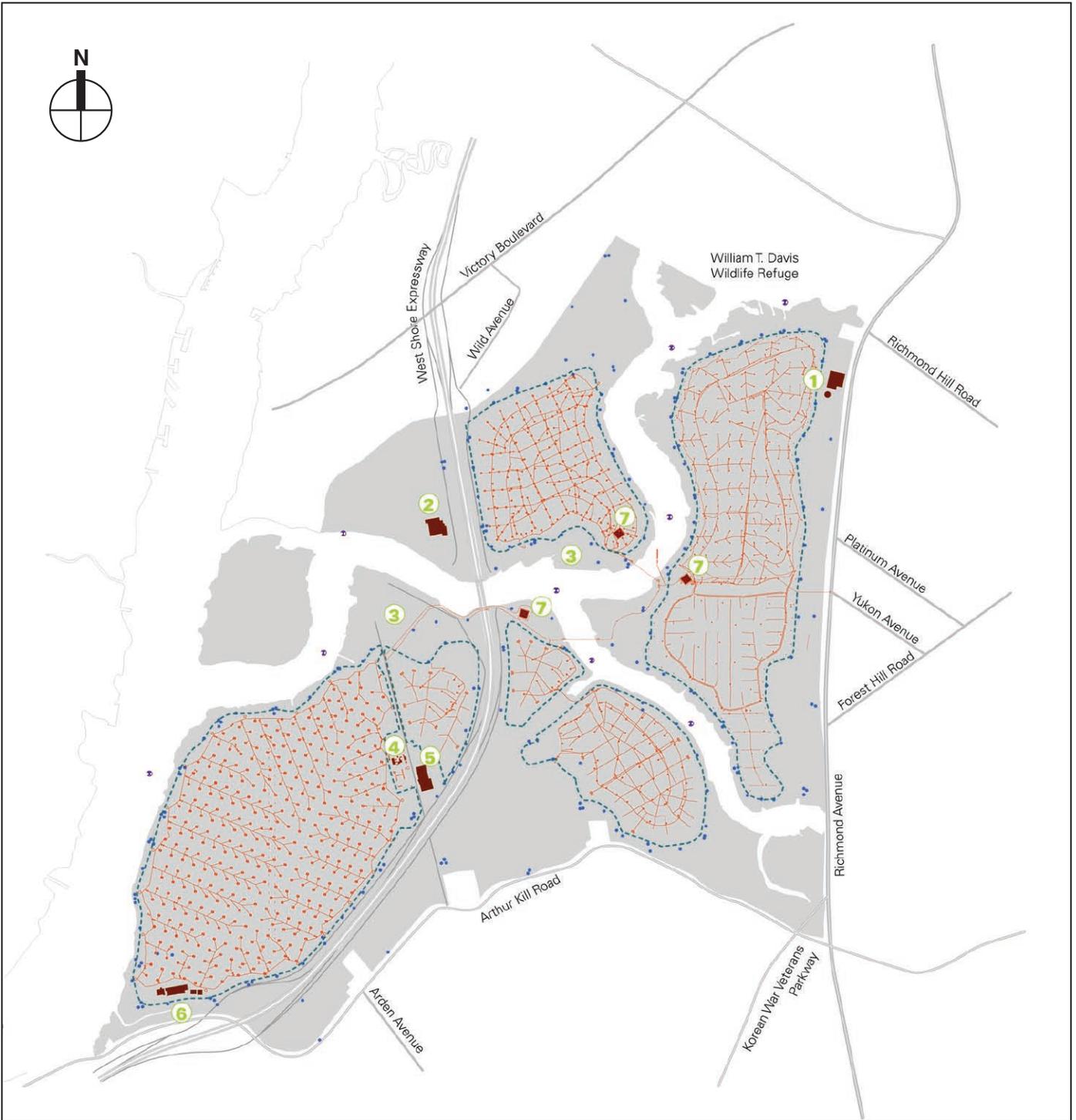
⑪ DSNY Staten Island District 3 Garage and Borough Repair Shop

⑫ DSNY Leachate Treatment Plant

⑬ DSNY LFG Flare Station

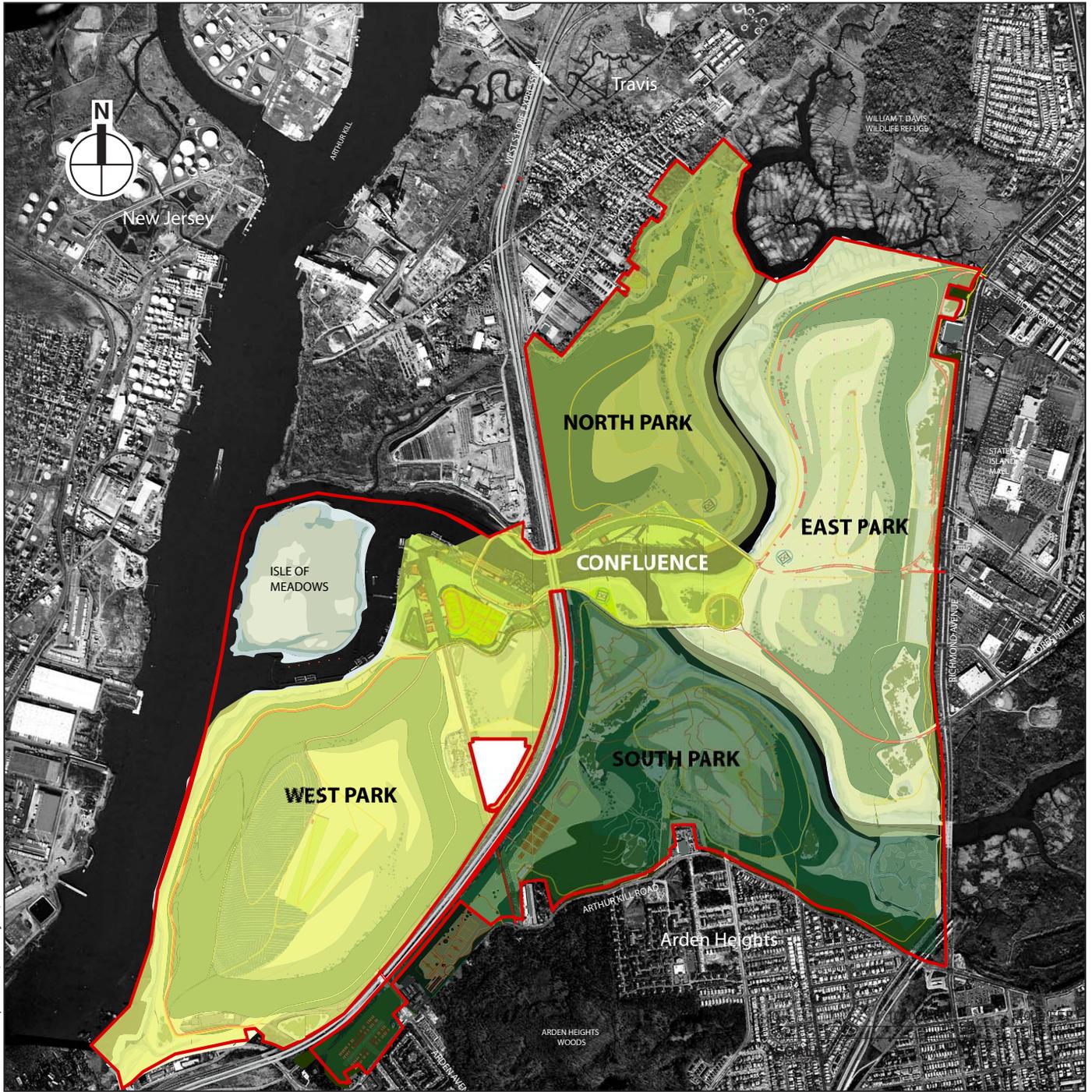
DSNY Fresh Kills Facilities

Figure 1-3a



- - - - - leachate collection and containment system
- groundwater monitoring well
- x surface water sampling location
- - - - - landfill gas collection system

- DSNY operations facility
- 1 DSNY Staten Island District #2 Garage & Repair Shop
- 2 Staten Island Waste Transfer Station, Crushing and Screening Facility
- 3 DSNY staging area
- 4 DSNY landfill gas recovery facility
- 5 DSNY Staten Island District #3 Garage & Borough Repair Shop
- 6 DSNY leachate treatment plant
- 7 DSNY LFG flare station



 Fresh Kills Park Site Boundary

0 1700 FEET  
SCALE



- Travis neighborhood park
- eco-education center
- Travis neighborhood softball field
- rock basin garden
- hilltop open field
- park maintenance building
- Creek Landing
- the Terrace
- the Point
- overlook
- park maintenance building
- park administration and maintenance building
- Isle of Meadows
- waterfront picnic ground
- Isle of Meadows overlook
- September 11 earthwork monument
- Arthur Kill overlook
- indoor sport facility

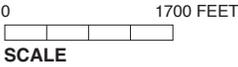
- event lawn and overlooks
- berm overlooks
- water garden + wetland boardwalk
- fresh water marsh
- interpretive center
- park maintenance building
- hilltop meadow
- Sunken Forest
- hilltop overlook
- mountain biking trails
- hilltop meadow
- picnic area and canoe launch
- equestrian center
- tennis courts
- information center and park maintenance building
- Arden Heights neighborhood park, barbecue and play area

- high-intensity areas
- sport + recreation areas
- passive recreation areas
- visitor center
- information center
- park features
- DSNY maintenance and operations areas
- paths and trails
- mountain biking trails

0 1/2 Mile  
SCALE



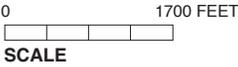
— Proposed Park Road



NOTE: ILLUSTRATIVE PLAN BASED ON DMP



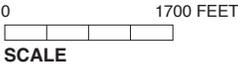
— Proposed Park Road



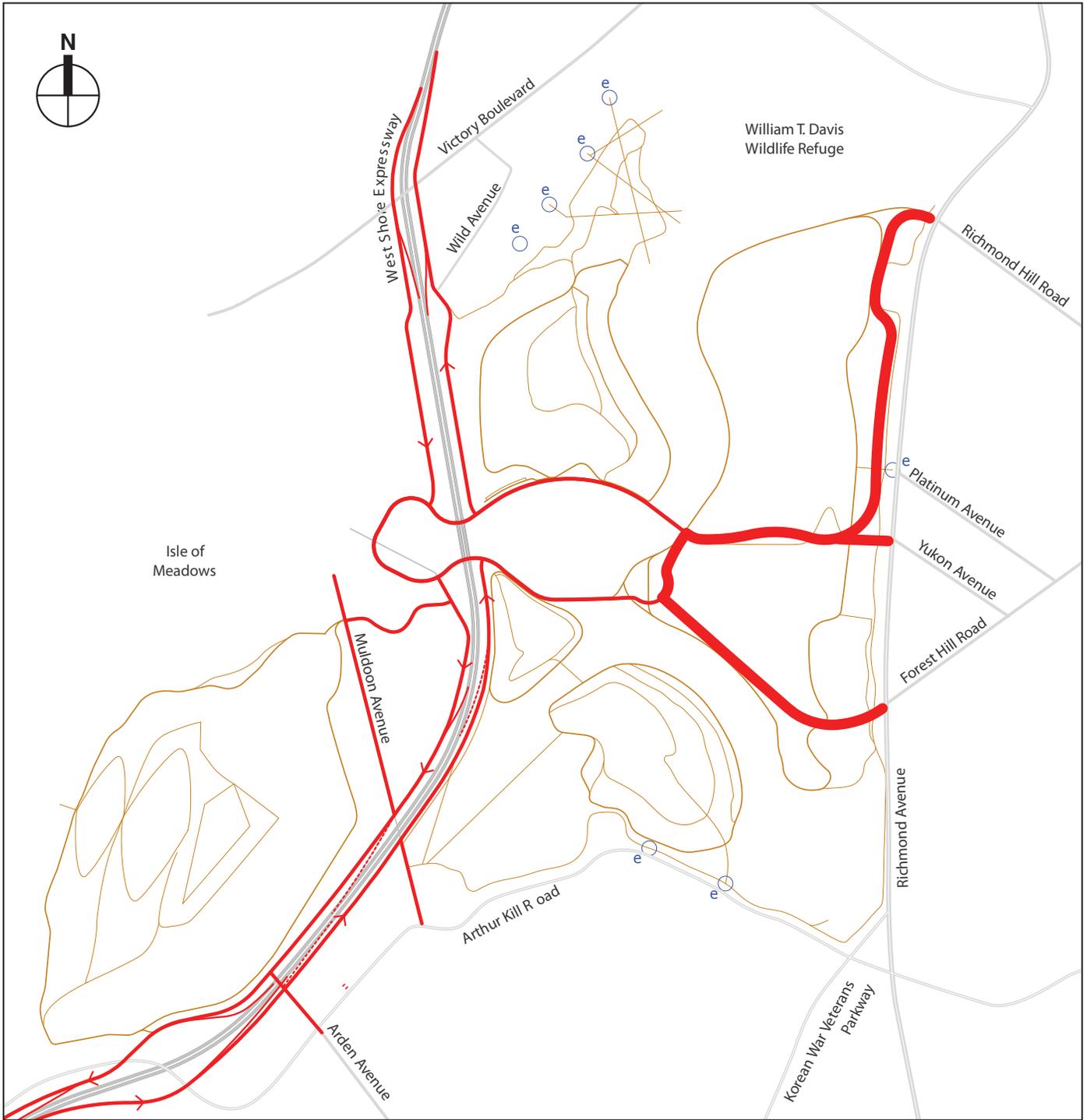
NOTE: ILLUSTRATIVE PLAN BASED ON DMP



— Proposed Park Road



NOTE: ILLUSTRATIVE PLAN BASED ON DMP



-  Proposed East Park Roads (2-4 lane option)
-  Confluence Loop Road and West Shore Expressway Connection
-  Path and Trails

**Road Design Standards**

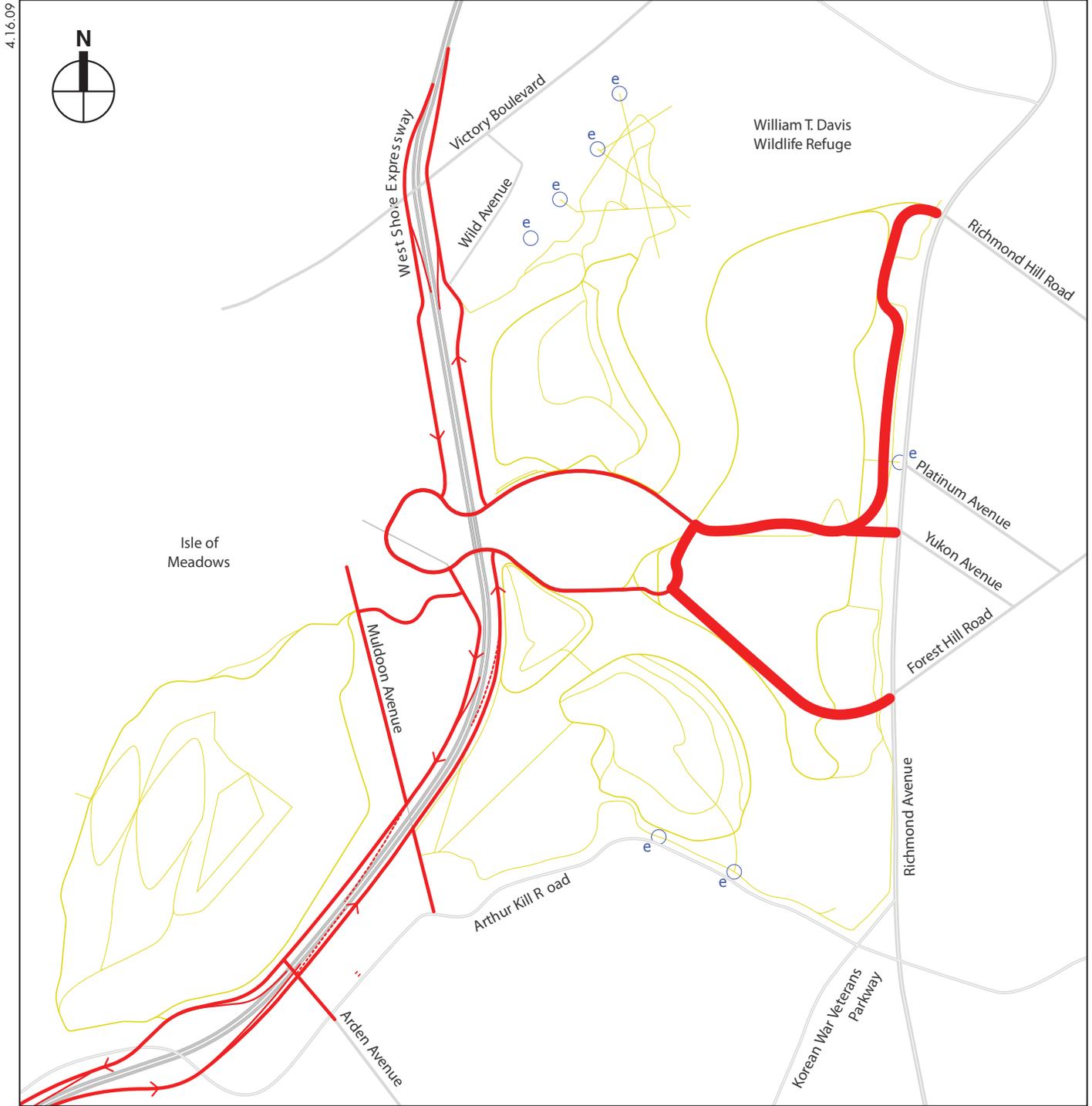
4 travel lanes (11 feet wide)

Median - 4 feet

Shoulder - 2 feet

Speed - 35 mph

NOTE: See also Table 1-3



**Road Design Standards**

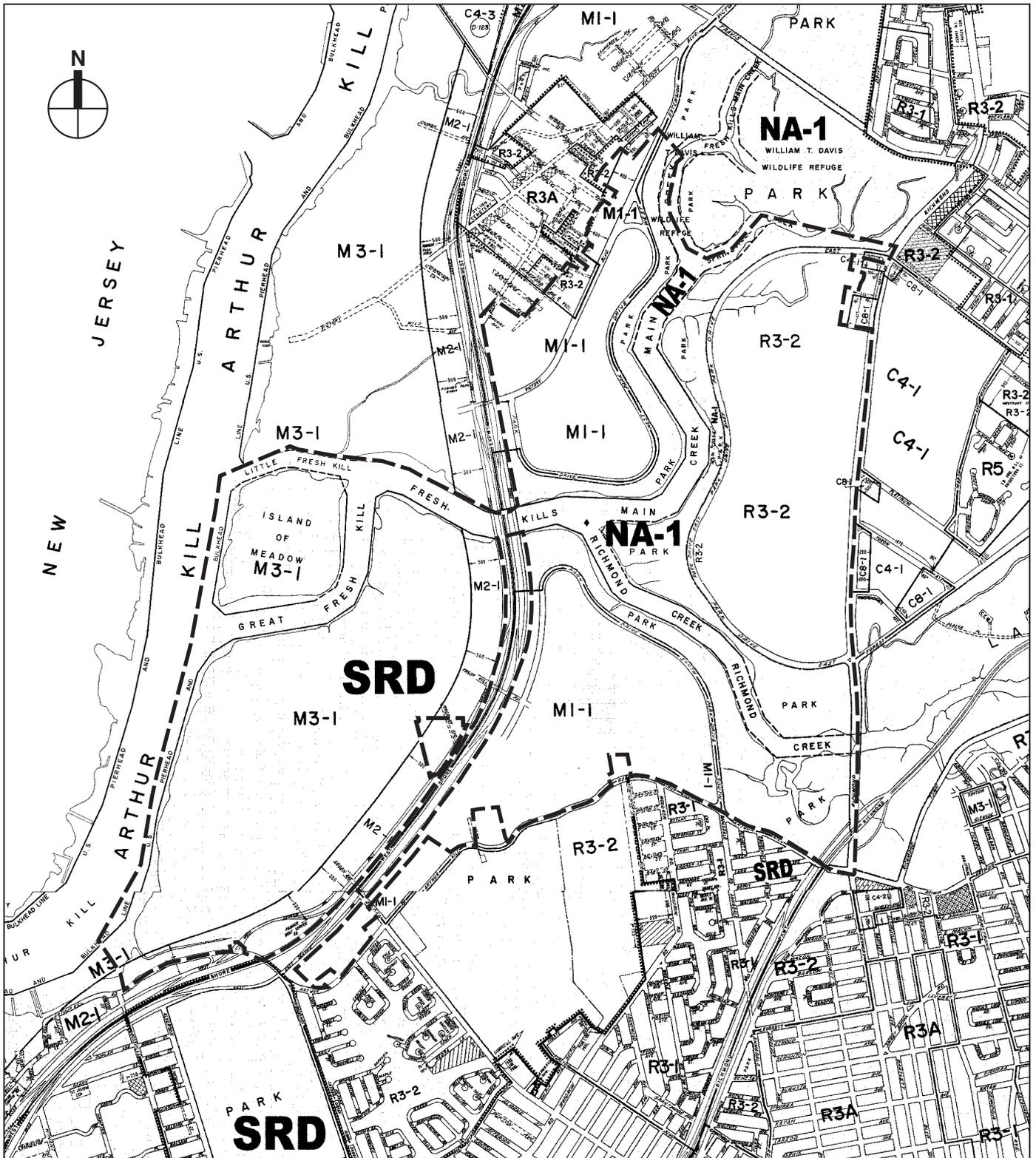
*4 travel lanes (11 feet wide)*

*Median - 4 feet*

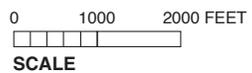
*Shoulder - 2 feet*

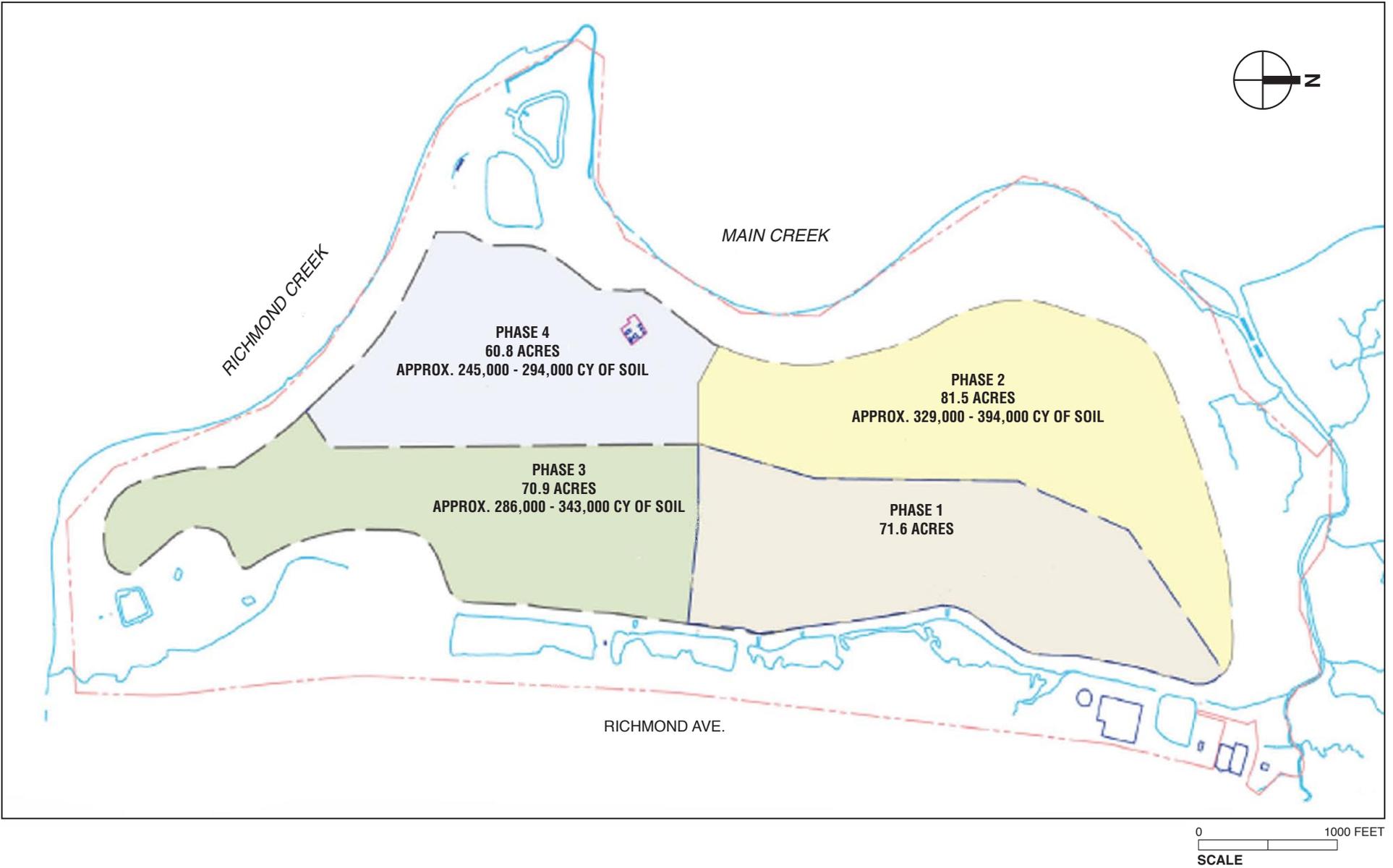
*Speed - 35 mph*

**NOTE:** See also Table 1-3



- - - Fresh Kills Park Site Boundary
- Zoning District Boundary
- Special Purpose District
- C1-1 Overlay
- C1-2 Overlay
- SRD South Richmond District
- NA-1 Natural Area District
- Fresh Kills East Park Roads • Seis
- Currently Mapped Park Drive
- C1-3 Overlay
- C2-1 Overlay
- C2-2 Overlay



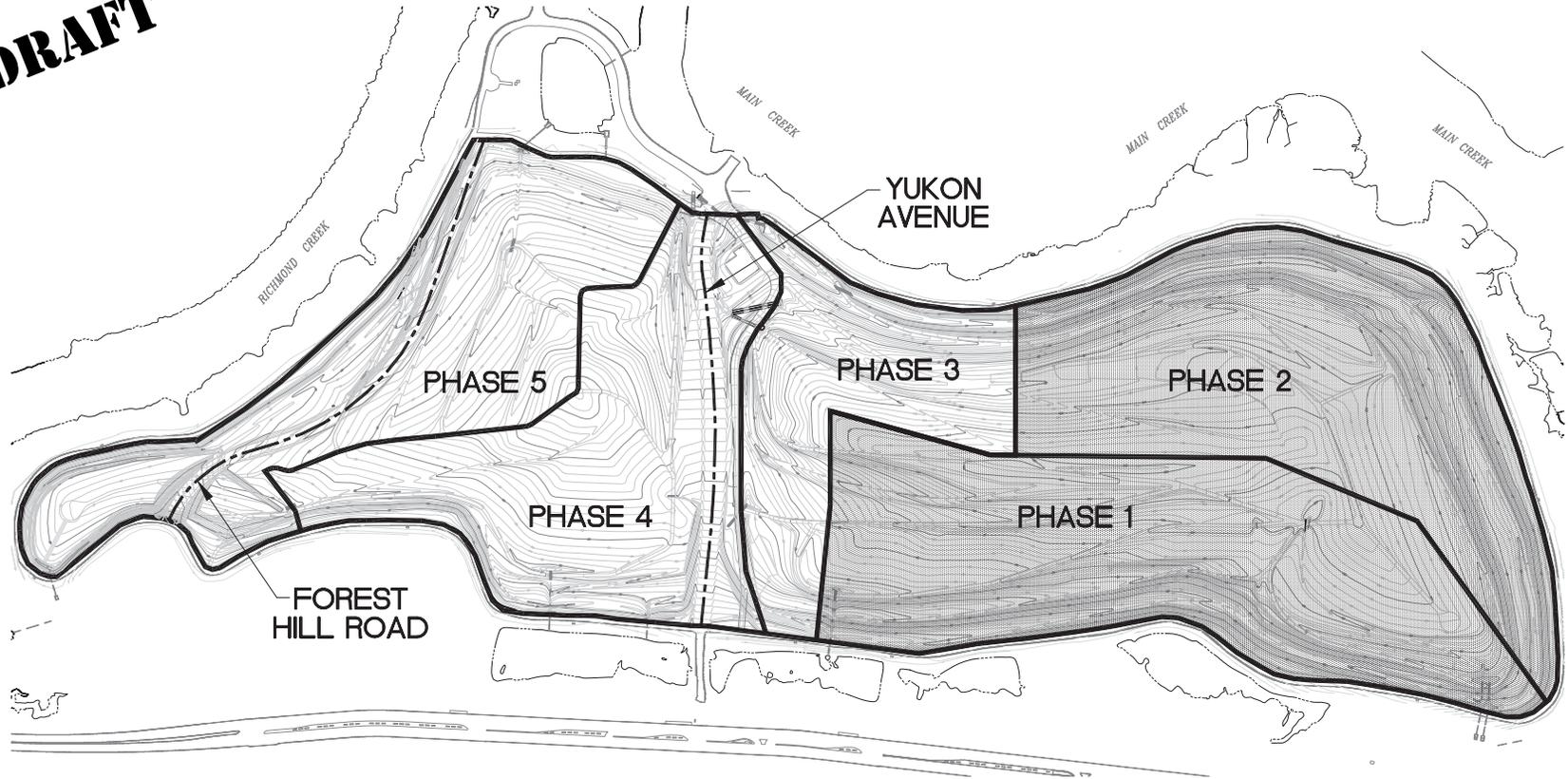
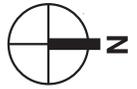


Final Closure Construction Phasing for Section 6/7  
(Approved Plan)

**Figure 1-6**

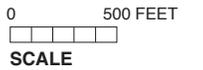
**DRAFT**

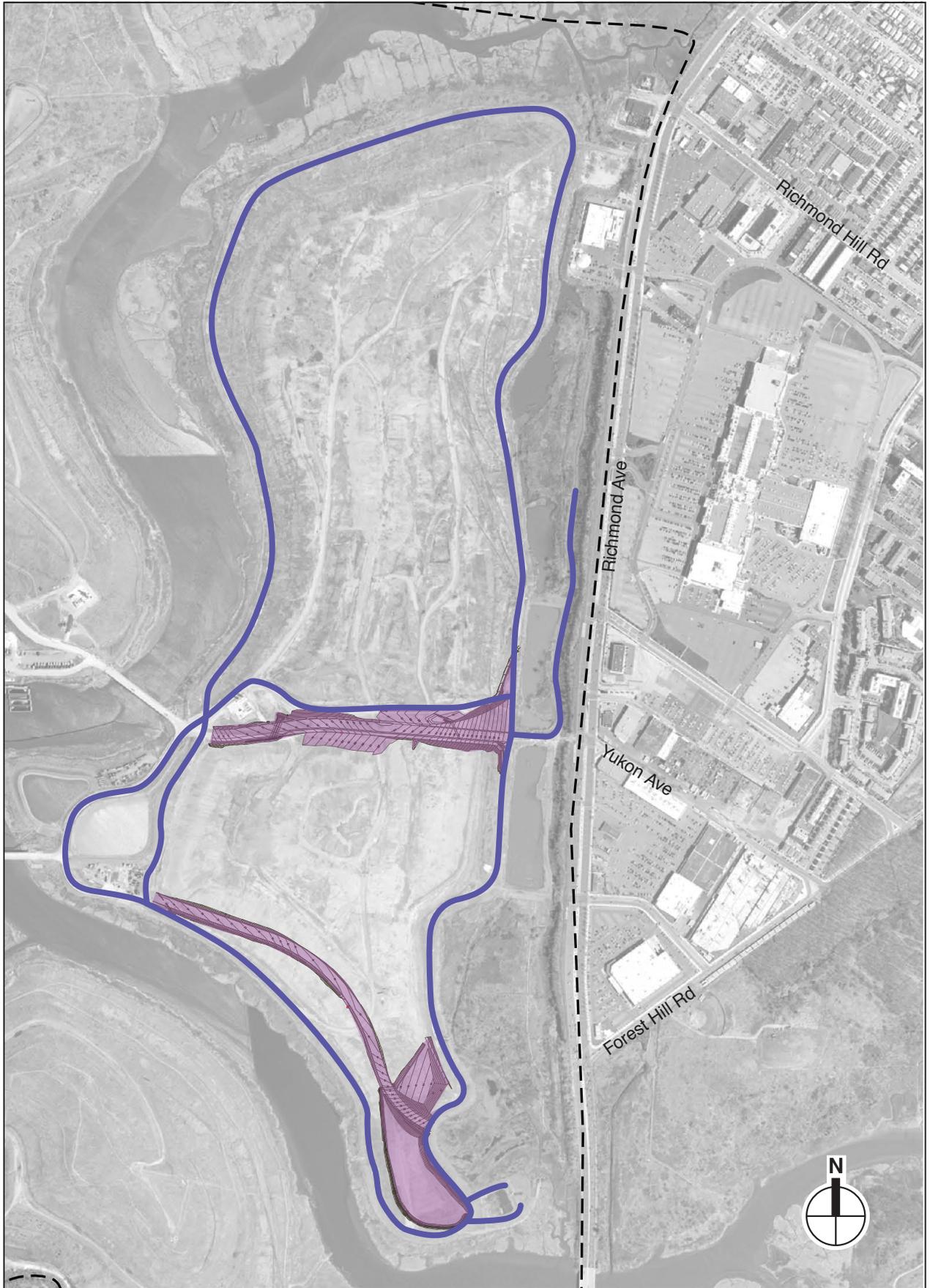
**CONCEPTUAL ALTERNATE FINAL CLOSURE  
PHASED CONSTRUCTION SEQUENCE**



NOTES:

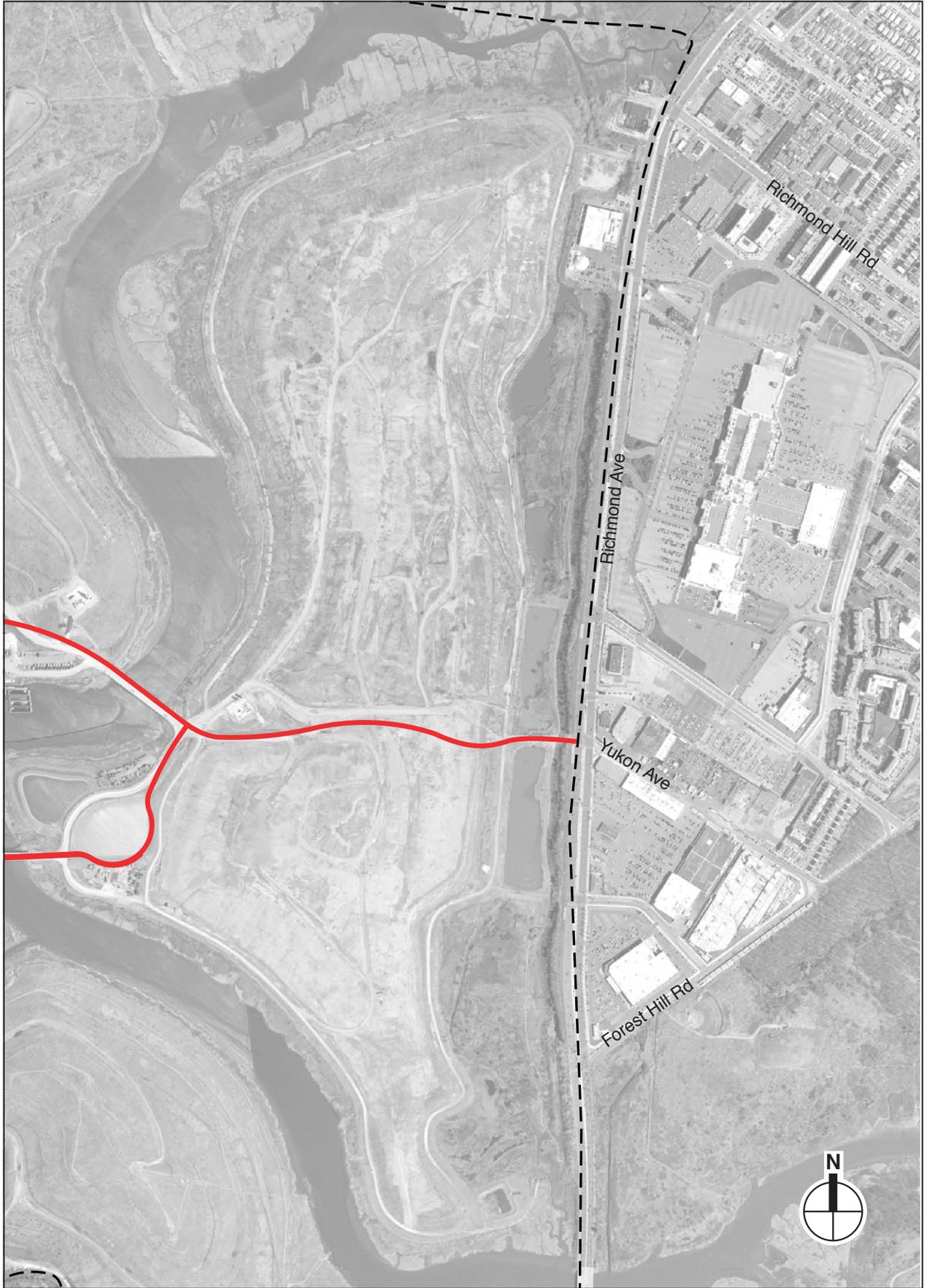
- 1. CONCEPTUAL ALTERNATE FINAL CLOSURE SEQUENCE IS SUBJECT TO CHANGE.
- 2. PHASE 1 AND PHASE 2 COMPLETED AS OF 2009. PHASE 3 WORK TO BE COMPLETED IN 2009.





-  DSNY Service Roads
-  Area of Landfill Modification

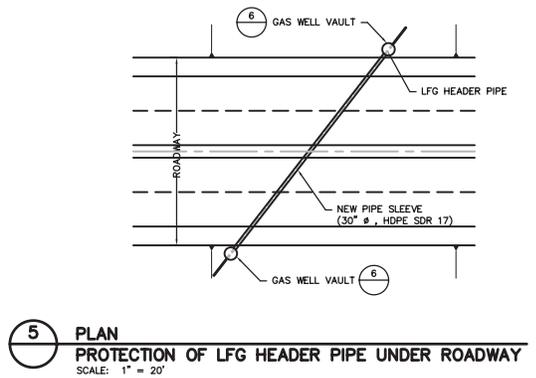
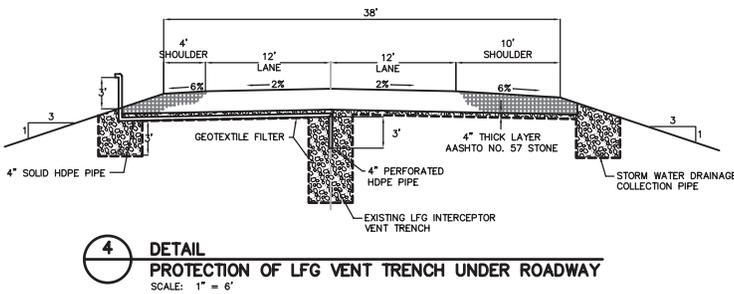
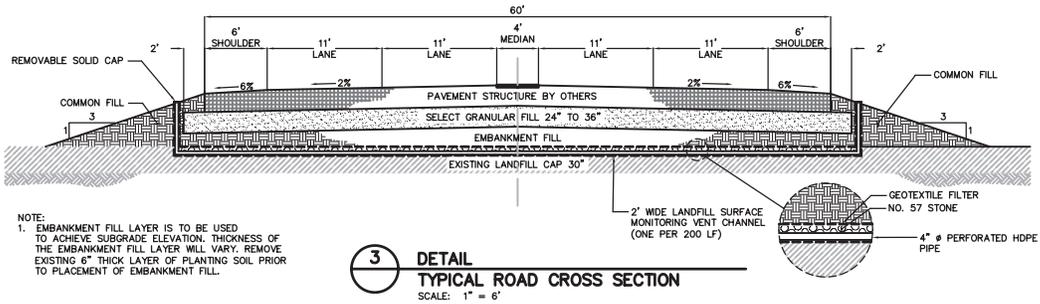
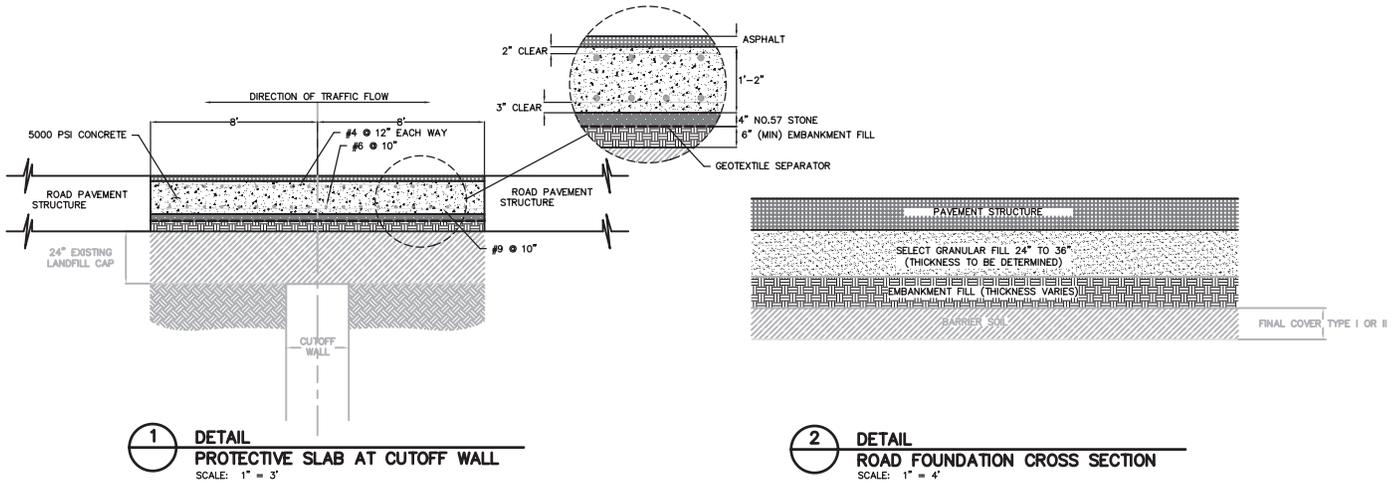
Landfill Section 6/7  
2011: Embankment Modification  
**Figure 1-7**



— Proposed Park Road

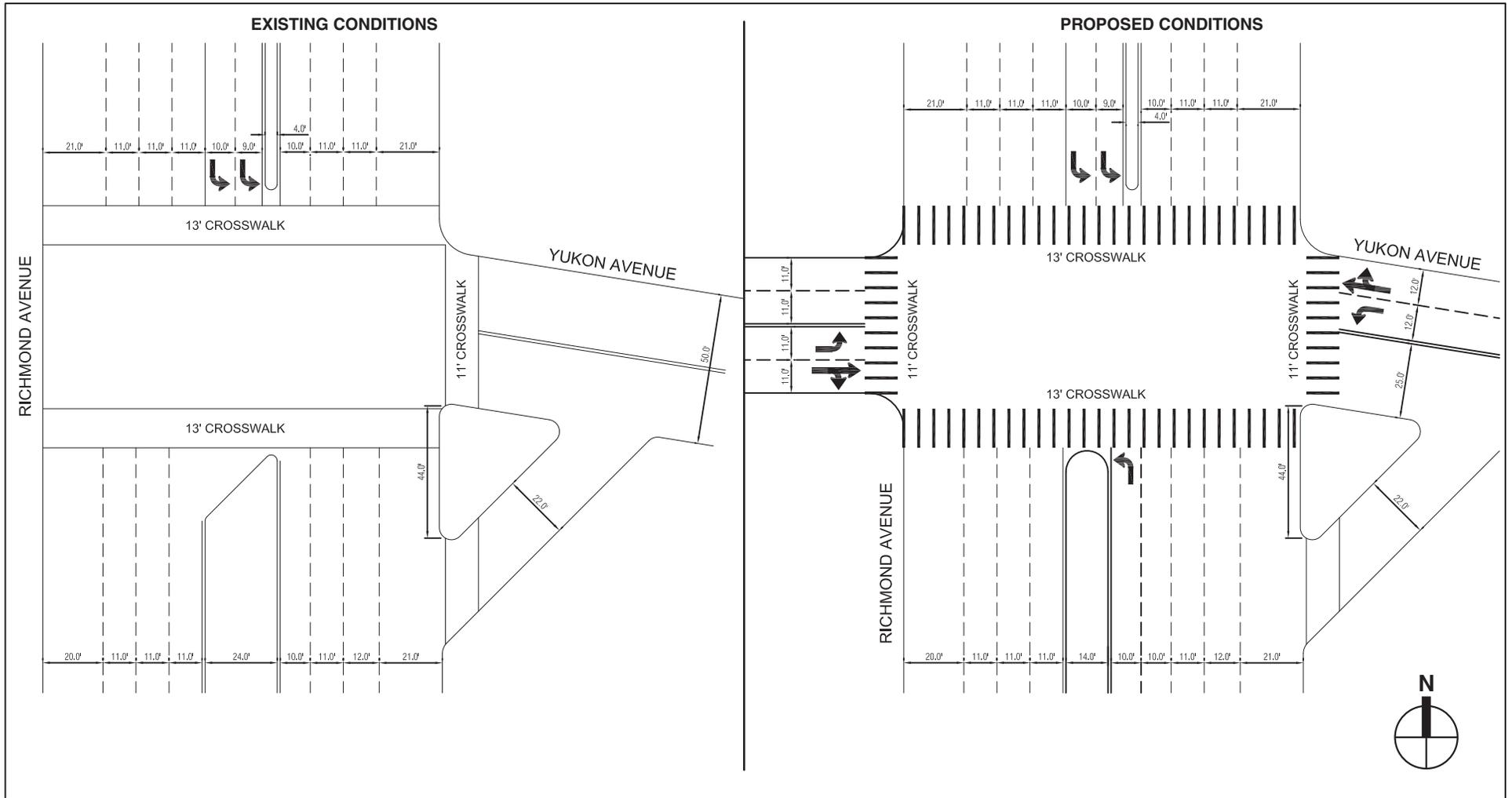
East Park Roads  
2016: Yukon Avenue Connection

Figure 1-8



Source: Geosyntec, January 17, 2008

NOTE: Typical section for 4-lane road. Section for 2-lane road would have one less 11-foot travel lane in each direction and a total road width of 38-feet



Proposed Intersection of Yukon Avenue and Richmond Avenue  
(with Mitigation)



— Proposed Park Road

Fresh Kills Park Landfill Section 6/7  
2036: 4 Lane Road Connections



- DSNY Service Roads/ Multipurpose Path
- Proposed Park Roads
- DSNY Service Roads/ Hiking Path/ Trail

Fresh Kills Park Landfill Section 6/7  
2036: All Connections  
**Figure 1-11a**



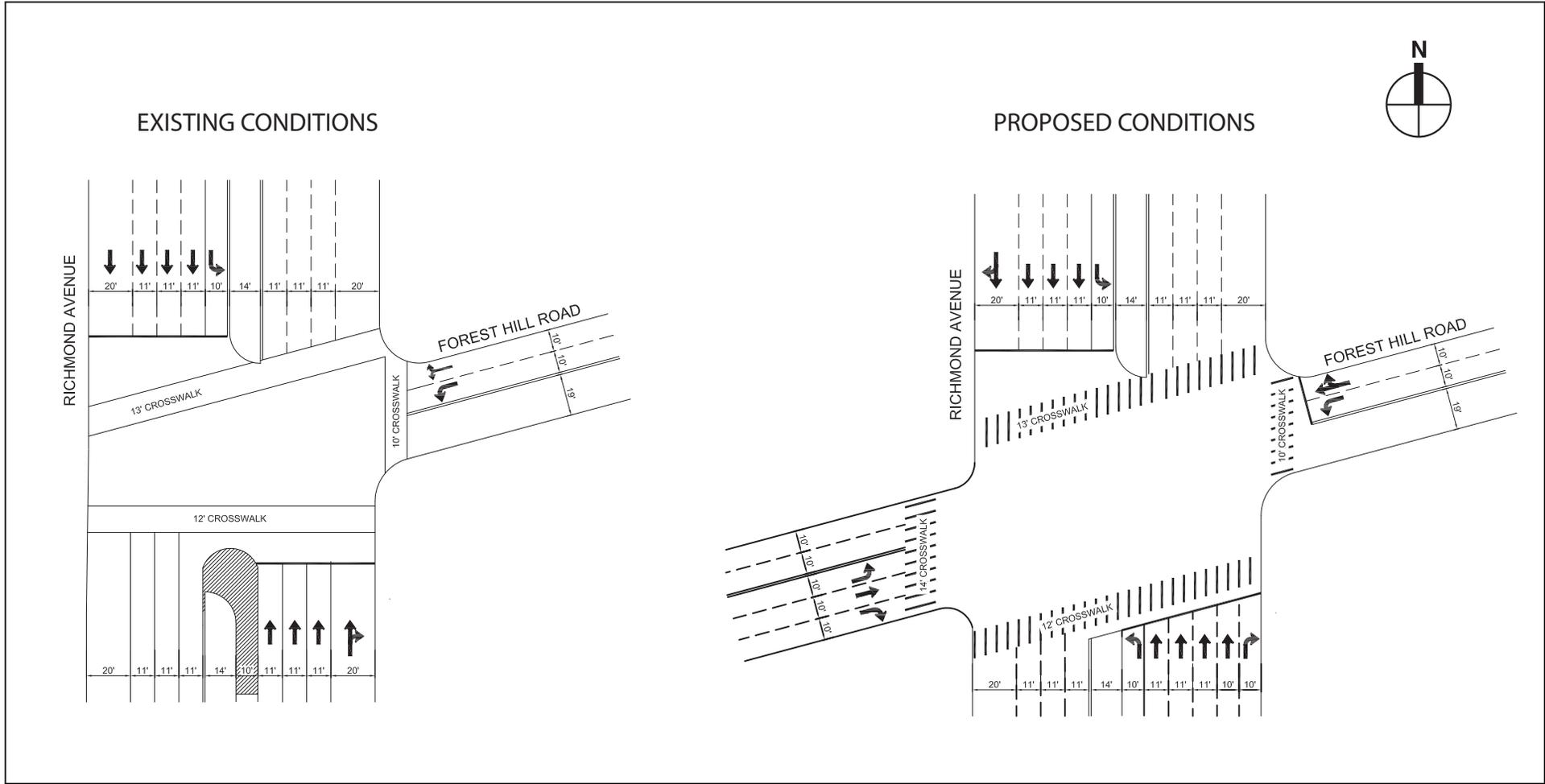
**EAST PARK**

- 1 hilltop field; 23 acres
- 2 overlook deck; 550 sf
- 3 picnic fields; 9 acres
- 4 flare station + screen; n/a
- 5 picnic area and lawn; 2 acres
- 6 recreational path loop; 12 miles
- 7 tidal marsh area; 28 acres
- 8 wetlands with boardwalk; 13 acres
- 9 nature education area; 21 acres
- 10 bosque parking; 6 acres
- 11 mixed woodland; 130 acres
- 12 successional meadow; 187 acres
- 13 outdoor classroom; 600 sf
- 14 nature education center; 4000 sf
- 15 woodland + berm trail; 30 acres
- 16 berm overlooks; 900 sf each
- 17 Forest Hill entrance;
- 18 Richmond Hill entrance;
- 19 Yukon entrance;
- 20 East Park Drive (alternate A)
- 21 East Park Drive (alternate B)
- 22 East Park Drive, south
- 23 pile bridge over wetland
- 24 potential golf course or recreational fields
- 25 morphing timelines: energy (MLU)
- 26 pedestrian and bicycle bridge

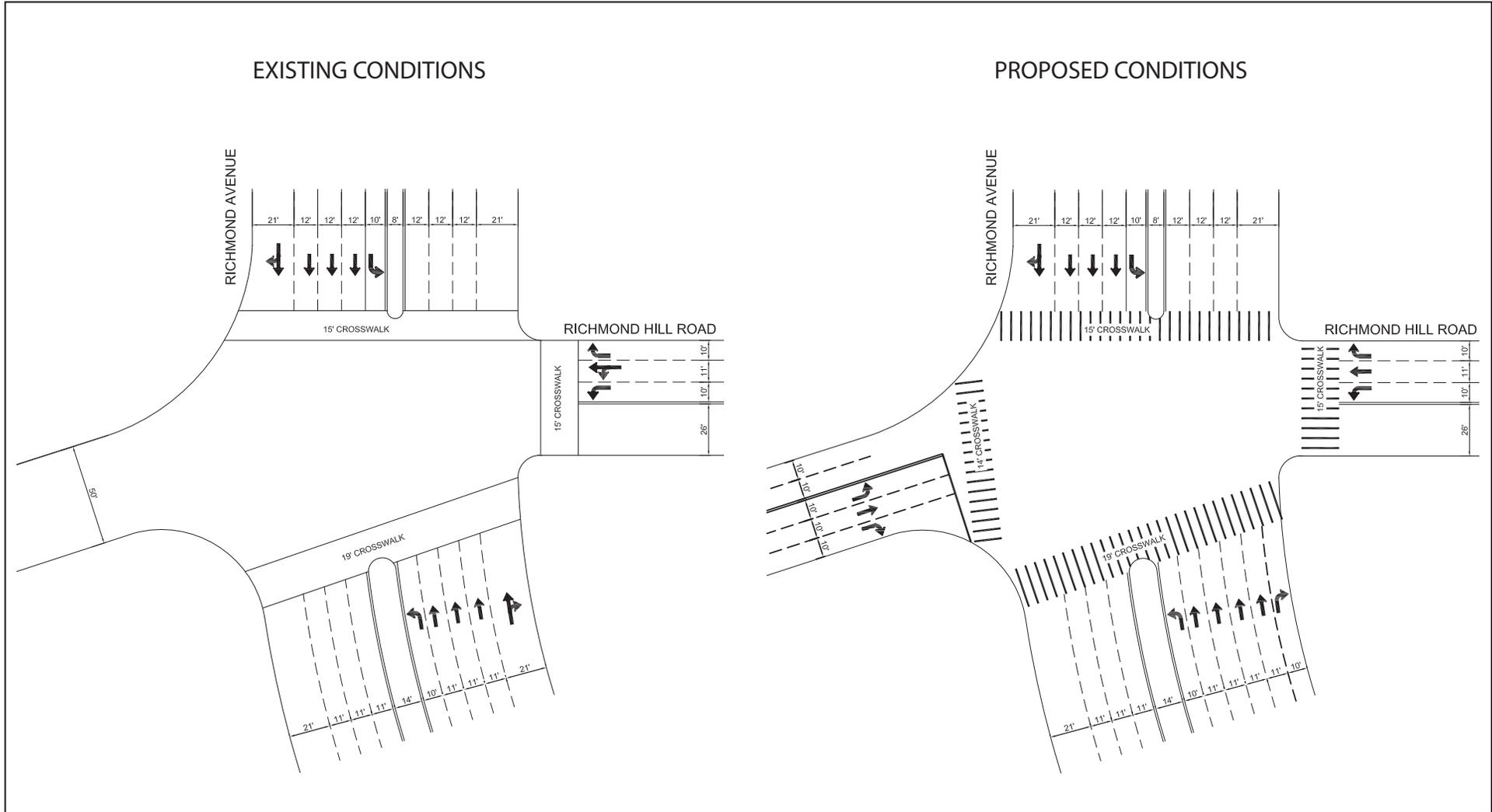


Source: Field Operations, January 24, 2008

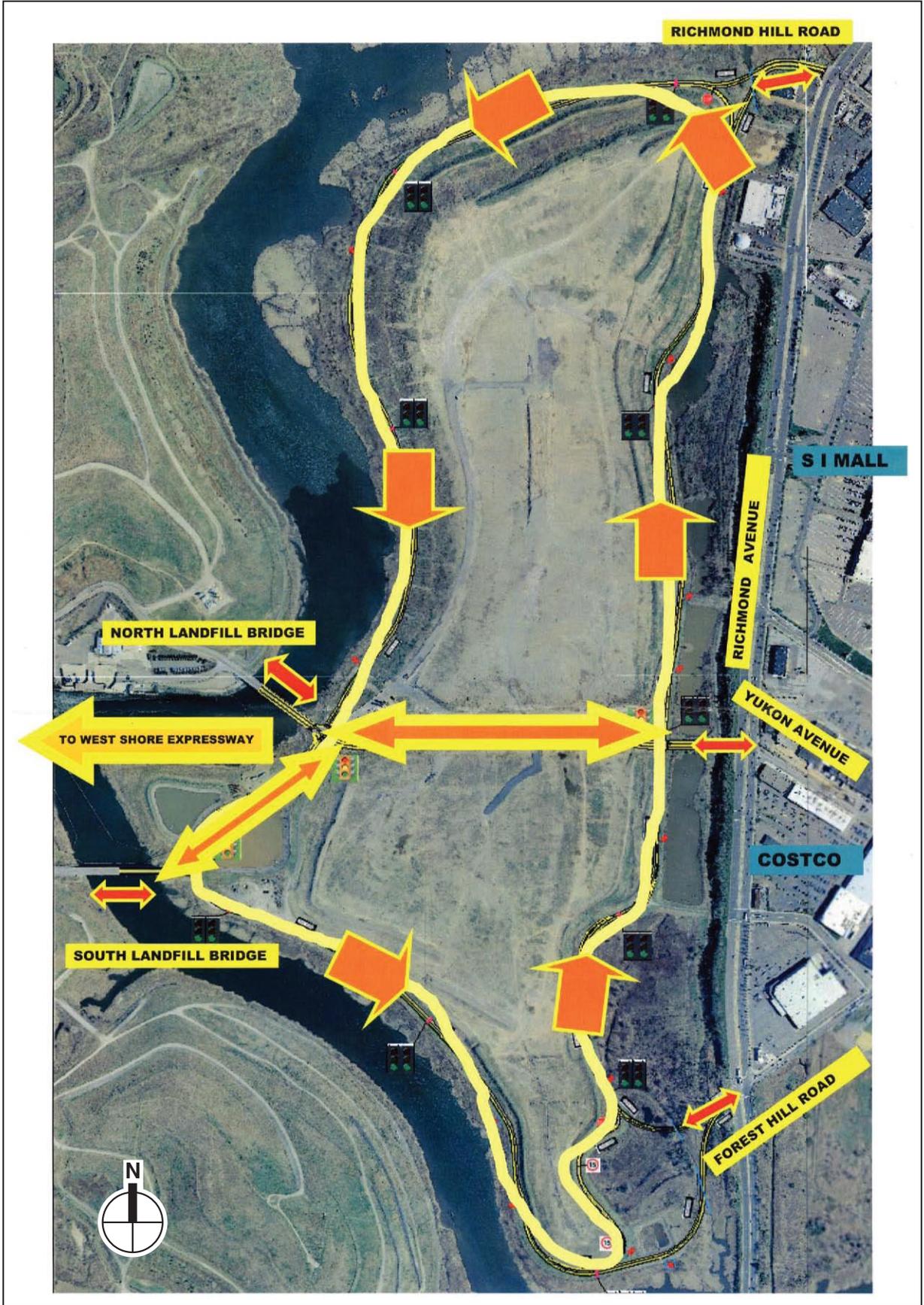
NOTE: FOR ILLUSTRATIVE PURPOSES ONLY



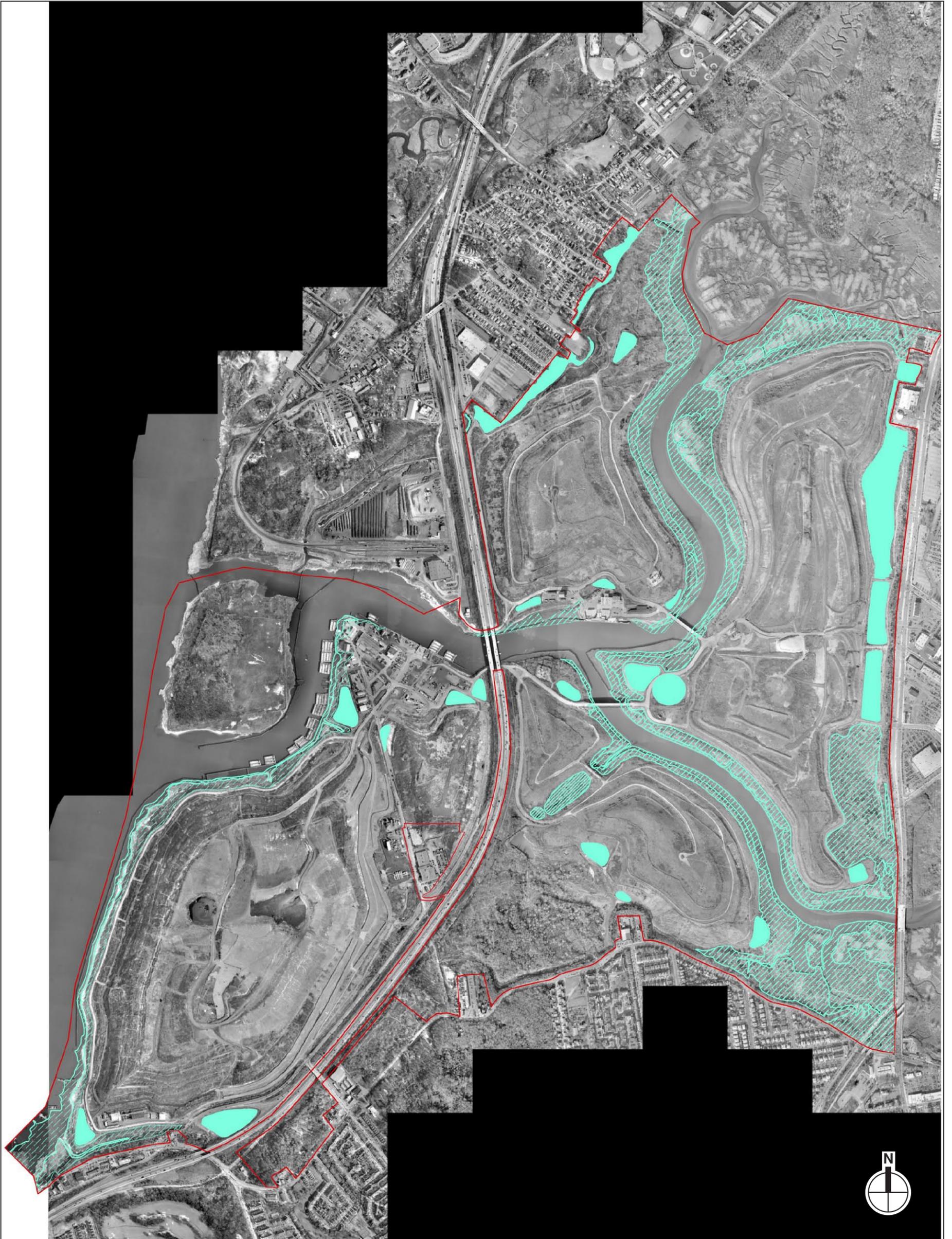
Proposed Intersection of Forest Hill Road Connection Park Road South/Richmond Avenue/Forest Hill Road



Proposed Intersection of  
Richmond Hill Road Connection Park Road North/  
Richmond Avenue/Richmond Hill Road  
**Figure 1-14**



East Park Loop Road and Richmond Avenue Connections  
**Figure 1-15**



- Fresh Kills Project Site Boundary
- Stormwater Basins and Freshwater Wetlands
- Tidal Wetlands

Stormwater Basins and Degraded Wetlands for Potential Improvement  
**Figure 1-16**