Chapter 21: Construction Impacts

A. INTRODUCTION

Construction of the proposed project would occur over a 9-year period. The first section of the chapter describes the schedule and sequencing of the construction, and then provides a detailed description of each type of construction activity. The activities discussed include demolition, excavation and foundations, construction of the superstructure of the buildings, installation of the exteriors, and interior finishes, as well as reconstruction of the waterfront platform. General construction practices, including those associated with deliveries and access, hours of work, and sidewalk and lane closures, are presented. Following the discussion of construction techniques, individual sections of this chapter discuss potential impacts with regard to land use and neighborhood character, historic resources, socioeconomic conditions, hazardous materials, infrastructure, traffic and transportation, air quality, noise and vibration, and rodent control. Finally, measures that avoid or reduce the potential for significant adverse construction impacts are identified.

PRINCIPAL CONCLUSIONS

LAND USE

Construction would cause some disruptions to activities in the surrounding area. Although construction would occur over several years, most disruptions would be temporary in nature and would not occur at any one location for the entire construction period. During construction, access to all adjacent businesses, residences, and other uses would be maintained according to established regulations. When work would take place within building shells, effects on the surrounding uses would be substantially reduced as compared with excavation and foundation activities. Management practices would be developed and implemented to minimize the effects of construction-related changes in access to businesses and buildings in the vicinity of the project site. Other changes, such as sidewalk closures, would affect people living and working in the surrounding area, but implementation of the construction management practices would minimize the effects of these closures. There would be no significant adverse impacts on land use due to construction activity.

SOCIOECONOMIC CONDITIONS

Construction activities on the project site would include various land and/or sidewalk closures for different stages of construction. These enclosures would not disrupt adjacent businesses. Most of the businesses adjacent to the project site are industrial and do not rely on foot traffic. During construction, access to industrial and other types of businesses would not be obstructed. There would be no significant adverse impacts on socioeconomic conditions due to construction. Rather, construction would create major direct benefits resulting from expenditures on labor, materials, and services, as well as substantial indirect benefits created by expenditures by

material suppliers, construction workers, and other employees involved in the direct activity. Construction would also generate increased tax revenues for the city and state.

OPEN SPACE

Because construction of the northernmost building on the project site would occur immediately adjacent to Grand Ferry Park, special measures would be taken to prevent its intrusion into the park. A solid fence would be erected along the perimeter of the site that borders the park. The fence would have no openings between the construction site and the park and would be high enough to reduce sound from construction activity of the project site and to minimize dust. The hoists, cranes, and other equipment would be located on the side of the building away from the park. As the superstructure is being erected, netting would be installed on the side of the building facing the park to prevent any materials from falling into the park.

Construction activities would be conducted with the care mandated by the close proximity of an open space to the project site. Dust control measures—including watering of exposed areas and dust covers for trucks—would be implemented to ensure compliance with the New York City Air Pollution Control Code, which regulates construction-related dust emissions. As discussed below, there would be no significant adverse air quality impacts on open spaces.

HISTORIC RESOURCES

A Construction Protection Plan (CPP) for the Refinery would be prepared in coordination with a licensed professional engineer. It would describe the measures to be implemented during the rehabilitation of the Refinery itself, as well as measures to be taken to protect the Refinery during construction of adjacent buildings on the project site.

As described in Chapter 8, "Historic Resources," the project site is located within 90 feet of three historic resources: the Williamsburg Bridge, the former American Sugar Refinery Buildings, and the former Matchett Candy factory. Construction of the project could result in inadvertent physical impacts to these resources if proper precautions are not taken. To avoid any construction-related impacts on the latter two resources, including ground-borne vibration, falling debris, and accidental damage from heavy machinery, a CPP would be developed in consultation with the State Historic Preservation Officer (SHPO) and the New York City Landmarks Preservation Commission (LPC). The CPP would follow the guidelines set forth in section 523 of the *CEQR Technical Manual,* including conforming to LPC's *New York City Landmarks Preservation Commission Guidelines for Construction Adjacent to a Historic Landmark* and *Protection Programs for Landmark Buildings*. The CPP would also comply with the procedures set forth in the New York City Department of Buildings' *Technical Policy and Procedure Notice* (TPPN) #10/88.

The Williamsburg Bridge is separated from the project site by South 5th Street, which is 60 feet wide. Protection measures for this resource would be developed in coordination with SHPO, LPC, and the New York City Department of Transportation (DOT).

With these measures in place, construction of the proposed project would not result in any significant adverse impacts on historic resources.

HAZARDOUS MATERIALS

With the measures in place described in Chapter 12, "Hazardous Materials," there would be no significant adverse impacts with respect to hazardous materials during the construction process.

NATURAL RESOURCES

The implementation of erosion and sediment control measures, and a Stormwater Pollution Prevention Plan (SWPPP), would minimize potential impacts on littoral zone tidal wetlands from discharge of stormwater runoff during land-disturbing activities. In addition, measures would be taken to prevent any adverse impacts to peregrine falcons during construction. With these measures, the proposed project's construction would not result in significant adverse impacts on natural resources.

INFRASTRUCTURE

The construction activities that would be required to connect the proposed project to existing energy systems are part of Con Edison's and National Grid's normal operations for providing services to new customers, and occur on a regular basis throughout the city. Therefore, these construction activities would not result in a significant adverse impact to infrastructure and energy systems.

TRAFFIC AND PARKING

Because the proposed development program would result in buildings completed and occupied at different times, the total project-generated traffic during construction, beginning with the completion of the first building, would encompass both construction and operational traffic. Trip-making attributable to construction activities would peak in the first quarter of 2016. A secondary peak construction scenario in early 2020 was also reviewed to determine the appropriate and representative peak construction condition for assessing potential construction traffic impacts. This review showed that peak construction vehicle trips are expected to be twice as high in the first quarter of 2016 as those projected for the first quarter of 2020. However, the operational trips in the first quarter of 2016 would be less than half of the operational trips in the first quarter of 2020.

With the construction and operational trips combined, the 2016 first quarter construction scenario would yield more 6 to 7 AM construction peak hour vehicle trips but fewer 3 to 4 PM and 5 to 6 PM construction peak hour vehicle trips than the 2020 first quarter construction scenario. For the early morning 6 to 7 AM construction peak hour, components of the proposed project would generate minimal operational trips; hence, the scenario with the higher construction trips (2016 first quarter) would yield the most total project-generated trips. For the afternoon 3 to 4 PM and 5 to 6 PM hours, however, the scenario with the higher operational trips (2020 first quarter) would yield the most total project-generated trips. Compared to the 2020 full build-out of the proposed project, both construction scenarios would yield fewer total project-generated trips. Hence, overall traffic conditions during construction in the traffic study area are expected to be better than the 2020 future with the proposed project condition presented in Chapter 17, "Traffic and Parking." Furthermore, based on Automatic Traffic Recording (ATR) data updated in October 2009, the 6 to 7 AM background traffic volumes are approximately 45 percent lower than the 8:30 to 9:30 AM commuter peak hour volumes, while the 3 to 4 PM background traffic volumes are not substantially different from the 4:30 to 5:30 PM commuter peak hour traffic volumes. Since existing and future without the proposed project (No Action) traffic conditions at some of the study area intersections through which construction-related traffic would also travel were determined to operate at unacceptable levels during commuter peak hours, it is possible that significant adverse traffic impacts could occur at some or many of these locations during construction. In order to alleviate construction traffic impacts, measures

recommended to mitigate impacts associated with the proposed actions could be implemented during construction before completion of the proposed project.

For the Final Environmental Impact Statement (FEIS), a quantified traffic analysis will be prepared to identify significant adverse traffic impacts during construction that may differ from those identified for the project's final build-out and which may require different mitigation measures. As discussed above, the 2020 first quarter construction scenario would result in more total combined project-generated trips during two of the three construction peak hours than the 2016 first quarter construction scenario. However, because the construction trip component during the first quarter of 2020 would make up a very small portion of the total trips (construction and operational) associated with the proposed project, the conditions would be more reflective of those in the final build-out, which is already being addressed in Chapter 17, "Traffic and Parking." Therefore, it is more appropriate to consider the 2016 first quarter construction scenario as the representative worst-case condition for assessing potential construction traffic impacts and mitigation measures. This analysis will evaluate locations where travel patterns are expected to be different during construction and where there would be significant adverse impacts under the full build-out of the proposed project.

Because the majority of construction activities would be accommodated on-site, construction trucks would be staged primarily within the project site, or on newly completed streets on the project site adjacent to or south of active construction sites. However, curb lanes and sidewalks on Kent Avenue might be temporarily closed due to construction activities. In November 2008, DOT created bicycle lanes on both the east and west sides of Kent Avenue, replacing what had been curbside parking on both sides of the street. As noted in Chapter 17, "Traffic and Parking," in the fall of 2009, Kent Avenue was reconfigured as a one-way northbound street with two traffic lanes, a two-way bicycle lane on the west side of the street, and a parking lane between the bicycle lane and the traffic lanes. Construction of the proposed project would require temporarily either narrowing or relocating portions of these bicycle lanes. During the entire construction period, a lane of traffic would be maintained along Kent Avenue. In addition, sidewalk protection or temporary sidewalks would be provided to maintain pedestrian access.

Construction vehicle parking would be accommodated on the project site; therefore, construction of the proposed project would not result in significant adverse parking impacts.

TRANSIT AND PEDESTRIANS

Approximately 25 percent of construction workers would travel to and from the project sites via transit. Based on the peak 2016 projections, there would be approximately 122, 93, and 29 construction-related transit trips during the 6 to 7 AM, 3 to 4 PM, and 5 to 6 PM hours, respectively. The transit trip demand during the morning and afternoon peak construction hours would represent only nominal increases in transit demand and would occur along each of those routes and at each of the transit access locations during hours within and outside of the typical commuter peak periods. Hence, no further evaluation of nearby transit services is required, and there would be no significant adverse transit impacts attributable to the projected construction-worker transit trips. Any temporary relocation of bus stops along bus routes that operate adjacent to the project site would be coordinated with and approved by DOT and Metropolitan Transportation Authority-New York City Transit (NYCT) to ensure proper access is maintained.

Approximately 5 percent of construction workers would travel to and from the project sites on foot. Based on the peak 2016 projections, there would be approximately 24, 19, and 6 construction-related walk trips during the 6 to 7 AM, 3 to 4 PM, and 5 to 6 PM hours,

respectively. Since these pedestrian trips would be small in number, primarily occur outside of peak hours, and would be distributed among numerous sidewalks and crosswalks in the area, there would be no significant adverse pedestrian impacts attributable to the projected construction-worker pedestrian trips. During construction, where temporary sidewalk closures are required, adequate protection or temporary sidewalks and appropriate signage would be provided in accordance with DOT requirements.

AIR QUALITY

During construction, emissions from on-site construction equipment and on-road construction-related vehicles, and any congestion caused by construction traffic, have the potential to impact air quality. With the implementation of the emissions control program described below under "Construction Impacts of the Proposed Project," the on-site emissions levels during construction are expected to be very low when compared with typical construction activity. With control measures in place, construction activities associated with the proposed project are not expected to cause new exceedances of the National Ambient Air Quality Standards (NAAQS) for any pollutant, and would not significantly increase concentrations of particulate matter with an aerodynamic diameter equal to or less than 2.5 microns ($PM_{2.5}$) at any location. This has been shown by fully quantified analyses done for larger projects with higher emission profiles. The emissions during the highest quarter were compared with data from other emission profiles generated by other projects that have had construction air emissions analyzed. These projects included FEISs for the 1) Proposed Manhattanville in West Harlem Rezoning and Academic Mixed-Use Development, 2) Atlantic Yards Arena and Redevelopment Project, and 3) First Avenue Properties Development. The highest air emissions in the Domino Sugar Rezoning analysis were found to be lower than for the fully quantified analyses. It was determined that these other projects would not cause significant adverse air quality impacts from construction activities. Therefore, construction activities for the proposed project would not result in any significant adverse air quality impacts. Components of the emissions control program described below under "Construction Impacts of the Proposed Project" may be adjusted between Draft and Final EIS.

NOISE

Construction of the proposed project would implement measures to control noise sources (i.e., reducing noise levels at the source or during most sensitive time periods) and noise pathways (e.g., placement of equipment, implementation of barriers between equipment and sensitive receptors). Even with these measures, a screening analysis, based on the number and type of pieces of construction equipment in use during a worst-case time period, determined that the noise levels due to construction activities at sensitive receptors, including residential uses, around the project site are expected to exceed City Environmental Quality Review (CEQR) impact criteria. Many of these receptors have double glazed windows and some form of air conditioning (window units, through-wall, or Packaged Terminal Air Conditioners), which would provide substantial attenuation of the incident construction noise and result in acceptable interior noise levels according to CEQR criteria during most times of day. Between the DEIS and FEIS, a more detailed construction noise analysis will be performed in order to quantify the magnitude of the noise level increases at the nearby sensitive receptors and determine the practicability and feasibility of additional control measures to reduce or eliminate the significant adverse noise impacts.

B. CONSTRUCTION ACTIVITIES

SCHEDULE

The total anticipated period of construction for the proposed project is approximately nine years, starting in early 2012 and finishing in late 2020. While it is possible that work on the upland portion of the project site could begin before 2012, the analyses in this chapter conservatively assume that construction activity would be compressed into the 9-year period from 2012 to 2020. The locations of principal construction components are shown in Figure 21-1. The duration of construction on individual sites would range from approximately 2 to 3.5 years. As currently contemplated, construction would begin on the upland parcel and proceed along the waterfront parcel from south to north. This construction phasing of site development would be set forth in the Restrictive Declaration.

As shown in Table 21-1 and Figure 21-2, the duration and timing of construction would vary from building to building on the various sites. The shortest task would be the construction of the buildings on Site E on the upland parcel of the site, which would take about two years. The longest construction period would be for Site B, the largest of the waterfront sites, which would be constructed over a period of about 43 months. Typically, construction would occur simultaneously on two of the parcels throughout the eight-year construction period.

Table 21-1
Construction Components and Projected Durations

Project Parcel	Estimated Duration	Start Date	Finish Date
Site E	24 months	Jan. 2012	Nov. 2013
Site D	39 months	Jan. 2012	Dec. 2014
Site C	29 months	Dec. 2014	March 2017
The Refinery	43 months	Dec. 2013	June 2017
Site B	43 months	July 2016	Oct. 2019
Site A	24 months	Nov. 2018	Oct. 2020
Waterfront platform	32 months	April 2013	Sept. 2015

Source: The Refinery LLC, Gotham Construction, F.J. Sciame Construction, and Mueser Rutledge.

GENERAL CONSTRUCTION PRACTICES

Certain practices would be observed throughout the project. The developer would designate a contact person for the community throughout the construction period. This person would serve as the contact for the community to voice concerns about construction activities, and would be available to meet with the community to resolve concerns or problems.

In addition, the New York City Department of Buildings (DOB) requires that a telephone number be posted conspicuously at the construction site for the public to report concerns anonymously. DOB investigates all complaints and may shut down construction if any violations of city regulations are found. If violations are found, DOB may institute fines and other penalties.

DELIVERIES AND ACCESS

Access to the construction sites would be tightly controlled. The work areas would be fenced off, and limited access points for workers and trucks would be provided. It is anticipated that parking

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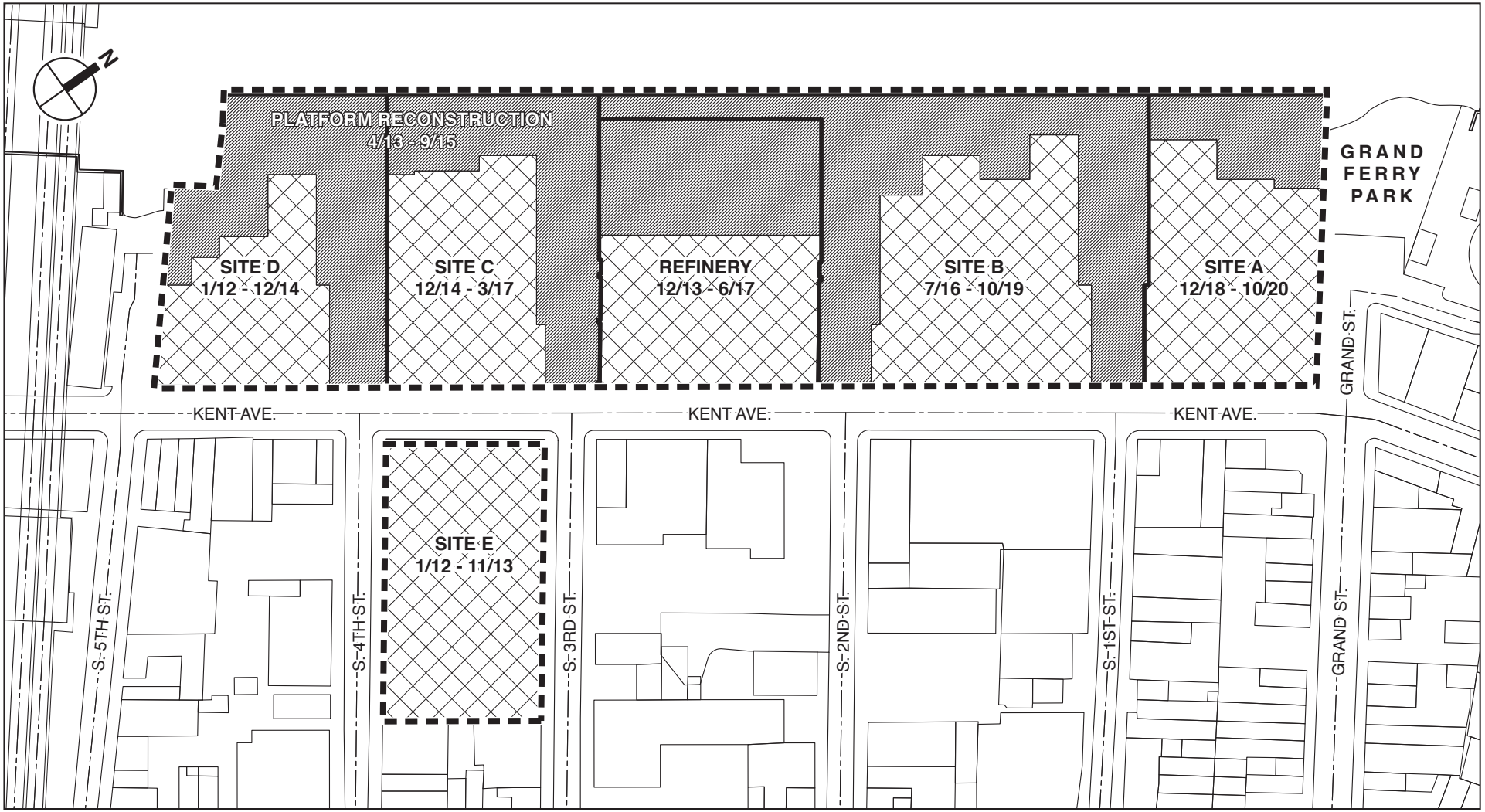


Project Site Boundary

12/12 - 3/15 Start and Finish Dates (Month/Year) of Construction

Landscape

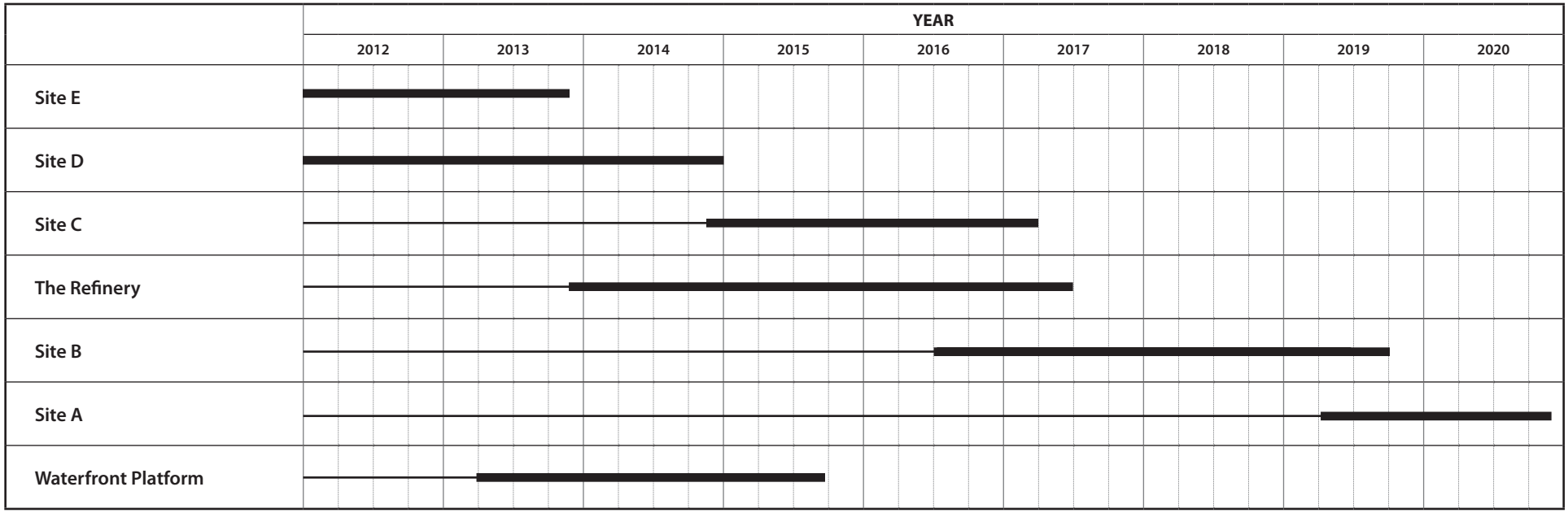
Building

0 100 200 FEET

SCALE

Construction Phasing Plan

Figure 21-1



Anticipated Construction Schedule
Figure 21-2

for worker vehicles would be provided on-site. In the early phases of construction, surface parking would be provided on unbuilt portions of the project site. In later phases, workers would be able to park in the garages of the newly constructed buildings. However, as proposed buildings are constructed and occupied, temporary imbalances in terms of parking supply and demand may occur. In such a case, some construction workers may need to seek off-site parking in the study area.

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 the site would be refused entry. After work hours, the gates would be closed and locked. Unauthorized access would be prevented after work hours and over the weekends.

Material deliveries to the site would be highly controlled and scheduled. Unscheduled or haphazard deliveries would not be allowed. To aid in adhering to the delivery schedules, flaggers would be employed at each of the entry and exit gates. The flaggers would control trucks entering and exiting the site so that they would not interfere with one another and so as to minimize disruptions to local on-street traffic.

HOURS OF WORK

Construction activities for the buildings would take place in accordance with New York City laws and regulations which allow construction activities to take place between 7:00 AM and 6:00 PM. Construction work would begin at 7:00 AM on weekdays, with most workers arriving between 6:00 AM and 7:00 AM. Typically, work would end at 3:30 PM, but could be extended as late as 6:00 PM without requiring authorization from DOB for such tasks as completing the drilling of piles or finishing a concrete pour for a floor deck. Extended workday activities may not include all construction workers on site, but only those involved in the specific task. Extended workdays would occur during foundation and superstructure tasks, and limited extended workdays could occur during other tasks over the course of construction.

At limited times over the course of constructing a building, weekend work would be required. Weekend work requires a permit from DOB and, approval of a noise mitigation plan from the New York City Department of Environmental Protection (DEP) under the New York City Noise Control Code. The New York City Noise Control Code, as amended December 2005 and effective July 1, 2007 limits construction (except in special circumstances) to weekdays between the hours of 7:00 AM and 6:00 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 permitted only to accommodate: (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) undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts and/or financial considerations. In such cases, the numbers of workers and pieces of equipment in operation would be limited to those needed to complete the particular authorized task. Therefore, the level of activity for any weekend work would be less than a normal workday. The typical weekend workday would be on Saturday from 7:00 AM with worker arrival and site preparation to 5:00 PM for site cleanup.

A few tasks may have to be completed without interruption, and the work can extend past 6:00 PM. In certain situations, concrete must be poured continuously to form one structure without joints.

STAGING AND LAY DOWN AREAS

Because of the large size of the project site, the staging and lay down of materials would be done onsite or along curb lanes and would not be located on outside properties. Materials that are needed during the day are usually delivered early in the day. These materials, such as reinforcing bars and prefabricated pieces, are stored until needed in lay down areas.

Concrete pours for foundations and floor slabs are usually continuous, and a staging area is needed for the concrete mixer trucks. Because concrete in mixer trucks usually needs to be poured within 90 minutes, the concrete trucks drive directly from the plant to the construction site. If several trucks arrive at the same time, a queue forms. It is expected that this queue or staging would take place on the waterfront parcel. For construction of the upland parcel, the concrete trucks would exit onto either South 3rd of South 4th Street. For the buildings on the waterfront parcel, the concrete trucks would approach them internally from the site.

SIDEWALK AND LANE CLOSURES

During the course of construction, sidewalks and some curb lanes adjacent to the construction site would have to be closed or protected for varying periods of time. A maintenance and protection of traffic (MPT) plan would be developed for construction of each building. The MPT would show which lanes of traffic would be closed and how the flow of traffic would be maintained. In addition, sidewalk protection for pedestrians would be included in the MPT. DOT's Office of Construction Mitigation and Coordination (OCMC) would review and approve the MPT before any lanes or sidewalks can be temporarily closed for construction purposes. The curb lanes and sidewalks in front of each building would be affected during the construction of that building. In addition, some additional lanes and sidewalks would be closed intermittently to allow for certain construction activities. Pedestrians would be guided through the construction area in safe, protected routes. Generally, the waterfront and upland parcels of the project site are large enough to allow staging within the sites. However, at times, curb lanes may be closed to allow for deliveries.

Bus stops may have to be temporarily relocated and crosswalks redirected. NYCT would have to review and approve any temporary relocation of bus stops.

In November of 2008, DOT created bicycle lanes on both the east and west sides of Kent Avenue, replacing what was previously curbside parking on both sides of the street. In the fall of 2009, Kent Avenue was reconfigured with a two-way bicycle lane on the west side of the street. Construction of the proposed project would require temporarily either narrowing or relocating portions of these bicycle lanes.

During the entire construction period, a lane of traffic would be maintained along Kent Avenue.

STORMWATER POLLUTION PREVENTION PLAN

A construction SWPPP would be developed for the overall project construction activity in accordance with the requirements of the New York State Department of Environmental Conservation's (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-02-01), which would be required for construction. The SWPPP 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. The SWPPP would include designation of responsible parties and personnel who would have a

role in management of construction stormwater runoff. The SWPPP 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.

Stormwater management during construction activities would be performed through implementation of a site-specific erosion and sedimentation control plan. In accordance with NYSDEC guidance, the SWPPP would include both structural and non-structural components. The structural components are expected to consist of 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.

RECONSTRUCTION OF THE WATERFRONT PLATFORM

The waterfront platform would be reconstructed over a period of slightly longer than two-and-a-half years. The schedule would take into account avoiding in-water work during fish spawning seasons, even though the East River is not considered to be prime spawning grounds. Construction activities would include removal of the existing deck and piles; installation of new piles, pile caps, and deck slabs; and installation of a cast-in-place deck topping and fender system.

The southern half of the platform would be reconstructed first, starting at a point approximately 100 feet south of South 2nd Street, and continuing to the southern end of the project site at South 5th Street. While the marine equipment is on site, some work would be done on the northern portion of the platform, but it would be mostly demolition. When the southern portion of the platform is reconstructed, marine construction would start a few months later on the northern portion. The first step would be to remove the existing decking and cribbing using large, barge-mounted cranes. The existing timber piles supporting the existing deck either would be pulled or cut at the mudline as required, so that new precast, prestressed concrete piles could be driven. Precast, prestressed piles are fabricated off-site and transported to the site for installation. Precasting allows greater control in fabricating the piles and minimizes the amount of on-site construction. Adjacent to the southern half of the pile-supported platform, a new sheet pile bulkhead would be installed landward of the Mean High Water (MHW) elevation. New pile caps that connect the piles together would be formed and poured on-site. After the pile caps are constructed, precast, prestressed concrete deck planks would be installed using cranes. The final step would be installation of a timber fender system on the water side of the new platform. The fender system protects the platform from damage.

Marine construction is generally done from barges, and most of the work does not involve on-land activities. The cranes and pile drivers are located on barges, which are moved into position by tugboats. In addition, it is likely that the precast, prestressed piles and deck planks would be transported to the site via barge. Depending on the situation, the poured in-place concrete could be transported either via water by barges or on land with trucks.

CONSTRUCTION OF BUILDINGS

The proposed project entails the construction of new buildings on Sites A through D on the waterfront parcel and Site E on the upland parcel. Sites A through D have existing structures that

would be demolished. Because these sites are located on the waterfront parcel, reconstruction of the platform would take place prior to or concurrent with construction on each of these sites. Sites B and C are the largest of the waterfront sites on which new construction would occur, and buildings on these sites would be the tallest of any on the project sites, rising to a height of up to 400 feet. The Refinery, located on the waterfront between South 2nd and South 3rd Streets, would have its exterior restored, and a three- and four-story addition would be constructed above the existing Refinery structure, all in accordance with LPC-approved plans and with the Certificate of Appropriateness approved by LPC. In addition, its interior would be demolished and replaced with a new structure.

The construction techniques needed for the restoration and adaptive reuse of the Refinery are described in more detail below under "Adaptive Reuse of the Refinery."

Site E is located on the vacant upland parcel; no demolition or waterfront platform work would be required prior to excavation and foundation work.

The parking facilities beneath each parcel would be developed concurrently with the buildings on each of the parcels. In addition, for the parcels along the waterfront, the publicly accessible open space surrounding each parcel would be completed by the time the buildings are completed.

ABATEMENT AND DEMOLITION

Construction of any of the proposed new buildings would require disconnection of existing utilities and demolition of the existing buildings to clear the sites. Asbestos and lead-based paints abatement would be the first part of demolition. These specialty tasks are strictly regulated in New York City to protect the health and safety of the construction workers and the public, nearby residents, and workers. Depending on the extent of the asbestos, either the whole building or portions of the building would be closed off by containment barriers. The barriers prevent any existing asbestos from leaving the containment area. Specially trained workers in protective clothing use hand tools to remove the asbestos. These asbestos-containing materials are sealed in bags and taken to licensed landfills for disposal. While the asbestos is being abated, air monitoring is performed by a licensed third-party inspector. After abatement is complete, an independent third party inspector would certify that the building is asbestos free, and general demolition would begin. During demolition, lead-based paint is generally not stripped from surfaces. Structures are disassembled or broken apart with most paint still intact. Normal dust control measures (spraying the building with water) will be used during demolition. The lead content of any resulting dust is therefore expected to be low, and normal dust control measures are sufficient to prevent off-site impacts. Depending on the amount of asbestos to be removed, 10 to 20 workers could be employed for this task, and about one or two closed or tarped truckloads of bagged materials could be removed per day. This phase can typically last about one month per building.

EXCAVATION AND FOUNDATION

Excavations

Soil excavation and foundation construction for a building would take approximately six to eight months to complete, depending on the size of the development component. Trucks would remove excavated material for off-site disposal in a licensed landfill or recycling facility. Depending on the size of the excavation, the peak number of workers would range from about

40 per day on the smaller buildings to about 50 per day on a large building. Typical mobile equipment would include excavators, backhoes, bulldozers, loaders, and compactors. Because bedrock is relatively deep, it is not expected that blasting and rock excavation will be necessary.

Foundation Activities

Foundation work would include pile driving and pouring concrete footings and foundations. Ready-mix concrete trucks would deliver concrete to the site. As discussed in "Traffic and Transportation," the number of trucks that would visit the site in a given day would vary for each of the parcels. Like excavation, the number of workers on site each day would depend on the size of the foundation and would range from about 40 to 50.

Dewatering

The excavation would have to be dewatered during the excavation and foundation activities because of rainfall and inflow from the nearby East River, and the water would be sent to an on-site sedimentation tank so that the suspended solids could settle out. The decanted water would be discharged either into the New York City sewer system or the East River; the settled sediment would be conveyed to a licensed disposal area. Water discharged into the New York City sewerage is regulated by DEP. DEP regulations specify the following maximum concentration of pollutants:

- Petroleum hydrocarbons: 50 parts per million
- Cadmium: 2 parts per million
- Hexavalent chromium: 5 parts per million
- Copper: 5 parts per million
- Amenable cyanide: 0.2 part per million
- Lead: 2 parts per million
- Mercury: 0.05 part per million
- Nickel: 3 parts per million
- Zinc: 5 parts per million

In addition, DEP limits other pollutants, such as total suspended particles, in the discharge water. DEP also imposes project-specific limits, depending on the location of the project and contamination that has been found in nearby areas. For large-volume discharges into the sewer system, which are not expected, DEP samples and tests the discharge water.

If the dewatering is discharged into the East River, a NYSDEC SPDES permit must be obtained prior to discharge. Because the discharge is sent directly into the receiving waterbody without treatment except for settling, NYSDEC imposes more restrictions than the DEP regulations.

SUPERSTRUCTURE

Superstructure construction would take between 10 and 16 months to complete, depending on the size of the development component. Construction of the structure would create the framework (beams and columns) and floor decks. The structure would likely consist of reinforced concrete. Construction of the interior structure, or core, of the proposed buildings would create elevator shafts; vertical risers for mechanical, electrical, and plumbing systems; electrical and mechanical equipment rooms; core stairs; and restroom facilities. Core

construction would begin when the foundation is ready and would continue through the interior construction and finishing stage.

Superstructure activities would require the use of cranes, derricks, delivery trucks, forklifts or loaders, and other heavy equipment such as tower cranes, concrete pumps, welding machines, rebar benders and cutters, and compressors. Temporary construction elevators (hoists) would also be constructed for the delivery of materials and vertical movement of workers during this stage. Cranes would be used to lift structural components, façade elements, large construction equipment, and other large materials. Smaller construction materials and debris generated during this stage of construction would generally be moved with hoists. During peak construction, the number of workers would be up to 120 per day. About 10 to 15 trucks per day would deliver materials to the building.

EXTERIOR CONSTRUCTION

Exterior construction involves the installation of the façade (exterior walls, windows, and cladding) and the roof. Exterior construction would take about 5 months for Site E on the upland parcel and 10 to 15 months for each site on the waterfront parcel, and would overlap with the completion of the superstructure and the interior finishing. Cranes would be used to lift the façade into place, and welding machines and impact wrenches would secure the exterior to the superstructure. Anywhere from 25 to 50 workers per day would be needed for the exterior construction.

INTERIOR CONSTRUCTION AND FINISHING

Installation of mechanical, electrical, and plumbing systems begun in the superstructure stage would continue during the interior construction and finishing stage. Other activities in this stage would include the installation of heating, ventilation, and air conditioning (HVAC) equipment and ductwork; installation of elevator, escalator, and life safety systems; construction of interior walls; installation of lighting fixtures; and interior finishing work (e.g., flooring, painting).

Interior construction and finishing would take between 10 and 18 months to complete, depending on the size of the development component. Up to 150 workers per day would be used for the interior finishing. As stated above, some superstructure and exterior construction would overlap with the interior construction and finishing stage.

ADAPTIVE REUSE OF THE REFINERY

The Refinery, located on the waterfront between South 2nd and South 3rd Streets, would have its exterior restored, and a three- and four-story addition would be constructed above of the existing Refinery structure, all in accordance with LPC-approved plans and with the Certificate of Appropriateness approved by LPC. In addition, its interior would be demolished and replaced with a new structure. Because the Refinery's physical constraints pose unique construction challenges and because of its status as a New York City Landmark, construction methods would differ in some ways from those used in the new construction buildings on the project site.

ABATEMENT AND DEMOLITION

For the Refinery, demolition work would include complete removal of the interior of the buildings and the equipment within. It is anticipated that the Refinery walls would have to be braced to prevent the walls from collapsing. Because of the size of the refining machinery, the

equipment would be removed piecemeal through the tops of the buildings. Abatement of any hazardous materials within this structure would occur during this time.

The sugar processing equipment within the existing buildings and the uneven floor levels among the three buildings that comprise the Refinery pose a challenge for the demolition work. Given the lack of continuous floors from building to building, and the fact that some of the equipment extends between multiple floors, maintaining the existing floor structure is not feasible. Rather, the processing equipment and the interior floor structures would have to be removed. The roof of the existing buildings would be removed and the equipment currently inside the buildings would be lifted out through the top.

The demolition and abatement is expected to be sequenced as follows:

- Pre-abatement demolition for general preparation and staging area clearing;
- Abatement;
- Opening of centers of all three buildings that together comprise the Refinery and removing interior column runs (structure and slab removals would be coordinated around equipment removals);
- Removing the roof structure on all three buildings in order to facilitate equipment removal via tower crane. The perimeter column bay would remain intact to act as bracing for the façade and would be demolished concurrent with structural steel installation.
- Phased demolition of perimeter bays along with steel installation (concrete and floor removal only).

It is expected that abatement and demolition would occur over a period of approximately four and nine months, respectively.

The entire existing façade of the Refinery would require shoring during the demolition and construction process. The bracing would keep the perimeter column bay intact to act as temporary shoring of the existing façade. Additional steel would be required at each floor to brace the existing brick during demolition activities. Shoring steel would be added as the building is demolished, from the top down.

It is also assumed that timber shoring for new/enlarged window openings would be installed along with repair and replacement of window sills and lintels.

EXCAVATION AND FOUNDATION

A foundation for what would essentially be a new building within the existing Refinery walls would be constructed by retrofitting the existing foundation. Under this scheme, new piles would be added at each existing wet column location where a column is required. It is expected that construction would include new pile caps, concrete footings at soil-bearing conditions, and underpinning at the perimeter load-bearing masonry wall. A new slab would also be constructed.

This work would take approximately 6 months.

SUPERSTRUCTURE

A new steel structure would be erected within the existing exterior walls and the elevator system would be put into place. The façade shoring would remain in place during steel erection. This work would take approximately 18 months to complete.

EXTERIOR CONSTRUCTION

Exterior construction would include the restoration of masonry on the façade and stack, installation of LPC-approved windows on the existing structure, and construction of the new rooftop addition. All exterior construction would be done in accordance with the Certificate of Appropriateness approved by LPC.

INTERIOR CONSTRUCTION AND FINISHING

Interior construction work on the Refinery would involve essentially the same activities as the construction of the new buildings on the project site. It is anticipated that this work would occur over approximately 19 months.

PUBLIC OPEN SPACE

As required under the New York City Zoning Resolution, the proposed project's public open space would be constructed in tandem with the buildings along the waterfront. Work on the underlying waterfront platform would occur over a period of about two-and-a-half years, as described above under "Reconstruction of the Waterfront Platform." The landscaping of the platform to create the waterfront esplanade and other public open space would occur sequentially as each site is built out. As each waterfront site in the proposed project is constructed, public access would be maintained to previously built public open space and the new components would be connected to the previously built sections.

A connection between the project site's public open space and Grand Ferry Park would be constructed concurrent with the development of the public open space on Site A at the northern end of the project site.

C. METHODOLOGY FOR CONSTRUCTION IMPACTS ANALYSIS

In general, the analyses presented in this chapter are qualitative. However, the traffic, pedestrian, and air quality analyses are semi-quantitative. The total number of worker vehicle trips and truck deliveries were estimated for each calendar quarter during construction using a conservative transportation modal split specifically applicable to construction workers in the area. As detailed below, two construction peak scenarios were reviewed, and the quarter with the greatest number of construction-generated trips was selected for analysis. For the analysis quarter, the vehicle trips were distributed according to construction work hours, with allowances for expected extended work shifts. Trips were assigned to routes coming to and leaving the project site, based on direction of travel for the workers and on designated truck routes for the trucks. The FEIS will account for the traffic patterns resulting from the newly configured Kent Avenue and provide a quantified construction traffic analysis that is reflective of that condition. Potential significant adverse impacts during construction will be identified and mitigation measures recommended.

For the air quality analysis, the number, type, and size of all construction equipment expected to be on site was developed by the construction consultants. The emissions from each of the pieces of construction equipment were determined either from manufacture's data or from existing published sources. An emissions profile was developed for each quarter of construction. The emissions during the highest quarter were compared with data from other emission profiles generated by other projects that have had construction air emissions analyzed. These projects included FEISs for the Proposed Manhattanville in West Harlem Rezoning and Academic

Mixed-Use Development, Atlantic Yards Arena and Redevelopment Project, and First Avenue Properties Development. The highest air emissions in the Domino Sugar Rezoning analysis were found to be lower than for the fully quantified analyses. These other projects did not cause significant adverse air quality impacts from construction activities.

NUMBER OF CONSTRUCTION WORKERS AND MATERIAL DELIVERIES

Table 21-2 shows the estimated number of workers and deliveries to the project site by calendar quarter. The estimates were derived from information supplied by the proposed project's construction consultant. The construction consultant prepared construction sequencing for each building. The work tasks were broken into the activities discussed above. The number of workers required for each task, as well as the number of truck deliveries, were estimated. When work on two buildings overlapped, the total number of workers and truck deliveries were summed for each quarter. These represent an average for days of work and deliveries within each quarter; the numbers of construction workers and delivery trucks would vary from day to day within the quarter. The average daily number of workers would be about 259 during the construction of the project, and would peak during the first quarter of 2016 at 610 workers. The number of truck trips would peak in the 3rd quarter of 2013, with 44 trucks arriving per day on average. Detailed workforce projections can be found in Appendix F.

Table 21-2
Number of Construction Workers and Delivery Trucks per Day

Year	2012				2013				2014				2015			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers	43	68	162	167	182	187	203	273	323	308	267	237	235	345	512	582
Trucks	23	31	22	26	29	37	30	31	31	38	39	38	35	37	44	35
Year	**2016**				**2017**				**2018**				**2019**			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers	610	563	480	137	73	30	37	47	103	243	267	347	353	387	347	258
Trucks	30	29	28	18	18	11	13	16	9	9	17	31	27	24	18	20
Year	**2020**				**Project**											
Quarter	1st	2nd	3rd	4th	Peak		Average									
Workers	280	260	173	160	610		259									
Trucks	18	13	9	6	44		25									

Note: This table represents average conditions within each quarter.
Source: Gotham Construction and F.J. Sciame Construction.

Absent the proposed project, the project site would be developed with commercial and light-industrial uses permitted under the existing M3-1 zoning. Because this construction would occur as of right, there would be less oversight and regulation with respect to hazardous materials, noise, and air quality than the construction means and methods described in this chapter.

D. CONSTRUCTION IMPACTS OF THE PROPOSED PROJECT

Construction may at times be disruptive to nearby residential buildings and open spaces during the construction period. The following analysis describes the overall temporary effects of construction on the relevant areas of concern: land use, socioeconomic conditions, open space, historic resources, hazardous materials, natural resources, infrastructure, traffic and parking, transit and pedestrians, air quality, noise, and rodent control.

LAND USE

Construction would cause some disruptions to activities in the surrounding area. Although construction would occur over several years, most disruptions would be temporary in nature and would not occur at any one location for the entire construction period. In addition, the location of construction activity would move over the course of the construction period. Construction activities would be similar to construction activities at other large sites in the city, and the hours of the construction would be regulated by DOB and DEP.

As described in Chapter 3, "Land Use, Zoning, and Public Policy," land uses in the area immediately adjacent to the project site include commercial and light-industrial uses along Kent Avenue and Grand Street and residential uses along Kent Avenue between South 4th and South 5th Streets. There are also residential uses opposite the upland parcel of the project site on South 3rd and South 4th Streets, and on Wythe Avenue. As discussed in more detail below under "Open Space," Grand Ferry Park is immediately adjacent to the northern edge of the project site.

During the construction, access to all adjacent businesses, residences, and other uses would be maintained according to the regulations established by DOB. When work takes place within building shells, effects on the surrounding uses would be substantially reduced, as compared with excavation and foundation activities. Management practices would be developed and implemented to minimize the effects of construction on access to businesses and buildings in the vicinity of the project site. Other changes, such as sidewalk closures, would also affect people living and working in the surrounding area, but implementation of the construction management practices would minimize the effects of these closures. Potential affects on Grand Ferry Park are discussed below under "Open Space."

There would be no significant adverse impacts on land use due to construction.

SOCIOECONOMIC CONDITIONS

Construction activities on the project site would include various lane and/or sidewalk closures for different stages of construction. However, access to industrial and other types of businesses would not be obstructed, and these closures would not disrupt adjacent businesses. In addition, most of the businesses adjacent to the project site are industrial and do not rely on foot traffic.

Construction would create major direct benefits resulting from expenditures on labor, materials, and services, as well as substantial indirect benefits created by expenditures by material suppliers, construction workers, and other employees involved in the direct activity. Construction would also contribute to increased tax revenues for the City and state, including those from personal income taxes.

There would be no significant adverse impacts on socioeconomic conditions due to construction.

OPEN SPACE

Because construction of the building on Site A would occur immediately adjacent to Grand Ferry Park, special measures would be taken to prevent construction activities from intruding into the park. A solid fence would be erected along the perimeter of the site that borders the park. The fence would have no openings between the construction site and the park and would be high enough to reduce sound from construction activity on the project site and to minimize dust. The hoists, cranes, and other equipment would be located on the side of the building away

from the park. As the superstructure is being erected, netting would be installed on the side of the building facing the park to prevent any materials from falling into the park.

As described above under Section B, "Construction Activities," a connection would be constructed between the proposed project's public open space and Grand Ferry Park. Creating this connection would require construction activity within the southern portion of the park. The design of the connection and the necessary construction work within Grand Ferry Park are being coordinated with the New York City Department of Parks and Recreation (DPR). This connection would enhance the use of Grand Ferry Park by providing access to the larger waterfront esplanade running the length of the project site. Measures would be taken to minimize the temporary disruption to this open space during construction. Therefore, construction of the proposed project would not result in significant adverse impacts on open space.

Construction activities would be conducted with the care mandated by the close proximity of an open space to the project site. Dust control measures—including watering of exposed areas and dust covers for trucks—would be implemented to ensure compliance with Section 1402.2-9.11 of the New York City Air Pollution Control Code, which regulates construction-related dust emissions. There would be no significant adverse air quality impacts on open spaces due to construction.

HISTORIC RESOURCES

A CPP for the Refinery would be prepared in coordination with a licensed professional engineer. It would describe the measures to be implemented during the rehabilitation of the Refinery itself, as well as measures to be taken to protect the Refinery during construction of adjacent buildings on the project site.

As described in Chapter 8, "Historic Resources," the project site is located within 90 feet of three historic resources: the Williamsburg Bridge, the former American Sugar Refinery Buildings, and the former Matchett Candy factory. Construction of the project could result in inadvertent physical impacts to these resources if proper precautions are not taken. To avoid any construction-related impacts on the latter two resources, including ground-borne vibration, falling debris, and accidental damage from heavy machinery, a CPP would be developed in consultation with SHPO and LPC. The CPP would follow the guidelines set forth in section 523 of the *CEQR Technical Manual*, including conforming to LPC's *New York City Landmarks Preservation Commission Guidelines for Construction Adjacent to a Historic Landmark* and *Protection Programs for Landmark Buildings*. The CPP would also comply with the procedures set forth in DOB's *Technical Policy and Procedure Notice* (TPPN) #10/88.

The Williamsburg Bridge is separated from the project site by South 5th Street, which is 60 feet wide. Protection measures for this resource would be developed in coordination with SHPO, LPC, and DOT.

With these measures in place, construction of the proposed project would not result in any significant adverse impacts on historic resources.

HAZARDOUS MATERIALS

As discussed in Chapter 12, "Hazardous Materials," soil and groundwater from the proposed project site has been tested for hazardous materials. Site investigation activities did reveal the presence of semi-volatile organic compounds and metals associated with historic fill material in

the site subsurface, but the presence of these compounds alone does not pose a significant adverse impact to human health or the environment. While uncontrolled excavation activities could increase pathways by exposing sub-surface contaminated materials, potential impacts would be avoided by performing construction activities in accordance with federal, state, and local regulations.

A Remedial Action Plan (RAP) has been prepared to outline general guidelines and measures for remediation and proper handling of soil during the redevelopment of the project site. Specifically, the RAP includes requirements for confirmatory sampling to document post-development subsurface conditions, soil disposal, pre-characterization soil sampling, tank removal procedures, measures to address petroleum spills, dust and vapor controls, air monitoring, contingency planning, installation of a site cap consisting of building cover, paving or two feet of clean fill, and installation of a vapor barrier below each building to prevent potential vapor intrusion. The RAP was approved by DEP on September 24, 2009. The RAP was designed to facilitate the remediation of different phases of the proposed project in any potential order while still protecting current and future neighbors and site occupants.

A Construction Phase Environmental Health and Safety Plan (CHASP) has been prepared to assign responsibilities, establish personnel protection standards and mandatory safety practices and procedures, and provide for contingencies that may arise during construction at the project site. The CHASP is intended to minimize health and safety risks resulting from the known and potential presence of hazardous materials on the site and outlines potential hazards, personal protective equipment, air monitoring, and health and safety plan soil sampling. The CHASP was approved by DEP on September 24, 2009. The CHASP was also designed to facilitate the remediation and construction of different phases of the proposed project in any potential order while still protecting current and future neighbors and site occupants.

Pursuant to the Restrictive Declaration to be recorded against the property, development activities, including any remediation, will be conducted in accordance with the DEP-approved RAP and CHASP under the oversight of DEP and/or the New York City Mayor's Office of Environmental Remediation (NYCOER). This would avoid any significant adverse impacts to construction workers, the surrounding community, and future site occupants. The RAP and CHASP outline procedures for removal of any storage tanks and management of excavated soil during the construction activities, and requirements for vapor controls and a site cap to prevent exposure to future occupants of the project site.

These measures would ensure that there would be no significant adverse impacts on public health, worker safety, or the environment as a result of potential hazardous materials exposed by or encountered during construction.

NATURAL RESOURCES

As described in Chapter 11, "Natural Resources," the proposed project would be covered under the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity Permit No. GP-0-08-001. To obtain coverage under this permit, an SWPPP would be prepared and a Notice of Intent (NOI) would be submitted to NYSDEC. The SWPPP would comply with all of the requirements of GP-0-08-001, NYSDEC's technical standard for erosion and sediment control presented in *New York Standards and Specifications for Erosion and Sediment Control*, and NYSDEC's technical standard for the design of water quantity and water quality controls (post-construction stormwater control practices) presented in the *New York State Stormwater Management Design Manual*. Implementation of erosion and sediment control measures, and

stormwater management measures identified in the SWPPP would minimize potential impacts on littoral zone tidal wetlands along the edges of the project site associated with discharge of stormwater runoff during land-disturbing activities resulting from construction of the proposed project.

Groundwater recovered during dewatering of excavations would be sent to an on-site sedimentation tank so that the suspended solids could settle out. The decanted water would be discharged into the New York City combined sewer system or the East River and the settled sediment conveyed to a licensed disposal area.

As described in Chapter 11, "Natural Resources," peregrine falcons, an endangered species, may appear in the vicinity of the project site. Peregrine falcons are accustomed to the intensely developed habitats of New York City and are not expected to experience a significant adverse impact due to the proposed project. In the event that peregrine falcon nesting activity is documented as occurring on or near the project site (i.e., the Williamsburg Bridge and/or nearby buildings) prior to or during construction of the proposed project, measures to minimize potential adverse impacts to peregrine falcons would be developed in coordination with NYSDEC and DEP. These measures would focus on minimizing potential impacts to nesting, foraging or roosting activity by adult falcons and offspring in the vicinity of proposed construction. Potential measures could include bird control devices on the tops of cranes or other tall construction equipment to prevent young falcons from landing on such equipment and becoming entangled or otherwise injured.

INFRASTRUCTURE

The proposed new buildings and the Refinery would receive some combination of electricity and gas via extensions of the existing Con Edison and National Grid underground distribution systems. During the erection of the superstructure, some sidewalk and on-street construction activities would be required to connect the proposed buildings to existing utility networks. For electrical connections, short-term sidewalk excavations ranging from approximately 50 to 150 feet in length would be required. In addition, electric lines would be extended from existing manholes to the new transformer vaults, requiring roadway excavation.

The construction activities that would be required to connect the proposed project to existing energy systems are part of Con Edison's and National Grid's normal operations for providing services to new customers, and occur on a regular basis throughout the city. Therefore, these construction activities would not result in a significant adverse impact to infrastructure and energy systems. To the extent logistically feasible, Con Edison electricity would be used to power construction equipment.

TRAFFIC AND PARKING

Construction activity would occur from 2012 to 2020 and would generate construction worker and truck traffic. Because of the lengthy duration of these activities, an evaluation of construction sequencing and worker/truck projections was undertaken to assess potential traffic-related impacts. As described below, the projected peak conditions during construction would yield less total traffic than the full build-out of the proposed project. Nonetheless, a quantified construction traffic analysis reflective of the newly configured Kent Avenue condition will be prepared for the FEIS to identify significant adverse impacts during construction that may differ from those identified for the project's full build-out and which may require different mitigation measures.

CONSTRUCTION TRAFFIC PROJECTIONS

Average daily construction worker and truck activities by quarter were projected for the full nine years of construction. These projections were further refined to account for worker modal splits and vehicle occupancy, and arrival and departure distribution.

Daily Workforce and Truck Deliveries

For a reasonable worst-case analysis of potential transportation-related impacts during construction, the daily workforce and truck trip projections in the peak quarters were used as the basis for estimating peak hour construction trips. With construction beginning in 2012, the combined construction worker and truck traffic peak would occur in the first quarter of 2016, when construction activities at Site C and the Refinery would be underway. The daily average numbers of construction workers and truck deliveries during the construction peak quarter were estimated at 610 workers and 30 truck deliveries per day. These estimates of construction activities are further discussed below.

Construction Worker Modal Splits

According to the U.S. Census reverse journey-to-work (RJTW) data, commuting to work via auto for construction and excavation occupations in the study area is approximately 67 percent, with an average auto occupancy rate of 1.39. Commuting to work by public transit is approximately 25 percent, and the remaining 8 percent of commuting trips are made by walk only. However, for a more conservative analysis, a 70 percent auto usage was used to project the numbers of vehicle trips generated by future construction workers. It was assumed that 5 percent of the commuting trips for the construction activities would be made by walk only.

Peak Hour Construction Worker Vehicle and Truck Trips

Site activities would mostly take place during the typical construction shift of 7:00 AM to 3:30 PM. However, some construction tasks would extend to 5:00 to 6:00 PM, requiring a portion of the construction workforce to remain for this extended shift.

While construction truck trips would be made throughout the day (with more trips made during the early morning), and most trucks would remain in the area for short durations, construction worker travel would typically take place during the hours before and after the work shift. For analysis purposes, each worker vehicle was assumed to arrive in the morning and depart in the afternoon or early evening, whereas each truck delivery was assumed to result in two truck trips during the same hour (one “in” and one “out”).

The estimated daily vehicle trips were distributed throughout the workday based on projected work shift allocations and conventional arrival/departure patterns of construction workers and trucks. For construction workers, the majority (80 percent) of the arrival and departure trips would take place during the hour before and after each shift (6 to 7 AM for arrival and 3 to 4 PM for departure on a normal day shift, or 5 to 6 PM for days with extended shifts). For construction trucks, deliveries would occur throughout the day when the construction site is active. Construction truck deliveries typically peak during the hour before the regular day shift (25 percent of regular shift and 20 percent of extended shift), overlapping with construction worker arrival traffic. Based on these assumptions, peak hour construction traffic was estimated for the entire nine-year construction period, as detailed in Appendix F. The peak construction hourly trip projections averaged for the first quarter of 2016 are summarized in Table 21-3.

Table 21-3
Peak Construction Trip Projections 2016 (First Quarter)

Hour	Construction Workers				Construction Truck Trips		Total Vehicle-Trips			Total PCEs
	Worker-Trips		Auto-Trips							
	In	Out	In	Out	In	Out	In	Out	Total	
6 AM to 7 AM	488	0	246	0	8	8	254	8	262	278
7 AM to 8 AM	122	0	61	0	3	3	64	3	67	73
8 AM to 9 AM	0	0	0	0	3	3	3	3	6	12
9 AM to 10 AM	0	0	0	0	3	3	3	3	6	12
10 AM to 11 AM	0	0	0	0	3	3	3	3	6	12
11 AM to12 PM	0	0	0	0	3	3	3	3	6	12
12 PM to 1 PM	0	0	0	0	3	3	3	3	6	12
1 PM to 2 PM	0	0	0	0	2	2	2	2	4	8
2 PM to 3 PM	0	47	0	24	2	2	2	26	28	32
3 PM to 4 PM	0	371	0	187	0	0	0	187	187	187
4 PM to 5 PM	0	60	0	30	0	0	0	30	30	30
5 PM to 6 PM	0	117	0	59	0	0	0	59	59	59
6 PM to 7 PM	0	15	0	7	0	0	0	7	7	7
Day Total	**610**	**610**	**307**	**307**	**30**	**30**	**337**	**337**	**674**	**734**

Notes: Hourly construction worker and truck trips were derived from projected estimates of 610 workers and 30 trucks making two daily trips each (arrival and departure) in the first quarter of 2016. Numbers of construction worker vehicles were calculated with a 70 percent auto split with vehicle occupancy of 1.39.
PCEs = passenger car equivalents where 1 truck trip equals 2 PCEs.

TRAFFIC

Because the proposed development program would result in buildings completed and occupied at different times, the total project-generated traffic during construction, beginning with the completion of the first building, would encompass both construction and operational traffic. As described above, trip-making attributable to construction activities would peak in the first quarter of 2016. At that time, only Buildings D and E would have been completed and would generate a relatively small percentage of the total operational traffic that would occur upon the project's final build-out. A secondary peak construction scenario in early 2020, when all proposed buildings except for Building A would have been completed and operational, was also reviewed to determine the appropriate and representative peak construction condition for assessing potential construction traffic impacts. As shown in Table 21-4, peak construction vehicle trips are expected to be twice as high in the first quarter of 2016 as those projected for the first quarter of 2020. However, the operational trips in the first quarter of 2016 would be less than half of the operational trips in the first quarter of 2020.

Table 21-4
Comparison of Weekday Vehicle Trip Generation—Construction and Operational

	2016 Construction Scenario									2020 Construction Scenario									2020 Full Build-Out Project-Generated Trips in PCEs		
	Construction Trips in PCEs (Q1 2016)			Operational Trips in PCEs (Buildings D & E)			Total PCEs			Construction Trips in PCEs (Q1 2020)			Operational Trips in PCEs (No Building A)			Total PCEs					
Time	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
6-7 AM	262	16	278	4	2	6	266	18	284	123	10	133	15	8	23	138	18	156	--	--	--
8-9 AM*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	409	353	762
12-1 PM*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	283	289	572
3-4 PM	0	187	187	124	120	244	124	307	431	0	79	79	260	254	514	260	333	593	--	--	--
5-6 PM	0	59	59	170	132	302	170	191	361	0	34	34	363	362	725	363	396	759	433	524	957

Notes:

* Peak hours of operational traffic analysis are 8:30-9:30 AM and 12:15-1:15 PM.
See Appendix F for detailed construction trip estimates.
PCEs = passenger car equivalents where 1 truck trip equals 2 PCEs.
The above operation trip estimates in PCEs do not account for trip credits from the as-of-right development.

With the construction and operational trips combined, the 2016 first quarter construction scenario would yield more 6-7 AM construction peak hour vehicle trips but fewer 3-4 PM and 5-6 PM construction peak hour vehicle trips than the 2020 first quarter construction scenario. For the early morning 6-7 AM construction peak hour, components of the proposed project would generate minimal operational trips; hence, the scenario with the higher construction trips (2016 first quarter) would yield the most total project-generated trips. For the afternoon 3-4 PM and 5-6 PM hours, however, the scenario with the higher operational trips (2020 first quarter) would yield the most total project-generated trips. Compared to the 2020 full build-out of the proposed project, both construction scenarios would yield fewer total project-generated trips. As demonstrated in Table 21-4's trip projections, the combined 6-7 AM construction and operational trips are less than 40 percent of the total projected operational trips for the 2020 full build-out AM analysis peak hour and the combined 3-4 PM or 5-6 PM construction and operational trips are less than 80 percent of the total projected operational trips for the 2020 full build-out PM analysis peak hour. Hence, overall traffic conditions during construction in the traffic study area are expected to be better than the 2020 future with the proposed project condition presented in Chapter 17, "Traffic and Parking." Furthermore, based on ATR data updated in October 2009, the 6 to 7 AM background traffic volumes are approximately 45 percent lower than the 8:30 to 9:30 AM commuter peak hour volumes, while the 3 to 4 PM background traffic volumes are not substantially different than the 4:30 to 5:30 PM commuter peak hour traffic volumes. Since existing and No Action traffic conditions at some of the study area intersections through which construction-related traffic would also travel were determined to operate at unacceptable levels during commuter peak hours, it is possible that significant adverse traffic impacts could occur at some or many of these locations during construction. In order to alleviate construction traffic impacts, measures recommended to mitigate impacts associated with the proposed actions could be implemented during construction before completion of the proposed project.

For the FEIS, a quantified traffic analysis will be prepared to identify significant adverse traffic impacts during construction that may differ from those identified for the project's final build-out and which may require different mitigation measures. As discussed above, the 2020 first quarter construction scenario would result in more total combined project-generated trips during two of the three construction peak hours than the 2016 first quarter construction scenario. However, because the construction trip component during the first quarter of 2020 would make up a very

small portion of the total trips (construction and operational) associated with the proposed project, the conditions would be more reflective of those in the final build-out, which is already being addressed in Chapter 17, "Traffic and Parking." Therefore, it is more appropriate to consider the 2016 first quarter construction scenario as the representative worst-case condition for assessing potential construction traffic impacts and mitigation measures. This analysis will evaluate locations where travel patterns are expected to be different during construction and where there would be significant adverse impacts under the full build-out of the proposed project.

DELIVERIES

Construction trucks would be required to use DOT-designated truck routes, including the Brooklyn Queens Expressway (BQE), Kent Avenue, Broadway, Metropolitan Avenue, North 10th/11th Streets, the Williamsburg Bridge, and the Queens-Midtown Tunnel. Trucks would then use local streets to access the construction sites, and would avoid local streets with narrow widths that require difficult turning maneuvers.

CONSTRUCTION TRAFFIC ASSIGNMENTS

As described in Chapter 2, "Analytical Framework," and Chapter 17, "Traffic and Parking," Kent Avenue was converted from two-way to one-way northbound in the fall of 2009. However, because the baseline traffic data were collected with Kent Avenue as a two-way street, the existing conditions in this EIS, including the traffic and construction analyses, reflect conditions in which Kent Avenue has both northbound and southbound traffic. Auto trips made by construction workers were assigned to the traffic network with the majority of trips (55 percent) assumed to access the project site from the BQE, 15 percent of the trips via the Williamsburg Bridge from Manhattan and New Jersey, and 30 percent of the trips from other available local streets. As discussed above, delivery trips made by construction trucks were assigned to DOT-designated truck routes, with the majority of the trips accessing the project site from the BQE. Illustrative traffic assignments for the 2016 first quarter construction-generated vehicle trips during the 6 to 7 AM, 3 to 4 PM, and 5 to 6 PM peak hours, respectively, are shown in Appendix F. The quantified construction traffic analysis will be prepared based on the traffic patterns developed for the newly configured Kent Avenue.

With Kent Avenue converted to one-way northbound, there would be some traffic diversions of existing and worker vehicle trips to other local streets, including Wythe Avenue and Broadway. Although delivery trips made by construction trucks would remain on available DOT-designated truck routes, it is expected that the majority of the inbound trips on the BQE would exit on the eastbound off-ramp to Flushing Avenue and the westbound off-ramp to Kent Avenue south of the study area, while the majority of the outbound trips traveling to the BQE would enter the eastbound on-ramp on Meeker Avenue and the westbound on-ramp on Marcy Avenue via Metropolitan Avenue north of the study area. As discussed in Chapter 17, "Traffic and Parking," the traffic patterns under the new configuration of Kent Avenue one-way northbound will be further evaluated between the DEIS and the FEIS, in coordination with DOT.

CURB LANE CLOSURES AND STAGING

Because the majority of construction activities would be accommodated on-site, construction trucks would be staged primarily within the project site, or on newly completed streets adjacent to or south of active construction sites. DOT created bicycle lanes on both the east and west

sides of Kent Avenue in November of 2008, replacing what had been curbside parking on both sides of the street. In the fall of 2009, Kent Avenue was reconfigured as a one-way northbound street with two traffic lanes, a two-way bicycle lane on the west side of the street, and a parking lane between the bicycle lane and the traffic lanes. However, bicycle lanes and sidewalks on Kent Avenue might be temporarily closed due to construction activities. Construction of the proposed project would require temporarily narrowing or relocating portions of these bicycle lanes. During the entire construction period, a lane of traffic would be maintained along Kent Avenue. In addition, sidewalk protection or temporary sidewalks would be provided to maintain pedestrian access.

Maintenance and protection of traffic plans would be developed for any curb lane and sidewalk closures. Approval of these plans and implementation of all temporary sidewalk and curb lane closures during construction would be coordinated with OCMC.

PARKING

The construction activities would generate a maximum daily parking demand of up to 307 spaces for the first quarter of 2016. The parking demand would be accommodated within the project site. However, as proposed buildings are constructed and occupied, temporary imbalances in terms of parking supply and demand may occur. In such a case, some construction workers may need to seek off-site parking in the study area.

TRANSIT AND PEDESTRIANS

Construction activities are not expected to result in significant adverse transit and pedestrian impacts.

TRANSIT

According to the U.S. Census RJTW data, approximately 25 percent of construction workers would travel to and from the project sites via public transit. Based on the peak 2016 projections discussed above, there would be approximately 122, 93, and 29 construction-related transit trips during the 6 to7 AM, 3 to 4 PM, and 5 to 6 PM hours, respectively. The transit trip demand during the morning and afternoon construction shoulder peak hours would range from 12 to 31 trips. Distributed among the J/M/Z and L subway lines and the B39, B61, and Q59 bus routes near the project site, only nominal increases in transit demand would be experienced along each of those routes and at each of the transit access locations during hours within and outside of the typical commuter peak periods. Hence, no further evaluation of nearby transit services is required, and there would not be a potential for significant adverse transit impacts attributable to the projected construction worker transit trips. Any temporary relocation of bus stops along bus routes that operate adjacent to the project site would be coordinated with and approved by DOT and NYCT to ensure proper access is maintained.

PEDESTRIANS

As discussed above, with a 70 percent of auto usage assumed and 25 percent of public transit usage based on the U.S. Census, the remaining 5 percent of construction workers would travel to and from the project sites on foot. Based on the peak 2016 projections discussed above, there would be approximately 24, 19, and 6 construction-related walk trips during the 6 to 7 AM, 3 to 4 PM, and 5 to 6 PM hours, respectively. For the same reasons discussed above, with respect to transit operations, a detailed pedestrian analysis to address the projected demand from the travel

of construction workers to and from the sites is also not warranted. Considering that these pedestrian trips would primarily occur outside of peak hours and be distributed among numerous sidewalks and crosswalks in the area, there would not be a potential for significant adverse pedestrian impacts attributable to the projected construction worker pedestrian trips. During construction, where temporary sidewalk closures are required, adequate protection or temporary sidewalks and appropriate signage would be provided in accordance with DOT requirements.

AIR QUALITY

Although they are temporary, construction projects can have a noticeable effect on surrounding communities. During construction, emissions from on-site construction equipment and on-road construction-related vehicles, and any congestion caused by construction traffic, have the potential to impact air quality. Therefore, the potential for air pollution from construction, based on construction activities and schedules, is discussed below along with methods that may be employed to minimize the effects of construction activities on air quality.

In general, most construction engines are diesel-powered and produce relatively high levels of particulate matter (PM) and nitrogen oxides (NO_X). Construction activities also emit fugitive dust. Although diesel engines emit much lower levels of carbon monoxide (CO) than gasoline engines, the stationary nature of construction emissions and the large quantity of engines could lead to elevated CO concentrations, and changes in traffic levels and patterns could increase mobile source-related emissions of CO as well. Therefore, the pollutants of concern for the construction period are NO_2, CO, particles with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}), and particles with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$). Since ultra-low-sulfur diesel (ULSD) would be used for all engines in the construction of the proposed project, sulfur oxides (SO_x) emitted from those construction activities would be negligible. For more details on air pollutants, see Chapter 19, "Air Quality and Greenhouse Gas Emissions."

Construction activity in general has the potential to adversely affect air quality as a result of diesel emissions. The main component of diesel exhaust that has been identified as having an adverse effect on human health is fine PM. To ensure that the construction of the proposed project results in the lowest practicable diesel particulate matter (DPM) emissions and fugitive dust emissions, the project sponsors would implement an emissions reduction program for all construction activities, consisting of the following:

- *Diesel Equipment Reduction.* The construction of the proposed project would minimize the use of diesel and gasoline engines, and use electric engines operating on grid power instead, as logistics allow. To that end, the project sponsor would contact Con Edison to seek temporary connection of grid power to the sites by the start of the superstructure construction for each project parcel, approximately six months from the start of the excavation task for each building. Construction contracts would specify the use of electric engines where practicable and ensure the distribution of power connections throughout the project site as needed. Equipment that would use grid power instead of diesel/gasoline engine power would include, but may not be limited to, concrete saws, concrete vibrators, cut-off saws, masonry bench saws, material hoists, rebar benders, table saws, welders, and water pumps. This would also eliminate some generators that would normally be needed for construction equipment.

- *Clean Fuel.* ULSD would be used exclusively for all diesel engines throughout the project site. This would enable the use of tailpipe reduction technologies and would directly reduce DPM and SO_x emissions.
- *Best Available Tailpipe Reduction Technologies*. Nonroad diesel engines with a power rating of 50 horsepower (hp) or greater and controlled truck fleets (i.e., truck fleets under long-term contract with the project sponsor, such as concrete mixing and pumping trucks) would utilize the best available tailpipe technology for reducing DPM emissions. Diesel particle filters (DPFs) have been identified as the tailpipe technology currently proven to have the highest reduction capability. Construction contracts would specify that all diesel nonroad engines rated at 50 hp or greater and all controlled-fleet trucks would utilize DPFs or other tailpipe reduction technology, either original equipment manufacturer (OEM) or retrofit technology with add-on controls, verified to reduce DPM emissions by at least 90 percent (when compared with the uncontrolled exhaust of an equivalent engine). Controls may include active DPFs,[1] if necessary.
- *Utilization of Tier 2 or Newer Equipment.* In addition to the tailpipe controls commitments, Domino Sugar's construction program would mandate the use of Tier *2*[2] or later construction equipment for all nonroad diesel engines. (Since Tier 3 engines do not address PM emissions, and Tier 4 engines may not yet be available, the use of additional tailpipe emissions reduction technology is required, at least in early years, as stated under *Best Available Tailpipe Reduction Technologies*, above. In later years, the use of a Tier 4 engine is akin to the use of a Tier 2 engine with a DPF.) Gasoline powered nonroad engines would also be required to meet the latest emissions standards for newly manufactured engines.
- The use of newer engine models with cleaner emissions standards, such as Tier 2, is expected to reduce the likelihood of DPF plugging due to soot loading (i.e., clogging of DPF filters by accumulating particulate matter). Additionally, while all engines undergo some deterioration over time, newer as well as better maintained engines would emit less PM than their older Tier or unregulated counterparts. Therefore, restricting site access to equipment with lower tailpipe PM emission values would enhance this emissions reduction program and implementation of DPF systems as well as reduce maintenance frequency due to soot loading (i.e., less downtime for construction equipment to replace clogged DPF filters). The inclusion of cleaner small engines and gasoline engines would further reduce emissions.

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[1] There are two types of DPFs currently in use: passive and active. Most DPFs currently in use are the "passive" type, which means that the heat from the exhaust is used to regenerate (burn off the PM) in order to eliminate the buildup of PM in the filter. Some engines do not maintain temperatures high enough for passive regeneration. In such cases, "active" DPFs can be used, i.e., DPFs that are heated either by an electrical connection from the engine, by plugging in during periods of inactivity, or by removal of the filter for external regeneration.

[2] The first federal regulations for new nonroad diesel engines were adopted in 1994, and signed by EPA into regulation in a 1998 Final Rulemaking. The 1998 regulation introduces Tier 1 emissions standards for all equipment 50 hp and greater and phases in the increasingly stringent Tier 2 to Tier 3 standards for equipment manufactured in 2000 through 2008. In 2004, The EPA introduced Tier 4 emissions standards with a phased-in period of 2008 to 2015. The Tier 1 through 4 standards regulate the EPA criteria pollutants, including particulate matter (PM), hydrocarbons (HC), oxides of nitrogen (NO_x) and carbon monoxide (CO). Prior to 1998, emissions from nonroad diesel engines were unregulated. These engines are typically referred to as Tier 0.

- *Source Location.* In order to reduce the resulting concentration increments at sensitive receptors, large emissions sources and activities, such as concrete trucks and pumps, would be located within site limits and away from residential buildings, schools, playgrounds, and parks, as logistics allow, with special attention given to areas immediately adjacent to sensitive receptors. This measure would reduce potential concentration increments from on-site sources at such locations by increasing the distance between the emission sources and the sensitive locations, resulting in enhanced dispersion of pollutants.

  There are four areas where sensitive receptors are located adjacent to the site: Grand Ferry Park, immediately adjacent to the site to the north, and residential buildings on Kent Avenue between South 4th Street and South 5th Street, on the corner of Kent Avenue and South 2nd Street, and on South 3rd Street between Kent Avenue and Wythe Avenue. In all of these cases the sensitive receptors are across the street, so there is some buffering distance from potential sources. Stationary engines such as cranes and portable generators, truck queuing, and concrete pumping operations will not be located immediately near the site boundary across from these receptors, as logistics allow, and concrete trucks and pumps will not be staged or operated on the street across from these receptors. Since the construction activity would generally be similar all throughout the site, it is not expected that activity would be concentrated in any specific area for a prolonged period, and therefore emissions from sources would be generally spread throughout the site.
- *Dust Control.* Strict fugitive dust control plans would be required 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 large construction sites. Truck routes within the sites 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 avoid the resuspension of dust. All trucks hauling loose material would be equipped with tight fitting tailgates and covered prior to leaving the sites. In addition to regular cleaning by the City, area roads adjacent to the sites would be cleaned as frequently as needed. Hoists, cranes, or chutes would be used for material drops during demolition; when chutes are required, the lower end of the chute will be inserted in the collection bin with a tight fitting cover surrounding the chute and covering the collection bin. An on-site vehicular speed limit of 5 mph would be imposed. Water sprays would 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 would be watered, stabilized with a biodegradable suppressing agent, or covered.

All of the above measures would be implemented by the project sponsor in detailed specifications to be included in the construction contracts. Additional measures would be taken to reduce pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes, and included explicitly in the contract specifications. These include the restriction of on-site vehicle idle time to three minutes for all vehicles that are not using the engine to operate a loading, unloading, or processing device (e.g., concrete-mixing trucks).

Due to the extensive emissions control program outlined above, the on-site emissions levels during construction are expected to be very low when compared with typical construction activity under an as-of-right construction project.

The proposed project would also include the reconstruction of the waterfront platform. As described previously, marine construction is generally done from barges, and most of the work

does not involve on-land activities. The barges would be towed and positioned by tugboats. The tugboats used for towing would have propulsion engines rated at approximately 2,000 hp and the smaller tugboats used for repositioning of barges would have propulsion engines rated at approximately 500 hp. When not actively moving barges, it is assumed that the propulsion engines would be idled, and the auxiliary engines and boilers would become the primary source of emissions. The larger tug boats would not remain at the project site and a minimal amount of dwelling time would be expected; the smaller tug boats would be operating approximately 10 percent of the time. In addition, waterfront platform work would be located on the western end on the site, away from sensitive receptor locations. Therefore, construction activities associated with the reconstruction of the waterfront platform would not result in any significant adverse air quality impacts.

The modeled emissions rate for $PM_{2.5}$ on a 24-hour basis is about 2.1 pounds per day, and this is expected to occur in May 2015. During that period of time, the annual PM_{25} modeled emissions rate is about 1.6 pounds per day. As a comparison, the modeled emissions rates for larger projects that had sensitive receptors immediately adjacent to activity and were shown not to have significant adverse impacts on air quality were about 8.5 pounds per day on a 24-hour basis and just under 4 pounds per day on an annual basis. Because the emissions rates during construction of the proposed project would be so much lower than the emissions rates of projects that were demonstrated not to have significant air quality impacts, and since the proposed project would be implementing the best available control technologies and practices, including addressing specific local receptors and source placement, construction activities associated with the proposed project are not expected to cause new exceedances of the National Ambient Air Quality Standards (NAAQS) for any pollutant, and would not significantly increase concentrations of $PM_{2.5}$ at any location. Therefore, the construction of the Domino Sugar project would not have significant air quality impacts. Components of the emissions control program may be adjusted between Draft and Final EIS.

NOISE

INTRODUCTION

Impacts on community noise levels during construction of the proposed project can result from noise from construction equipment operation and from construction vehicles and delivery vehicles traveling to and from the site. Noise and vibration levels at a given location are dependent on the kind and number of pieces of construction equipment being operated, the acoustical utilization factor of the equipment (i.e., the percentage of time a piece of equipment is operating at full power), the distance from the construction site, and any shielding effects (from structures such as buildings, walls, or 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. The most significant construction noise sources are expected to be impact equipment such as jackhammers, excavators with ram hoes, drill rigs, rock drills, impact wrenches, tower cranes, and paving breakers, as well as the movements of trucks.

Noise from construction activities and some construction equipment is regulated by the New York City Noise Control Code and by the U.S. Environmental Protection Agency (EPA). 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 7:00 AM and 6:00 PM, and sets noise limits for certain specific pieces of construction

equipment. Construction activities occurring after hours (weekdays between 6:00 PM and 7:00 AM, and on weekends) may be authorized in the following circumstances: (1) emergency conditions; (2) public safety; (3) construction projects by or on behalf of City agencies; (4) construction activities with minimal noise impacts; and (5) where there is a claim of undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts, and/or financial considerations. EPA requirements mandate that certain classifications of construction equipment meet specified noise emissions standards.

CONSTRUCTION NOISE IMPACT CRITERIA

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." This has been interpreted to mean that such impacts would occur only at sensitive receptors where the activity with the potential to create high noise levels would occur for approximately two years or longer. 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 20, "Noise," for an explanation of noise measurement and sound levels. The criteria are as follows:

If the existing noise levels are less than 60 decibels, A-weighted equivalent sound level for one hour (dBA $L_{eq(1)}$) and the analysis period is not a nighttime period, the threshold for a significant impact would be an increase of at least 5 dBA $L_{eq(1)}$. For the 5 dBA threshold to be valid, the resulting noise level in the future with the proposed project would have to be equal to or less than 65 dBA. If the existing noise level is equal to or greater than 62 dBA $L_{eq(1)}$, or if the analysis period is a nighttime period (defined in the CEQR criteria as being between 10:00 PM and 7:00 AM), the incremental significant impact threshold would be 3 dBA $L_{eq(1)}$. (If the existing noise level is 61 dBA $L_{eq(1)}$, the maximum incremental increase would be 4 dBA, since an increase higher than this would result in a noise level higher than the 65 dBA $L_{eq(1)}$ threshold.)

The impact criteria contained in the *CEQR Technical Manual* were used for assessing impacts from mobile and on-site construction activities.

NOISE ANALYSIS FUNDAMENTALS

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 effect of each of these noise sources was evaluated. The results presented below show the effects of construction activities (i.e., noise due to both on-site construction equipment and construction-related vehicle operation) and the total cumulative impacts due to operational effects (caused by project-generated vehicular trips) and construction effects (as construction proceeds on uncompleted components of the project).

Noise from the operation of construction equipment on-site at a specific receptor location near a construction site is calculated by computing the sum of the noise produced by all pieces of equipment operating at the construction site. For each piece of equipment, the noise level at a receptor site is a function of:

- The noise emission level of the equipment;
- A usage factor, which accounts for the percentage of time the equipment is operating at full power;

- The distance between the piece of equipment and the receptor;
- Topography and ground effects; and
- Shielding.

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

- The noise emission levels of the type of vehicle (e.g., auto, light-duty truck, heavy-duty truck, bus, etc.);
- Vehicular speed;
- The distance between the roadway and the receptor;
- Topography and ground effects; and
- Shielding.

SENSITIVE RECEPTOR SITES

There are several sensitive receptor sites, including residential uses, in the study area bounded by Kent Avenue, Grand Street, Bedford Avenue, and South 5th Street. Most of the buildings in this area have double-glazed windows and alternative ventilation (i.e., air conditioning).

NOISE REDUCTION MEASURES

The applicant has committed to taking a proactive approach during construction, which employs a wide variety of measures that exceed standard construction practices, but the implementation of which is deemed logistically feasible and practicable, to minimize construction noise and reduce potential noise impacts. These measures will be described in the noise mitigation plan required as part of the New York City Noise Control Code. These measures include a variety of source and path controls.

In terms of source controls (i.e., reducing noise levels at the source or during the most sensitive time periods), the following measures for construction, which go beyond typical construction techniques, would be implemented:

- Equipment that meets the sound level standards specified in Subchapter 5 of the New York City Noise Control Code would be utilized from the start of construction activities, along with a wide range of equipment, including construction trucks, which produce lower noise levels than typical construction equipment. Table 21-5 shows the noise levels for typical construction equipment and the mandated noise levels for the equipment that would be used for construction of the proposed project.
- Where feasible and practicable, construction procedures that reduce noise levels and equipment (such as concrete trucks, delivery trucks, and trailers) that are quieter than that required by the New York City Noise Control Code would be used.
- As early in the construction period as logistics will allow, diesel- or gas-powered equipment would be replaced with electrical-powered equipment such as welders, water pumps, bench saws, and table saws (i.e., early electrification).

Table 21-5
Typical Construction Equipment Noise Emission Levels (dBA)

Equipment List	DEP & FTA Typical Noise Level at 50 feet[1]	Mandated Noise Level at 50 feet[2]	Noise Level with Path Controls at 50 feet[3]
Asphalt Paver	85	85	75
Asphalt Roller	85	74	
Backhoe/Loader	80	77	
Compressors	80	67	
Concrete Pump	82	79	
Concrete Trucks	85	79	
Cranes	85	77	
Cranes (Tower Cranes)	85	85	75
Delivery Trucks	84	79	
Drill Rigs	84	84	74
Dump Trucks	84	79	
Excavator	85	77	
Excavator with Ram Hoe	90	90	80
Fuel Truck	84	79	
Generators	82	68	
Hoist	85	80	70
Impact Wrenches	85	85	75
Jackhammer	85	82	72
Mortar Mixer	80	63	
Power Trowel	85	85	75
Powder Actuated Device	85	85	75
Pump (Spray On Fire Proof)	82	76	
Pump (Water)	77	76	
Rebar Bender	80	80	
Rivet Buster	85	85	75
Rock Drill	85	85	75
Saw (Chain Saw)	85	75	
Saw (Concrete Saw)	90	85	75
Saw (Masonry Bench)	85	76	
Saw (Circular & Cut off)	76	76	
Saw (Table Saw)	76	76	
Sledge Hammers	85	85	75
Street Cleaner	80	80	
Tractor Trailer	84	79	
Vibratory Plate Compactor	80	80	
Welding Machines	73	73	

Notes:
[1] Sources: Citywide Construction Noise Mitigation, Chapter 28, Department of Environmental Protection of New York City, 2007. Transit Noise and Vibration Impact Assessment, FTA, May 2006.
[2] Mandated noise levels are achieved by using quieter equipment, better engine mufflers, and refinements in fan design and improved hydraulic systems.
[3] Path controls include portable noise barriers, enclosures, acoustical panels, and curtains, whichever feasible and practical.

- Where practicable and feasible, construction sites would be configured to minimize back-up alarm noise. In addition, all trucks would not be allowed to idle more than three minutes at the construction site based upon New York City Local Law.
- Limit equipment on-site (only necessary equipment on-site).
- Contractors and subcontractors would be required to properly maintain their equipment and have quality mufflers installed.
- In terms of path controls (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors), the following measures for

construction, which go beyond typical construction techniques, will be implemented to the extent feasible:

- Where logistics allow, noisy equipment, such as cranes, concrete pumps, concrete trucks, and delivery trucks, would be located away from and shielded from sensitive receptor locations. For example, during some of the early phases of work, delivery and dump trucks, as well as many construction equipment operations would be located and take place below grade to take advantage of shielding benefits. Once building foundations are completed, delivery trucks would operate behind noise barriers, where possible;
- Noise barriers would be utilized to provide shielding (e.g., the construction sites would have a minimum 8-foot barrier and, where logistics allow, truck deliveries would take place behind these barriers once building foundations are completed); and
- Path noise control measures (i.e., portable noise barriers, panels, enclosures, and acoustical tents, where feasible) would be used for certain dominant noise equipment, i.e., asphalt pavers, drill rigs, excavators with ram hoe, hoists, impact wrenches, jackhammers, power trowels, powder actuated devices, rivet busters, rock drills, concrete saws, and sledge hammers. The details to construct portable noise barriers, enclosures, tents, etc. are based upon the instructions of DEP Citywide Construction Noise Mitigation.

CONSTRUCTION NOISE RESULTS

The noise reduction measures described above would be expected to substantially reduce noise levels. A screening analysis performed using a spreadsheet model and acoustic fundamentals showed that absent these measures construction activities would be expected to produce $L_{eq(1)}$ noise levels in the high-70-to-mid-80 dBA range at sensitive noise receptor locations adjacent to the project site. A similar screening analysis showed that with the proposed measures, noise from construction activities would be approximately 10 dBA less, and construction activities would be expected to produce $L_{eq(1)}$ noise levels in the high-60-to-mid-70 dBA range at the sensitive noise receptor locations adjacent to the project site. Existing $L_{eq(1)}$ noise levels at sensitive receptor locations in the area bounded by the East River, North 1st Street, Berry Street, and South 5th Street during the hours of construction range from approximately 60 to 70 dBA. Consequently, it is likely that during the construction period, construction activities would result in increased noise levels at receptor locations within this area that would exceed the CEQR impact criteria (i.e., increase by more than 3 dBA comparing the noise levels due to construction activities with existing noise levels), and these exceedances of the CEQR impact criteria may occur for two or more consecutive years, resulting in significant noise impacts at sensitive locations (i.e., residential buildings) within this area.

Most residential buildings within this area have double-glazed windows and alternative ventilation (i.e., air conditioners). This results in interior noise levels approximately 20 to 25 dBA less than exterior noise levels with window air conditioners, and interior noise levels approximately 25 to 30 dBA less than exterior noise levels with through-the-wall or sleeve air conditioners. The double-glazed windows and alternative ventilation at these structures would provide a significant amount of sound attenuation, and would result in interior noise levels during most of the time that are below 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria). However, even though these structures have double-glazed windows and alternative ventilation (i.e., window air conditioning), during some limited time periods, construction

activities may result in interior noise levels that would be above the 45 dBA $L_{10(1)}$ noise level recommended by CEQR for these uses and result in significant adverse noise impacts.

Project buildings that would be completed and occupied before construction is completed at other sites within the project would also experience exterior noise levels due to construction activities in the high-60-to-mid-70 dBA range. However, the design of all project buildings would include double-glazed windows and alternate means of ventilation (i.e., air conditioners) that would provide at least 30 dBA on all facades, and 35 dBA on facades facing Kent Avenue. The double-glazed windows and alternative ventilation at these structures would result in interior noise levels during most of the time that are below 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria). However, even though these structures would have double-glazed windows and alternative ventilation (i.e., air conditioners), during some limited time periods, construction activities may result in interior noise levels that would be above the 45 dBA $L_{10(1)}$ noise level recommended by CEQR for residential uses.

On-site, construction activities would produce noise levels at open space areas that exceed the levels recommended by CEQR for passive open spaces (55 dBA L_{10}). (Noise levels in these areas exceed CEQR recommended values for existing and No Action conditions.) While this is not desirable, there is no effective practical mitigation[1] that could be implemented to avoid these levels during construction. Noise levels in many parks and open space areas throughout the city, which are located near heavily trafficked roadways and/or near construction sites, experience comparable, and sometimes higher, noise levels.

Between the DEIS and FEIS, a detailed analysis will be performed to (1) quantify the specific locations, magnitude, time of occurrence, and duration of any potential exceedances of the CEQR impact criteria, and (2) determine the practicability and feasibility of implementing any additional construction control measures (beyond those listed above) or receptor mitigation measures to reduce or eliminate the significant adverse construction noise impacts cited above. Absent the implementation of measures which would produce lower interior noise levels, the proposed action would have unmitigated significant noise impacts at the locations specified above for limited periods of time.

VIBRATION

INTRODUCTION

Construction activities have the potential to result in vibration levels that may in turn result in structural or architectural damage, and/or annoyance or interference with vibration-sensitive activities. In general, vibratory levels at a receiver are a function of the source strength (which in turn is dependent upon the construction equipment and 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. Vehicular traffic, even in locations close to major roadways, typically does not result in perceptible vibration levels unless there are discontinuities in the roadway surface. With the exception of the case of fragile and possibly historically significant structures or buildings, generally construction activities do not reach the levels that can cause architectural or structural damage, but can achieve levels that may be perceptible and annoying in buildings very close to a construction site. A screening assessment

[1] Noise barriers would not be practical because of security concerns.

examined potential vibration impacts of construction activities on structures and residences near the project site.

Additionally, a construction vibration assessment was conducted to evaluate potential structural consequences for the existing Historic Landmark Refinery Building. The Refinery is located on the west side of Kent Avenue between South 2nd and South 3rd Streets, within the project site. Therefore, an analysis was undertaken of the potential adverse effects of construction vibration on this structure. The vibration assessment computes the "critical distances," or the distances within which the use of certain construction equipment would have the potential to cause damage to The Refinery building.

For purposes of assessing potential structural or architectural damage and potential annoyance or interference with vibration sensitive activities, the following formula was used:

$$PPV_f = PPV\ i / (18.46716^{\wedge}(\log(D_f / D_i)))$$

where:

PPV_f = Peak Particle Velocity at final location

PPV_i = Peak Particle Velocity at initial (or reference) location (i.e., at 100 feet)

D_f = Distance, in feet, from the source to the final position

D_i = Distance, in feet, from the source to the initial (or reference) location

(i.e., at 100 feet)

Table 21-6 shows vibration source levels for typical construction equipment.

CONSTRUCTION VIBRATION CRITERIA

Several vibration criteria guidelines were considered in this case, all of which were applied as conservatively as possible in order to yield cautious results. The criteria include those published by the FTA for minor cosmetic damage of fragile structures, the Central Artery/Tunnel Project's Vibration Design Policy for potential damages to extremely susceptible buildings, and the Swiss Standard 640-312, which also addresses extremely susceptible buildings. More tolerant damage criteria were also considered, such as those from the U.S. Bureau of Mines and NYCDOB under their *TPPN #10/88*.

Vibration levels may be quantified using several different metrics depending on the issue being evaluated. Vibration is mechanical energy in oscillatory motion and can, therefore, be evaluated in terms of instantaneous or average acceleration, velocity or displacement. For structures, it is most common to evaluate the vibration velocity component. The results can be expressed in units of velocity such as inches per second. The peak particle velocity (PPV) is the preferred metric for evaluating potential damages to structures, and its results are also expressed in units of inches per second. Alternatively, vibration velocity levels can be expressed in decibel units (VdB) where the PPV level is logarithmically compared to a reference velocity level of 1 micro-inch per second after having been adjusted to account for the root-mean-square quantity. The PPV represents the highest (or worst-case) instantaneous vibration level, and vibration levels expressed in VdB represent a time and energy-averaged vibration level. Therefore, potential damages to structures are usually evaluated in terms of PPV whereas the annoyance of vibration as perceived by human beings is usually evaluated in terms of VdB.

As mentioned above, there are vibration criteria intended to prevent major structural damage to buildings. These vibration limits are much higher than those used to evaluate minor cosmetic damage or human annoyance. For reference, major structural damage criteria limits of about 1.9 to 2.0 PPV inch/sec are intended to avoid significant damage that could weaken a structure's integrity. Minor structural damage criteria limits are set much lower and are intended to avoid cosmetic damages such as hairline cracking of plaster or concrete. Minor structural damage vibration criteria for fragile historic structures ranges from about 0.12 PPV inch/sec for continuous or steady vibration sources, to 0.30 PPV inch/sec for transient or impulsive vibration sources.

Table 21-6
Vibration Source Levels for Construction Equipment

Equipment	Device Type	PPV_{ref} (in/sec)
Description	M-steady, S-transient	@ 100 ft
Auger Drill Rig	Steady	0.011
Backhoe	Steady	0.011
Compactor	Steady	0.030
Concrete Mixer	Steady	0.010
Concrete Pump	Steady	0.010
Crane	Steady	0.001
Dozer	Steady	0.011
Dump Truck	Steady	0.010
Excavator	Steady	0.011
Flat Bed Truck	Steady	0.010
Front End Loader	Steady	0.011
Gradall	Steady	0.011
Grader	Steady	0.011
Horizontal Boring Hydr. Jack	Steady	0.003
Hydra Break Ram	Transient	0.050
Impact Pile Driver	Transient	0.200
Insitu Soil Sampling Rig	Steady	0.011
Jackhammer	Steady	0.003
Mounted Hammer hoe ram	Transient	0.190
Paver	Steady	0.010
Pickup Truck	Steady	0.010
Scraper	Steady	0.0004
Slurry Trenching Machine	Steady	0.002
Soil Mix Drill Rig	Steady	0.011
Tractor	Steady	0.010
Vibratory Pile Driver	Steady	0.150
Vibratory Roller (large)	Steady	0.059
Vibratory Roller (small)	Steady	0.022
Blasting	Transient	0.750
Clam Shovel	Transient	0.025
Rock Drill	Steady	0.011
3-ton truck at 35 mph	Steady	0.0002

CONSTRUCTION VIBRATION ANALYSIS RESULTS

Based on the vibration emission levels produced by certain equipment, the critical distance, or distance (in feet) within which vibration levels might exceed relevant criteria, can be computed. Table 21-7 summarizes six typical high-vibration-producing-equipment found on construction

sites and provides the computed critical distances for each piece of equipment with respect to major and minor structural damage criteria.

Table 21-7
Construction Equipment Vibration Critical Distances

Construction Equipment	Reference Vibration Emission Level PPV at 100 feet	Vibration Critical Distance		
		Major Structural Damages	Minor Damages From Impulsive Sources	Minor Damages From Steady Sources
Clam Shovel Drop	0.025 PPV inch/sec	4 feet	15 feet	N/A
Auger Drill Rig	0.011 PPV inch/sec	2 feet	N/A	16 feet
Jackhammer	0.003 PPV inch/sec	1 foot	N/A	6 feet
Mounted Hoe Ram	0.190 PPV inch/sec	17 feet	70 feet	N/A
Vibratory Pile Driver	0.150 PPV inch/sec	14 feet	N/A	120 feet
Impact Pile Driver	0.200 PPV inch/sec	17 feet	73 feet	N/A

Based on the results shown in Table 21-7 it can be concluded that vibration impacts to the existing Refinery building can be avoided provided certain high-vibration-producing equipment are not used within the critical distances stated in the table, as feasible for project construction. Thus, jackhammers, drills, and clam shell buckets should not be used within 1 to 4 feet of the Refinery building, and hoe rams and pile drivers should not be used within 14 to 17 feet. Jackhammers, drills and clam shell buckets should not be used within 6 to 16 feet of the refinery building, and hoe rams and pile drivers should not be used within 70 to 120 feet of the refinery building, in order to avoid potential minor structural damages.

VIBRATION MITIGATION MEASURES

However, it may be likely that project construction can not feasibly follow the recommended critical distances described above. Therefore, in the event that high-vibration-producing equipment would be used in close proximity to the Refinery structure, vibration mitigation options would be considered. Potential vibration mitigation measures for hoe rams might include the use of rock drills combined with hydraulic jack or chemical splitters, or the use of carefully controlled blasting, to demolish large rock or concrete obstacles. Pile driving mitigation options would include the use of a hydraulic pile pushing system, the use of slurry walls dug out by a hydromill, or pre-trenching the piles with a backhoe or water jet. Further, a program would be established to monitor vibration levels and any construction effects on the Refinery from vibration. As described above, under "Historic Resources," a CPP would be established for the project. The CPP would meet the guidelines set forth in *TPPN #10/88*, concerning procedures for the avoidance of damage to adjacent historic structures from nearby construction, the *Protection Programs for Landmarked Buildings* guidance document of the LPC, and the National Park Service's *Preservation Tech Notes, Temporary Protection #3: Protecting a Historic Structure during Adjacent Construction*. The CPP would specify measures and construction procedures, such as vibration limits and monitoring, that would be implemented during construction of the Proposed Actions. According to *TPPN 10/88*, PPV due to construction-related vibration must not exceed 0.5 inch/sec. The program would monitor PPV and activities that create vibration at historic structures in excess of established limits would be terminated. Alternative construction methods that produce vibration within established limits would be used. It would also empower the structural and foundation engineers to issue "stop

work" orders to prevent damage to the Refinery building. With these measures, there would not be a significant adverse impact on the High Line due to construction of the Proposed Actions.

RODENT CONTROL

Construction contracts would include provisions for a rodent (mouse and rat) control program. Before the start of construction, the contractor would survey and bait the appropriate areas and provide for proper site sanitation. During the construction phase, as necessary, the contractor would carry out a maintenance program. Coordination would be maintained with appropriate public agencies. Only EPA - and NYSDEC-registered rodenticides would be permitted, and the contractor would be required to perform rodent control programs in a manner that avoids hazards to humans, domestic animals, and non-target wildlife. Therefore, construction of the proposed project would not result in any significant adverse impacts on rodent control. ✷