Chapter 20: Construction

A. INTRODUCTION

OVERVIEW

This chapter describes a preliminary construction and phasing plan for the proposed project, presents a description of associated construction activities during the three analysis scenarios including the implementation of a proposed landfill cover (2011), construction of the two-lane Yukon Avenue Connection (2016) and completion of the East Park road system, assuming construction of the Forest Hill Road and Richmond Hill Road Connections (2036). The design of the proposed roads does not include any paved public walkways or bikeways; therefore, this analysis focuses on the construction of the embankment and the associated road corridor landscaping.

The proposed project involves construction activities that would occur over an extended period (approximately 30 years). The long-term nature of the project is due, in part, to the complexity of the construction program as well as the capital costs of implementation. As would be expected, intensity of construction activity varies over time and depends on the particular construction phase. However, while the construction period is lengthy, this extended construction phasing over many years also has the effect of limiting construction impacts for individual road projects. In addition, the size of the project site and its access to regional highways allows this project to stage the major construction activities within the site and provides significant buffers between the project site and the surrounding neighborhoods. A description of the construction period and potential impacts of the proposed project follows.

GUIDELINES FOR CONSTRUCTION IMPACT ANALYSES

The *City Environmental Quality Review (CEQR) Technical Manual* states that construction impacts, although temporary, can include noticeable impacts, such as traffic and noise. The degree of the impact is generally dependent on the duration and magnitude of construction. The predominant concerns relative to construction impacts are traffic-related impacts from construction employees and truck traffic or due to street or lane closings for the cranes and other heavy equipment needed for utility installations; air quality that may be affected by mobile source emissions from trucks and other vehicular traffic as well as dust due to earth moving operations (i.e., clearing, grading, excavatory filling) or on-site operations (e.g., a concrete batching plant or soil making operation); noise associated with blasting, pile driving, or other construction activities; and disturbance of soils or groundwater that may contain hazardous materials or impact natural resources.

The proposed project would be constructed in three segments and each segment would be constructed over a distinct two- to three-year period.

Because of the extended construction period, this chapter is comprehensive and includes impact analyses in the areas with the greatest potential for adverse impacts during construction, including:

- Land use and neighborhood character, which is a construction period analysis that is typically prepared when a construction activity is going to affect a property for an extended period of time. This analysis will determine whether the type and duration of effect could affect local land uses and neighborhoods.
- Historic resources that may be potentially affected because of their presence in the area, such as by vibration as well as the potential impacts to archaeological resources.
- Natural resources and water quality for activities that would be occurring in wetlands and along water bodies as well as runoff from sediments and the activities that generate sediments, such as excavation, grading and exposed soils areas.
- Hazardous materials issues as they relate to soil and groundwater conditions as well as demolition of existing structures.
- Traffic and parking, particularly along major truck routes and vehicle corridors serving the project site as well the potential to impact any street or lane closings. A quantified or detailed study of traffic is usually only undertaken for projects with long construction periods and where traffic during construction could have measurable impacts that are comparable or greater than a project impact for an extended duration. Additional considerations are street or lane closures for cranes and other types of construction activity that may occur in a built city street; also possible are temporary diversions or full or partial street closings.
- Air quality from mobile sources such as increased vehicle and truck traffic, on-site construction equipment and fugitive dust emissions caused by demolition, excavation, and other construction activities as well as stationary sources such as concrete batching plants.
- Noise from mobile sources and heavy equipment operations on the site (e.g., compressors, and gas- and diesel-powered engines).
- Solid waste and the disposal of construction debris.
- Public health.

The determination of impact significance for construction impacts is based on the same criteria as the technical analyses prepared for each of these EIS technical areas (see the preceding chapters). However, since construction impacts are often short-term, the impacts can be described as temporary and, for that reason, not significant.

With respect to other EIS technical areas not cited above, the proposed project would provide significant construction jobs, but would not adversely impact local businesses, nor would it adversely impact any local community facilities or services, or local open spaces. Few transit or pedestrian trips are expected and therefore these technical areas are not analyzed. In addition, while the proposed project would require connections to infrastructure, these connections are expected to be standard utility connections to provide site service extensions or upgrade water and electrical service to the site and therefore no significant impacts on infrastructure are expected during construction.

A construction impact analysis typically begins with a description of the anticipated construction activities and phasing, where construction staging would occur, and for multiple phase projects the equipment and activities associated with each phase. This information serves as the basis for describing and analyzing construction impacts. The phasing analysis for this project can also be broken down both temporally and geographically. Measures necessary to address potential impacts during construction are discussed in Chapter 23, "Impact Avoidance Measures and Mitigation."

B. DESCRIPTION OF PROPOSED CONSTRUCTION PROGRAM

PROJECT IMPLEMENTATION AND PHASING

This SEIS analyzes the environmental impacts of the proposed project in three analysis years: 2011, 2016, and 2036 (see Table 20-1). The first year, 2011 addresses construction of a road embankment across Landfill Section 6/7; the second year 2016, is the year by which the Yukon Avenue Connection road construction is expected to be completed as a two-lane road; the 2036 analysis year is year by which the East Park road system would be completed.

Table 20-1
Project Phases for Construction Analysis

Project Phase	Estimated Completion Date
Proposed Embankment and Final Closure Construction—construction of road embankment across Landfill Section 6/7.	**2011**
Proposed Park Road (Yukon Avenue Connection)—two-lane park road connection extending from Yukon Avenue/Richmond Avenue on the east to Confluence Loop Park Road on the west.	**2016**
Completed East Park Road System—park road connections extending from Forest Hill Road/Richmond Avenue; Richmond Hill Road/Richmond Avenue; and the Loop Park Road with connections on the west to Confluence Loop Park Road on the west.	**After 2016**
Sources: New York City Department of Parks & Recreation, March 2009.	

As stated above, the proposed project is a major capital project that would be developed in multiple phases over several decades. It involves the construction of about two miles of park roads and potential connections/intersections with Richmond Avenue at Yukon Avenue, Forest Hill Road and Richmond Hill Road.

PARK ROAD TYPICAL CONSTRUCTION ACTIVITIES

Construction activities associated with the proposed park roads would involve the importation of soil for road base as well as material for road surfaces, finishes and corridor landscaping. The proposed Landfill Section 6/7 Final Cover Report, Addendum 1 and the Yukon Avenue Connection are nearer term project elements. The road segments proposed for the 2017 to 2036 period are long term, subject to design decisions, and many years away from final design. For the longer-term projects, a development build year and more detailed designs are yet to be finalized. Typical construction activities associated with these park road projects are presented in Tables 20-2 through 20-4.

TYPICAL CONSTRUCTION EQUIPMENT

Typical construction equipment expected to be used over the duration of park road construction is listed in Table 20-5. Because the intensity of construction activities would vary depending on the construction phase the use of each type of equipment over the many capital phases of construction would differ depending on the phase of construction.

Table 20-2
Proposed Project Elements

Proposed Park Road Connections	Estimated Construction Period
Landfill Section 6/7 Final Closure Construction and Proposed Road Embankment—roadway embankment construction over the central and southern portions of Landfill Section 6/7.	**2009-2011**
Yukon Avenue Connection (two-lane)—roadway connection between the Confluence Loop Park Road and Yukon Avenue at Richmond Avenue totaling approximately 2,600 linear feet including a road segment over the central portion of Landfill Section 6/7 and a new intersection at Richmond Avenue and Yukon Avenue.	**2010-2012**
Forest Hill Road Connection—road connection between the Confluence Loop Park Road and Richmond Avenue at Forest Hill Road totaling approximately 4,600 linear feet including a roadway segment over the south portion of Landfill Section 6/7, a viaduct crossing of wetlands, and a new intersection at Richmond Avenue and Forest Hill Road.	**After 2016[1]**
Richmond Hill Road Connection—road connection between the Confluence Loop Park Road on the south and Richmond Avenue at Richmond Hill Road on the north totaling approximately 4,990 linear feet and crossing landfill stormwater management facilities east of Landfill Section 6/7 including embankments and drainage basins adjacent to wetlands, and creating a new intersection at Richmond Avenue and Richmond Hill Road	**After 2016[1]**
East Park Loop Road—loop road around the base of Landfill Section 6/7 and including modification to Landfill Section 6/7 infrastructure and regrading to create a two-lane public road with road segments adjacent to and across freshwater and tidal wetlands.	**After 2016[1]**
Note: (1) It is estimated that the period of construction for these road segments would be about two years **Source:** Fresh Kills Park Development Team, 2009.	

Table 20-3
Estimated Duration of Construction

Roadway Element	Estimated Duration of Construction
Yukon Avenue Connection	2 years
Forest Hill Road Connection	2-3 years
Richmond Hill Road Connection	2-3 years
East Park Loop Road	2 years
Source: Fresh Kills Park Development Team, 2009.	

Table 20-4
Typical Construction Activities for Three Phases of Construction

Proposed Project	Typical Construction Activities
Landfill Section 6/7 Final Closure Construction and Proposed Road Embankment	Site preparation and relocation of landfill infrastructure (as necessary), heavy equipment to import engineered fill for embankment and grading, grading for stormwater swales, final cover of grasses and gravel service roads.
Yukon Avenue Connection	Site preparation, heavy equipment road grading, installation of utilities, construction of road base and asphalt surface, installation of lighting, road and landscaped edge finishes, signage, and striping.
Forest Hill Road Connection	Site preparation, protection of off-mound environmental monitoring points, and modification to landfill gas vent trench. Heavy equipment to import engineered fill for embankment and grading, installation of utilities, grading for stormwater swales, construction of road base and asphalt surface, installation of lighting, road and landscaped edge finishes, signage, and striping. Natural bottom arched culverts construction involves excavation, drilling of piles, construction of pile caps and piers, surfacing with asphalt, installation of barriers and railings, and installation of finishes, lighting, signage and striping. Heavy equipment is utilized to deliver materials, for excavation and pile drilling/driving, erection of steel elements and for lifting construction materials.
Richmond Hill Road Connection	Site preparation, protection of off mound environmental monitoring points and modification to landfill gas vent trench. Heavy equipment to import engineered fill for embankment and grading, installation of utilities, grading for stormwater swales, construction of road base and asphalt surface, installation of lighting, road and landscaped edge finishes, signage, and striping. Culvert construction involves excavation, drilling or driving of piles. Heavy equipment is utilized to deliver materials, for excavation and pile drilling/driving and for lifting construction materials.
East Park Loop Road	Site preparation, modification, protection and relocation of landfill environmental infrastructure as necessary. Heavy equipment to import engineered fill for embankment and grading, installation of utilities, grading for stormwater swales, construction of road base and asphalt surface, installation of lighting, road and landscaped edge finishes, signage, and striping.
Source: Fresh Kills Park Development Team, 2009.	

Table 20-5
Typical Construction Equipment

Equipment for Peak Stages	Engine Size (hp)
Backhoes	87.17
Excavators	137.6
Loaders	87.17
Dozers	136.1
Cranes	237.7
Compressors	83.9
Pile Driver	237.7
Concrete Pumps	137.7
Water Pumps	8.5
Generators	33.4
Graders	231.2
Pavers	134.6
Rollers	84.7
Heavy Trucks	N/A

Source: *Hunt's Point WPCP FEIS*, July 12, 2007.

During construction, various types of construction equipment would be used at different locations throughout the site. Some of the equipment is mobile and would operate throughout the site while some would remain stationary on-site at distinct locations. Stationary emission sources include the crane, compressor, concrete pump, water pumps, generator and pile driving, depending on the particular period of construction. The excavators, loaders, backhoes, dozers, graders, pavers, rollers, trucks, and heavy trucks would also operate throughout the site at the particular areas of park road construction or would follow the road alignment during road construction.

CONSTRUCTION TRUCK ROUTES AND ACCESS

It is anticipated that truck movements for the proposed construction would, to a large degree, follow the routes currently used by the New York City Department of Sanitation (DSNY) and its contractors in conjunction with the final landfill closure construction. This maximizes use of regional roads for delivery of soils and materials and minimizes use of local roads. Use of existing truck routes also provides the opportunity for controlled access for deliveries of soil and materials.

Flaggers, temporary dividers, and traffic controls to manage the access and movements of trucks would be used for construction activities along Richmond Avenue, as necessary. These construction activities would all be subject to the review and approval of the New York City Department of Transportation (NYCDOT) as part of a construction access permit that would be necessary to construct the proposed ramps and service roads that are within the jurisdiction of NYCDOT.

Some of the site deliveries would also occur along the perimeters of the project site (e.g. landscape materials, fencing). For projects that require work along or in City streets, as with any other street construction projects, these activities would take place in accordance with NYCDOT-approved traffic maintenance plans, as appropriate. However, the need for such traffic management plans is expected to be limited since little project construction is proposed within existing City streets. The exceptions include activities associated with the construction of the three connections along Richmond Avenue, which would require work with these intersections. A traffic management plan would be necessary for these activities, particularly

since this is a major intersection along a major traffic corridor that carries heavy traffic volumes. As the project design proceeds, a plan for maintaining traffic at this intersection would be developed and subject to NYCDOT approval.

Because road construction would be performed on the interior of the site, construction vehicles would not have to undertake disruptive back-in maneuvers and would be able to enter all project locations head on. This would also limit backing up into City streets and any associated temporary disruptions to traffic.

GENERAL CONSTRUCTION PRACTICES

DELIVERIES AND ACCESS CONTROLS

Because of site constraints, the presence of large equipment, and the type of construction activities, access to the construction sites would be secured. The work areas are predominantly within the Fresh Kills site. Consequently, the existing landfill access controls would be used to limit site access to workers and construction vehicles. Security guards and flaggers would be posted, and all persons and trucks would have to pass through security points. Workers or trucks without a need to be on site would not be allowed entry. After work hours, the gates would be closed and locked.

As is the case with almost all large urban construction sites, material deliveries to the site would be highly scheduled. Soils would be necessary for landscape and landscape cover. Other material deliveries are expected to include stone, asphalt, cement, lighting, and lighting conduit for the proposed roads.

CONSTRUCTION HOURS

Construction activities generally take place Monday through Friday, with some exceptions. In accordance with City laws and regulations, construction work would generally begin at 7:00 AM on weekdays, with workers typically arriving to prepare work areas between 6:00 AM and 7:00 AM. Typically work ends at 3:30 PM, but some work days may be extended to complete specific tasks beyond normal work hours. In these cases an extended workday would generally not go beyond 6:00 PM and would not include all construction workers on-site, but just those involved in the specific task requiring additional work time. Construction work hours will also be coordinated with any DSNY site-specific work-hour requirements.

At limited times over the course of construction weekend or nighttime work may also be required. For example, nighttime work may be necessary for the purposes of performing work in city streets (such as Richmond Avenue) or along the West Shore Expressway. However, the purpose of performing this work at night would be to minimize impacts on traffic patterns. Again, the numbers of workers and pieces of equipment in operation would be limited to those needed to complete the particular task at hand. For extended weekday and weekend work, the level of activity would be reduced from the normal workday. The typical weekend workday would be a Saturday starting from 7:00 AM with worker arrival and site preparation and continuing to 5:00 PM. Nighttime work is expected to be limited to street or highway work and would also be performed in accordance with street and highway access permits from NYCDOT and NYSDOT, respectively, and it is expected that a traffic management plan would be required. For the nighttime work the objective would be to complete the tasks as soon as possible in order to minimize costs, nighttime construction activity, and disruptions to traffic.

For all work occurring outside the normal construction work day, the necessary approvals would be obtained from City and State agencies and as necessary coordinated with DSNY. In addition, in accordance with City regulations, a noise control plan would be developed and implemented to minimize intrusive noise emanating into nearby areas and affecting sensitive receptors. The noise control plan would identify locations for generators and methods for avoiding unnecessarily loud construction activities at night. A copy of the noise mitigation plan would be kept on-site for compliance review by the New York City Department of Environmental Protection (DEP) and the New York City Department of Buildings (DOB) (see also the discussion below under "Noise").

COORDINATION OF CONSTRUCTION WITH DSNY CLOSURE, MONITORING AND MAINTENANCE ACTIVITIES

Closure Construction

In the future the closure of Landfill Section 6/7 would occur under either the approved closure plan or the Modified Landfill Section 6/7 Final Closure plan which is put forth as part of this proposed project. Thus, if the proposed project is approved, it would not conflict with closure construction at Landfill Section 6/7.

Prevention of Interference with Landfill Monitoring and Maintenance

During construction of the public roadway segments associated with the 2016 and 2036 analysis years, the City's capital project manager (i.e., the New York City Department of Parks and Recreation [DPR] or the New York City Department of Design and Construction [DDC]) will coordinate road construction activities with DSNY maintenance, operation and monitoring activities. Because many of the monitoring activities are performed on a regularly scheduled interval, there will be opportunities to plan the construction schedule around the scheduled activities. On-going communication and coordination between the project owner and DSNY will be also be maintained throughout construction to address unscheduled or non-routine maintenance, operations or monitoring requirements.

Stormwater Management

For the 2011 analysis year, stormwater runoff will be managed in accordance with the Fresh Kills Landfill Stormwater Best Management Practices (BPM) Plan developed and maintained under the facility SPDES permit for the Fresh Kills Landfill. For the 2016 and 2036 phases of construction it is assumed that runoff from the on-landfill road construction would be directed towards the existing stormwater management basins. To the extent possible, construction runoff outside of the landfill footprint would also be directed towards the existing basins. Where this is not possible, temporary stormwater runoff controls would be implemented in accordance with the individual SWPPPs prepared for each analysis year for construction activities (see the discussion below). Erosion and sediment control measures for the 2016 and 2036 analysis years would be implemented in accordance appropriate state SPDES regulations (see Chapter 23, "Impact Avoidance and Mitigation Measures").

STREET CLOSURES

STREET CLOSURES (SIDEWALKS AND TRAVEL LANES)

During the course of construction, since the majority of work would be the construction of new streets within the project site, limited closure of traffic lanes and sidewalks is expected. There would

be some closures for some construction phases that require connections to streets at the periphery of the site, such as the entrances along Richmond Avenue. However none of these activities are expected to require extended periods of time. This work would be coordinated with and approved under street opening permits by the appropriate City and State agencies, as necessary.

STORMWATER POLLUTION PREVENTION PLAN

As described above, the project site is large and requires grading and a substantial importation of fill soils. As a result, an important element in the construction plan is the development of a stormwater pollution prevention plan (SWPPP) in accordance with the requirements of DEC's State Pollutant Discharge Elimination System (SPDES) General Permit. For the 2011 analysis year, work will be performed under the existing Fresh Kills Landfill SPDES Permit. For the latter analysis years, work is anticipated to be performed under a Fresh Kills Park Individual SPDES Permit for Discharges Associated with Construction Activity. The individual project SWPPPs would include fully designed and engineered stormwater management practices with all necessary maps, plans, and construction drawings, providing the site-specific erosion and sediment control plan and best management practices. It would designate responsible parties and personnel who would have a role in management of construction stormwater runoff and would outline a routine site inspection and reporting program for identification and prompt repair of any deficiencies for the erosion and sediment control structures or practices.

For each capital park road project, stormwater management during construction would then be performed in accordance with a site-specific erosion and sedimentation control plan. A SWPPP contains both structural and non-structural components. The structural components are expected to consist of hay-bale barriers/silt fencing, inlet protection, and installation of a stabilized construction entrance or other appropriate means to limit potential off-site transport of sediment. The non-structural "best management practices" would include routine inspection, dust control, cleaning, and maintenance programs; instruction on the proper management, storage, and handling of potentially hazardous materials; and identification of parties responsible for implementation and ongoing maintenance programs. All temporary control measures would be maintained until disturbed areas of the site are stabilized. A general description of the practices that could be applied to each capital project is presented below under "Natural Resources."

CONSTRUCTION STAGING AND OPERATIONS

CONSTRUCTION STAGING

As stated above, this is a multi-year, multi-phased construction project. It is an objective of the proposed construction program to provide construction staging areas within the interior of the East Park project site and away from sensitive uses from which construction operations could be based, soils and plantings could be stockpiled and stored, equipment could be safely parked, construction worker parking could be provided and construction period offices and trailers could be placed. This staging area would both minimize the need to conduct major construction preparation and staging activities at the periphery of the site where it could be more intrusive to local neighborhoods and would also allow construction workers to park within the site rather than using local street parking. Road construction staging areas are expected to follow the corridors for the proposed roads. However, given the size of the project site, it is not expected that construction staging areas would need to be sited near sensitive receptors, such as local neighborhoods, or near ecologically sensitive areas on the site, such as wetlands.

CONSTRUCTION IMPACT AVOIDANCE OBJECTIVES

Figure 20-1 shows a land use map that identifies the residential uses and communities nearest the project site. As shown in that figure, there are limited residential uses at the periphery of the site. The uses immediately surrounding the site are predominantly parkland, commercial, industrial, and some residential uses. The two neighborhoods nearest the project site are Travis to the north and Arden Heights to the south. The park road construction operations would occur away from local neighborhoods. Some of the general construction principles that would be applied to the proposed project are:

- Prepare staging plans that site construction activities and carefully stage construction internal to the project site for the larger projects thereby minimizing impacts on local neighborhoods and roads at the periphery;
- Site individual capital project staging areas in areas that were previously disturbed or that would be disturbed as part of project development thereby avoiding impacts to wetlands and natural features;
- Locate road construction staging and storage areas in the proposed road corridor, clear of wetlands and landfill infrastructure;
- Use existing truck access routes for construction since these allow for direct access to and from the regional highway while internalizing truck traffic and minimizing the use of neighborhood streets around the project site;
- Prepare a noise control plan in accordance with City regulations;
- Protect wetlands and natural resources through flagging and signage to protect areas adjacent to construction activities;
- Undertake wetland enhancement and mitigation during seasons that would not conflict with existing wildlife and avian species use of the site;
- Perform field inspections and provide barriers to protect rare and endangered species and their landscapes or nesting areas during the construction period (2016 and 2036 analysis years);
- Use best management strategies to control soil erosion and sedimentation;
- Incorporate enhancement measures that would minimize disturbance and removal of desirable existing native vegetation where possible;
- Minimize the closing of existing streets by performing nighttime work along major corridors (e.g., to implement modifications at the three Richmond Avenue intersections);
- Control worker access to the site by stipulating entry and exit points within each contract; and
- Provide for on-site construction worker parking and offices.

The above descriptions are general operational objectives of the construction plan. As the project moves forward, additional site-specific construction measures would be implemented to minimize the impacts of each project and to implement the general operational objectives presented above.

CONSTRUCTION ACTIVITIES

PROPOSED ROAD EMBANKMENT (2011)

Overall Description of Activities

Activities Common to Approved and Modified Closure Plans

Construction activities associated with the construction of the design as described in the Landfill Section 6/7 Final Clover Design Report, Addendum 1 will include the same general construction activities that are required to complete approved final closure design, plus two new utility modifications. In general the landfill closure construction activities that are necessary under both the proposed and existing plans include:

- Cutting and waste relocation to achieve the embankment elevations;
- Filling to achieve the embankment elevations;
- Installation of geosynthetic landfill final cover system;
- Installation of landfill gas system components;
- Construction of stormwater management swales and culvert;
- Installation of vegetation; and
- Construction of DSNY landfill service roads.

In addition, the modified closure construction activities will require partial relocation of a fire fighting water main that services a fire hydrant located at the Landfill Section 6/7 ground flare and relocation of an overhead electric utility line that also services the Landfill Section 6/7 ground flare and other on-site equipment.

Activities Specific to Implementation of Landfill Section 6/7 Final Cover Design Report, Addendum 1

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 would be constructed, the modified final cover design includes the following construction activities:

- Placing surcharge pile along the Forest Hill Corridor to consolidate and reduce future differential settlement;
- Increasing the barrier protection layer component of the final cover system from two feet to four feet thick along the proposed road corridors;
- Modifying the location of several stormwater conveyance swales and culverts;
- Modifying the location of some landfill service road alignments;
- Modifying parts of the landfill gas management system; and
- Relocating a portion of the existing fire water main and overhead power lines.

Details of the specific construction activities are provided in the report, Landfill Section 6/7 Final Cover Design Report, Addendum 1 (Geosyntec Consultants for DSNY, September 2009).

ROAD CONSTRUCTION ACTIVITIES (2016 AND 2036)

Assumptions regarding road construction activities include the following:

- Most road construction would be primarily within the Fresh Kills property site and areas closed to public traffic, thereby limiting conflicts with existing traffic and pedestrians with a plan to minimize impacts to landfill infrastructure;
- Limited grading and engineered embankment fill are expected along most of the Loop Park Road segments which primarily reuse existing DSNY landfill access roads;
- Approximately 10-20 workers are expected to be on-site during installation of road surface finishes using haul trucks, backhoes, graders and rollers, mains, sanitary sewers, storm sewers and lighting infrastructure (where necessary);
- Approximately 20-30 workers on-site during the asphalt cover phase utilizing haul trucks, pavers and rollers;
- Viaduct and culvert construction (e.g., along the Forest Hill Road Connection) with about 10-15 workers involved during the average construction day which may include pile installation during the first year (assuming that construction of the viaduct occurs concurrently with construction of the Forest Hill Road Connection road segment over the landfill); and
- Construction of the intersections along Richmond Avenue would be separated from Richmond Avenue by protective safety barriers placed along the western curbline. Modifications within Richmond Avenue include installation of new traffic signals, adjusting drainage and modifying striping, and are expected to take from 1-2 months at each location, with work disruptive to traffic operations undertaken at night.

CUMULATIVE TOTAL ACTIVITY

Tables 20-6 and 20-7 present the cumulative totals for construction truck and employee activity during the park road construction periods.

PROTECTION OF DSNY INFRASTRUCTURE DURING CONSTRUCTION[1]

Construction of the 2011 road embankment is anticipated to be performed by the current contractor who is performing closure construction for the entire Landfill Section 6/7. The embankment design, as described in the Final Cover Report, Addendum 1 would be performed in conjunction with construction of this landfill final cover. The contractor would be responsible for installing the landfill final cover system including various components of the landfill gas system and stormwater management system. The contractor will employ care when working around existing infrastructure.

During the 2016 and 2036 analysis years, the proposed park road asphalt courses, finishes and landscaping would be built over the landfill final cover, which also contains extensive infrastructure that has been installed to collect leachate and landfill gas along with monitoring equipment that is used to protect the surrounding environment and public health. Within the segment of the proposed roads over Landfill Section 6/7, modifications to these systems to allow the proposed road construction would be performed as part of the 2011 embankment and final

[1] A detailed discussion of protection measures is also provided in Chapter 23, "Impact Avoidance Measures and Mitigation."

cover construction. However, it is recognized that during construction of the park road surfaces and finishes the protection of landfill infrastructure will continue to be essential. These protections would be developed during the park road design phase and preparation of engineering drawings that will detail construction requirements related to road construction at Fresh Kills. Protection measures during this phase of construction could include additional worker training, monitoring, and the use of physical barriers or protections. It is also expected that all design drawings for the proposed park roads would be subject to review by DSNY and approval by DEC. Among the general landfill protections that may be part of the park road designs for protecting landfill infrastructure are the following:

Table 20-6
Assessment of Construction Activity: Modified Landfill Cover and Road Construction

Road Element (Assumes 4-lane park road)	Estimated Volume of Fill Material (Cubic Yards) Per Year	Estimated Total Truckloads Per Year	Estimated Truck Loads/Deliveries Per Day	Truck Deliveries Per Hour (Assumes average 8-hour work day)
Embankment (2011)				
Proposed Landfill Cover with Engineered soils beneath road embankment	±60,000	3,000 (Assumes 20 CY per truck)	20 (Assumes 160 delivery days per year)	3-5
Embankment and Asphalt Courses (2016 and 2036)				
Proposed Roads--Embankment (Assumes 1 foot thick throughout)	24,000 cubic yards	1,000-1,500 (Assumes 20 CY per truck)	15-25 (Assumes concentrated 60 delivery days per year)	2-4
Proposed Roads–Asphalt Courses (e.g., finished roads over landfill, East Park Loop Road)	20,000 cubic yards	1,000-1,200 (Assumes 20 CY per truck)	30-40 (Assumes concentrated 30 delivery days per year)	4-5
Viaduct/ Culvert Construction (2036)				
2036 **Forest Hill Road Connection**—Viaduct and culverts (Assumes up to 2 years of construction)	N.A.	120-150	8-15	1-2
2036 **Richmond Hill Road Connection**—culvert (Assumes 1 year of construction)	N.A.	120-150	8-15	1-2

Note: Work progression would be generally scheduled to have sequential rather than concurrent deliveries of embankment and asphalt course materials. Delivery of bridge construction materials would be sporadic. Assumes maximum impacts from 60-foot-wide roads.
Source: Fresh Kills Park Development Team, January 2009.

Table 20-7
Average Daily Construction Activity

Project Element	Total Average Workers per Day	Total Average Trucks per Day
Park Roads	20-40	50-70

Note: Assumptions for park roads and park features are for the more intensive periods of construction.
Source: Fresh Kills Park Development Team, January 2009.

- Pre-construction contractor education and training that addresses identification of landfill above and below grade infrastructure that roads contractor must be aware of;
- Flagging or marking of infrastructure;
- Posting of signs, such as “Buried Utility” or “Overhead Lines”;

- Review of construction procedures to identify whether alternative, less disruptive construction techniques, are applicable to a given activity;
- For construction that would come in close proximity to critical landfill infrastructure, trained personnel would observe the construction activities to document any potential effects to the infrastructure; and
- Observations of the construction activities and any monitoring results will be recorded.

As the project design moves forward, it is expected that additional measures would become part of the project's construction protection program and incorporated into the capital project design drawings. All designs would also be subject to the review by DSNY and approved DEC prior to construction of the road designs.

C. POTENTIAL CONSTRUCTION PERIOD IMPACTS OF THE PROPOSED PROJECT

INTRODUCTION

The analysis below presents the potential impacts of the proposed project with respect to the three phases of analysis: 1) Proposed Landfill Section 6/7 Final Cover; 2) Yukon Avenue Connection two-lane road; and 3) Completion of East Park road system, assuming additional Forest Hill Road and Richmond Hill Road Connections. The analysis for these impacts is presented below.

LAND USE, NEIGHBORHOOD CHARACTER AND OPEN SPACE

Fresh Kill Park and East Park are large properties that are currently bounded by industrial uses to the west, other park properties to the north, east, and south, commercial uses to the east, and residential neighborhoods such as Travis to the north and Arden Heights to the south (see Figure 20-1). The majority of Fresh Kills is not bordered by residential uses, nor are the proposed East Park roads near any residential uses. Sensitive receptors in the vicinity of the project site include parks users (e.g., LaTourette Park), public uses in the local commercial areas (e.g., the Staten Island Mall), and natural habitats along Main and Richmond Creek. There are no sensitive residential receptors or community facilities in the immediate area of the proposed roads.

As described above, in order to minimize impacts on sensitive receptors, construction activities (e.g., staging, storage, operations) would be concentrated in the central portion of Fresh Kills Park. These areas allow for centralized access and re-use of areas previously disturbed that are located away from local communities and existing open spaces and natural areas. Construction staging would not need any off-site locations and construction activities would occur entirely within the Fresh Kills property with the exception of the intersection connections along Richmond Avenue.

Certain types of construction activities at the periphery of the park (e.g., the road connections at Richmond Avenue) would be potentially noisy for local residents and current parks users at places such as LaTourette Park and some short-term construction activities would also be audible and visible from the local community and park. As described in greater detail later in this chapter, there are likely to be temporary and localized construction impacts due to construction noise, operation of heavy equipment, construction workers traveling to and from the site, and trucks delivering materials to and removing construction waste from the site. However, the intensity of the off-site impact decreases with the distance from the site and

construction access and traffic corridors would primarily use the West Shore Expressway and internal project site roads to avoid impacts to neighborhoods.

In addition, as discussed below (see "Noise"), pursuant to the New York City Noise Control Code, as amended December 2005 and effective July 1, 2007, the adoption and implementation of noise mitigation plans would be required for project construction.

In sum, the local neighborhoods would be sufficiently buffered from construction activity associated with the East Park roads, and it is concluded that no potential significant adverse construction period impacts on land use or community character would occur with the proposed project.

HISTORIC RESOURCES

ARCHAEOLOGY

Construction excavation may potentially impact subsurface archaeological resources that have been identified at particular locations as part of the Phase 1A Archaeology Study of the site (see the Fresh Kills Park FGEIS, Appendix B). Mitigation for these potential impacts is described in Chapter 23, "Impact Avoidance Measures and Mitigation." These mitigation measures are to be instituted prior to construction, but can also be incorporated into the construction bid documents, as long as the work is undertaken before construction proceeds.

HISTORIC RESOURCES

There are no historic resources in the vicinity of the proposed modified cover or roads; thus, the proposed project would not impact any historic resources during construction.

NATURAL RESOURCES

INTRODUCTION

The analysis below examines the potential for impact on natural resources due to the proposed project. No direct impacts to natural resources are expected with the proposed 2011 analysis year modified landfill cover work, as described in the Landfill Section 6/7 Final Cover Design Report, Addendum 1, as this work would occur entirely within the existing landfill footprint. There is the potential for indirect impacts during this construction due to soil erosion and sedimentation. Measures to avoid these impacts are addressed below. The analysis below therefore largely pertains to the potential for construction period impacts on the segments of road located to the east of Landfill Section 6/7 and outside of the landfill solid waste management unit area.

NATURAL RESOURCES PROTECTIONS

Land-Disturbing Activities (2016 and 2036)

Construction would result in the following land disturbance activities:

- Land clearing—removal of existing vegetation or other existing cover material;
- Temporary stockpiling of fill;

- Grading and construction of stormwater drainage systems;
- Installation of road utilities.

These activities have the potential to impact terrestrial and aquatic resources through:

- Discharge of stormwater to tidal and freshwater wetlands present within the project site;
- Deposition of fugitive dust resulting from grading activities into terrestrial and aquatic landscapes;
- Physical damage to vegetation outside a project area (i.e., above ground portion of the plants and the below ground portion of the tree protection zone for trees identified for retention);
- Direct (i.e., physical removal of plant community or grading of soil, loss of individual wildlife due to collision with or as a result of operation of construction equipment) and indirect (avoidance of landscape due to noise, vehicle traffic, or other human disturbance) loss of landscape; and
- Potential impacts to natural resources as a result of these activities would be minimized through the implementation of measures and guidelines discussed in the following sections.

Measures to Reduce Potential Wildlife Impacts During Construction (2016 and 2036)

In typical construction activities, short-term construction impacts to wildlife can include loss of habitat due to staging areas for construction equipment and work sites, habitat degradation due to partial removal of necessary substrate for wildlife activity (i.e., non-permanent removal or damage of vegetation as a result of a temporary project, such as tree trimming or temporary blocking of a drainageway to limit stormwater runoff), wildlife avoidance of construction sites due to noise, human disturbance, lighting, and other construction period factors that cause habitats to be unsuitable. Wildlife use of a particular area would be expected to return upon completion of construction and enhancement activities. Moreover, in the long term, the restored and enhanced landscapes proposed for Fresh Kills Park would be expected to benefit wildlife through the introduction of vegetative cover of higher quality and diversity than currently present within much of the project site.

Strategies to limit wildlife impacts as a result of the above construction activities would depend on the duration and extent of the disturbance. Physical barriers at construction and staging areas, such as drift fencing, would be used to restrict movement of ground-dwelling wildlife (i.e., small mammals, reptiles and amphibians). Direct impacts to wildlife would also be reduced by limiting the speed of construction vehicles, and avoiding nighttime construction operations. Additionally, the phasing of the park road development activities over a 30-year period would limit the extent of land disturbance and area of in-water construction activities at a given time, increasing the potential that suitable habitats may be available in other areas of Fresh Kills Park.

Habitat Protection Plan (2016 and 2036)

In addition to the above, a natural resources protection plan would be prepared for each capital construction project. This plan would identify landscapes, trees, sensitive plant communities such as wetlands, and any other communities that have been identified for protection under the proposed project and establishes the necessary protection zones around these resources so as to minimize the potential for adverse direct or indirect impacts. These protection zones would be flagged and staked in the field by a professional (i.e., certified/registered arborist for trees, and by a horticulturist or botantist for wetlands and other sensitive plant communities), and identified on all construction drawings along with notes indicating activities allowed and prohibited within each protection zone.

Clearing of staging areas for roadway construction would also be conducted in a manner consistent with minimizing impacts to large trees (e.g. trees greater than 12-inches in diameter at breast height) that are outside or adjacent to areas proposed for construction disturbance. Maintaining existing mature trees provides benefits in temperature reduction (via shading and evapotranspiration potential), air quality improvements, and aesthetic value to park visitors that could take decades to restore through reforestation programs.

GEOLOGY, SOILS, AND GROUNDWATER

Proposed Road Embankment (2011)

The necessary road embankments across Landfill Section 6/7 will be constructed as described in the Landfill Section 6/7 Final Cover Design Report, Addendum 1. Development of the proposed park road embankment across Landfill Section 6/7 is not expected to result in significant impacts with respect to geology, soils and groundwater. These project elements would be built over the man-made waste mound, Landfill Section 6/7, and would not affect any natural geologic, soils, topographic, or groundwater conditions.

An examination of leachate volumes during the construction period has also disclosed that the proposal would not significantly increase leachate volumes during the construction of the proposed final cover design (see Appendix E, "DEC Supplemental Data").

Cutting and filling operations will be required for each of the three analysis years. Total cut and fill quantities under the proposed project are presented below in Tables 20-8a and 20-8b for both the on-landfill and off-landfill road segments.

Table 20-8a
Cut and Fill Quanitities for Road Options (2011)
(On Landfill Section 6/7)

Road Option	Cut (cubic yards)	Fill (cubic yards)	Net
Yukon Avenue Connection (4 lane road)	83,113	64,124	–18,989
Yukon Avenue Connection (2 lane road)	43,468	56,000	+12,532
Forest Hill Road Connection (4 lane road)	115,770	65,391	–50,379
Forest Hill Road Connection (2 lane road)	98,770	56,751	–42,019

Note: 40-foot-wide embankment for two-lane road; 60-foot-wide embankment for four-lane roads.
Source: Geosyntec, September 2009.

Table 20-8b
Cut and Fill Quanitities for Road Options (2016 and 2036)
(Off Landfill Section 6/7)

Road Option	Cut (cubic yards)	Fill (cubic yards)	Net
Yukon Avenue Connection (4 lane road)	3,785	5,685	±1,900
Yukon Avenue Connection (2 lane road)	3,345	2,040	-1,305
Richmond Hill Road Connection (4 lane road)	21,365	87,404	+66,039
Richmond Hill Road Connection (2 lane road)	16,239	70,550	+54,230
Forest Hill Road Connection (4 lane road)	1,195	33,365	+32,170
Forest Hill Road Connection (2 lane road)	970	25,175	+24,205

Note: Two lane roads at 40 feet wide; four-lane roads at 60 feet wide.
Source: HDR, May 2009.

As discussed above, construction monitoring would be implemented to ensure that the construction of the road elements would protect the existing environmental protection and monitoring systems at Fresh Kills (i.e., landfill gas and groundwater monitoring systems, and stormwater basins).

FLOODPLAINS

Neither the development of the proposed closure plan or the park roads would impact floodplains. The work area for the proposed road embankment is well outside the floodplain and the proposed road alignments are generally outside the 100-year floodplain with limited exceptions (e.g., the connection at Richmond Hill Road).

Development of the roads would require limited activities in the floodplain including vegetation clearing, fill for construction of embankment and surface, the viaduct and culvert installation for the Forest Hill Road and Richmond Hill Road connections, and possible construction of stormwater outlets associated with the management of stormwater runoff from the road surfaces. Stormwater runoff generated by the additional impervious surfaces of the roads would be directed to the stormwater management system that would treat the runoff and attenuate the rate of discharge using best management practices and low impact designs. Neither the increased fill and structure nor the increased runoff from the road would affect local flood levels. As discussed above, the floodplains of the project site are primarily influenced by coastal flooding. Increased stormwater flow and the limited amount of fill and structure to construct the proposed roadways would therefore not impact the mapped floodplain at the project site or in the adjacent areas.

WETLANDS AND AQUATIC RESOURCE HABITAT ACREAGE IMPACTS

Introduction

As described above, implementation of erosion and sediment control measures for each park road element would minimize the potential for significant adverse impacts to both water quality and aquatic resources during construction.

In addition, it is expected that all activities in wetlands (both tidal and freshwater) would require permits. This would include permits for tidal wetlands and protection of water, as well as permits from the U.S. Army Corps of Engineers (USACE) for activities in waterways and wetlands. Permit applications for these would require site-specific design data and would be accompanied by site-specific impact analyses relative to natural resources. Applications for these permits would be reviewable by both Federal and State agencies to ensure that impacts to landscapes and wildlife are minimized or avoided to the extent feasible and that mitigation of impacts is also part of each capital project, as necessary. For all analysis years, construction erosion and sedimentation measures, established in accordance with the site SWPPP will be used to control impacts to stormwater runoff during construction. A description of construction period impacts follows.

Proposed Road Embankment (2011)

Road embankment construction activities across Landfill Section 6/7 would not have any direct impacts on wetlands.

Yukon Avenue Connection (2016)

Construction of the proposed two-lane Yukon Avenue Connection would not result in any direct construction impacts to wetlands. There would, however, be temporary impacts along the basins

for the installation of runoff best management practices and the installation of the proposed culvert.

Completed East Park Road System (2036)

Forest Hill Road Connection (Four-Lane Road)

The Forest Hill Road Connection under this option crosses over a portion of the freshwater/estuarine wetland system on the east side of Section 6/7. It is anticipated that the crossing of this wetland would be accomplished with a viaduct or natural bottom (substrate) arch culvert structure. As currently contemplated, a viaduct structure would be approximately 260 feet long and about 60 feet wide in its crossing of a portion of the wetland. The structure would affect about 2.54 acres of wetlands. These emergent wetlands are predominantly dominated by *Phragmites*. Construction of the viaduct has the potential to result in impacts to wetlands within the viaduct alignment due to activities of construction vehicles and the direct impact of structures within the wetlands. Construction techniques to minimize damage to wetlands would be implemented as part of the construction management plan and in coordination with the New York State Department of Environmental Conservation (DEC) and USACE requirements, which would be expected during the permitting process (structures in this segment of construction would require wetland permits). (An analysis of potential shading impacts is also presented in Chapter 10, "Natural Resources.") For all of these wetlands areas, the loss of wetland acreage would be mitigated. A description of this wetland mitigation is provided in Chapter 23, "Impact Avoidance Measures and Mitigation."

Richmond Hill Road Connection (Four-Lane Road)

This road segment under this option would directly disturb about 3.09 acres of freshwater wetlands. In addition to this direct construction impact, there would be the potential for additional impact due to construction activities within the wetlands and DSNY basins. A description of the impact of this road option on local wetlands is described in Chapter 10 "Natural Resources" and mitigation is provided in Chapter 23, "Impact Avoidance Measures and Mitigation."

Forest Hill Road Connection (Two-Lane Road)

This road segment under this option would directly disturb about 2.16 acres of wetlands. In addition to this direct construction impact, there would be the potential for additional impact due to construction activities within the wetlands themselves. A description of the impact of this road option on local wetlands is described in Chapter 10, "Natural Resources" and mitigation is provided in Chapter 23, "Impact Avoidance Measures and Mitigation."

Richmond Hill Road Connection (Two-Lane Road)

This road segment under this option would directly disturb about 2.49 acres of wetlands. In addition to this direct construction impact, there would be the potential for additional impact due to construction activities within the wetlands and DSNY basins. A description of the impact of this road option on local wetlands is described in Chapter 10 "Natural Resources" and mitigation is provided in Chapter 23, "Impact Avoidance Measures and Mitigation."

Yukon Avenue Connection (Two-Lane Road)

As stated above, construction of the Yukon Avenue Connection only as a two-lane road connection would not have any direct or indirect impacts on wetland acreage. There would only be a temporary impact for the replacement of the existing 60-inch culvert with a new culvert between Basins B1 and B2.

Yukon Avenue Connection (Four-Lane Road)

This road segment under this option would directly disturb only a minimal area (about 0.01 acres) of wetlands in Basin B2. In addition to this direct construction impact, there would be the potential for additional impact due to construction activities within the wetlands and DSNY basins. A description of the impact of this road option on local wetlands is described in Chapter 10 "Natural Resources" and mitigation is provided in Chapter 23, "Impact Avoidance and Mitigation Measures."

East Park Loop Road and Richmond Avenue Connections

This park road option could potentially directly impact about 1.92 acres of wetlands. In addition to this direct construction impact, there would be the potential for additional impact due to construction activities within the wetlands and adjacent areas along Main and Richmond Creeks. A description of the impact of this road option on local wetlands is described in Chapter 10, "Natural Resources" and mitigation is provided in Chapter 23, "Impact Avoidance and Mitigation Measures."

AQUATIC RESOURCE HABITATS PROTECTIONS AND IMPACTS

Water Quality and Sediment Control Practices[1]

The project site contains wetlands including ponds, stormwater basins and emergent wetlands. It is a critical component of the project construction practices to avoid impacts to these natural systems, not only for the purposes of avoiding impacts to natural resources and water quality, but also for the purposes of avoiding siltation impacts to the existing DSNY stormwater basins. In order to avoid these impacts, the proposed project includes a "Conceptual Site-Wide Erosion and Sediment Control Plan." This plan, which is described below, establishes the guidelines by which each phase of project construction, through implementation of the proposed techniques, would avoid impacts to natural features and in-place stormwater management systems. Implementation of these techniques would be ensured not only by DPR, but through the SPDES Permit requirements (see description above), since most capital projects are expected to cover at least 1 acre. The overall objectives of the plan are as follows:

- No increase in turbidity that would cause a substantial visible contrast to natural conditions;
- No increase in suspended colloidal and settleable solids that would cause "deposition or impair waters for their designated best use"; and
- No residue from oil and floating substances.

Each proposed stormwater management plan would be designed to meet the requirements of the SPDES Permit for stormwater construction from construction activities and on subsequent amendments as well as Article 17 of the New York State Environmental Conservation Law and the Federal Clean Water Act. The Plan has also been designed to meet the standards of the *New York State Stormwater Design Manual* (DEC, 2003) and the New York State Standards and Specifications for Erosion and Sediment Control (DEC, 2005).

[1] Conceptual Site-Wide Erosion and Sediment Control Plan, Fresh Kills Park, Geosyntec Consultants, September 28, 2007.

Stormwater Pollution Prevention Plans and Erosion and Sediment Control Plans

DEC would need to review and approve an Individual State Pollutant Discharge Elimination (SPDES) permits for stormwater discharges associated with the proposed park roads projects for analysis years 2016 and 2036. The permit would require the road construction project to prepare an SWPPP and erosion and sediment control plan. The 2011 proposed final cover construction activities would be covered under the existing Fresh Kills SPDES permit that covers the current closure construction.

The SWPPP would be implemented by the site contractor for the purposes of minimizing erosion and sediment impacts on receiving waters and natural resources associated with the project construction. A conceptual site-wide erosion and sediment control plan was developed to present conceptual erosion and sediment controls that may be used during construction (see FGEIS, March 2009).

These requirements include development of the SWPPP by a qualified professional (e.g., Professional Engineer, CPESC, etc.) and implementation of the plan controls at the site prior to the start of construction and continuing through construction until the site is stabilized and permanent storm water best management practices (BMPs) have been installed. The project-specific permit would be prepared in accordance with the:

- Individual SPDES Permit No. NYC-2 for Stormwater Discharge Associated with Construction Activity.
- New York State Standards and Specifications for Erosion and Sediment Control developed by the NYSDEC, dated August 2005.
- New York State Stormwater Management Design Manual developed by DEC and the Center for Watershed Protection, dated August 2003.

The project-specific SWPPP will identify the existing site's topography and how it will be altered as well as the location, details, and maintenance requirements of erosion control measures that will be used to reduce sediment and other pollution from the construction site. The SWPPP will also include the coordination of erosion controls with construction activities by a phasing and sequencing schedule.

The erosion and sediment control plan would include temporary and permanent structural and vegetative erosion control measures that will be used to control erosion and sedimentation for each stage of the project from clearing to finish grading. Structural erosion controls may include, but are not limited to the following.

Sediment Basins. Sediment basins are intended to intercept sediment-laden runoff and reduce the amount of sediment leaving the disturbed area by trapping and retaining sediment. A sediment basin is temporary with a controlled storm water release structure. Sediment basins may be formed by constructing a temporary barrier or dam across a drainage way or other suitable location to intercept runoff. Sediment basins should be used in combination with additional erosion and sediment controls to reduce erosion and the sediment load to the basin.

Sediment Trap. Sediment traps should be used to collect and temporarily retain storm water runoff from drainage ways, storm drain inlets, or other points of collection within a disturbed area. Sediment traps should be used to break up a drainage area into smaller sections where a larger device such as a sediment basin would be inappropriate. Sediment should not be allowed to accumulate to a depth greater than 50 percent of the total sediment trap depth.

Stone and Block Inlet Protection. Inlet protection at the individual project sites may likely consist of stone and block inlet protection placed at drop or curb inlets that drain to the storm drain system. Inlets should have a drainage area of no more than one acre. This technique uses a berm of stone or stone and cement blocks to filter water prior to entering the outlet. Steps to avoid excessive ponding or slumping of aggregate into inlet should be taken.

Turbidity Barrier. A series of turbidity barriers may be installed in sediment basins to provide interior settling pools to trap and store accumulated sediment. The turbidity barriers should be inspected to ensure that they are in place and functioning and that water cannot bypass the barrier around its sides. Should a turbidity barrier be used, accumulated sediment should be removed from the upgradient end of the barrier periodically. In some site specific instances, turbidity curtains or barriers may also be used to facilitate tidal marsh restoration.

Riprap Inlet Filter Ring. A riprap filter ring or berm may be installed around the sediment basin inlets during construction. The filter ring would function to reduce the amount of sediment entering into the sediment basin outlet pipe and ultimately into the receiving water.

Rock Outlet Protection. Rock outlet energy dissipation and protection should be utilized at culvert outfalls to reduce scour and erosion in the receiving downstream reach. Rock outlet protection commonly is constructed using rip-rap and woven geotextile. In instances where significant flows are expected, gabion baskets may provide a more appropriate stabilization technique.

Silt Fence. Standard erosion control practices consisting of silt fences may be used at the limits of work and around soil stockpiles. Silt fences should be securely installed so as to prevent sediment bypass. Silt fences should be inspected and maintained to ensure proper function.

Compost Sock. Compost socks may be used as an alternative method of perimeter control. Compost socks should be installed and maintained in accordance with the manufacturer's specifications.

Perimeter Dike/Swale. Perimeter dikes and swales may be used as an alternative method of perimeter control/stormwater conveyance for drainage areas less than two acres in size. Dikes/swales should be constructed by excavating a swale and creating a dike on the downstream side with the cut material.

Filter Berm. A filter berm may consist of rip-rap and stone and may be installed to trap sediment in storm water runoff from disturbed areas. The filter berm is a temporary control that should be inspected periodically and after major storm events to ensure it is still in place and functioning. The filter berm should be inspected for accumulated sediment.

Construction Entrances/Exits. A temporary construction entrance comprised of crushed stone may be installed at all entrances and exits to disturbed areas in order to reduce tracking of sediment onto streets and roads. The entrance should be maintained in a condition that will prevent tracking of sediment onto public streets.

Non-structural erosion controls may include, but are not limited to the following:

Dust Control. During site grading activities, mitigation measures may be implemented by the contractor as necessary to control fugitive dust. Dust control measures may include seeding, wet suppression, application of soil stabilization agents, or other measures to control dust generated by construction activities.

Dewatering Techniques. Should dewatering be required (e.g., of dredged sand for soil manufacturing), a non-woven geotextile dewater bag or prior approved equal product should be used to filter resulting dewatering discharge. The bag should be installed in accordance with the details and maintained in accordance with manufacturer's specifications.

Temporary controls for waste excavation and relocation may include, but are not limited to the following. Storm water runoff that comes in contact with exposed waste shall be treated as leachate and shall not be discharged to the storm water management system.

Temporary Perimeter Berm. During waste excavation or placement, a temporary perimeter berm should be installed down gradient of the excavation area. The perimeter berm shall be made of a low-permeable material and compacted to contain storm water runoff from the exposed waste. A temporary collection point (see below) may be installed on the upgradient side of the berm.

Temporary Collection Point. A temporary collection point may be installed on the upgradient side of a temporary perimeter berm or in a low area of waste excavation to collect storm water runoff that comes in contact with exposed waste. The collection point may consist of a sump with gravel and a perforated pipe placed in the center to dewater. The dewatering should be pumped to the leachate collection system or temporary storage container and managed as leachate in accordance with the facility's leachate management procedures.

Run-on Diversion Berms. Temporary run-on diversion berms should be installed on the upgradient side of the waste excavation areas to divert storm water run-on around the waste excavation and placement area and into the storm water management system. The volume of run-on that comes in contact with the exposed waste shall be minimized.

Temporary Cover. Temporary cover may be installed over waste excavation areas that are temporarily inactive. The temporary cover should be installed to the facility's standard operating procedures and should be temporarily stabilized.

Stabilization practices will be used to control the source of sediment in combination with structural and non-structural erosion and sediment control described above. Stabilization practices reduce erosion by creating a protective cover over the soil. The root network of vegetative stabilization methods provide subsurface stabilization network in addition to the protection offered by the surface vegetation.

Erosion controls will remain in place until disturbed areas have been stabilized and vegetation has established with a minimum cover of 75 percent. Removal of the controls will be based on requirements established in the SWPPP or Individual Permit as appropriate. Controls will be inspected and maintained throughout the construction sequence for each area. Stabilization controls may include, but are not limited to the following:

Temporary Seeding and Stabilization. Denuded areas that will not be brought to final grade or on which construction will be stopped for a period of more than 14 working days (or otherwise specified by the Individual SPDES permit) should be stabilized with temporary stabilization practices. Temporary stabilization practices may include seed, mulch, track-walking, and erosion control blankets. Mulch may be used as temporary stabilization and applied to disturbed soils to reduce erosion. Temporary mulch should be applied to areas that have been seeded to facilitate vegetative establishment. Mulch may also be used to temporarily stabilize areas that cannot be seeded because of the season of the year and need for soil protection; for mud or dust control, and/or to provide protection during a period when construction or seeding cannot be done.

Mulch should include organic materials such as clean, toxin-free wood fiber, paper, or straw, and should not contain plant seed heads.

Permanent Stabilization. Once work is complete in an area, the area will be permanently stabilized. In most cases, establishment of permanent vegetation is the preferred method of stabilization. Permanent stabilization for erosion and sediment control may differ from the final cover. Project specific conditions and constraints may require customized seed mixes of native vegetation that will be developed based on the specified final land use and soil characteristics of each project area. Seed should be applied through broadcasting, drilling, cultipack seeding, hydroseeding or any combination thereof. Native vegetation planting will also include plugs, peat pots, container and ball and burlapped nursery stock. Topsoil used on-site will be tested to confirm it meets NYSDEC standards.

Rip-rap may also be used to permanently stabilize slopes where the establishment of vegetation is not feasible or appropriate (e.g., very steep slopes, stream banks with high flow). A filter fabric may also be used with rip-rap to prevent soil migration through the rip-rap.

Control of Solid Waste. Measures would also be employed in the SWPPP and erosion and sediment control plan with respect to controlling impacts from solid waste that may be exposed during construction. These measures would include collecting and properly disposing of all water that has contacted exposed solid waste.

Channel Protection. Another element of the SWPPP is channel protections. Stormwater conveyances such as channels and swales ultimately receive the runoff from the site. In certain cases, it may be prudent to line channels and swales with erosion-resistant materials. For example, channels with anticipated low velocities and flow rates may be lined with vegetation and temporary erosion control blankets. Channels with anticipated high velocities and flow rates may be lined with a permanent erosion-resistant lining such as rip-rap, rock, or permanent erosion control blanket.

In addition to the structural techniques discussed above, the following non-structural erosion and sediment controls and best management practices are likely to be used during park construction (see also Table 20-9).

Table 20-9
Construction Period Water Quality Protection Measures

Concrete Washout
Contaminated Soil Management
Debris/Waste Management
Dewatering
Dust Control
Hazardous Waste Management
Long Term Pollutant Control
Material Storage Areas
Material Use
Pesticides and Fertilizers
Portable Toilets
Secondary Containment
Spill Prevention
Stockpile Management
Vehicle and Equipment Cleaning
Vehicle and Equipment Fueling and Maintenance
Water Management
Source: Geosyntec, December 2007.

Additional Stabilization Practices. Other stabilization practices may also be used in addition to the erosion and sediment control methods described above. These added measures would reduce erosion by creating a protective cover over the soil. This would include the vegetation cover that provides soil in addition to the protection offered by the surface vegetation. All denuded areas that would not have final cover for a period of more than 14 working days could be temporarily stabilized with temporary stabilization practices, including: seed, mulch, track-walking, and erosion control blankets. Temporary seed may include types of seed described below (see Table 20-10).

Table 20-10
Temporary Seeding/Mulching Options

Time	Seed Type	Application Rate (lbs/acre)	Application Rate (lbs/1000 ft^2)
Spring, Summer, Early Fall	Rye Grass (annual or perennial)	30	0.7–1.0
Late Fall, Early Winter	Aroostook Winter Rye (cereal rye)	100	2.5
All Year	Mulch with Hay or Straw	4000	90 (2 bales)
Source: Geosyntec, December 2007.			

Mulch may also be used as temporary stabilization and applied to disturbed soils to reduce erosion. Temporary mulch can be applied to areas that have been seeded to facilitate vegetative establishment. Mulch may also be used to temporarily stabilize areas that cannot be seeded because of the season of the year and need for soil protection.

Once construction is complete, these areas would be permanently stabilized. In most cases, efficient implementation of permanent vegetation or cover is the preferred method of stabilization.

In-Water Construction Activities

Certain elements of park construction would require activities in the water. As summarized below, this construction activity is expected to include:

- Construction of stormwater outfalls and aprons.
- Placement of fill material, culverts, and other structural elements within the existing surface waters or wetlands as required for the construction of the proposed park roads and viaducts.
- Removal of sediment and grading of shoreline required as part of the proposed wetland enhancement/mitigation activities.

These activities have the potential to impact aquatic resources and wetlands through:

- Temporary increases in suspended sediment; resuspension and redeposition of sediment contaminants during sediment disturbing activities such as piling installation, bulkhead repair/replacement, and; removal of sediment and grading as a result of wetlands enhancement efforts.
- Direct loss of wetlands within the footprint of viaduct and culverts as well as fill material or other structural elements associated with the proposed park roads.

Given the high degree of mixing in the Fresh Kills waterways, any temporary increase in suspended sediment resulting from in-water construction activities is expected to be localized and dissipate within a short distance of the project activity. In the majority of cases these activities are also quite limited in duration (1-2 weeks) and impacts would cease upon completion of the in-water (sediment disturbing) activity. Therefore, although temporary short-term disturbances to aquatic habitats and suspended materials in the water column may occur,

in-water construction activities would not be expected to result in significant adverse impacts on water quality or aquatic biota during construction. Similarly, any contaminants released to the water column as a result of sediment disturbance would not be expected to result in significant short-term or long-term impacts on water quality in Main or Richmond Creeks.

Life stages of estuarine-dependent and anadromous fish species, bivalves and other macroinvertebrates are fairly tolerant of elevated suspended sediment concentrations and have developed behavioral and physiological mechanisms for dealing with variable concentrations of suspended sediment (Birtwell et al. 1987, Dunford 1975, Levy and Northcote 1982 and Gregory 1990 in Nightingale and Simenstad 2001a, LaSalle et al. 1991). Fish are mobile and generally avoid unsuitable conditions in the vicinity such as increases in suspended sediment and noise (Clarke and Wilber 2000). While a localized increase in suspended sediment may cause fish to temporarily avoid the area around where piles or other in-water structures are being installed, the affected area would be expected to be small. Similar suitable landscapes would be available for use by fish to avoid the area of in-water construction. Fish also have the ability to expel materials that may clog their gills when they return to cleaner, less sediment laden waters. Most shellfish are adapted to naturally turbid estuarine conditions and can tolerate short-term exposures by closing valves or reducing pumping activity. More mobile benthic invertebrates that occur in estuaries have been found to be tolerant of elevated suspended sediment concentrations. In studies of the tolerance of crustaceans to suspended sediments that lasted up to two weeks, nearly all mortality was caused by extremely high suspended sediment concentrations (greater than 10,000 mg/L) (Clarke and Wilber 2000) which would not occur from the in-water work associated with the proposed project.

Potential impacts to natural resources as a result of construction activities could be minimized through implementation of the following:

- Measures to minimize increases in turbidity and suspended sediment in the water column, and to capture floating debris during sediment removal and grading activities, and installation of in-water structures. Examples of measures to be considered include silt curtains and coffer dams. Measures would be selected on the basis of on-site conditions and consultation with DEC and the USACE.
- Implementation of measures to stabilize the wetlands enhancement areas as necessary during planting, such as the use of biodegradable/geosynthetic erosion control mats or revegetation mats.
- If necessary, implementation of measures that may restrict or limit the construction activities in water or sensitive landscapes during certain seasons.

In addition, it is recognized that all construction activities within open waters or other wetlands are subject to the review and approval of DEC and USACE and federal natural resource agencies through the permitting process that would further identify and implement these and other protection measures necessary to protect water quality and sensitive landscapes.

Impact Analyses

Proposed Road Embankment (2011)

As stated above, a SPDES permit implementing stormwater pollution prevention, erosion and sediment control measures practices would minimize the potential for indirect adverse impacts to water quality and aquatic resources during construction of the proposed road embankment.

Yukon Avenue Connection (2016)

As presented above under the general discussion of potential impacts from upland construction and wetland enhancement activities, implementation of erosion and sediment control measures included in a SWPPP and an Individual SPDES permit would be implemented to avoid indirect impacts to water quality and aquatic resources during construction with the proposed Yukon Avenue Connection.

Completed East Park Road System (2036)

As presented above, implementation of erosion and sediment control measures, as well as the use of silt curtains and other measures in open water areas to minimize sediment suspension during in-water construction activities (e.g., installation of viaduct supports), would minimize the potential for significant adverse impacts to water quality and aquatic resources during construction of the proposed 2036 park road segments (all options). Additional protection measures would need to be implemented during the construction activities within the freshwater wetlands east of Landfill Section 6/7 to ensure that in addition to the acreage that would be directly impacted by construction of the proposed roadway, additional areas of freshwater wetland are not indirectly impacted during construction. These protection measures are described above. It is also assumed that a SWPPP and an Individual SPDES permit would be in place to avoid indirect impacts to water quality and aquatic resources.

As stated above, in order to avoid these indirect impacts during construction, the proposed project's environmental protection measures during construction would be implemented (see the discussion above). In addition, these long-term construction activities would be subject to the permitting review of the USACE and DEC. It would be the objective of the permitting process to minimize the impacts and require the implementation of the project's freshwater wetland improvement program.

SIGNIFICANT COASTAL FISH AND WILDLIFE HABITAT

Construction of the proposed modified closure plan and park roads would not be expected to conflict with the Fresh Kills Significant Coastal Fish and Wildlife Habitat. During construction, with the proposed construction protection measures in place, the tidal creeks of this designated landscape would continue to provide spawning and nursery opportunities for anadromous, estuarine, and resident fish, and would continue to be used by wading birds, waterfowl, shorebirds, raptors and passerines. In addition, all proposed in-water activities would be subject to permitting by the DEC and USACE for the purposes of protecting wetlands and water quality and would require the input of the DOS with respect to coastal policies and protection of significant coastal fish and wildlife landscape. Each capital park project would be reviewed on an individual basis as part of its permit review. For these reasons, it is concluded that the proposed project would not conflict with this designation during construction.

During construction, the tidal creek systems of Main and Richmond Creeks would continue to provide spawning and nursery landscape for anadromous, estuarine, and resident fish, and would continue to be used by wading birds, waterfowl, shorebirds, raptors, and passerines. In addition, no indirect impacts to water quality and the Significant Coastal Fish and Wildlife Habitat are anticipated during construction.

TERRESTRIAL RESOURCES

Proposed Road Embankment (2011)

The proposed road embankment would be constructed on top of the landfill in areas currently disturbed by an interim cover and proposed to be disturbed under the approved cover plan in the No Build condition. Thus, it is concluded that construction of the proposed cover plan with the road embankment would not have any impacts on terrestrial resources.

Yukon Avenue Connection (2016)

Construction of the Yukon Avenue Connection across Landfill Section 6/7 would occur on a developed embankment. It would not have any direct impacts on terrestrial resources. For the road segment between the landfill and Richmond Avenue, there would be limited direct impacts (i.e., clearing and physical removal of plant communities or grading of soil within the roadway alignments, loss of individual wildlife due to collision with or as a result of operation of construction equipment) and the potential for indirect impacts (avoidance of habitats due to noise, vehicle traffic, or other human disturbance) to terrestrial habitats and wildlife. The proposed project has been designed to minimize direct clearing impacts to the extent possible by utilizing existing disturbed corridors, such as the Yukon Avenue Connection (see Figures 10-2a and 10-7a), thereby limiting impacts to terrestrial resources. Thus, clearing of resources in this road segment would be minimal and not significant.

While certain wildlife individuals may avoid undisturbed landscapes in the vicinity of road construction due to noise, vehicle traffic or increased human activity, this is also not expected to be a significant impact in this area.

Completed East Park Road System (2036)

Construction of the Forest Hill Road Connection across Landfill Section 6/7 would be on an existing landfill cover and on service roads maintained as part of the Landfill Section 6/7 final closure. Consequently, this road segment would not have any direct impacts on terrestrial resources.

The segment of the Forest Hill Road Connection between the base of the landfill and east to Richmond Avenue would occur within an area of wetlands (see the discussion above) and terrestrial habitats including the Richmond Avenue berm and wetlands. This berm includes a linear wooded area along Richmond Avenue that contains planted white pine, Douglas fir, and Norway spruce. The proposed Forest Hill Road Connection would span an area of mixed upland and wetlands that contain a mix of habitats including native and non-native scrub-shrub and *Phragmites*. The proposed park road segment would be directed through woodlands along the berm and in the southern end of the 0.5 acre forested area, resulting in removal of a few large trees (i.e., greater than 12 inches diameter at breast height) in this vicinity. The small loss of landscaped habitat associated with the roadway construction would not result in significant adverse impacts to wildlife resources.

Construction of the Richmond Hill Road Connection also has the potential to result in direct impacts (i.e., clearing and physical removal of plant community and soil grading) as well as potential loss of individual wildlife due to collision with or as a result of operation of construction equipment as well as indirect impacts (avoidance of habitat due to noise, vehicle traffic, or other human disturbance). However, construction of the Richmond Hill Road Connection would require minimal impacts on terrestrial resources in its alignment along the

Richmond Avenue berm, which is a landscape feature. This limited clearing would not result in significant adverse impacts to wildlife resources.

Completion of the East Park Loop Road would also not be expected to have any impacts on terrestrial resources since it largely would follow an alignment of built DSNY haul road surfaces. Thus, it would not have a significant impact on terrestrial resources.

THREATENED OR ENDANGERED SPECIES

Construction under the modified closure plan, the Yukon Avenue Connections, or the completed East Park Roads would not result in significant adverse impacts to colonial waterbird nesting activity on Isle of Meadows, or inhibit the re-establishment of such activity in the future. Barn owls have nested on bridges in the vicinity of Richmond Creek in recent years. None of the analysis scenarios would impact these species. Thus, it is concluded that construction of the East Park Roads would not have any impacts on threatened or endangered species (see also Chapter 10, "Natural Resources").

HAZARDOUS MATERIALS

Development of the modified closure plan and the proposed park roads would involve excavation and disturbance of the existing on-site soils as part of construction activities. This could result in temporary increases in exposure pathways for workers and nearby residents. To avoid this impact, preventative measures would be undertaken to protect the safety of the workers and local residents as well as the larger environment for areas where construction activity has the potential to encounter areas of contamination. The environmental issues with respect to hazardous materials conditions as identified at the project site during the current and previous environmental studies (see also the Fresh Kills Park FGEIS) would be remediated as part of the road construction.

Prior to construction, site investigations for hazardous materials would be performed (as necessary) and a site-specific Construction Health and Safety Plan would be prepared. It would include health and safety procedures to minimize exposure to workers and the public, including possible dust monitoring and/or volatile organic compound (VOC) monitoring, if applicable, and provisions for the identification and management of known and unexpected buried tanks or contaminated materials that might be encountered during the soil disturbance activities associated with construction. Such a plan would ensure that the construction workers, the surrounding community, and the environment are not adversely affected by environmental conditions exposed by or encountered during the construction activities. In addition, existing fill remaining on-site would be either covered with 2 feet of certified clean fill (e.g., road landscaped edges) or covered by structures such as road pavement. With these proposed measures in place, the health and safety of construction workers and the visiting public would be protected from adverse environmental conditions during construction (see also Chapter 23 "Impact Avoidance and Mitigation Measures").

INFRASTRUCTURE

PROPOSED ROAD EMBANKMENT (2011)

Overview

As part of the 2011 build-out grading of the Landfill Section 6/7 surface prior to closure construction would be required. Grading would disturb: (i) existing landfill cover soils; (ii) stormwater diversion berms, which are constructed with clean soil fill; and (iii) existing waste material. To avoid impacts from these activities, a series of operational procedures and protection measures would be implemented in accordance with the existing Final Cover Design Report (Malcolm Pirnie, 2001). These procedures are described below.

During 2011 and 2016 construction periods, the public would not be permitted within the landfill area or project area. Therefore, no increased public exposure is anticipated during these construction periods.

Nuisance and Vector Management

It is recognized that grading activities, which are necessary to achieve the alternate design subgrade elevations, will encounter waste. The associated excavations and onsite waste relocation activities have the potential to create odor nuisances and attract vectors. However, these issues also exist as part of the work necessary to construct the final cover as described in the Landfill Section 6/7 Final Cover Design Report, Addendum 1. Consequently, specifications to establish acceptable construction procedures and mitigation techniques are also provided in the Final Cover Design Report (Malcolm Pirnie, 2001) Technical Specifications; specifically, Section 02224, Solid Waste Relocation.

The presence of putrescible materials in the waste makes it potentially attractive to animal life, particularly to vermin, insects, and predatory and scavenging birds. The management of the waste excavation and spoil locations recognizes these possible effects and controls these vectors through proper sanitary landfilling procedures. Specifically, the speed of deposit, compaction, and covering of the waste minimizes or eliminates them. Compacted waste does not provide the habitat desired by vermin such as rats and mice, and well covered lifts of waste prevent disturbances of the surface by birds and animals by eliminating their access to a potential food source. The suppression of insects is also achieved by the prompt application of cover soils, which buries them and their breeding areas.

Odors from the decaying materials in the landfill will continue to be controlled by the landfill gas collection system, which collects the decomposition gases as they are generated within the landfill mound. The collected gases are principally processed at the Fresh Kills Landfill Gas Purification Facility, where odorants and contaminants are removed from the landfill gas, and the gas is separated into methane and carbon dioxide – two odorless gases. This system will continue to operate during construction in accordance with the facility's permits, which regulate landfill gas emissions.

While the landfill gas collection system will prevent gaseous emissions from the landfill, odors may still result from the volatilization of odiferous compounds from the excavation, transport and placement of the excavated garbage. The off-site impact of these odors has been mitigated by the following:

- spoiling the excavated material far from the facility's property line to avoid potential off-site receptors;
- limiting the excavation and spoiling areas to match daily construction progress;
- covering both the excavation and spoiling areas with a daily cover to suppress odors; and
- applying an odor suppressant as necessary to further abate off-site impacts.

The following subsections describe additional measures that have already been established by the DSNY as a part of site operation activities or landfill final cover construction that are used to manage nuisance conditions.

Inclement Weather

Inclement weather such as heavy rains, snow, ice conditions, high winds, or extreme temperatures may impact the construction operations. Additional procedures that may be implemented in these conditions are as follows.

- Heavy rains. Following heavy rain events, drainage channels, culverts, and erosion and sediment control features are inspected for sediment and debris that may block water flow. Blockages are removed as necessary, and the integrity of the systems restored;
- Heavy snow. Snow accumulation is cleared from work area, as needed for work to progress in accordance with the Construction Quality Control Plan;
- Ice conditions. If adverse weather creates dangerous icing conditions, work is stopped; and
- High winds. During periods of high winds, the extent of the waste relocation excavation area is minimized to reduce the possibility of blowing litter. After periods of high winds, the site will be inspected for blown litter and the observed blown litter collected.

Litter and Debris Control

During waste relocation activities, the following litter and debris controls are employed.

- Blown litter and debris is collected on a daily basis. Collected litter originating from the excavation work is landfilled with other relocated waste;
- Debris Control. Debris that falls off of waste transportation vehicles is collected and landfilled with other relocated waste; and
- Scavenging. No waste scavenging is allowed.

Dust Control

Dust control activities that have been employed to ensure safe on-site working conditions have proven effective at avoiding off-site impacts. These measures include the following:

- Existing aggregate or stabilized haul roads are used for transporting relocated waste and construction materials to the greatest extent possible; additional temporary roads of aggregate and/or asphalt millings are constructed for areas of extensive and extended construction traffic to limit the generation of dust and facilitate access;
- Dust is suppressed primarily through the application of water to roads, and other surfaces from which dust could be generated. A truck equipped with a portable water storage tank (water wagon) is used periodically to dampen these surfaces as conditions warrant; and
- As necessary, a power broom is used to remove accumulated soil from paved roadways in order to minimize dust generation.

Vector Control

Vectors such as birds, rodents, and insects can be attracted to putrescible wastes exposed during the relocation activities. Vector control during construction activities associated with the alternate design presented in the Final Cover Design Report, Addendum 1 will be performed in accordance with the Final Cover Design Report, Vector Control Plan (Malcolm Pirnie, 2001). Some of the primary vector control methods are described below:

- Daily cover is placed over all waste each workday. Typically, the cover over the spoiled waste consists of a minimum of six inches of soil. A sufficient stockpile of cover soils is available near the excavation and disposal areas to meet the day's activities. In order to expedite completion of the excavation work, tarps, or other approved alternate daily cover materials, may be employed as daily cover at the excavation locations;
- Good housekeeping measures are implemented during waste relocation activities to eliminate conditions that could attract vectors, and the measures modified as conditions may require;
- The working area for both excavation and landfilling are minimized to what can be reasonably worked for the day to limit the area of exposed waste; and
- Should rodents and insects develop to become a vector problem during waste relocation activities, control measures specific to the identified problem will be implemented to avoid infestation, including the application of pesticides in accordance with New York City and New York State Department of Health requirements.

Mass Excavation and Waste Relocation

Additional procedures will be employed during the mass excavation and relocation of waste. These procedures include the following:

- Inspection personnel will monitor the excavation and disposal areas for scavenging birds and other potential vectors, and maintain a record of daily observations. This information would be reviewed to determine if there is an increasing pattern of vector activity in the work areas. If the potential vector population continues to grow, the inspections will be expanded to the perimeter of Section 6/7 to scope the extent of additional control measures;
- Should scavenging and/or predatory birds present an interference with the work or a vector threat to surrounding neighborhoods, the work areas will be further restricted, and additional measures will be developed and implemented in consultation with a wildlife biologist to address the problem.

Odor Control

Landfill gas emissions will continue to be controlled by the landfill gas collection system. While cover soil is expected to sufficiently suppress odors from the excavated and landfilled garbage, chemical odor suppressants, as described in Final Cover Design Report, Technical Specification Section 02224 (Malcolm Pirnie, 2001), will be used as necessary to further mitigate odors from creating an off-site nuisance. Odor control materials will be used in accordance with manufacturer recommended procedures.

Noise Control

In accordance with Part 360-1.14(p), noise levels resulting from equipment or operations will not exceed 67 decibels (A) beyond the property line during construction between 7:00 a.m. and 10:00 p.m. Noise levels will also comply with local laws.

YUKON AVENUE CONNECTION (2036)

With the 2011 modified landfill closure in place, the proposed Yukon Avenue Connection would not require any additional modifications to landfill infrastructure for the segment of road crossing the landfill.

For the segment of road between the base of the landfill and Richmond Avenue, work would encroach upon the existing service road that provides access to environmental monitoring pointes located to the north of the alignment. No monitoring points are located within the proposed alignment and therefore no further modifications to the landfill infrastructure would be required.

COMPLETED EAST PARK ROAD SYSTEM (2036)

With the 2011 proposal closure plan in place, the proposed Forest Hill Road Connection would not require any additional modifications to landfill infrastructure for the segment of road crossing the landfill.

For the segment of the Forest Hill Road between the base of the landfill and Richmond Avenue the alignment would encroach upon the landfill gas vent trench. Landfill gas migration monitoring point GX-40 is located in the vicinity of the alignment but not within the roadway alignment itself. GX-40 would be flagged and protected from disturbance during construction. To mitigate the encroachment of the road over the gas vent trench, a gravel venting layer would be placed above the landfill gas vent trench to ensure a permeable conduit to the surface. Placement of fill soil or pavement over a limited section of the gas vent trench is consistent with as-built conditions along the vent trench. Therefore, the fill placement, in connection with placement of a gravel venting layer beneath the road, would not compromise the function of the vent trench.

For the segment of the Richmond Hill Road Connection between the base of the landfill and the Yukon Avenue Corridor, the alignment would pass near groundwater monitoring wells 154D, 174S, and 153D. The alignment would also pass by gas migration monitoring wells G-44, G-17, G-18, G-46, and G-19. Each of these features would be protected during construction and not disturbed. (These impacts are also discussed in Chapter 13, “Infrastructure.”)

SOLID WASTE

The proposed project would require new construction across generally unbuilt land. It is not expected that significant demolition debris would be generated by any of the construction phases. It is expected that solid waste from construction would consist primarily of construction debris and packaging from new construction materials brought onto the site. All construction waste would be handled by private carters who would haul the materials and dispose of the materials in full accordance with the applicable regulatory requirements. The City has an active program to reduce solid waste generated by construction sites. Table 20-11 identifies some of the construction activity products that are potentially recyclable.

ENERGY

Energy impacts due to construction are primarily a result of the energy required to manufacture, deliver, and install the materials at the construction site. This type of energy is known as the embodied energy of the material. Embodied energy is expended extracting the raw materials, manufacturing and fabricating the product, handling and transporting them to the site, and

placing the materials in the roadway. Approximately 70 percent of the energy embodied in new construction is attributable to the manufacture of the basic construction materials and components. The remaining embodied energy is divided among direct fuel purchases, wholesale and retail trade, business and professional services, transportation of materials furnishings, and construction machinery and equipment. Almost all (approximately 99.5 percent) of the embodied energy is consumed before the material reaches the construction site. Construction of the proposed project over the course of 30 years is not expected to have a significant impact on energy demands for the City or region.

Table 20-11
Principal Recyclable Materials for New York City Construction Projects

The principal materials present in the NYC C& D waste stream that are currently recyclable in the New York City area include:	
Asphalt	Fluorescent Lamps
Brick	Glass
Cardboard	Land Clearing Debris
Corrugated Cardboard	Metal
Carpet	Pallets
Concrete	Roofing (asphalt)
Film Plastic	Wood
Materials that manufacturers will take back if they are installing new material include:	
Carpet	Ceiling Tile
Materials common in the C&D waste stream that could be recovered, but for which there is currently no local market/outlet include:	
Gypsum/Dry Wall (Current Outlet in Montgomery, NY)	Rigid Foam Insulation (Current Outlet in Florida)
Materials that may be salvageable before renovation or demolition begins include:	
Appliances	Office Furniture
Architectural Features	Windows/Doors
Circuit Breakers	Wood Timbers
Source: New York City Department of Design and Construction, 2005.	

TRAFFIC AND PARKING

INTRODUCTION

This section of the construction impacts analysis evaluates whether construction-related traffic from the proposed project would significantly impact local traffic and parking conditions. The project site is located in southwest Staten Island and has direct access to a regional highway, the West Shore Expressway, and local access via Arthur Kill Road, Richmond Avenue and other local streets surrounding the project site. Construction of the proposed park roads would generate traffic in the study area, including construction workers commuting by car, construction trucks making deliveries to and from the project site and the delivery and removal of soil with the greatest volumes of delivery occurring with the importation of base soils and road building materials.

PROJECTED TRAVEL PATTERNS OF CONSTRUCTION-RELATED TRAFFIC

Construction workers are expected to access the site primarily from the West Shore Expressway although some may reach the site by local roads. However, it is noted that for the 2016 program, other than the park projects at the site periphery, the site would not be accessible to vehicles from the local roads (i.e., there would not be any access from Richmond Avenue).

Given the site's access and egress opportunities to the regional highway network, most construction-related traffic would not be expected to use local streets. Arriving and departing

autos would primarily reach and exit the site via the West Shore Expressway connections to the project site and then use landfill service roads within the site. For any off-site locations where service conditions might be affected by project-generated construction traffic, the impact would be temporary and short-term. Details of site access would be coordinated between DPR and the contractors with the assistance of NYSDOT and NYCDOT.

WORKER AND TRUCK TRIPS

Construction activities would generate a modest amount of traffic during the peak hours during both the construction of the proposed park elements and the proposed roads. In addition, construction workers generally arrive before the peak morning commuter peak traffic period and depart before the peak afternoon commuter peak traffic period, with limited weekend work. Therefore, these vehicle trips generally do not affect the local traffic network. In addition to the worker commutes, there would also be trucking activity associated with the delivery and removal of soils (particularly the delivery of soils), and there would also be the delivery and removal of materials. Tables 20-10 and 20-11 project the potential truck traffic during construction. As also described above, given the size of the project site, it is expected that the delivery of all soils and materials that are expected to be necessary for the proposed project could reach the site via the West Shore Expressway and once on site could reach the work location for that particular phase of construction via the internal roadways, thus minimizing impacts on the surrounding neighborhood. Truck deliveries are expected to include:

- Engineered fill and asphalt for road construction; and
- Landscape materials for park road corridor landscaping.

These truck movements would be spread throughout the day and would vary depending upon the period of construction. However, as described above, it is expected 70 to 100 trucks per day, or about 10 per hour, would be providing deliveries to the site during the more intense periods of construction, particularly with respect to the importation of soil. Truck deliveries would be dispersed over the day with few occurring in the peak hours.

Regarding worker vehicles, conservatively assuming that all workers would travel to the site via automobile as single occupants, the daily trip generation would be about 50 to 100 vehicles during the more intensive periods of construction. With the proposed direct access to the West Shore Expressway that would provide access to central parking facilities, these trips would require limited use of local roads during peak periods. It is therefore expected that construction vehicle traffic from the proposed park would not significantly impact local roads. As stated above, most of the trips associated with construction would not coincide with the traditional commuter peak travel hours. Construction workers typically arrive between 6:00 and 7:00 AM and leave between 3:00 and 4:00 PM. This minimizes the likelihood of any significant increase in peak period traffic congestion due to construction.

TRAFFIC MAINTENANCE DURING CONSTRUCTION

With the proposed construction program, access to the project site would be gate-controlled and some streets may be temporarily closed or have lane closures at the periphery of the site for the construction of new intersections (e.g., the re-construction at the intersections along Richmond Avenue), as well as the installation of utility connections (e.g., water, sewer, gas, electric) at the periphery of the site. During these limited periods of construction impact, major roads, such as

Richmond Avenue, would have at least one lane open to traffic at all times. The temporary and limited closure of travel lanes is an unavoidable temporary impact on the local traffic network.

In addition, nighttime construction may be considered at high traffic locations along Richmond Avenue in order to minimize disruption to traffic. This would be a consideration at final design and proposed (if appropriate) as part of the construction approval process with NYCDOT and NYSDOT.

PARKING

The surrounding area contains primarily open spaces and low-density residential uses that generate little on-street parking demand traffic throughout the day. However, it is expected that parking would be provided on the project site in order to avoid any impacts on local on-street parking conditions. Thus, during the proposed construction period, parking demand in the vicinity of the project site would be similar to existing levels. As discussed above, with limited exceptions such as the construction of the small neighborhood parks, all construction worker vehicle parking is expected to be accommodated in the central staging areas.

AIR QUALITY

INTRODUCTION

Construction activities have the potential to impact local air quality as a consequence of emissions from stationary on-site equipment, emissions from construction vehicles on site and traveling to and from the site, as well as emissions from worker vehicles. For example, most construction engines are diesel powered, and produce relatively high levels of particulate matter. As a result, air quality impacts could occur on the surrounding area due to on-site sources as well as traffic that could also increase mobile source-related emissions. In addition, construction activities also emit fugitive dust

The construction of the proposed project would be subject to Local Law 77 of 2003; thus the potential for particulate emissions would be controlled by required emission controls and ultra-low sulfur diesel (ULSD). In addition, it is acknowledged that as a longer-term construction project there will continue to be advances in air pollution control for construction equipment, as well as turnover and replacement with newer vehicles and equipment that would further reduce emissions from construction vehicles.

City regulations would require all project contractors to reduce particulate matter emissions to the extent practicable by employing relatively new equipment including diesel oxidation catalysts (DOCs). As stated above, the construction activities would all be subject to New York City Local Law 77, which requires the use of Best Available Technology (BAT) for equipment at the time of construction.[1]

[1] New York City Administrative Code § 24-163.3, adopted December 22, 2003, also known as Local Law 77, requires that any diesel-powered non-road engine with a power output of 50 hp or greater that is owned by, operated by or on behalf of, or leased by a city agency shall be powered by ultra low sulfur diesel fuel (ULSD), and utilize the best available technology (BAT) for reducing the emission of pollutants, primarily particulate matter and secondarily nitrogen oxides. NYCDEP is charged with defining and periodically updating the definition of BAT.

FUGITIVE EMISSION SOURCES

Fugitive emissions can result from land clearing operations, such as excavation, hauling, dumping, spreading, grading, compaction or wind erosion and traffic over unpaved areas. Actual quantities of emission depend on the extent and nature of the clearing operations, the type of equipment employed, physical characteristics of the underlying soils, speed at which construction vehicles are operated and the fugitive dust control methods that are employed. The EPA suggests a general overall emission rate of about 1.2 tons of particulate matter per month per acre for construction sites with significant land clearing operations and no fugitive dust control measures. However, this is a national estimate and actual emissions vary widely depending on many factors. In addition, the proposed project would include techniques to reduce fugitive emissions during construction.

The proposed project would require soil importation and filling, excavation, site grading, and repaving. With the exception of truck traffic, no construction activities would occur adjacent to residential areas. At the project site, there are substantial buffers between the project site and local sensitive receptors (even the commercial receptors are separated by a wide heavily traveled road, Richmond Avenue), and recognizing that fugitive dust generated by construction activities consists of relatively large-size particles that settle on the ground within a short distance from the construction activity, fugitive dust emission impacts on the surrounding community should not be significant.

Moreover, because fugitive dust is a common impact of construction, it is also regulated under New York City's code (Local Law 77). Therefore, during construction, all appropriate fugitive dust control measures—including watering exposed areas and using dust covers for trucks—must be used to satisfy Section 1402.2-9.11 of the New York City Air Pollution Code. To prevent fugitive dust from becoming airborne, those measures include:

- Use of water to control dust in construction operations and during the clearing and grading of land;
- Application of water to dirt paths, materials, stockpiles, and other surfaces that can generate airborne dust over extended periods;
- Construction of temporary roads would be built with properly sized stone or concrete equivalent over filtering material;
- Covering of open-body trucks transporting materials likely to generate airborne dust at all times when in motion;
- Paving and management of access roads to control dust; and
- Prompt removal of earth or other material from paved streets where earth or other material has been deposited by trucking or earth-moving equipment, erosion by water, or other means.

Increases in concentrations of particulate matter are difficult to quantify accurately because of the difficulty in determining total emissions and the wide range of size of the particles emitted. However, since much of the fugitive dust generated by construction activities consists of relatively large-size particles, that dust would settle to the ground within a short distance of the construction site and would not adversely affect nearby residential areas or community facilities. In addition, dust-control procedures cited above, including stabilization of exposed areas, the frequent watering of affected areas, and the use of dust covers for trucks, would be required as part of the construction contract documents so that only minimal increases in ambient concentrations of particulate matter would occur.

Because contaminated materials exist in some project areas, more extensive dust control measures and perhaps monitoring would be employed when contaminants in soils are identified. When construction occurs in these areas, it is expected that a health and safety plan would be developed specifically designed to reduce the risk to the public and construction workers at particular sites where contaminated materials may be present (see also the description above under "Hazardous Materials") and may also include a monitoring plan, where necessary.

In addition, provided in Appendix E ("Supplemental DEC Data") is an analysis of the potential additional air emissions that would be expected during the added duration of landfill closure. As described in that appendix, the added emissions are negligible and would not result in a significant adverse air quality impact due to the proposed project.

MOBILE SOURCE EMISSIONS

Gaseous hydrocarbon and NO_x emissions from construction equipment, private vehicles on construction workers, and delivery vehicles at the construction sites would not be expected to impact local air quality. The small localized increases in hydrocarbon and NO_x emissions during the construction process caused by these sources would be insignificant when compared with total regional levels of these pollutants. Thus, these increases are expected to have a negligible effect on regionwide concentrations of photochemical oxidants.

Concentrations of NO_x tend to be localized phenomena. Some small increase in ambient concentrations can be expected from construction delivery vehicles in the vicinity of the construction site, emissions from the construction worker vehicles, and from construction vehicles at the site. Construction workers tend to start work early (before the AM peak hour) and finish work early (before the PM peak hour). Consequently, these vehicles should cause only a relatively small increase in the traffic and air pollutant concentrations in the area. Emissions from construction vehicles would not be a major source of CO since most equipment is diesel powered and emits relatively low amounts of CO. No violations of National Ambient Air Quality Standards (NAAQS) would occur as a result of the proposed project.

ODORS AND METHANE

Proposed Road Embankment (2011)

Methods to control odors during construction of the proposed roads are presented above in this chapter, under "Infrastructure."

East Park Roads (2016 and 2036)

With the 2011 final cover in place, no additional disturbance of the landfill cover would be necessary. Thus it is not expected that construction of the road final grade and finishes would result in any significant odor or methane impacts. Consequently, landfill gas and waste odors would be managed by the continuous operation of the landfill gas extraction and collection system.

SUMMARY

During construction of the proposed project, emissions from on-site construction equipment and on-road construction-related vehicles, and their effect on background traffic congestion could have short-term impacts on air quality. In general, most construction engines are diesel-powered, and produce relatively high levels of nitrogen oxides (NO_x) and particulate matter (PM).

Construction activities also emit fugitive dust. Although diesel engines emit much lower levels of CO than gasoline engines, the stationary nature of construction emissions and the large quantity of engines could lead to elevated CO concentrations, and impacts on traffic could increase mobile source-related emissions of CO as well, although these increases are not expected to be significant. Potential measures that could be implemented to reduce short-term impacts of the proposed project include the following:

1. *Diesel Equipment Reduction.* Individual capital projects could minimize the use of diesel engines and use electric engines by operating from grid power instead, to the extent possible. This would allow the use of electric engines where practicable and could potentially eliminate some generators that would normally be needed for construction equipment.
2. *Clean Fuel.* ULSD would be used exclusively for all diesel engines throughout the project duration.
3. *Newer Equipment.* The use of newer engine models with cleaner emissions standards would reduce air emissions particularly with respect to particulate matter. While all engines undergo some decline in performance over time, newer as well as better maintained engines emit less particulate matter than their older, unregulated counterparts. Therefore, requiring the use of new equipment as well as the anticipated turnover and technological advances in construction equipment through the life of the project would reduce emissions for future projects. Use of cleaner small engines and gasoline engines would further reduce emissions.
4. *Point Source Site Selection.* In addition, to reduce the resulting concentration increments at sensitive receptors, large emissions sources and activities, such as concrete trucks and pumps, would be located away from residential buildings, schools, and playgrounds.
5. *Dust Control/Soil Erosion and Sediment Control Practices.* Each contractor would be required to implement a dust control plan that includes strict fugitive dust control plans as part of contract specifications. For example, stabilized truck exit areas would be established for washing off the wheels of all trucks that exit the project site. In addition, truck access points would be either watered as needed or, in cases where such routes would remain in the same place for an extended duration, the routes would be stabilized, covered with gravel, or temporarily paved to minimize dust. All trucks hauling loose material could also be equipped with tight fitting tailgates and covered prior to leaving the site. In addition to regular cleaning by the City, area roads adjacent to the sites should be cleaned as frequently as needed. Water sprays could be used for all excavation, demolition, and transfer of spoils to ensure that materials are dampened as necessary to avoid the suspension of dust into the air. Loose materials could be watered, stabilized with a biodegradable suppressing agent, or covered. By implementing the above, an aggressive fugitive emissions reduction program could reduce fugitive dust emissions by at least 50 percent. In addition, the soil erosion and sediment control practices presented above would have the dual benefit of providing dust suppression.
6. *Construction Vehicle Speeds and Idling.* Limiting on-site travel speeds to 5 miles per hour would control particulate emissions. In addition, idling of trucks or other equipment would not be permitted during periods when they are being unloaded or are not in use.
7. *Odors and Methane.* With the odor protection measures in-place during the construction of the proposed final cover and embankment in place and no additional disturbance of the landfill cover for the proposed roads in 2016 and 2036, it is not expected that construction of the proposed project would result in any significant odor or methane impacts (see also the discussions in Chapter 23, “Impact Avoidance and Mitigation Measures”).

NOISE

Impacts on community noise levels during construction can result due to noise from construction equipment operation and from construction vehicles and delivery vehicles traveling to and from the site. Construction activity generates noise from the construction equipment, construction vehicles, worker traffic, and deliveries of soils and materials to and from the construction site. Noise and vibration levels at a given location would depend on the number and types of construction equipment being operated, the acoustical utilization factor of the equipment (i.e., the percentage of time a piece of equipment is operating), the distance from the construction site, and any shielding effects (shielding due to structures, elevated topography, or natural barriers). Noise levels caused by construction activities would vary widely, depending on the phase of construction and the location of the construction relative to receptor locations. Typically, the most significant noise associated with construction is jackhammers and pile driving (see Table 20-12). (For example, drilling or drilling of piles and the use of jackhammers may be necessary for the off-mound construction of the Forest Hill Road Connection. This would be subject to additional potential design and review as part of the implementation of this road segment.) The impact of noise would be based on the result of individual project construction phases and sequences and the location of each phase of construction relative to the project site boundaries; the particular construction tasks within each phase, including the types and number of construction equipment specific to each task, recognizing that the construction of the road would progress geographically. For example, the use of jackhammers is expected to be very limited, perhaps for the breaking of pavement to provide utility connections at select locations. In addition, pile driving (or drilling) would occur, but also at select locations for the construction of the viaducts and crossings for the Yukon Avenue, Forest Hill Road and Richmond Hill Road connections; however, these activities are well removed from the local neighborhoods. Pile activity nearer local neighborhoods would be limited to lighter and shorter duration activity, such as the construction of a small dock in North Park.

Noise levels associated with the construction of the proposed project would be subject to the noise emission source controls of the recently revised New York City Noise Control Code. This code specifies maximum sound pressure levels at receiving properties (designated by octave band levels). The *CEQR Technical Manual* also provides guidance for examining the incremental noise impacts, and comparisons with NYCDEP's external Noise Exposure Guidelines. Finally, the City of New York's Zoning Resolution sets octave band limits for the lot line of a property. Construction equipment is also regulated by the Noise Control Act of 1972.

The New York City Noise Control Code, as amended December 2005 and effective July 1, 2007, requires the adoption and implementation of a noise mitigation plan for each construction site, limits construction (absent special circumstances as described below) to weekdays between the hours of 7 AM and 6 PM, and sets noise limits for certain specific pieces of construction equipment. Construction activities occurring after hours (weekdays between 6 PM and 7 AM and on weekends) may be authorized in the following circumstances: (i) emergency conditions; (ii) public safety; (iii) construction projects by or on behalf of city agencies; (iv) construction activities with minimal noise impacts; and (v) where there is a claim of undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts and/or financial considerations. It is not anticipated that extended hours (7:00 AM through 6:00 PM) would be needed for construction of the proposed project on a regular basis.

Table 20-12
Noise Levels for Typical Construction Equipment

Equipment	FTA (or FHWA) Typical Noise Level (dBA) at 50 feet
Arc Welder	73
Asphalt Pavers	85
Asphalt laying equipment	85
Backhoe	80
Bulldozer	85
Compactor	80
Compressors	80
Cement Mixer	85
Concrete Pumps	82
Concrete Trucks	85
Delivery Trucks	84
Dual Hoist	85
Crane (Crawler Crane)	85
Crane (Hydraulic Crane)	85
Crane (Tower Crane)	85
Crane (Rubber Tire Crane)	83
Drill Rigs	85
Dump Trucks	84
Excavators	85
Forklift	85
Generators	82
Impact Wrenches	85
Jackhammers	85
Pavers Cutter	85
Pile driving rig	95
Rebar Bender	80
Roller	85
Saw (Chain Saw)	85
Saw (Circular Saw)	76
Saw (Table Saw)	76
Scissor Lift	85
Slurry supply system	85
Tamper	85
Trailers	85
Toweling Machine	85
Water Pumps	77

Sources: Transit Noise and Vibration Impacts Assessment, Federal Transit Administration, May 2006; and Federal Highway Administration Roadway Construction Noise Model (FHWA RCNM), 2006.

Noise from construction activities and some construction equipment is regulated by not only the New York City Noise Control Code but also by the EPA. The EPA requirements mandate that certain classifications of construction equipment meet specified noise emissions standards. These federal requirements mandate that: 1) certain classifications of construction equipment and motor vehicles meet specified noise emission standards; and 2) construction material is handled and transported in a manner that does not create unnecessary noise.

CONSTRUCTION NOISE IMPACT ASSESSMENT

Overview

The *CEQR Technical Manual* states that significant noise impacts due to construction would occur "only at sensitive receptors that would be subjected to high construction noise levels for an extensive period of time." In addition, the *CEQR Technical Manual* states that impact criteria for vehicular sources, using existing noise levels as the baseline, should be used for assessing construction impacts (see Chapter 19, "Noise," for a description of noise measurement and sound levels).

Construction activities for the proposed project would be expected to result in increased noise levels as a result of: (1) the operation of construction equipment on-site; and (2) the movement of construction-related vehicles (i.e., worker trips, and material and equipment trips) on the surrounding roadways. The degree of potential construction noise includes:

- Noise emission level of the equipment;
- A usage factor, or percentage of time the equipment is operating;
- Distance between the equipment and the receptor;
- Topography and ground effects; and
- Shielding.

Similarly, noise levels due to construction-related traffic are a function of:

- Noise emission levels generated by the type of vehicle (e.g., auto, light-duty truck, heavy-duty truck, bus, etc.);
- Vehicle speed;
- Distance between the roadway and the receptor;
- Topography and ground effects; and
- Shielding.

As discussed above, the City has recently updated its Noise Control Code (effective July 1, 2007). Thus, the construction associated with the proposed project would be subject to the requirements of the new City Noise Control Code. Presented below (see page 20-42) are methods for source control that may be used to attain those noise reduction requirements.

While the level of construction noise associated with the type of construction activity depends on the numbers and type of equipment employed at any time, noise levels associated with construction may occasionally be noticeable to nearby residents, particularly during the times when jackhammers and/or other pavement-breaking equipment are used. Significant ambient noise level increases along streets where construction activities are taking place can reach up to 98 A-weighted decibels (dBA) under worst-case conditions (pavement breaking at 50 feet). However, given the type of construction that is expected with the proposed project, limited use of higher noise generating equipment is expected since most activities would occur in areas not previously covered by paved surfaces. In most cases these types of impacts would be related to the installation of utility connections, or street connections at Richmond Avenue or Arthur Kill Road, for example.

Temporary noise increases from more significant noise generating equipment can be intrusive to nearby residents at distances of up to about 400 feet from the activity. However, there are no cost-effective measures that can be implemented to effectively eliminate temporary noise increases of this type which occur throughout the city as part of the construction process. In addition, construction of the road, for example, would largely take place on the interior of the site and would not require any substantial use of jackhammers or pavement breaking equipment.

Noise levels also increase/decrease exponentially over distance. Thus, they decline by an estimated 2–4 dB with each doubling of distance from the source. Thus, sound pressure levels after peaking at the front of a residential unit or park would decline by 2–4 dB for every 100 feet of distance. Once the construction has moved to 200 feet away, the sound pressure levels would decrease by 4–8 dB. While this noise level would continue to audible in the generally quiet neighborhoods, the decreasing noise levels and distance from the receptors would limit impacts. Therefore, although elevated noise levels are considered a nuisance and would be intrusive at

times, these impacts would be short-term and are not considered a significant adverse impact. Moreover, the project site is largely removed from the local neighborhood and the distances between the construction activities and local residential uses should be more than adequate to minimize the construction noise impacts of the proposed park roads.

As described above, all construction equipment and vehicles must also meet the City, State, and Federal regulatory requirements regarding noise emissions, and construction activities would be limited to weekdays between the hours of 7:00 AM and 6:00 PM.

Potential Source Controls

In terms of potential source controls (e.g., reducing noise levels at the source or during most sensitive time periods), the following types of measures could be implemented as part of a noise control plan:

- NYCDEP, in its review of the noise control plan, would require all contractors and subcontractors to properly maintain their equipment;
- DPR could require all contractors and subcontractors to properly maintain their equipment and have quality mufflers installed;
- Noisy equipment, such as generators, cranes, concrete pumps, concrete trucks, and dump trucks, should be located away from and shielded (as necessary) from local neighborhoods which are the only existing sensitive receptor immediately adjacent to the construction site and used to the least extent possible; and
- Noise curtains and equipment enclosures could be utilized to provide shielding to sensitive receptor locations as necessary.

Based on the above, it is concluded that construction period noise emissions would be limited to the extent practicable and performed in accordance with all local, State and Federal laws and practices. The proposed project would also make use of the project site to avoid impacts on the surrounding neighborhoods and sensitive receptors. Thus, it is concluded that although short-term noise impacts would be selected for certain capital projects, the overall construction noise impact of the proposed project should not be significant.

VIBRATION

Vibrations generated by construction activities, generally within one thousand feet of existing buildings, may be perceptible or potentially damaging to structures. Table 20-13 shows the vibration source levels for typical construction equipment. Table 20-14 shows typical vibration induced risk criteria. No blasting would be performed as part of the proposed project; however, pile driving, or drilling, may be performed. In general, vibratory levels at a receptor are a function of the source strength (which in turn is dependent upon the construction equipment and construction methods utilized), the distance between the equipment and the receiver, the characteristics of the transmitting medium, and the receiver building construction. Construction equipment operation causes ground vibrations which spread through the ground and decrease in strength with distance. Vehicle traffic, even in locations close to major roadways, typically does not result in perceptible vibration levels, unless there are irregular road surfaces. With the exception of the case of fragile, historically significant structures or buildings, generally construction activities do not reach the levels that can cause architectural or structural damage, but they can achieve levels that may be perceptible and annoying in building very close to a construction site. Since no blasting is proposed, the greatest vibration activity is expected to

travel a distance of no more than two hundred feet (pile driving). Thus, vibrations are not expected to affect local residences**.** This activity would occur as part of the long-term phases of park and road construction. Impact avoidance measures would therefore be developed based on more detailed road designs for the protection of landfill infrastructure and where necessary, alternative means of installing support piles, including drilling, may be preferred (see also the discussion above under "Landfill Protections During Construction").

PUBLIC HEALTH

Potential construction period public health impacts due to air and noise pollutant emissions can stem from construction equipment and construction vehicles. Of particular concern is the potential for diesel emissions with particulate matter from construction-related activities to impact public health (such as increasing asthma rates). In response to those concerns, as described above, the City has adopted Local Law 77, which would control air pollution from construction equipment.

Table 20-13
Vibration Source Levels for Construction Equipment

Equipment	PPV_{ref} (in/sec)	Approximate L_v (ref) (VdB)
Pile Driver (impact)	0.644	104
Pile Driver (sonic)	0.170	93
Clam Shovel drop (slurry wall)	0.202	94
Hydromill (slurry wall in rock)	0.017	75
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drilling	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Source: *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006.

Table 20-14
Typical Vibration-Induced Risk Criteria for Residential Buildings*,**

Activity	Perceptible Distance (feet)	Damage Risk Distance (Feet)
Pile Driving	200	50
Pavement Breaking	150	40
Bulldozing	60	20
Heavy Truck Traffic	50	15
Jackhammers	30	10

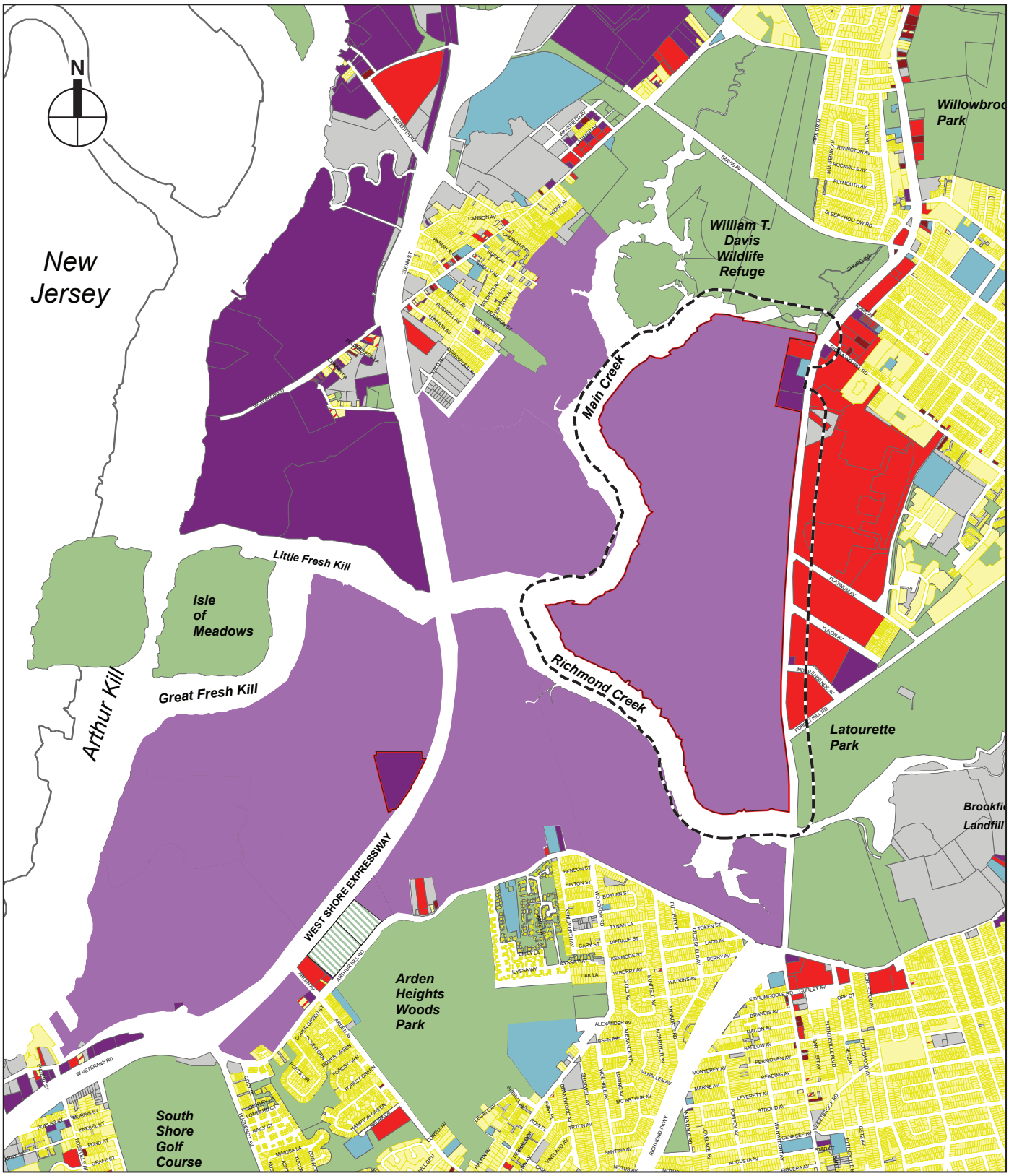
Notes:
* Wiss, John F. Construction Vibrations: State-of-the-Art. Journal of the Geotechnical Engineering Division, Proceedings of the American Society of Civil Engineering Division, Proceedings of the American Society of Civil Engineers, Volume 107, No. GT2, February, 1981.
** Standard Recommended Practice for Evaluation of Transportation Related Earthborne Vibrations, ASSHTO Designation R8-81(1986).

Considering that a significant reduction in percolation would occur with completion of the Landfill Section 6/7 final cover system in 2011 build-out, it is concluded that construction activities associated with the proposed Landfill Section 6/7 embankment (2011), performed using appropriate best management practices, would not result in impacts to local groundwater or public health. Likewise, the construction of the proposed roads would take place on prepared embankment and off the landfill and therefore would not increase the volume of leachate required to be managed above the volume managed prior to closure construction.

With the odor protection measures in-place during the construction of the proposed final cover construction and embankment and no additional disturbance of the landfill cover for the proposed roads, it is not expected that construction of the proposed project would also not result in any significant odor or methane impacts. Odor and methane emissions are closely related because odor causing compounds are emitted with methane from landfill gas. Therefore, odor protection measures in combination with measures designed to maintain collection of methane during construction would address these potential air quality issues such that no impacts would be expected on local public health due to the proposed construction activities.

During the 2011 analysis year, vector control will be provided as described above(see "Nuisance and Vector Management"). In addition, with the proposed protection and testing programs for road construction (2016 and 2036), no impacts would occur with respect to hazardous materials.

For all the above reasons, it is concluded that with proposed impact avoidance and protection measures in place, no public health impacts would occur during the three phases of project construction. ✷



Land Uses Within 400 Feet of Project Construction Site

Figure 20-1