Chapter 20: Construction Impacts

A. INTRODUCTION

This chapter summarizes the conceptual construction plan for the development associated with the proposed project, and considers the potential for adverse impacts during construction. As discussed below, the development site would be redeveloped with a new commercial office building with a retail base (that may or may not also include trading floor uses), below-grade accessory parking, and new below-grade subway improvements. As part of the project, significant mass transit improvements would be undertaken, including the relocation and significant upgrade of the existing subway entrances on West 32nd and West 33rd Streets and the re-opening and renovation of the passageway under the south side of West 33rd Street.

Two development scenarios are under consideration for this project (Single-Tenant Office Scenario and Multi-Tenant Office Scenario), which have very similar construction schedules and would require similar numbers of workers and deliveries. However, because the Single-Tenant Office Scenario was found to have the more intensive construction program, its construction, in conjunction with the construction associated with the subway improvements (that would be undertaken to complement either office scenario) has been chosen for detailed analysis. The effects of construction of the Multi-Tenant Office Scenario would be very similar to those described below for the Single-Tenant Office Scenario, and would generally be identical to, or of slightly smaller magnitude during certain phases of project construction.

Collectively, the construction schedules and associated activities for the Single-Tenant Office Scenario and the below-grade subway improvements have been combined to represent a reasonable worst-case development scenario (RWCDS) for the construction analyses presented in this chapter. The development site is occupied by the Hotel Pennsylvania, which contains hotel rooms and ground-floor retail space along Seventh Avenue and West 32nd and West 33rd Streets. The project site consists of the development site and the remainder of the block (Block 808, Lot 40), which is occupied by the Manhattan Mall, containing a mix of chain retail stores. The existing Hotel Pennsylvania on the development site would be demolished to make way for the new commercial mixed-use building, and the Manhattan Mall would remain unaltered, except for the alterations that would occur as a result of the subway improvements associated with re-opening and renovating of the pedestrian passageway under the south side of West 33rd Street. The conceptual construction phasing and schedule for the RWCDS is described, followed by the types of activities likely to occur during the construction of the various project components. An assessment of potential impacts of construction activity and the methods that may be employed to avoid, minimize, or mitigate the potential for significant adverse construction impacts is then presented.

PRINCIPAL CONCLUSIONS

LAND USE

Construction activities would affect land use on the development site but would not alter surrounding land uses. Certain types of construction activities, such as excavation and foundation work, would be intrusive to the adjacent businesses, residences, and religious uses; however, all construction staging activities for the proposed project would occur within the development site or within portions of sidewalks, curbs, and travel lanes of public streets immediately adjacent to the development site. In later stages of construction, when work would take place within the building shell, effects on the surrounding uses would be substantially reduced. Additionally, access to surrounding land uses would be maintained throughout the construction period, and adherence to the provisions of the New York City Building Code and other applicable regulations would reduce the potential adverse effects of construction activities on land use patterns and neighborhood character. Moreover, although the project anticipates an approximately 4½-year construction schedule, the level of activity would vary depending on the types of construction activities being undertaken at the development site or at the locations of the subway improvements, and no one area would experience the effects of the project's construction activities for the full duration of project construction. Potential noise effects on sensitive receptors within the surrounding area are discussed below under "Noise."

SOCIOECONOMIC CONDITIONS

Construction would create 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. Construction of the RWCDS would not affect the access to and therefore the viability of any business. It is not expected that construction activities would cause the failure of any business thereby affecting neighborhood character. Overall, there would be no significant adverse impacts on socioeconomic conditions resulting from construction.

COMMUNITY FACILITIES

There are two community facilities located in the area surrounding the development site: the St. Francis Roman Catholic Church and the New York City Fire Department (FDNY) Engine 1 and Ladder 24. While construction of the proposed project would result in temporary increases in traffic during the construction period, access to and from these facilities would not be affected during the construction period. As discussed below (see "Noise"), the DEIS identified the potential for a significant adverse noise impact at the St. Francis Roman Catholic Church; however, the quantified noise analysis undertaken as part of the FEIS demonstrates that this impact would not occur with the noise reduction measures to be incorporated during the construction effort.

OPEN SPACE

There are no publicly-accessible open spaces within the development site, and no open space resources would be used for staging or other construction activities. Therefore, the proposed project would not limit access to open space resources in the vicinity of the development site. At limited times, activities such as excavation and foundation construction may generate noise that could impair the enjoyment of nearby open space resources, but such noise effects would be temporary. Therefore, construction of the proposed project would not result in significant adverse impacts on open space.

HISTORIC AND CULTURAL RESOURCES

Like the No Action condition, the demolition of the 22-story, brick- and stone-clad Hotel Pennsylvania will remove an S/NR-eligible resource from the development site. Because the S/NR-eligible Hotel Pennsylvania will be demolished with the No Action project in the future without the proposed actions, the redevelopment of the development site with the proposed project would not constitute a significant adverse impact on architectural resources. Historic American Buildings Surgery (HABS) Level II documentation would be undertaken by the project sponsor prior to the hotel's demolition to record the history and appearance of the Hotel Pennsylvania. This commitment would be set forth in a Restrictive Declaration. The HABS documentation would be submitted to an appropriate public repository.

The development site is within 90 feet of one architectural resource—the former Equitable Life Assurance Company Building. To avoid potential inadvertent construction-related impacts on this architectural resource, including ground-borne vibration, falling debris, and accidental damage from heavy machinery, a Construction Protection Plan (CPP) would be developed in consultation with the New York City Landmarks Preservation Commission (LPC) and would be implemented by a professional engineer prior to any demolition at the development site. Other architectural resources in the study area would not be expected to be adversely affected by the proposed project, as they are at a greater distance from the development site.

TRAFFIC

The construction of the proposed project would generate its peak construction traffic at the end of the fourth quarter of 2012. Levels of construction traffic would then taper off somewhat, but remain at consistently elevated levels though 2013 and into the first quarter of 2014. The construction of the No Action development would generate slightly lower amount of traffic in the second quarter of 2013. Compared to the construction of the No Action development, the construction of the proposed project would not result in substantial increase in construction-related vehicle trips. Therefore, the construction of the proposed project is unlikely to result in any significant adverse traffic impacts.

Delivery trips would follow the New York City Department of Transportation (NYCDOT) designated truck routes. Delivery trips made by over-size construction trucks, and temporary curbside lane or sidewalk closures made by these deliveries, would take place in accordance with the detailed NYCDOT Office of Construction Mitigation and Coordination (OCMC)-approved Maintenance and Protection of Traffic (MPT) Plans.

PARKING

The construction of the proposed project would generate a maximum parking demand of approximately 160 spaces for construction workers commuting by private auto during the peak construction periods. This parking demand would be accommodated by numerous off-street parking facilities with more than 1,900 parking spaces available within the study area during the early morning peak accumulation periods. Hence, the construction of the proposed project is not expected to result in any significant adverse parking impacts.

TRANSIT

With the projected construction workers distributed among the various subway and bus routes, station entrances, and bus stops near the study area, only nominal increases in transit demand would be experienced along each of these routes and at each of the transit access locations during hours outside of the typical commuter peak periods. Hence, there would not be a potential for significant adverse transit impacts attributable to the projected construction worker transit trips. While there are likely to be temporary stairway closures at nearby subway stations, adequate circulation and access to transit service would be maintained through coordination with NYCDOT and Metropolitan Transportation Authority-New York City Transit (NYCT).

PEDESTRIANS

For the same reasons discussed above for transit, the construction activities would not result in any significant adverse pedestrian impacts. During construction, where temporary sidewalk closures are required, adequate protection or temporary sidewalks and appropriate signage would be provided and coordinated with NYCDOT.

AIR QUALITY

Construction activities could affect local air quality because of engine emissions generated by on-site construction equipment and trucks entering/exiting the site during construction, and because of fugitive dust emissions generated by construction activities. Subsequent to publication of the DEIS, a detailed analysis of emissions from on-site construction activities was undertaken to quantify the potential emissions from the proposed project. As demonstrated in this analysis, the proposed project would not result in any concentrations of NO_2, PM_{10}, and CO that exceed the National Ambient Air Quality Standards (NAAQS). In addition, the maximum predicted incremental concentrations of $PM_{2.5}$ would not exceed applicable New York City Department of Environmental Protection (NYCDEP) interim guidance criteria. Therefore, no significant adverse air quality impacts are expected from the on-site construction sources.

NOISE

Subsequent to publication of the DEIS, a quantified construction noise analysis was performed to quantify the magnitude, time of occurrence, and duration of the potential exceedances of the CEQR impact criteria (the DEIS identified construction-period noise impacts on the St. Francis Roman Catholic Church and The Epic), and determine the practicability and feasibility of implementing any additional control measures to reduce or eliminate the significant adverse noise impacts. During construction, a variety of measures that exceed standard construction practices would be employed to minimize construction noise and reduce potential noise impacts. While these noise reduction measures would substantially reduce noise levels, elevated noise levels exceeding CEQR criteria would occur at various locations; however, at most locations the duration would be limited and at the remaining locations (The Epic and the building under construction at 885 Sixth Avenue), interior noise levels that would meet CEQR criteria would be maintained, and therefore no significant adverse impacts would occur. Significant adverse impacts would occur at The Epic's terraces where noise levels already exceed the acceptable CEQR range for outdoor areas requiring serenity and quiet; there are not feasible mitigation measures that could be implemented to eliminate the significant noise impacts at these locations and, therefore, at these locations a significant unmitigated adverse noise impact would occur.

VIBRATION

The buildings and structures of most concern with regard to the potential for structural or architectural damage due to vibration are those immediately adjacent to or across the street from the proposed development site. With the exception of the Manhattan Mall, which is immediately adjacent to the development site, vibration levels at nearby buildings and structures would be well below the 0.50 inches/second PPV limit for structural damage. At the Manhattan Mall, special measures would be utilized and a monitoring program would be implemented to ensure that this limit is not exceeded, and that no architectural or structural damage would occur. At all other locations, the distance between construction equipment and receiving buildings or structures is large enough to avoid vibratory levels that would result in architectural or structural damage.

In terms of potential vibration levels that would be perceptible and annoying, the pieces of equipment that would have the most potential for producing levels which exceed the 65 VdB limit are the clam shell drop and vibratory roller. A clam shell drop would produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at receptor locations within a distance of approximately 232 feet. However, the operation would only occur for limited periods of time at a particular location and therefore would not result in any significant adverse impacts. (No pile driving or blasting are expected as part of the proposed project's construction.) In no case are significant adverse impacts from vibrations expected to occur.

CUMULATIVE EFFECTS

There are a number of large-scale transportation projects that will be under construction in the vicinity of the development site in the future without the proposed project. These projects include the Empire State Development Corporation's Moynihan Station, New Jersey Transit's Access to the Region's Core (ARC) project, and possibly Metro-North's project to bring service to the Penn Station Complex. While these projects are all expected to be completed after the proposed project's estimated 2014 completion year, some construction phases for these projects will occur at the same time the proposed project would be constructed.

An assessment was undertaken to determine whether there would be the potential for cumulative impacts from construction of the proposed project and these transportation projects. It is anticipated that because construction efforts for these three projects would occur at a distance from the development site, the potential for cumulative effects would be minimal. However, construction of the proposed project would be coordinated with these other projects to the extent practicable, to minimize the potential for adverse construction impacts of the concurrent efforts.

B. OVERVIEW OF CONSTRUCTION ACTIVITIES

A description of the proposed project's general construction practices (including those associated with deliveries and access, hours of work, sidewalk and lane closures, staging and laydown, and construction parking), construction methods, and a conceptual schedule of anticipated construction activities, is provided in the discussion below.

GENERAL CONSTRUCTION PRACTICES

Certain practices would be observed throughout the construction of the proposed project. For construction on the development site, as well as for construction at the locations of the various subway improvements, the construction manager for each location would designate a contact person for community relations 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.

The following describes typical construction practices in New York City. In certain instances, practices employed at the individual construction sites may vary from those described below.

DELIVERIES AND ACCESS

Access to the construction sites would be controlled. The work areas would be fenced off, or otherwise isolated from the general public, and limited access points for workers and trucks would be provided. Typically, worker vehicles would not be allowed into the construction area, as there would be no place for them to park. Security guards and flaggers would be posted, and all persons and trucks would have to pass through security points. Workers or trucks without a need to be on-site would not be allowed entry. After work hours, the gates or other portals allowing access to the construction sites would be closed and locked. Unauthorized access would be prevented after work hours and during weekends. Material deliveries to the sites would be controlled and scheduled.

HOURS OF WORK

Construction activities for the RWCDS would take place in accordance with New York City laws and regulations, which allow construction activities to take place between 7 AM and 6 PM. Construction work would begin at 7 AM on weekdays, with most workers arriving between 6 AM and 7 AM. Typically, work would end at 3:30 PM, but could be extended until 6 PM for such tasks as finishing a concrete pour for a pad, or completing the bolting of a steel frame erected that day. Extended workday activities would 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 but would be minimized to the greatest extent practicable.

At limited times over the course of constructing a building, weekend work could be required. Weekend work requires a permit from the New York City Department of Buildings (DOB) and, in certain instances, approval of a noise mitigation plan from New York City Environmental Protection (NYCEP) under the City's Noise Code. The New York City Noise Control Code, as amended in December 2005 and effective July 1, 2007, limits construction (other than special circumstances as described below) to weekdays between the hours of 7 AM and 6 PM, and sets noise limits for certain specific pieces of construction equipment. Construction activities occurring after hours (weekdays between 6 PM and 7 AM and on weekends) may be permitted only to accommodate: (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) 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. If it were to become necessary, the typical weekend workday would be on Saturday, beginning with worker arrival and site preparation at 7 AM, and ending with site cleanup at 5 PM.

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

This type of concrete pour is usually associated with foundations and structural slabs at grade, which would require a minimum of 12 hours or more to complete, depending on the size of the area being poured.

SIDEWALK AND LANE CLOSURES

For the construction of the new building, it is anticipated that standard sidewalk and street lane closures, typical for construction of high-rise buildings, would be required, as described in more detail below.

Construction activities at the development site may require the closing of curbside traffic lanes immediately adjacent to the site on the south side of West 33rd Street between Sixth and Seventh Avenues, the eastern-most lane on Seventh Avenue between 32nd and 33rd Streets, and possibly the curbside lane adjacent to the site on the north side of West 32nd Street between Sixth and Seventh Avenues.. These lanes may be closed and used for staging of cranes and other equipment for part of the duration of construction. NYCDOT would have to approve any lane closures and would do so only if the lane closure would not unduly interfere with traffic flow. In addition, construction activities may require the closing and/or relocation of pedestrian sidewalk paths at these same locations. It is expected that these closings or relocations would occur over a period of approximately 4½ years.

Some sidewalks may have protective sheds or pedestrian access may be within barriers when construction is taking place next to the sidewalk. To the extent possible, pedestrian traffic would be maintained via covered pedestrian walkways to ensure public safety. In addition, it is expected that in certain locations temporary access ways for trucks and worker vehicles into the construction sites would cross sidewalks. However, during some construction activities, it may be necessary to close sidewalks adjacent to the construction sites and temporarily re-route pedestrian traffic.

Construction activities related to the subway improvements, particularly the stairways and entrances to the subways, may require some re-routing of pedestrian flows both above and below grade. In addition, construction activities may affect some subway station movements during stairway construction. It is intended that construction would be performed during normal hours by segregating pedestrian flows with barriers. While measures would be taken, in coordination with NYCT, to minimize inconveniences to subway and commuter rail patrons (including scheduling construction activities during off-peak periods to the extent possible), construction activities may result in some temporary disruptions to pedestrian circulation. For the construction work associated with the subway improvements, no street lane closures are assumed to be required. Some sidewalk closures may occur during some work around subway entrances.

As discussed above, construction activities would require the closing of portions of one traffic lane on the streets immediately adjacent to the construction site, and may also require the closing and/or relocation of pedestrian sidewalk paths at some locations. A plan would be developed in coordination with the Mayor’s Office of Construction to minimize disruptions to traffic and pedestrian flows during the construction period. At all locations where either curbside or moving lanes of traffic are closed, measures would be taken to provide the maximum number of moving lanes to maintain traffic flows.

STAGING AND LAYDOWN AREAS

Because of the density of the finished building, laydown areas would likely be on the curb lane of the local streets bordering the development site. It is not expected that any streets would be closed and used for material laydown. Materials that are needed during the day are usually delivered early that day. These materials, such as reinforcing bars and prefabricated pieces, would be stored at the site until needed.

CONSTRUCTION WORKER PARKING

Because of the excellent transit access to the development site, as well as the locations of the subway improvements, it is anticipated that many of the workers would travel to the site via mass transit. It is not anticipated that any notable number of construction worker vehicles would have the ability to park on the streets in the area. However, for workers choosing to drive to the site, off-street parking is available at a number of nearby lots and garages in the study area. The combined construction activities for the development site and the subway improvements would generate a maximum daily parking demand of approximately 160 spaces at the end of 2012, with daily worker parking needs ranging between approximately 125 to 155 spaces between the first quarter of 2013 and the first quarter of 2014. During other times of construction of the proposed project, daily worker parking demand would average between 50 and 125 spaces.

CONSTRUCTION METHODS AND ACTIVITIES

The mixed-use commercial building would utilize conventional construction techniques. The building site would be prepared, the foundation built, and then the building erected. The skeleton or core of the building would be built, and then the exterior or shell installed as the core rises to 6 to 8 stories. The building on the development site, as well as the subway improvements, would involve extensive interior finishing for the walls, floors and the associated electrical and mechanical systems. It is important to note that there is often overlap between one or more of the various phases of construction. The construction methods to be employed are described in more detail below.

GENERAL SITE PREPARATION

The first step would be to prepare the development site for construction. This would involve site cleanup and demolition. The activities associated with these general site preparation steps are outlined below and will occur in the No Action condition in preparation for the No Action building (or for the proposed project, if approved). Many, but not all, of the following activities would also be necessary at the subway improvement sites (construction of the subway improvements would occur only with the proposed project, not with the No Action building).

Site Cleanup and Demolition

At the development site, site cleanup and demolition activities would begin in mid-2010 and last for approximately 16 months, finishing by the end of 2011. The activities associated with this stage of project construction would be the same with the No Action building. For the various subway improvements, these activities would be expected to take about 9 months each, commencing at different times.

The purpose of these activities is to remove all loose materials and complete the demolition of the building. It is notable that because of the size and location of the existing Hotel Pennsylvania (particularly as it is situated partially over active railroad tracks), that the demolition of this structure will involve the deconstruction or dismantling of the building, rather than more traditional demolition using wrecking balls or implosion. One of the steps in general demolition is to remove any economically salvageable materials, and then large equipment is used to deconstruct the building. Typical demolition, including the deconstruction techniques that would be utilized at the development site, requires solid temporary walls around the building to prevent accidental dispersal of building materials into areas accessible to the general public. After the building has been deconstructed, front-end loaders would be used to load materials into dump trucks. The demolition debris would be sorted prior to being disposed at landfills to maximize recycling opportunities. The activities associated with this stage of construction would include:

- Installation of a site perimeter security fence;
- Removal of residual materials, loose debris, furniture, and garbage;
- Inventory and removal of small containers, and loose items requiring special disposal, such as paints, oils, petroleum containers, etc.;
- Demolition of the building above ground, and of any portions of the existing subway facilities necessary for renovation or expansion, and segregating materials for disposal/recycling; and
- Breakup and removal of concrete floor slabs for recycling/disposal.

Demolition and excavation may disturb or involve certain materials (e.g., asbestos-containing materials, lead-based paint) that are governed by existing federal, state, and local regulations. Adherence to all applicable regulations related to the disturbance and disposal of these materials would avoid significant adverse impacts.

Accounting for the size of the building to be demolished, about 220 workers are expected to be on-site during these activities for the development site, with an additional 10 to 20 workers needed at the various subway improvement sites. The equipment would include forklifts, small trucks, barrel handlers, and various small tools. About 27 trucks per day are expected to travel to and from the development site during this phase of construction, with another approximately 4 to 5 trucks per day associated with each of the subway improvement sites.

CONSTRUCTION OF THE DEVELOPMENT SITE BUILDING

Building construction would begin after all site cleanup and demolition is largely completed; foundation work would overlap with those initial activities by about four months. Typical construction stages for commercial buildings do not vary greatly, and it is estimated that the construction of the commercial building proposed for the development site would require approximately 3 years to be completed after the demolition work is finished, because of its size and specialized building systems. Building construction would generally involve four phases: foundations, core and shell construction, exteriors, and interior finishing. The development site's commercial office building would be built as a steel frame structure, with poured-in-place steel reinforced concrete on metal decks. To construct the taller components of the building, construction of building cores and shells would include installation of steel beams and columns and roof construction. These activities would require the use of cranes, compressors, material hoists, on-site reinforcing bar bending jigs, welding equipment, and a variety of hand-held tools. At this point in the construction, electric service may be provided, and generators would no longer be needed. The building structure and the interior finishing stages would overlap one another, as the upper parts of the structure would be under construction while finishing of the lower floors would be completed. Interior finishing involves electrical installation; heating, ventilation and air conditioning; sheet-rocking; and painting. Mostly small hand tools are used for interior finishing, but a high number of deliveries for materials such as sheet rock, ceiling tiles, flooring, and interior electrical, mechanical and plumbing fixtures are required.

It is expected that almost all work would be done during normal construction hours of 7 AM to 4 PM, five days a week. On occasion, some extended shift work to 6 PM may be required to complete a particular task. Weekend and night work is not expected to be required.

Foundations

One of the steps that would occur during this stage of construction activities would be to excavate into bedrock for the footings that will be needed to set the column foundations that would support the building. Because of the shallow depth to bedrock at the development site, pile driving is not anticipated. It is also not anticipated that blasting would be necessary for the bedrock excavation, and that the necessary excavation would be accomplished by cutting into the bedrock. Some of the early foundation work can be undertaken independent of the demolition of the hotel that would occur during the previous construction phase, which allows for an overlap of approximately four months for these two phases of construction. This involves the construction of a new crash wall being built beneath the development site at track level adjacent to the tracks leading in and out of Penn Station, in an area beneath West 33rd Street and Seventh Avenue. A variety of other equipment would be used for the demolition and site cleanup activities. Foundation work would include the use of bobcats, rockbreakers, loaders, pumps, motorized concrete buggies, concrete pumps, jackhammers, pneumatic compressors, a variety of small (mostly hand-held) tools, as well as dump trucks and concrete trucks. Approximately 130 workers would be “on-site” during these tasks, with deliveries estimated to require between 10 and 20 trucks per day, depending on which stage of site preparation activity is underway. Because of the complex nature of erecting such a large structure partially over active rail lines, these activities would take longer than would be expected for a typical office building; for this project these activities are expected to last about 16 months.

Core and Shell

It has been estimated that the core and shell construction of the proposed building would last approximately 28 months and would include construction of the building’s framework (installation of beams and columns) and floor decks. These activities would require the use of the tower crane, compressors, personnel and material hoists, concrete pumps, on-site reinforcing bar bending jigs, welding equipment, and a variety of hand-held tools, in addition to the delivery trucks that would bring construction materials to the site. Each day, between 300 and 700 workers and about 20 to 30 truck deliveries would be required for this stage of building construction.

Exteriors

The exterior would likely be either concrete or steel and glass. In either case, the exterior is typically assembled off-site and trucked to the site. Either concrete planks or steel and glass sheets would be lifted by large cranes from the beds of the tractor trailers and secured into place on the face of the building. Exterior construction work, which also includes roofing and waterproofing, would overlap with the tower building core and shell construction. This stage of construction would require about 180 workers and about 5 truck deliveries per day per building, and would last for about 18 months.

Interior Fit-out and Finishing

This stage would include the construction of interior partitions, installation of lighting fixtures, interior finishing (flooring, painting, etc.), and mechanical and electrical work, such as the installation of elevators. Mechanical and other interior work would overlap almost completely with the tower building core and shell construction, extending for about an additional month beyond the core and shell activities, for a total of about 24 months. The activities during this stage of construction would employ about 150 to 250 workers. In addition, anywhere from 10 to 20 truck deliveries would be expected per day at the building site. Equipment used during interior construction would include exterior hoists, pneumatic equipment, delivery trucks, and a variety of small hand-held tools. This stage of construction is the quietest and does not generate fugitive dust.

SUBWAY IMPROVEMENTS

During construction of the various subway improvements, the necessary activities would include stairway widening, renovation and expansion of other subway facilities, widening of the pedestrian passageway under the south side of West 33rd Street, and the associated water- and fire-proofing, as well as the interior finishing of the renovated or expanded subway facilities, which would involve electrical installation; heating, ventilation and air conditioning; sheet-rocking; and painting. Mostly small hand tools are used for interior finishing. As with the construction of the commercial office building, deliveries for materials, such as sheet rock, ceiling tiles, flooring and interior electrical, mechanical and plumbing fixtures are required. The overall duration for construction activities at each of the three given subway improvement sites is expected to be about 29 months, including the associated site preparation activities at each location. These activities would be significantly less worker-intensive than the construction of the new office building; for any of the three given subway improvement sites, a maximum of about 70 workers per site would be required each day. On average, approximately 4 to 7 delivery trucks would arrive at and leave each of the subway improvement sites each working day in connection with this task.

For the construction of the subway improvements, it is expected that almost all work would be done during normal construction hours of 7 AM to 4 PM, five days a week. On occasion, some extended shift work to 6 PM may be required to complete a particular task. Weekend and night work is not expected.

CONCEPTUAL CONSTRUCTION PHASING AND SCHEDULE

The anticipated construction activities for the proposed project can be divided into three general categories: site preparation, above-grade building construction, and construction of subway improvements. Construction of the various components of the proposed project would occur over a number of years, with construction activities and intensities varying, depending on which components of the overall development are under way at any given time. Site preparation activities on the development site are anticipated to begin in September 2010, with construction activities to begin late in the third quarter of 2011, and with complete build-out of the development assumed to be completed in the fourth quarter of 2014. The various subway improvements to be undertaken as part of the proposed project would fall within this timeframe, with construction on the Sixth Avenue and Seventh Avenue improvements anticipated to begin in the fall of 2010, continuing through early 2013, and the improvements and expansion of the pedestrian passageway anticipated to commence in mid-2011, with completion anticipated in early 2014.

Figure 20-1 presents a conceptual schedule of construction for the RWCDS construction plan for the proposed project, indicating the estimated start and end dates for each general construction activity (site preparation/demolition, foundations, core and shell, exteriors, interiors/finishing) for each of the proposed project components that would be constructed, and when these activities would be expected to overlap.

Table 20-1 presents the maximum daily number of construction workers and delivery trucks expected for each quarter during the construction of the proposed project (including construction at the development site and at the three subway improvement sites).

Table 20-1
Quarterly Peak Numbers of Daily Construction Workers and Delivery Trucks: Proposed Action (Single-Tenant Office Scenario with Subway Improvements)

Year	2010				2011				2012			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers	0	0	276	276	298	298	396	396	308	326	589	1,145
Trucks	0	0	34	34	36	36	50	50	28	30	46	55
Year	**2013**				**2014**				**Overall RWCDS**			
Quarter	**1st**	**2nd**	**3rd**	**4th**	**1st**	**2nd**	**3rd**	**4th**	**Maximum**		**Average**	
Workers	1,070	1,075	1,090	1,083	1,070	874	833	736	1,145		639	
Trucks	45	38	37	37	38	32	32	29	55		36	

Notes: The number of construction workers and delivery trucks represents the highest number over a several week period and may not reflect the absolute peak day.
1st Quarter: January-March; 2nd Quarter: April-June; 3rd Quarter: July-September; 4th Quarter: October-December.
Estimates have assumed construction work would occur weekdays during regular allowable construction hours for most activities, with some selected activities (e.g., concrete pouring) requiring extended shifts involving approximately 20 percent of the daily workers.

The number of workers would peak at the end of 2012, with up to 1,145 workers per day. During the same period there would also be a peak of 55 trucks per day associated with project construction activities. This worker and truck peak occurs at the end of the fourth quarter of 2012, based on the projected schedule. These numbers represents the highest number of workers and deliveries sustained over a several week period and may not reflect the single highest day.

C. THE FUTURE WITHOUT THE PROPOSED PROJECT

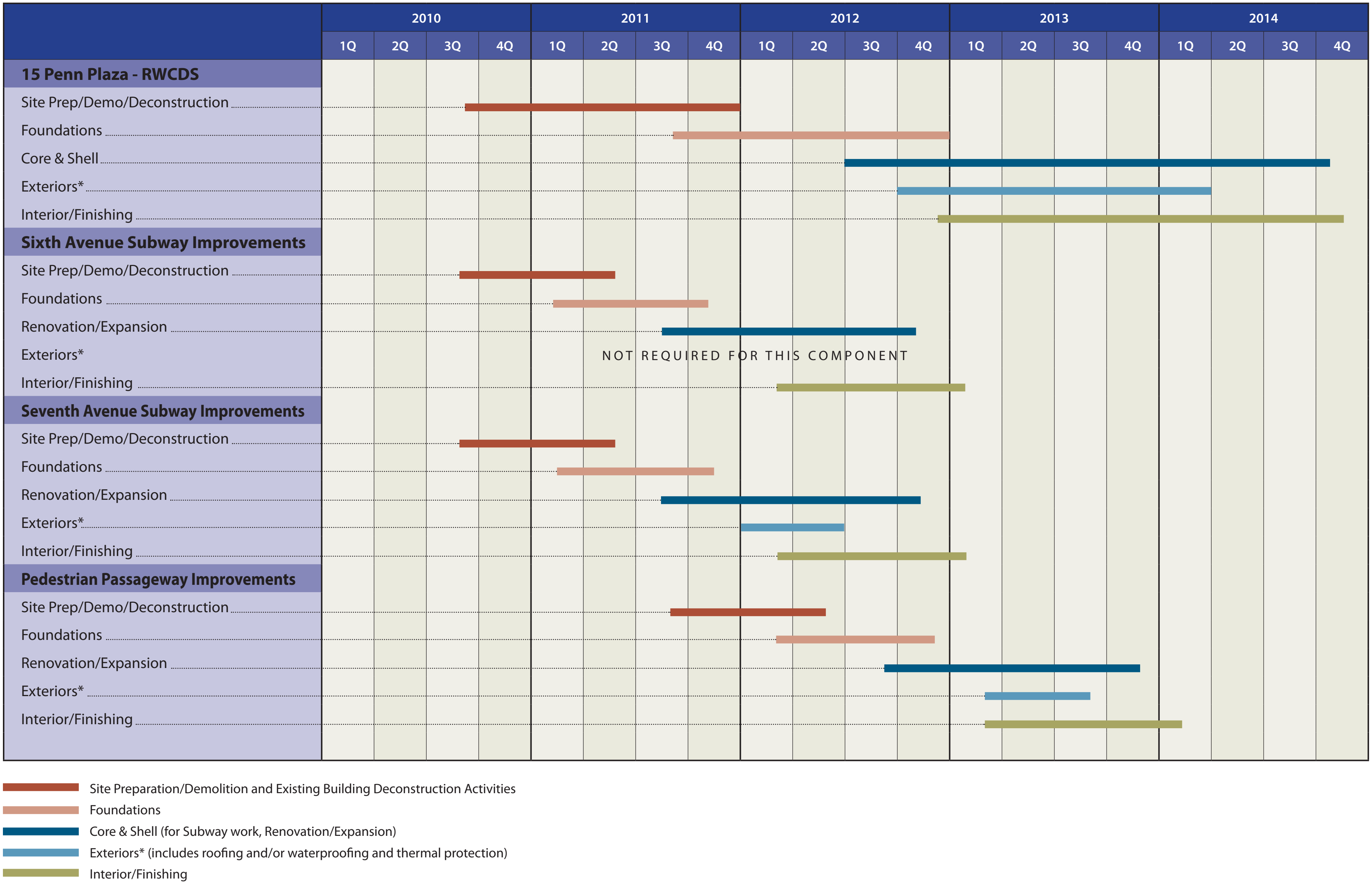
DEVELOPMENT SITE AND PROJECT SITE

In the future without the proposed project (the "No Action" condition), the existing Hotel Pennsylvania will be demolished and an as-of-right commercial office building development of approximately 1.6 million gross square feet (gsf) will be constructed on the development site (the No Action Building), which will include a mix of commercial office, retail, lobby and amenity spaces, and mechanical space, as well as below-grade accessory parking for 100 vehicles.

No changes are anticipated to occur at the Manhattan Mall site.

Therefore, in the No Action condition, the development site will be transformed from a site containing hotel use to a site containing commercial office and retail uses. The remainder of the project site (the Manhattan Mall site) will continue to contain retail and office uses.

2.4.2010



Source: Estimates of construction durations for various phases of construction developed by Bovis Lend Lease, 2009.

RWCDS Construction Schedule

Figure 20-1

Construction of the No Action development would be expected to take a total of about 42 months to complete. Of this construction duration, approximately 18 months would be devoted to the site preparation, demolition, and foundations phases—which would be nearly identical to the Single-Tenant Office Scenario building—with about 28 months of general construction activities for the No Action development. Construction of the No Action development would involve the same construction phases with similar durations and worker intensities as the proposed Single-Tenant Office Scenario. The shorter duration of construction for the No Action development would largely be a result of the smaller building to be constructed (fewer stories, and commensurate less building finishing work) when compared with the proposed project. Additionally, the No Action development would not include any of the construction activities associated with the various subway improvements, so that the worker, truck movements, and construction activities and temporary disruptions to certain sidewalk and transit elements will not occur in the No Action condition.

Table 20-2 presents the maximum daily number of construction workers and delivery trucks expected for each quarter during the construction of the No Action development (excluding the three subway improvement sites). The number of workers would peak during the first and second quarters of 2013 with up to 880 workers per day, during this period there would also be a maximum of 29 trucks per day associated with project construction activities. Similarly, it should be noted that the peak for trucking activity associated with the No Action development would not occur during the same period, and instead would occur in the fourth quarter of 2011, with up to 32 trucks per day. Worker levels during this period would be lower than the peak for the overall No Action development, peaking at approximately 316 workers per day during the 2011 truck peak, and accounting for the various construction sites. These numbers represent the highest number of workers and deliveries sustained over a period of several weeks and may not reflect the single highest day.

Table 20-2
Quarterly Peak Numbers of Daily Construction Workers and Delivery Trucks: No Action Development (without Subway Improvements)

Year	2010				2011				2012			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers	0	0	221	221	221	221	221	316	125	398	404	688
Trucks	0	0	24	24	24	24	24	32	11	26	20	23

Year	2013				2014				Overall RWCDS	
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	Maximum	Average
Workers	880	880	607	504	48	0	0	0	880	388
Trucks	29	29	15	14	5	0	0	0	32	22

Notes: The number of construction workers and delivery trucks represents the highest number over a several week period and may not reflect the absolute peak day.
1st Quarter: January-March; 2nd Quarter: April-June; 3rd Quarter: July-September; 4th Quarter: October-December.
Estimates have assumed construction work would occur weekdays during regular allowable construction hours for most activities, with some selected activities (e.g., concrete pouring) requiring extended shifts involving approximately 20 percent of the daily workers.

Construction of the No Action building would result in elevated noise levels within the area surrounding the development site. Noise reduction measures beyond what is required by the New York City Noise Code could be implemented but would not be required; therefore, in the No Action condition, without the noise control measures that are being committed to by the project sponsor, noise levels would be expected to be approximately 10 dBA higher than noise levels with the proposed project, and impacts are expected to occur at the St. Francis Roman

Catholic Church, The Epic residential building and the residential building under construction at 885 Sixth Avenue, and possibly at other locations.

SURROUNDING AREA

There are a number of large-scale transportation projects that are anticipated to be under construction in the vicinity of the development site in the future without the proposed project. These projects include the Empire State Development Corporation's Moynihan Station, New Jersey Transit's Access to the Region's Core (ARC) project, and possibly, Metro-North's project to bring service to the Penn Station Complex. These projects will be constructed in the following areas:

- Moynihan Station. Construction will occur predominantly below grade west of Eighth Avenue and within the Farley Complex located between Eighth and Ninth Avenues between 31st and 33rd Streets. One high rise building will constructed on an associated development transfer site on the western portion of the One Penn Plaza block, between West 33rd and 34th Streets at Eighth Avenue, a full block west of the 15 Penn Plaza development site. This site would involve construction typical of a high-rise building.
- ARC Project. NJ Transit's ARC Project includes the construction of two new tracks in the Meadowlands in New Jersey, two new single-track tunnels under the Hudson River and platform and station capacity improvements at a new station under 34th Street in Manhattan that will have connections to Penn Station, including new station entrances at Sixth, Seventh and Eighth Avenues, and will include direct connections to New York City subway concourses at Eighth, Seventh, and Sixth Avenues, as well as to the PATH train service. Most of the ARC construction would occur below grade, with the tunnel spoils and much of the staging for ARC project construction efforts in Manhattan to be located at Twelfth Avenue and West 28th Street, well west of the 15 Penn development site. The ARC project would also include two additional minor spoils removal fan plant and access shaft sites that would be located at 33rd Street between Sixth and Seventh Avenues and 35th Street between Seventh and Eighth Avenues, both north of the 15 Penn Plaza development site.
- Metro-North at Penn Station. There are existing track connections from Metro-North's New Haven and Hudson Lines to Penn Station on the West Side of Manhattan which could be used to provide access for Metro-North trains into Penn Station. Connections of Metro-North's Harlem Line may require track reconstruction. However, at Penn Station, these construction activities would be below grade and any necessary above ground work would not be anywhere near the 15 Penn development site.

It is anticipated that these three projects would include, where necessary, the coordination of construction schedules and activities for these projects as they would affect overall access to, and circulation within, the Penn Station Complex. This coordination will avoid or minimize, to the extent practicable, adverse construction impacts of the concurrent efforts on the station.

D. PROBABLE IMPACTS OF THE PROPOSED PROJECT

LAND USE AND NEIGHBORHOOD CHARACTER

Construction activities would affect land use on the development site but would not alter surrounding land uses. Certain types of construction activities, such as excavation and foundation work, would be intrusive to the adjacent businesses, residences, and religious uses;

however, all construction staging activities for the proposed project would occur within the development site or within portions of sidewalks, curbs, and travel lanes of public streets immediately adjacent to the development site. In later stages of construction, when work would take place within the building shell, effects on the surrounding uses would be substantially reduced. Additionally, access to surrounding land uses would be maintained throughout the construction period, and adherence to the provisions of the New York City Building Code and other applicable regulations would reduce the potential adverse effects of construction activities on land use patterns and neighborhood character. Moreover, although the project anticipates an approximately 4½-year construction schedule, the level of activity would vary depending on the types of construction activities being undertaken at development site or at the locations of the subway improvements, and no one area would experience the effects of the project's construction activities for the full 4½-year duration. The potential noise effects on The Epic, a residential use south of the project site, and other surrounding land uses, are discussed in detail in "Noise."

SOCIOECONOMIC CONDITIONS

Construction would create 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. Construction of the RWCDS would not affect the access to and therefore the viability of any business. It is not expected that construction activities would cause the failure of any business thereby affecting neighborhood character. Overall, there would be no significant adverse impacts on socioeconomic conditions resulting from construction of the proposed project.

COMMUNITY FACILITIES

There are no public schools, hospital facilities, day care facilities, or public libraries within the area immediately surrounding the development site. The St. Francis Roman Catholic Church is located directly south of the development site with its main entrance on West 31st Street, and the New York City Fire Department (FDNY) Engine 1 and Ladder 24 facilities are located on the south side of West 31st Street. While construction of the proposed project would result in temporary increases in traffic during the construction period, access to and from these facilities would not be affected during the construction period. As discussed below (see "Noise"), the DEIS identified the potential for a significant adverse noise impact at the St. Francis Roman Catholic Church; however, the quantified noise analysis undertaken as part of the FEIS demonstrates that this impact would not occur with the noise reduction measures to be incorporated during the construction effort.

OPEN SPACE

There are no publicly-accessible open spaces within the development site, and no open space resources would be used for staging or other construction activities. Therefore, construction of the proposed project would not limit access to open space resources in the vicinity of the development site. At limited times, activities such as excavation and foundation construction may generate noise that could impair the enjoyment of nearby open space resources, but such noise effects would be temporary. Therefore, construction of the proposed project would not result in significant adverse impacts on open space.

HISTORIC RESOURCES

Like with the No Action development, the demolition of the 22-story, brick- and stone-clad Hotel Pennsylvania will remove a S/NR-eligible resource from the development site. Because the S/NR-eligible Hotel Pennsylvania will be demolished with the No Action project in the future without the proposed actions, the redevelopment of the development site with the proposed project would not constitute a significant adverse impact on architectural resources. HABS Level II documentation would be undertaken by the project sponsor prior to the hotel's demolition to record the history and appearance of the Hotel Pennsylvania. This commitment would be set forth in a Restrictive Declaration. The HABS documentation would be submitted to an appropriate public repository.

As described in Chapter 8, "Historic and Cultural Resources," the development site is within 90 feet of one architectural resource—the former Equitable Life Assurance Company Building, which is approximately 60 feet south of the development site. To avoid potential inadvertent construction-related impacts on this architectural resource, including ground-borne vibration, falling debris, and accidental damage from heavy machinery, a Construction Protection Plan (CPP) would be developed in consultation with the New York City Landmarks Preservation Commission (LPC) and would be implemented by a professional engineer prior to any demolition at the development site. The CPP would follow the guidelines set forth in section 523 of the *CEQR Technical Manual*, including conforming with 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. Other architectural resources in the study area would not be expected to be adversely effected by the proposed project as they are at a greater distance from the development site.

TRAFFIC AND PARKING

CONSTRUCTION TRAFFIC PROJECTIONS

Average daily construction worker and truck activities by quarter were projected for the entire period 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. Based on a schedule of commencing construction in mid-2010, the combined construction worker and truck traffic peak would occur at the end of the fourth quarter of 2012. The daily average numbers of construction workers and truck deliveries during this construction peak quarter were estimated at 1,145 workers and 55 truck deliveries per day, as shown in **Table 20-1**. These estimates of construction activities are further discussed below.

Under the same methodology, as shown in **Table 20-2**, the construction of the No Action development would peak during the first and second quarters of 2013, with a total of approximately 880 daily workers and 29 daily truck deliveries.

Construction Worker Modal Splits

Based on the survey conducted at the construction site of the New York Times Building (located at Eighth Avenue and West 42nd Street) in 2006 and the recently approved *53 West 53rd Street Final Environmental Impact Statement*, it is anticipated that construction workers' travel within or commute to midtown Manhattan would be primarily by public transportation (approximately 70 percent), with a smaller percentage by private auto (approximately 30 percent) and an average auto occupancy rate of 2.04.

Peak Hour Construction Worker Vehicle and Truck Trips

The construction schedule assumed that all site activities would take place during the typical construction shift of 7:00 AM to 3:30 PM. While construction truck trips would be made throughout the day (with more trips made during the early morning), and trucks would remain in the area for shorter durations, construction worker travel would typically take place during the hours before and after the work shift.

Table 20-3 summarizes construction worker vehicle and truck trips during the peak construction periods for the proposed project and the No Action development. The construction of the proposed project would result in maximum construction traffic in the fourth quarter of 2012, as 158 and 134 vehicle trips during the 6 to 7 AM and 3 to 4 PM peak hours, respectively. The construction of the No Action development would result in maximum construction traffic in the second quarter of 2013, as 114 and 102 vehicle trips during the 6 to 7 AM and 3 to 4 PM peak hours, respectively.

Comparing to the construction of the No Action development, the construction of the proposed project would result in a net increase of construction-generated traffic of 44 and 32 vehicle trips during the AM and PM peak hours, respectively. Distributed to various roadways and parking facilities near the project site, these incremental construction vehicle trips would not result in more than 50 vehicle-trips (the CEQR analysis threshold) at any intersection. Therefore, a detailed construction traffic analysis is not warranted and the proposed project is not expected to result in significant adverse construction traffic impacts.

Street Lane and Sidewalk Closures

There could be various curbside lane and/or sidewalk closures associated with the project's construction activities. Truck movements would be spread throughout the day and would generally occur between the hours of 6:00 AM and 3:00 PM, depending on the stage of construction. No rerouting of traffic is anticipated and, as mentioned above, moving lanes of traffic are expected to be available at all times. It is anticipated that the sidewalks immediately adjacent to the development site would also be closed to accommodate heavy loading areas for at least several months of the construction period. Flaggers are expected to be present during construction to manage the access and movements of trucks. Pedestrians would either walk on the opposite side of the street or in a sectioned-off portion of the street. Detailed Maintenance and Protection of Traffic (MPT) Plans approved by NYCDOT's Office of Construction Mitigation and Coordination (OCMC) would implement the appropriate protective measures for ensuring pedestrian safety surrounding the development site.

Table 20-3
Peak Construction Vehicle Trip Projections

Hour	Auto Trip			Truck Trip			Total Vehicle Trip		
	In	Out	Total	In	Out	Total	In	Out	Total
Proposed Project (Fourth Quarter of 2012)									
5 AM – 6 AM	0	0	0	0	0	0	0	0	0
6 AM - 7 AM	130	0	130	14	14	28	144	14	158
7 AM - 8 AM	32	0	32	6	6	12	38	6	44
8 AM - 9 AM	0	0	0	6	6	12	6	6	12
9 AM - 10 AM	0	0	0	6	6	12	6	6	12
10 AM - 11 AM	0	0	0	6	6	12	6	6	12
11- AM - Noon	0	0	0	6	6	12	6	6	12
Noon - 1 PM	0	0	0	5	5	10	5	5	10
1 PM - 2 PM	0	0	0	2	2	4	2	2	4
2 PM - 3 PM	0	16	16	2	2	4	2	18	20
3 PM - 4 PM	0	130	130	2	2	4	2	132	134
4 PM - 5 PM	0	16	16	0	0	0	0	16	16
5 PM - 6 PM	0	0	0	0	0	0	0	0	0
No Action Development (Second Quarter of 2013)									
5 AM – 6 AM	0	0	0	0	0	0	0	0	0
6 AM - 7 AM	100	0	100	7	7	14	107	7	114
7 AM - 8 AM	25	0	25	3	3	6	28	3	31
8 AM - 9 AM	0	0	0	3	3	6	3	3	6
9 AM - 10 AM	0	0	0	3	3	6	3	3	6
10 AM - 11 AM	0	0	0	3	3	6	3	3	6
11- AM - Noon	0	0	0	3	3	6	3	3	6
Noon - 1 PM	0	0	0	3	3	6	3	3	6
1 PM - 2 PM	0	0	0	2	2	4	2	2	4
2 PM - 3 PM	0	13	13	1	1	2	1	14	15
3 PM - 4 PM	0	100	100	1	1	2	1	101	102
4 PM - 5 PM	0	12	12	0	0	0	0	12	12
5 PM - 6 PM	0	0	0	0	0	0	0	0	0
NET INCREMENT									
5 AM – 6 AM	0	0	0	0	0	0	0	0	0
6 AM - 7 AM	30	0	30	7	7	14	37	7	44
7 AM - 8 AM	7	0	7	3	3	6	10	3	13
8 AM - 9 AM	0	0	0	3	3	6	3	3	6
9 AM - 10 AM	0	0	0	3	3	6	3	3	6
10 AM - 11 AM	0	0	0	3	3	6	3	3	6
11- AM - Noon	0	0	0	3	3	6	3	3	6
Noon - 1 PM	0	0	0	2	2	4	2	2	4
1 PM - 2 PM	0	0	0	0	0	0	0	0	0
2 PM - 3 PM	0	3	3	1	1	2	1	4	5
3 PM - 4 PM	0	30	30	1	1	2	1	31	32
4 PM - 5 PM	0	4	4	0	0	0	0	4	4
5 PM - 6 PM	0	0	0	0	0	0	0	0	0

Notes:
1. Construction auto trips for the proposed project were based on 1,145 daily workers with a 28.9-percent auto split and an average auto occupancy rate of 2.04.
2. Construction truck trips for the proposed project were based on 55 daily trucks with 25% of daily deliveries occurring in the early morning hour.
3. Construction auto trips for the No Action development were based on 880 daily workers with a 28.9-percent auto split and an average auto occupancy rate of 2.04.
4. Construction truck trips for the No Action development were based on 29 daily trucks with 25% of daily deliveries occurring in the early morning hours.

PARKING

The construction activities would generate a maximum daily parking demand of approximately 160 spaces during the peak construction periods in the fourth quarter of 2012. However, as discussed in Chapter 16, "Traffic and Parking," within a quarter mile radius of the project site, there is an estimated off-street parking capacity of nearly 7,050 spaces in the 2014 No Action Condition. During the peak hour of construction arrivals, about 70 percent of the off-street parking spaces are expected to be utilized, leaving more than 1,900 available parking spaces. During the mid-day peak hour, about 93 percent of these spaces are expected to be utilized, leaving more than 470 available parking spaces, which are more than sufficient to accommodate the construction worker generated parking demand for the proposed project. Therefore, the proposed project is not expected to result in significant adverse construction parking impacts.

TRANSIT AND PEDESTRIANS

TRANSIT

As discussed above, with approximately 30 percent of the construction workers predicted to commute via auto, the remaining 70 percent are expected to travel to and from the development site via transit. During the peak construction period of the proposed project, up to approximately 1,145 workers could be at the development site on a given day. This would result in approximately 640 construction-related transit trips during the 6 to 7 AM and 3 to 4 PM construction peak hours, respectively. Similarly, during the peak construction period of the No Action development, up to approximately 880 workers could be at the development site on a given day. This would result in approximately 490 construction-related transit trips during the 6 to 7 AM and 3 to 4 PM construction peak hours, respectively.

Comparing to the construction of the No Action development, the construction of the proposed project would result in a net increase of approximately 150 construction-generated transit trips during the peak hours. Since these incremental construction-generated transit trips are below the 200 transit-trip CEQR analysis threshold, a detailed construction transit analysis is not warranted and the proposed project is not expected to result in significant adverse construction transit impacts.

As mentioned above, construction activities associated with the subway improvements may result in temporary closures to subway stairways or station elements during off-peak hours, which would not affect peak hour operations. In some instances, selected station elements may need to be closed and segregated from the public for safety reasons for relatively short durations. Adequate circulation and access to transit service would be maintained through coordination with NYCDOT and NYCT.

PEDESTRIANS

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 development site is also not warranted. Construction activities of the proposed project during peak construction periods in the fourth quarter of 2012 would yield up to approximately 920 pedestrian trips during the 6 to 7 AM and 3 to 4 PM construction peak hours. Construction activities of the No Action development during peak construction periods in the second quarter of 2013 would generate up to approximately 700 pedestrian trips during the 6 to 7 AM and 3 to 4 PM construction peak hours. Similarly, since these incremental construction-generated pedestrian trips are below the 200 pedestrian-trip CEQR analysis threshold, a detailed construction pedestrian analysis is not warranted and the proposed project is not expected to result in significant adverse construction pedestrian impacts.

During construction, where temporary sidewalk closures are required (possibly on the east sidewalk of Seventh Avenue between West 32nd and 33rd Streets, and the north sidewalk of West 32nd Street and the south sidewalk of West 33rd Street between Sixth and Seventh Avenues,) adequate protection or temporary sidewalks and appropriate signage would be provided in accordance with NYCDOT requirements.

AIR QUALITY[1]

INTRODUCTION

Construction activities have the potential to impact air quality as a consequence of engine emissions from on-site construction equipment, as well as dust generating activities. In general, much of the heavy equipment used in construction has diesel-powered engines and produces relatively high levels of nitrogen oxides and particulate matter. Gasoline engines produce relatively high levels of carbon monoxide. Construction activities also generate fugitive dust emissions. As a result, the air pollutants analyzed for construction activities include nitrogen dioxide (NO_2), particulate matter with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}), particulate matter with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$), and carbon monoxide (CO). Since ultra-low-sulfur diesel (ULSD) would be used for all diesel 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 18, “Air Quality.”

As stated above, construction activity in general, and large-scale construction in particular, 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 particulates. To ensure that the construction of the proposed project results in the lowest feasible diesel particulate matter (DPM) emissions, an emissions reduction program would be implemented and would consist of the following components:

1. *Diesel Equipment Reduction*. The construction of the proposed project would minimize the use of diesel engines and use electric engines operating on grid power instead, to the extent practicable. Construction contracts would specify the use of electric engines where available and practicable and ensure the distribution of power connections as needed and subject to availability.
2. *Clean Fuel*. ULSD would be used exclusively for all diesel engines throughout construction. This would enable the use of tailpipe reduction technologies (see below) and would directly reduce DPM and sulfur oxides (SO_x) emissions.
3. *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-

[1] The DEIS qualitatively assessed the potential for construction activities to result in significant adverse air quality impacts and determined that no significant adverse impacts would result from construction of the proposed project. As part of the FEIS, a quantified analysis was undertaken. This section is substantially revised to reflect that analysis, but to facilitate ease of reading, double-underlining was not used.

term contract, 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 being 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). Ninety percent reduction has been verified by a study of actual reductions of $PM_{2.5}$ emissions from comparable engines used at a New York City construction site. Controls may include active DPFs,[1] if necessary.

4. *Utilization of Tier 3 or Newer Equipment.* In addition to the tailpipe controls commitments, the construction program would mandate the use of Tier 3[2] (or newer) construction equipment for nonroad diesel engines greater than 50 hp.[3] The use of newer engines, is expected to reduce the likelihood of DPF plugging due to soot loading (i.e., clogging of DPF filters by accumulating particulate matter); the more recent the "Tier," the cleaner the engine for all criteria pollutants, including PM. Additionally, while all engines undergo some deterioration over time, "newer," as well as better maintained, engines will emit less PM than their older Tier or unregulated counterparts. Therefore, restricting site access to equipment with lower engine-out 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). In addition, to minimize hourly emissions of NO_2 from the proposed project's construction activities to the maximum extent practicable, non-road diesel-powered vehicles and construction equipment meeting or achieving the equivalent the EPA Tier 3 Non-road Diesel Engine Emission Standard would be used in construction, and construction equipment meeting Tier 4 would be used where conforming equipment is widely available, and the use of such equipment is practicable.

In addition, to reduce the resulting concentration increments at residential locations or other sensitive receptors, large emissions sources and activities, such as concrete trucks and pumps, would be located away from these receptors to the extent practicable. 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 exiting the construction site.

[1] Two types of DPFs are currently used: 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 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 and Tier 3 standards for equipment manufactured in 2000 through 2008. The Tier 1 through 3 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.

[3] The quantified analysis provided in this chapter used Tier 2 equipment in the modeling analysis.

Trucks entering and leaving the site with excavated or other materials would be covered. Truck routes within the site would be either watered as needed or, in cases where such routes would remain in the same place for an extended period, stabilized, covered with gravel, or temporarily paved to avoid the resuspension of dust. In addition to regular cleaning by the City, area roads would be cleaned as frequently as needed. The fugitive emissions reduction program would reduce $PM_{2.5}$ emissions by 50 percent for stockpiles and handling of demolition debris.

Additional measures to reduce pollutant emissions during construction of the proposed project would 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).

As discussed in Chapter 18, "Air Quality," EPA recently established a new 1-hour standard for NO_2. Great uncertainty exists as to 1-hour NO_2 background concentrations. In addition, as previously noted, there is no clear understanding with respect to the rate of transformation of NO to NO_2 at ground-level. Therefore, the significance of predicted construction impacts cannot be determined based on comparison with the new 1-hour NO_2 NAAQS since total 98th percentile values, including local area roadway contributions, cannot be estimated. In addition, construction-related air quality analysis methodologies have not been developed to accurately predict 1-hour NO_2 concentrations from construction activities.

Nevertheless, to minimize hourly emissions of NO_2 from the proposed project's construction activities to the maximum extent practicable, non-road diesel-powered vehicles and construction equipment meeting or achieving the equivalent the EPA Tier 3 Non-road Diesel Engine Emission Standard would be used in construction, and construction equipment meeting Tier 4 would be used where conforming equipment is widely available in New York City, and the use of such equipment is practicable.

AIR QUALITY ANALYSIS METHODOLOGIES

The following sections provide additional details relevant only to the construction air quality analysis methodology. For a review of the applicable regulations, standards and criteria, and benchmarks for stationary and mobile source air quality analyses refer to Chapter 18, "Air Quality."

A stationary source air quality analysis was conducted to evaluate potential construction impacts at the development site. Construction at the site would include a number of activities, such as demolition, limited excavation, materials handling, concrete pouring, and erecting of the proposed building. Air emission sources include exhausts on fuel burning equipment, fugitive dust from activities involving transfer of debris, and road dust. The analysis was performed following U.S. Environmental Protection Agency (EPA) and *CEQR Technical Manual* suggested procedures and analytical tools, as further discussed below, to determine source emission rates. The estimated emission rates were then used as input to an air quality dispersion model to determine potential impacts.

Construction Activity Assessment

Overall, construction of the proposed project is expected to occur over a period of several years. To determine which construction periods constitute the worst-case periods for the pollutants of concern, construction-related emissions were calculated throughout the duration of construction on an annual and peak-day basis for $PM_{2.5}$. $PM_{2.5}$ was selected as the worst-case pollutant because, as compared to other pollutants, $PM_{2.5}$ has the highest ratio of emissions to impact criteria. Therefore, $PM_{2.5}$ was used for determining the worst-case periods for analysis of all pollutants. Generally, emission patterns of other pollutants would follow $PM_{2.5}$ emissions, since most pollutant emissions are proportional to diesel engines by horse power. CO emissions may have a somewhat different pattern, but generally would also be highest during periods when the most activity would occur. Based on the resulting multi-year profiles of annual average and peak day average emissions of $PM_{2.5}$, a worst-case year and a worst-case short-term period were identified for the modeling of annual and short-term (i.e., 24-hour and 8-hour) averaging periods. September 2011 and the calendar year 2011 were identified as the worst-case short-term and annual periods respectively. Dispersion of the relevant air pollutants from the site during the worst-case periods was quantified using computer models, and the highest resulting concentrations are presented in the sections discussing air quality impacts. Broader conclusions regarding potential concentrations during other construction periods, which were not modeled explicitly, are discussed as well, based on the multi-year emissions profiles and the worst-case period results.

Construction Data

The construction analyses used an emission estimation method and a modeling approach that has been previously used for evaluating air quality impacts of construction projects in New York City. Because the level of construction activities would vary from month to month, the approach includes a determination of worst-case emission periods based on an estimated monthly construction work schedule, the number of each equipment type, and rated horsepower of each unit. As such, the worst-case short-term emissions (e.g., maximum daily emissions) and the maximum annual emissions (based on a 12-month rolling average) were determined for the construction program. A typical operating schedule of 7:00 AM to 3:30 PM (one 8-hour shift) was used for the analysis. In addition, the concentration of emission sources and the distances between sources and receptors were considered in selecting a worst-case scenario because of the shifting locations of construction activities throughout the development site and over time.

The specific construction information used to calculate emissions generated from the construction process includes, but is not limited to, the following:

- The number of units and fuel-type of construction equipment to be used;
- Rated horsepower for each piece of equipment;
- Hours of operation on-site;
- Excavation and processing rates;
- Average speed of dump trucks; and
- Average distance traveled on-site by dump trucks.

Engine Exhaust Emissions

The sizes, the types, and the number of construction equipment were based on the construction activities schedule. Emission factors for NO_X, PM_{10}, $PM_{2.5}$, and CO from the combustion of ULSD fuel for on-site construction equipment were developed using the latest EPA NONROAD Emission Model (Version 2005a). The model is based on source inventory data accumulated for specific categories of off-road equipment. The emission factors for each type of equipment were calculated from the output files for the NONROAD model (i.e., calculated from regional emissions estimates). However, these emission factors were not applied to trucks. Emission rates from combustion of fuel for on-site dump trucks, concrete trucks, and other heavy trucks were developed using the EPA MOBILE6.2 Emission Model. New York City restrictions placed on idling times were employed for the dump trucks and other heavy trucks. For analysis purposes, it was assumed that the concrete trucks would operate continuously. Short-term and annual emission rates were adjusted from the peak hour emissions by applying usage factors for each equipment unit. Usage factors were determined using the construction equipment schedule.

Fugitive Emission Sources

Road dust emissions from vehicle travel were calculated using equations from EPA's AP-42, Section 13.2.2 for unpaved roads. PM_{10} emissions were estimated for dump trucks traveling in and out of the construction area. Average vehicle weights (i.e., unloaded going in and loaded going out) were used in the analysis and a reasonably conservative round trip distance was estimated for on-site travel. Dust control measures (described above) would provide at least a 50 percent reduction in PM_{10} emission. Also, since on-site travel speeds would be restricted to 5 miles per hour, on-site travel for trucks would not be a significant contributor to $PM_{2.5}$ fugitive emissions.

Particulate matter emissions could also be generated by material handling activities (i.e., loading/drop operations for debris). Estimates of PM_{10} and $PM_{2.5}$ emissions from these activities were developed using EPA's AP-42 Sections 13.2.4. Excavation rates used for the analysis were based on information provided by the construction manager.

Dispersion Modeling

Potential impacts from on-site construction equipment were evaluated using the EPA/AMS AERMOD dispersion model (version 092902), which became the EPA and the New York State Department of Environmental Conservation (NYSDEC) preferred model on December 9, 2006. The AERMOD model was designed as a replacement to the EPA Industrial Source Complex (ISC3) model and is applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources (including point, area, and volume sources). AERMOD is a steady-state plume model that incorporates current concepts about flow and dispersion in complex terrain, including updated treatments of the boundary layer theory, understanding of turbulence and dispersion; it also includes handling of terrain interactions. The AERMOD model calculates pollutant concentrations based on hourly meteorological data.

Source Simulation

During construction, various types of construction equipment would be used at different locations throughout the site. Some of the equipment is mobile and would operate throughout the site, while some would remain stationary on-site at distinct locations during short-term periods (i.e., daily and hourly). Stationary emission sources include (but are not limited to) air compressors, cranes, and concrete pumps. These sources were considered to be point sources and were placed at fixed locations in the modeling analysis. The input data for point sources included stack heights that were equivalent to the height of engine exhaust points or tailpipes and an exhaust temperature of 250° Celsius (a temperature within the normal operating range of most diesel engines). Based on estimated fuel consumption rates per 100 hp and potential pressure drops with diesel particulate filters on the exhaust, a stack velocity of 17.2 feet per second (or 5.24 meters per second) per 100 hp was used for each exhaust point, along with a diameter of six inches (or 0.1524 meters).

Equipment such as excavators, bobcats, concrete trowels, and dump trucks would operate throughout the site. In the short-term periods, these sources were simulated as area sources for the purpose of the modeling analysis, and their emissions were distributed evenly across the construction site. In the modeled annual period all sources were simulated as area source emissions. In addition, on-road mobile sources at the intersection of Seventh Avenue and 32nd Street were represented as a line source in the AERMOD model. This source was included in the analysis of $PM_{2.5}$ as a measure of conservatism, since vehicle trips (see Traffic) were below CEQR thresholds for a detailed mobile source analysis.

Receptor Locations

AERMOD was used to predict maximum pollutant concentrations at nearby locations of likely public exposure ("receptors"). Discrete receptors were placed along sidewalks and residential buildings and other general public uses, including the St. Francis Roman Catholic Church. Sidewalk receptors were placed at the middle of the sidewalk and spaced 25 feet apart with a height of 1.8 meters. Residential receptors were placed at the nearest windows facing the construction site. These residential receptors were located at ground level and elevated portions of the building façade.

Meteorological Data

The meteorological data set consisted of the latest five years of data that are available: surface data collected at LaGuardia Airport (2003-2007) and concurrent upper air data collected at Brookhaven, New York.

Background Concentrations

Where needed to determine potential air quality impacts from the construction of the project, background ambient air quality data for criteria pollutants were added to the predicted off-site concentrations. The background data represent the latest available five years of data and were obtained from a nearby NYSDEC monitoring station that best represents the area surrounding the site. These background concentrations are provided below in **Table 20-4**. Short-term concentrations (i.e., 24- and 8-hour averages) represent the second highest concentration of the five-year data set, with the exception of PM_{10}, which is based on three years of data, consistent with current NYCDEP guidance (2006-2008). The annual concentration represents the maximum value of the five year data set. For $PM_{2.5}$, background concentrations are not considered, since impacts are determined on an incremental basis only.

Table 20-4
Background Pollutant Concentrations

Pollutant	Monitoring Station	Averaging Period	Background Concentration	Ambient Standard
NO_2	PS 59	Annual	67.7	100
CO	PS 59	1-hr	2,977	40,000
		8-hr	2,290	10,000
PM_{10}	PS 59	24-hr	60	150

Source: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2003–2007.

PROBABLE IMPACTS OF THE PROPOSED PROJECT

This section provides a summary of the projected air quality impacts from the construction activities of the proposed project.

NO_2, PM_{10}, and CO Concentrations

Table 20-5 presents the maximum predicted total concentration (including background) for several criteria pollutants due to the proposed construction activities for the proposed project. The maximum concentrations from on-site construction sources were predicted at receptors near the development site. As indicated in **Table 20-5**, the maximum predicted total concentrations of NO_2, PM_{10}, and CO would not result in any concentrations that exceed the NAAQS. This was true for all averaging periods, both short-term and annual, and for each pollutant modeled in the analysis using worst-case emissions. Therefore, no significant adverse air quality impacts are predicted from the on-site construction sources due to these pollutants.

Table 20-5
Maximum Predicted Total Concentrations for Construction Activities

Pollutant	Averaging Period	Background Concentration (μg/m^3)	Predicted Increment (μg/m^3)	Total Max Predicted Conc. (μg/m^3)	Ambient Standard (μg/m^3)
NO_2	Annual	67.7	8	75.7	100
PM_{10}	24-hour	60	47	107	150
CO	1-hour	2,977	23,935	26,912	40,000
	8-hour	2,290	6,413	8,703	10,000

$PM_{2.5}$ Concentrations

The air quality analysis was also performed to predict the concentrations of $PM_{2.5}$ from construction activities. Concentrations of $PM_{2.5}$ were modeled for the 24-hour averaging period (a measure of daily exposure) and the annual averaging period (a measure of long-term exposure). The results of the $PM_{2.5}$ analysis are presented in **Table 20-6** and summarized below.

Table 20-6
Maximum $PM_{2.5}$ Increments

Pollutant	Averaging Period	Maximum Predicted Increment (μg/m^3)	NYCDEP Criteria (μg/m^3)
$PM_{2.5}$	24-hour	1.9	2.0/5.0
	Annual	0.1	0.3

24-Hour Average (Short-Term) Concentrations

The maximum predicted 24-hour average (i.e., short-term) $PM_{2.5}$ incremental concentration from the proposed construction activities was modeled for comparison with the NYCDEP 24-hour average interim guidance criteria for a discrete receptor location. The 24-hour $PM_{2.5}$ construction impact assessment considers the potential frequency and extent of incremental impacts if predicted concentrations are above the NYCDEP interim guidance criteria (a discussion of the NYCDEP interim guidance criteria is presented in Chapter 18, "Air Quality").

A modeling analysis was conducted for the worst-case short-term period in September 2011. At receptor locations placed on nearby sidewalks, the maximum predicted incremental concentration was equal to 1.9 μg/m^3. At sensitive receptor locations placed in areas open to the public (i.e., St. Francis Roman Catholic Church, facing West 32nd Street), the maximum predicted incremental concentration was equal to 1.1 μg/m^3. At sensitive locations with a potential for 24-hour exposure, such as nearby residential receptors (i.e., The Epic on West 32nd Street), the maximum predicted $PM_{2.5}$ incremental concentration was equal to 0.5 $\mu g/m^3$. As indicated, all receptors, including residential receptors, would be below the current 24-hour interim guidance criteria of both 2 and 5 $\mu g/m^3$ for the maximum predicted value.

As stated above, the maximum predicted concentration for any location would be below the current 24-hour interim guidance criterion of 2 $\mu g/m^3$. Therefore, an analysis of the potential frequency of predicted impacts is not warranted. In addition, the maximum predicted concentrations are likely overstated because the model did not include the effects of a construction wall (used for noise attenuation purposes) that would be between nearby sidewalk receptors and the source of the emissions. The location of the maximum 24-hour average increments would also vary based on the location of the sources, which would move throughout the site over time. Therefore, continuous daily exposures at peak concentrations would not be likely to occur at any one location.

The maximum incremental impacts discussed above were computed based on periods with the highest emissions. Therefore, during other construction time periods with lesser emissions, the potential 24-hour incremental exposures would be less.

Annual Analysis Period

In addition to the 24-hour average short-term concentrations discussed above, an analysis was performed to predict annually averaged $PM_{2.5}$ concentrations. These concentrations were modeled for comparison to the NYCDEP annual average interim guidance values for discrete and neighborhood-scale receptors (see Chapter 18, "Air Quality"). The analysis period was January through December 2011.

The maximum predicted annual average $PM_{2.5}$ incremental concentration (for a discrete receptor location) occurred at a sidewalk receptor and was equal to 0.10 $\mu g/m^3$. At sensitive receptor locations placed in areas open to the public (i.e., St. Francis Roman Catholic Church, facing West 32nd Street), the maximum predicted incremental concentration was equal to 0.08 $\mu g/m^3$. At sensitive locations with a potential for 24-hour exposure such as nearby residential receptors (i.e., The Epic on West 32nd Street), the maximum predicted $PM_{2.5}$ incremental concentration was equal to 0.03 $\mu g/m^3$. As indicated, all maximum predicted concentrations are less than the interim guidance threshold of 0.3 $\mu g/m^3$.

The maximum predicted annual $PM_{2.5}$ incremental concentration from the proposed construction activities was modeled for comparison with the NYCDEP annual average neighborhood-scale interim guidance criterion of 0.1 $\mu g/m^3$. The annual average neighborhood-scale concentration increment from the construction activities was predicted to be 0.004 $\mu g/m^3$, which is less than the 0.1 $\mu g/m^3$ criterion.

NOISE[1]

INTRODUCTION

Potential impacts on community noise levels during construction of the proposed project could result from noise due to construction equipment operation and from noise due to 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 USEPA. 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 undue hardship is demonstrated resulting from unique site characteristics, unforeseen conditions, scheduling conflicts and/or financial considerations. USEPA requirements mandate that certain classifications of construction equipment meet specified noise emissions standards.

Subsequent to the publication of the DEIS, a quantified construction noise analysis was performed to quantify the magnitude, time of occurrence, and duration of the potential exceedances of the CEQR impact criteria (the DEIS identified construction-period noise impacts on the St. Francis Roman Catholic Church and The Epic), and determine the practicability and feasibility of implementing any additional control measures to reduce or eliminate the significant adverse noise impacts. Based on the analysis described below, unmitigated significant adverse noise impacts were found to occur at the terraces of The Epic residential building only.

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

[1] Between publication of the DEIS and this FEIS, a detailed analysis of the potential for noise impacts was undertaken to quantify the magnitude, time of occurrence, and duration of the potential exceedances of the CEQR impact criteria and to determine the practicability and feasibility of implementing any additional control measures to reduce or eliminate the significant noise impacts identified in the DEIS. This section is substantially updated to reflect that analysis but to facilitate ease of reading, double underlining was not used.

extensive period of time." For impact determination purposes, the significance of adverse noise impacts is based on duration, intensity, and area of impact and whether predicted incremental noise levels at sensitive receptor locations would be greater than the impact criteria suggested in the *CEQR Technical Manual*. In addition, the *CEQR Technical Manual* states that the impact criteria for vehicular sources, using existing noise levels as the baseline, should be used for assessing construction impacts. As recommended in the *CEQR Technical Manual*, this study uses the criteria to define a significant adverse noise impact 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 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 threshold would reflect an incremental increase of 4 dBA, since an increase higher than this would result in a noise level higher than the 65 dBA $L_{eq(1)}$ threshold).

NOISE ANALYSIS METHODOLOGY

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 vehicles 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.

Construction Noise Modeling

Noise effects from construction activities were evaluated using the CadnaA model, a computerized model developed by DataKustik for noise prediction and assessment. The model can be used for the analysis of a wide variety of noise sources, including stationary sources (e.g., construction equipment, industrial equipment, power generation equipment), transportation sources (e.g., roads, highways, railroad lines, busways, airports), and other specialized sources (e.g., sporting facilities). The model takes into account the reference sound pressure levels of the noise sources at 50 feet, attenuation with distance, ground contours, reflections from barriers and structures, attenuation due to shielding, etc. The CadnaA model is based on the acoustic propagation standards promulgated in International Standard ISO 9613-2. This standard is currently under review for adoption by the American National Standards Institute (ANSI) as an American Standard. The CadnaA model is a state-of-the-art tool for noise analysis.

Geographic input data used with the CadnaA model included CAD drawings that defined site work areas, adjacent building footprints and heights, locations of streets, and locations of sensitive receptors. For each analysis period, the geographic location and operational characteristics, including equipment usage rates (percentage of time equipment with full-horse power is used) for each piece of construction equipment operating at the development site, as well as noise control measures, were input to the model. In addition, reflections and shielding by barriers erected on the construction site, and shielding from both adjacent buildings and the project building as it is constructed, were accounted for in the model. Construction-related vehicles were assigned to the adjacent roadways. The model produced A-weighted $L_{eq(1)}$ noise levels at each receptor location, for each analysis period, which showed the noise level at each receptor location, as well as the contribution from each noise source.

Mobile Source Noise Modeling

Vehicular (i.e., operational) noise levels were calculated using the *Traffic Noise Model* Version 2.5 (TNM). The TNM is a computerized model developed for the Federal Highway Administration (FHWA) that takes into account various factors due to traffic flow, including traffic volumes, vehicle mix (i.e., percentage of autos, light duty trucks, heavy duty trucks, buses), sources/receptor geometry, and shielding (including barriers and terrain, ground attenuation). It is the model recommended in the *CEQR Technical Manual* for traffic noise analysis.

Analysis Periods

As described previously, the construction activities for the Single-Tenant Office Scenario along with the below-grade subway improvements represent a reasonable worst-case development scenario (RWCDS) for the construction analyses. These anticipated construction activities would occur over an approximately 4½-year period between 2010 and 2014, and construction activities for each phase would be expected to overlap.

A screening analysis was performed to determine two analysis quarters (i.e., a most noisy quarter and a related less noisy quarter) during each year of the construction period between 2010 and 2014. The screening analysis was based on a construction schedule showing the number of workers, types and number of pieces of equipment, and number of construction vehicles anticipated to be operating during each quarter of the construction period (see Appendix G-1). To be conservative, the detailed construction noise analysis for each analysis quarter assumed that both on-site construction activities and peak construction-related traffic conditions occurred simultaneously.

Noise Reduction Measures

The construction noise analysis assumes that the project sponsor commits to a proactive approach to minimize noise during construction activities. This approach employs a wide variety of measures that greatly exceed standard construction practices, but the implementation of which is deemed feasible and practicable to minimize construction noise and reduce potential noise impacts. These measures would be implemented and described in the Construction Noise Mitigation Plan required by the New York City Noise Control Code[1]. This program includes both source controls and path controls, which are described below.

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

- A wide range of equipment that produces lower noise levels than typical construction equipment required by the New York City Noise Control Code would be utilized. **Table 20-7** shows the noise levels for typical construction equipment and the noise levels for the equipment that would be used for construction of the proposed project.
- Where feasible and practicable, construction procedures and equipment (such as cement mixers, concrete trucks, concrete vibrators, cranes, delivery trucks, dump trucks, excavators, fuel trucks, generators, hoists, miscellaneous small tools, tractors, and trailers) that produce noise levels below the requirements of the New York City Noise Control Code would be used. References for quieter equipment are provided in Appendix G-2.
- Generally, the project sponsors would schedule and perform noisy work during times of highest ambient noise levels, for example on between 7:00 AM and 10:00 AM.
- Dominant noisier equipment, such as tower cranes, loading and unloading trucks, concrete pumps, concrete trucks, and trash hauling trucks should minimize banging, clattering, and buzzing.
- As early in the construction period as practicable, electrical-powered equipment would be selected for certain noisy equipment, such as bar benders, cement mixers, concrete vibrators, hoists, miscellaneous tools, paver cutters, saws, scissor lifts, sprayers, and welders (i.e., early electrification).
- Minimize the use of impact devices, such as jackhammers, pavement breakers, impact wrenches, pneumatic tools, and hoe rams, and only necessary equipment would be on-site.
- Typical equipment (i.e., compressors, jackhammers, and trash hauling vehicles) used at the construction sites need to meet the sound level standards specified in Subchapter 5 of the New York City Noise Control Code.
- Where practicable and feasible, construction sites would be configured to minimize back-up alarm noise. In addition, trucks would not be allowed to idle more than three minutes at the construction site based upon New York City Local Law.
- Contractors and subcontractors would be required to properly maintain their equipment and have quality mufflers installed.

[1] New York City Noise Control Code (i.e., Local Law 113). Citywide Construction Noise Mitigation, Chapter 28, Department of Environmental Protection of New York City, 2007.

Table 20-7
Construction Equipment Noise Emission Levels (dBA)

Equipment List	Mandated Noise Levels at 50 feet[1]	Project Equipment Noise Levels at 50 feet[2]	Noise Reduction with Path Controls[3]	Actual Noise Level at 50 feet
Asphalt Laying Equipment	85			85
Bar Bender	80			80
Bobcat w/ Bucket	80			80
Bobcat w/ Ram	90		80	80
Cement Mixer	75	63		63
Compressor (air)	56			56
Concrete Pump	82			82
Concrete Truck	85	79		79
Concrete Vibrator	80	75		75
Crane	85	82		82
Crane (tower Crane)	85		75	75
Delivery Truck	84	79		79
Dump Truck	84	79		79
Dual Hoist - High Rise	85	75		75
Excavator	85	77		77
Forklift	55			55
Fuel Truck	84	79		79
Generator	82	78		78
Impact Wrench	85		75	75
Jackhammer	71			71
Miscellaneous Small Tools	85	59		59
Paver Cutter	85		75	75
Roller	74			74
Saw	76			76
Scissor Lift	75			75
Sprayer	75			75
Tamper	80			80
Trailer/Tractor	84	79		79
Trash hauling	77			77
Toweling machine	85		75	75
Welder / Torch	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, Federal Transit Administration (FTA), May 2006; and Subchapter 5 of the New York City Noise Control Code.
2 Noise levels for project construction equipment would be achieved by using quieter equipment, better engine mufflers, and refinements in fan design and improved hydraulic systems.
3 Path controls include noise barriers, enclosures, acoustical panels, and curtains, whichever feasible and practical, and 10 dBA of reduction was assumed.

In terms of path controls (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors), the analysis assumes that the following measures would be implemented:

- Noisier equipment, such as tower cranes, concrete pumps, concrete trucks, and delivery trucks, would be located away from sensitive receptors (i.e., The Epic and the St. Francis Roman Catholic Church) at the south of the project site on 32nd Street.
- During the early construction 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.

- Noise barriers would be utilized to provide shielding. The construction sites would have a minimum 8-foot-high barrier, with a 15-foot-high barrier adjacent to residential and other sensitive locations. Where possible, concrete trucks and delivery trucks would be behind these barriers.
- Path noise control measures (i.e., portable noise barriers, panels, enclosures, and acoustical tents, where feasible) were assumed to be used for certain dominant noise equipment (i.e., concrete trowels, diesel tower crane, break ram, impact wrench, and paver cutter). The details to construct noise barriers, enclosures, tents, etc. are based upon the instructions of Chapter 28 Citywide Construction Noise Mitigation in New York City Noise Control Code.
- Acoustical curtains were assumed for internal construction activities in the construction buildings, to break the line-of-sight and provide acoustical shielding between noise sources and sensitive receptors.

Receptor Sites

Twelve locations (i.e., Sites 1 to 12) were selected as noise monitoring sites to determine baseline noise levels, and 25 receptor locations (i.e., Sites A to X) close to the development site were selected as discrete noise receptor sites for the construction noise analysis. These receptor locations are either directly adjacent to the development site or on streets where construction trucks would pass by. Each receptor location is either a residence or other noise sensitive use. At noise monitoring locations, receptors were placed at ground level (approximately five feet above grade). At analysis locations, noise receptors were placed at multiple elevations. **Figure 20-2** shows the noise receptor locations, and **Table 20-8** lists the noise receptor sites and their associated land uses. The receptor sites selected for detailed analysis are representative of locations where maximum project impacts due to construction noise would be expected.

DETERMINING EXISTING NOISE LEVELS

The TNM model and the CadnaA model were used to determine existing noise levels at the 25 analysis sites. At ground level receptor locations, existing $L_{eq(1)}$ noise levels were calculated using the TNM model based on existing traffic components and adjusted by baseline measured values at monitoring receptor locations. Existing noise levels at the 12 monitoring receptor sites were measured for 20-minute periods during the three peak periods—AM (7:00 to 9:00 AM), midday (MD) (noon to 2:00 PM), and pre-PM (2:30 to 4:30 PM). The measured existing noise levels are provided in Appendix G-3. To be conservative, the average $L_{eq(1)}$ noise levels were used for this analysis, which would reflect the related quieter ambient noise environment.

At elevated receptor locations, noise levels were calculated using the CadnaA model based on existing traffic components. The difference in noise levels between ground level and elevated receptors was used to determine elevation adjustment factors. The average $L_{eq(1)}$ noise levels at elevated locations were determined by adding the adjustment factors to ground level noise levels. Summary tables showing the detailed calculations for existing noise levels at 25 receptor locations are provided in Appendix G-4.

CONSTRUCTION NOISE ANALYSIS RESULTS

Using the methodology described above, and considering the noise abatement measures for source and path controls specified above, noise analyses were performed to determine maximum one-hour equivalent ($L_{eq(1)}$) noise levels that would be expected to occur during each year of construction.

Development Site

Project Site Boundary

1/4-Mile Perimeter

Noise Monitoring Receptor Location

Construction Noise Receptor Location

NOTE: This figure is new to the FEIS

Construction Noise Receptor Locations

Figure 20-2

Table 20-8
Construction Noise Receptor Locations

Receptor	Location	Associated Land Use
1	Seventh Avenue between West 32nd and West 33rd Streets	Hotel
2	West 32nd Street between Sixth and Seventh Avenues	Hotel
3	West 33rd Street between Sixth and Seventh Avenues	Hotel
4	West 31st Street between Sixth and Seventh Avenues	Church
5	West 30th Street between Sixth and Seventh Avenues	Residential and Public Facilities
6	West 34th Street between Seventh and Eighth Avenues	Hotel
7	West 35th Street between Sixth and Seventh Avenues	Commercial and Office Buildings
8	West 31st Street between Seventh and Eighth Avenues	Church
9	Broadway and Sixth Avenue at West 34th Street	Open Space
10	Broadway and Sixth Avenue at West 33rd Street	Open Space
11	Broadway between West 33rd and West 34th Streets	Residential with Commercial Below
12	Sixth Avenue between West 31st and West 32nd Streets	Residential with Commercial Below
A1	West 32nd Street between Sixth and Seventh Avenues	Church
A2	West 32nd Street between Sixth and Seventh Avenues	Church
B	West 32nd Street between Sixth and Seventh Avenues	Residential with Commercial Below
C*	West 32nd Street between Sixth and Seventh Avenues	Residential with Commercial Below
D	West 31st Street between Seventh and Eighth Avenues	Church
E	West 31st Street between Sixth and Seventh Avenues	Hotel
F*	West 31st Street between Sixth and Seventh Avenues	Residential with Commercial Below
G	Broadway and West 32nd Street	Hotel with Commercial Below
H	Broadway between West 33rd and West 34th Streets	Residential with Commercial Below
I	West 33rd Street between Fifth and Sixth Avenues	Residential with Commercial Below
J	West 32nd Street between Fifth and Sixth Avenues	Hotel
K	Broadway between West 30th and West 31st Streets	Residential with Commercial Below
L*	West 30th Street between Sixth and Seventh Avenues	Residential with Commercial Below
M	West 30th Street between Sixth and Seventh Avenues	Residential and Public Facilities
N	West 30th Street between Seventh and Eighth Avenues	Residential with Commercial Below
O	West 30th Street between Seventh and Eighth Avenues	Residential with Commercial Below
P	West 29th Street between Sixth and Seventh Avenues	Residential with Commercial Below
Q	West 35th Street between Seventh and Eighth Avenues	Hotel
R	West 36th Street between Seventh and Eighth Avenues	Residential with Commercial Below
S	Sixth Avenue between West 36th and West 37th Streets	Residential with Commercial Below
T	West 35th Street between Fifth and Sixth Avenues	Hotel
U	West 34th Street between Fifth and Sixth Avenues	Commercial and Office Buildings
V	West 31st Street between Fifth and Sixth Avenues	Residential with Commercial Below
W	West 29th Street between Fifth and Sixth Avenues	Residential with Commercial Below
X	Sixth Avenue between West 31st and West 32nd Streets	Residential with Commercial Below

Notes: Receptor sites from 1 through 12 are noise monitoring locations.
*****No Build projects

Table 20-9 shows the following (see Appendix G-5 for the complete list of results):

- Existing noise levels;
- Maximum predicted total noise levels (i.e., cumulative noise levels), which are the sum of noise due to construction activities[1] and noise due to traffic on the adjacent street; and
- Maximum predicted increases in noise levels based upon comparing the total noise levels with existing noise levels.

[1] The maximum predicted noise level due to construction activities alone includes the noise generated by on-site construction activities, assuming maximum construction activity during the analysis time period, and noise generated by construction vehicles traveling to and from the project site during the hour which generated the maximum number of construction vehicles.

Table 20-9
Construction Noise Analysis Results (dBA)

Noise Receptor	Receptor Height (in stories)	Existing dBA	2010-Q4		2011-Q4		2012-Q3		2013-Q2		2014-Q1	
			Total Leq(1)	Change	Total Leq(1)	Change	Total Leq(1)	Change	Total Leq(1)	Change	Total Leq(1)	Change
A1	at-grade	68.6	68.8	0.2	69.9	1.3	71.1	2.5	70.2	1.6	70.8	2.2
A2	at-grade	60.2	60.6	0.4	62.1	1.9	64.7	4.5	61.9	1.7	62.7	2.5
	top floor	61.8	62.3	0.5	69.0	**7.2**	73.3	**11.5**	64.4	2.6	65.8	**4.0**
B	at-grade	68.6	68.7	0.1	69.9	1.3	70.7	2.1	69.9	1.3	70.4	1.8
	15	50.3	59.2	**8.9**	69.4	**19.1**	71.1	**20.8**	63.5	**13.2**	64.9	**14.6**
C	at-grade	70.4	70.8	0.4	71.7	1.3	72.1	1.7	71.1	0.7	71.3	0.9
	15	63.7	68.3	**4.6**	72.5	**8.8**	73.7	**10.0**	65.9	2.2	66.2	2.5
D	at-grade	65.8	66.0	0.2	66.5	0.7	66.9	1.1	66.7	0.9	66.9	1.1
	top floor	65.7	65.9	0.2	66.6	0.9	67.2	1.5	66.8	1.1	66.9	1.2
E	at-grade	69.1	69.2	0.1	69.3	0.2	69.5	0.4	69.6	0.5	69.8	0.7
	top floor	56	56.6	0.6	57.3	1.3	57.9	1.9	61.6	**5.6**	58.9	2.9
F	at-grade	72	72.0	0.0	72.2	0.2	72.4	0.4	72.5	0.5	72.7	0.7
	top floor	56.9	57.1	0.2	58.1	1.2	58.9	2.0	59.7	2.8	59.6	2.7
G	at-grade	73.3	73.3	0.0	72.8	-0.5	72.3	-1.0	71.4	-1.9	70.8	-2.5
	top floor	64.1	65.7	1.6	67.9	**3.8**	69.5	**5.4**	63.7	-0.4	62.5	-1.6
H	at-grade	72.8	72.8	0.0	72.9	0.1	73.1	0.3	72.8	0.0	72.8	0.0
	top floor	63.6	65.1	1.5	67.3	**3.7**	69.9	**6.3**	66.3	2.7	65.4	1.8
I	at-grade	71.7	71.7	0.0	71.9	0.2	72.1	0.4	72.1	0.4	72.1	0.4
	top floor	61	61.8	0.8	63.8	2.8	66.1	**5.1**	66.0	**5.0**	64.5	3.5
J	at-grade	70.1	70.2	0.1	70.6	0.5	70.9	0.8	71.2	1.1	71.5	1.4
	top floor	67.3	67.5	0.2	68.0	0.7	68.7	1.4	68.6	1.3	69.0	1.7
K	at-grade	71.2	71.2	0.0	70.2	-1.0	69.3	-1.9	68.4	-2.8	67.4	-3.8
	top floor	63.7	63.7	0.0	62.8	-0.9	62.3	-1.4	61.3	-2.4	60.6	-3.1
L	at-grade	71	71.1	0.1	71.3	0.3	71.5	0.5	71.7	0.7	71.9	0.9
	top floor	55	55.3	0.3	57.4	2.4	59.2	4.2	61.4	**6.4**	59.4	4.4
M	at-grade	66.7	66.8	0.1	67.0	0.3	67.2	0.5	67.4	0.7	67.6	0.9
	top floor	64.2	64.4	0.2	64.8	0.6	65.6	1.4	65.4	1.2	65.9	1.7
N	at-grade	62	62.3	0.3	62.5	0.5	62.7	0.7	62.9	0.9	63.1	1.1
	top floor	54	54.9	0.9	56.4	2.4	58.4	4.4	58.0	4.0	58.9	4.9
O	at-grade	61.1	61.3	0.2	61.5	0.4	61.7	0.6	61.8	0.7	62.0	0.9
	top floor	54	54.6	0.6	55.2	1.2	56.2	2.2	56.8	2.8	56.9	2.9
P	at-grade	70.4	70.4	0.0	70.6	0.2	70.8	0.4	71.0	0.6	71.1	0.7
	top floor	68	68.1	0.1	68.3	0.3	68.5	0.5	68.7	0.7	68.9	0.9
Q	at-grade	64	64.0	0.0	64.3	0.3	64.6	0.6	64.8	0.8	65.1	1.1
	top floor	55.5	55.5	0.0	55.9	0.4	56.3	0.8	56.5	1.0	57.0	1.5
R	at-grade	69.5	69.6	0.1	69.9	0.4	70.2	0.7	70.5	1.0	70.8	1.3
	top floor	62.5	62.7	0.2	63.3	0.8	64.0	1.5	64.1	1.6	64.5	2.0
S	at-grade	72.6	72.6	0.0	72.8	0.2	73.0	0.4	73.1	0.5	73.3	0.7
	top floor	61.5	61.6	0.1	62.2	0.7	63.0	1.5	62.1	0.6	62.4	0.9
T	at-grade	67.9	67.9	0.0	68.1	0.2	68.4	0.5	68.5	0.6	68.7	0.8
	top floor	60.3	60.4	0.1	60.6	0.3	60.9	0.6	61.2	0.9	61.5	1.2
U	at-grade	71	71.0	0.0	71.1	0.1	71.2	0.2	71.2	0.2	71.2	0.2
	top floor	66	66.1	0.1	66.2	0.2	66.3	0.3	66.2	0.2	66.3	0.3
V	at-grade	66.8	66.8	0.0	66.9	0.1	66.9	0.1	66.9	0.1	67.0	0.2
	top floor	59.3	59.4	0.1	59.5	0.2	59.6	0.3	59.5	0.2	59.5	0.2
W	at-grade	69.6	69.6	0.0	69.8	0.2	70.0	0.4	70.2	0.6	70.3	0.7
	top floor	63.6	63.7	0.1	64.0	0.4	64.4	0.8	64.6	1.0	64.7	1.1
X	at-grade	74.5	74.6	0.1	74.8	0.3	75.1	0.6	75.1	0.6	75.3	0.8
	top floor	68.8	69.7	0.9	71.7	2.9	73.3	**4.5**	69.4	0.6	69.6	0.8

Notes: Locations where predicted noise levels exceed the CEQR impact criteria are shown in **bold**.

Representative elevated receptor information is provided in **Table 20-9** for each of the receptor location buildings. However, construction effects have been analyzed for a large number of elevated receptor locations on each building, and the values shown are only representative values of ground level noise levels and the highest noise levels at each building. (Additional details are presented in Appendix G-5).

In addition to the predicted noise levels at receptor sites, noise contours depicting the incremental noise due to construction activities (both on-site construction equipment operation and construction-related traffic) were developed for the area surrounding the development site and are presented in Appendix G-6.

In **Table 20-9**, locations where construction activities would result in noise levels that would exceed the CEQR impact criteria (i.e., increase by more than 3-5 dBA comparing the total noise level with existing noise level) are shown in bold. It should be noted that, to be conservative, the CEQR impact criteria increases were evaluated based upon the difference between total noise levels at a particular site due to construction and existing (rather than No Build) noise levels.

The noise analysis results show that predicted noise levels would exceed the 3-5 dBA CEQR impact criteria during two or more consecutive years at receptor sites B and C. At these two locations, the exceedance of the 3-5 dBA CEQR impact criteria would be due principally to noise generated by on-site construction activities (rather than construction related traffic). Where these exceedances are predicted to occur at elevated receptors, exceedances would also be expected at other locations on the same buildings that have a direct line-of-sight to the construction sites.

For impact determination purposes, the significance of adverse noise impacts is based on the duration, intensity, and area of impact and whether predicted incremental noise levels at sensitive receptor locations would be greater than the impact criteria suggested in the *CEQR Technical Manual*.

Construction activities would be expected to result in elevated noise levels that would exceed CEQR impact criteria at several locations (see Table 20-9) with the longest duration of exceedances at the following two locations:[1]

- Receptor B (128 West 32nd Street—The Epic residential and commercial uses), at locations that have a direct line-of-sight to the construction sites, from the fifteenth floor to the top floor during the year 2010, and from the fifth floor to the top floor during the years 2011 through 2014. The maximum predicted increase in noise levels was 20.8 dBA and would be expected to occur at the fifteenth floor in 2012; and
- Receptor C (885 Sixth Avenue—future residential and commercial uses), at locations that have a direct line-of-sight to the construction sites, from the fifth floor to the twentieth floor during the year 2010, from the fifth floor to the top floor during the years 2011 through 2012, from the thirtieth floor to the top floor during the year 2013, and from the thirty-fifth floor to the top floor during the year 2014. The maximum predicted increase in noise levels was 10.0 dBA and would be expected to occur at the fifteenth floor in 2012;

In general, the elevated noise levels that would exceed CEQR impact criteria are predicted to occur at the upper floors of these two receptors. Although the proposed project would incorporate noise reduction measures and would produce relatively low noise levels, these increases would occur because there is a direct line-of-sight between receptors on the upper floors to the construction sites because of the height of the receptor sites and the height at which construction activities are taking place.

The buildings at receptors B and C where elevated noise levels that would exceed CEQR impact criteria are predicted to occur, have or (in the case of the No Build building at receptor C) would

[1] The DEIS identified a potential significant adverse impact on the St. Francis Roman Catholic Church. However, based on the detailed analysis presented in this chapter, a significant adverse noise impact would not occur at this location.

be expected to have both double-glazed windows and some form of alternative ventilation (i.e., central air conditioning or packaged terminal air conditioner [PTAC] units). Consequently, even during warm weather conditions, interior noise levels would be approximately 30-35 dBA less than exterior noise levels. Although these locations would be considered to experience impacts based on the CEQR construction noise impact criteria, the double-glazed windows and alternative ventilation at these residential structures would provide a significant amount of sound attenuation that would result in interior noise levels below 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria). Therefore, these increases in noise levels are not considered significant adverse impacts.

Construction activities at the other receptor sites in the study area would at times produce noise levels that would be noisy and intrusive, but due to their limited duration would not result in significant adverse noise impacts.

With regard to the terraces on Receptor B (The Epic), the highest $L_{10(1)}$ noise levels would range from approximately 70 to 75 dBA $L_{10(1)}$. While noise levels at these terraces already exceed the acceptable CEQR range (55 dBA $L_{10(1)}$ or less) for an outdoor area requiring serenity and quiet, during the daytime analysis periods identified above when construction activities are predicted to significantly increase noise levels, construction activities would exacerbate these exceedances and result in significant adverse noise impacts. There are no feasible mitigation measures that could be implemented to eliminate the significant noise impacts at these locations.

In sum, construction activities would result in elevated noise levels exceeding CEQR criteria at various locations. However, significant adverse noise impacts would be limited to the terraces at The Epic.

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, vibration levels at a location 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 location, the characteristics of the transmitting medium, and the building construction type at the location. 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. An assessment has been prepared to quantitatively assess potential vibration impacts of construction activities on structures and residences near the project site.

CONSTRUCTION VIBRATION CRITERIA

For purposes of assessing potential structural or architectural damage, the determination of a significant impact was based on the vibration impact criterion used by LPC of a peak particle velocity (PPV) of 0.50 inches per second. For non-fragile buildings, vibration levels below 0.60 inches per second would not be expected to result in any structural or architectural damage.

For purposes of evaluating potential annoyance or interference with vibration-sensitive activities, vibration levels greater than 65 vibration decibels (VdB) would have the potential to result in significant adverse impacts if they were to occur for a prolonged period of time.

ANALYSIS METHODOLOGY

For purposes of assessing potential structural or architectural damage, the following formula was used:

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

where: PPV_{equip} is the peak particle velocity in inches per second of the equipment at the receiver location;

PPV_{ref} is the reference vibration level in inches per second at 25 feet; and

D is the distance from the equipment to the received location in feet.

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

$$L_v(D) = L_v(ref) - 30\log(D/25)$$

where: $L_v(D)$ is the vibration level in VdB of the equipment at the receiver location;

$L_v(ref)$ is the reference vibration level in VdB at 25 feet; and

D is the distance from the equipment to the receiver location in feet.

Table 20-10 shows vibration source levels for typical construction equipment.

Table 20-10
Vibration Source Levels for Construction Equipment

Equipment		PPV_{ref} (in/sec)	Approximate L_v (ref) (VdB)
Pile Driver (sonic)	upper range	0.734	105
	Typical	0.170	93
Hydromill (slurry wall)	In soil	0.008	66
	In rock	0.017	75
Clam shovel drop (slurry wall)		0.202	94
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

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

CONSTRUCTION VIBRATION ANALYSIS RESULTS

The buildings and structures of most concern with regard to the potential for structural or architectural damage due to vibration are those immediately adjacent to or across the street from the proposed development site. With the exception of the Manhattan Mall, which is immediately adjacent to the development site, vibration levels at nearby buildings and structures, including the former Equitable Life Assurance Company Building (i.e., a historic resource building), would be well below the 0.50 inches/second PPV limit for structural damage (see Appendix G-7). At the Manhattan Mall, special measures would be utilized and a monitoring program would be implemented to ensure that this limit is not exceeded, and that no architectural or structural damage would occur. At all other locations, the distance between construction equipment and receiving buildings or structures is large enough to avoid vibratory levels that would result in architectural or structural damage.

In terms of potential vibration levels that would be perceptible and annoying, the pieces of equipment that would have the most potential for producing levels which exceed the 65 VdB limit are the clam shell drop and vibratory roller. They would produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at receptor locations within a distance of approximately 232 feet (see Appendix G-7). However, the operation would only occur for limited periods of time at a particular location and therefore would not result in any significant adverse impacts. (No pile driving or blasting are expected as part of the proposed project's construction.) In no case are significant adverse impacts from vibrations expected to occur.

CUMULATIVE EFFECTS

The Hotel Pennsylvania is located partially over active railroad tunnels. These Amtrak-controlled railroad tunnels traverse the development site adjacent to the third basement level. Penetration into the railroad tunnels is prohibited by an existing easement agreement, and it is not anticipated that the structural support systems for the proposed project will involve penetration into the tunnel structure. However, construction activities would need to be closely coordinated with the operating railroads to ensure that there is no disruption to service.

As stated above, there are a number of large-scale transportation projects that are anticipated to be under construction in the vicinity of the development site in the future without the proposed project—Moynihan Station, ARC, and possibly Metro-North's Hudson Line service at Penn Station project. While these projects are all expected to be completed after the proposed project's estimated 2014 completion year, some construction phases for these projects are anticipated to occur at the same time the proposed project would be constructed. As stated above, it is anticipated that these three projects would include, where necessary, the coordination of construction schedules and activities for these projects as they would affect overall access to, and circulation within, the Penn Station Complex.

It is anticipated that, based on the location of these transportation projects, the potential for cumulative effects of construction of the proposed project and these projects would be minimal, as follows:

- Construction for the Moynihan project will mostly occur below-grade and within the Farley Complex from Eighth to Ninth Avenues between West 31st and West 33rd Streets, a full block west of the development site, with the exception of an associated development transfer site to be constructed on the western portion of the One Penn Plaza block, between 33rd and 34th Streets at Eighth Avenue, a full block west of the 15 Penn Plaza development site.
- Localized construction activities for the ARC project will occur along West 34th Street between Eighth and Sixth Avenues, a minimum of one block north of the 15 Penn development site. These activities would predominantly be limited to the construction of new station entrances at Sixth, Seventh and Eighth Avenues, and would include construction of direct connections from the new 34th Street ARC station into subway concourses at Sixth Avenue at Herald Square, and at Seventh and Eighth Avenues, as well as connections to PATH service at Herald Square. Most of the ARC construction would occur below grade, with the tunnel spoils and much of the staging for ARC project construction efforts in Manhattan to be located at Twelfth Avenue and West 28th Street, well west of the 15 Penn

Plaza development site. The ARC project would also include two additional minor spoils removal fan plant and access shaft sites that would be located at 33rd Street between Sixth and Seventh Avenues and 35th Street between Seventh and Eighth Avenues, both north of the 15 Penn Plaza development site.

- It is uncertain when construction for the Metro-North Access to Penn Station would occur, however Metro-North is expected to prepare an Environmental Assessment for the project, which is expected to be complete in 2011. There are existing track connections from Metro-North's New Haven and Hudson Lines to Penn Station on the West Side of Manhattan which could be used to provide access for Metro-North trains into Penn Station. Connections of Metro-North's Harlem Line may require track reconstruction. However, at Penn Station, these construction activities would be below grade and any necessary above ground work would not be anywhere near the 15 Penn Plaza development site.

While it is anticipated that the potential for cumulative effects of construction of the proposed project and construction of these area projects would be minimal, construction of the proposed project would be coordinated with these other efforts to the extent practicable to minimize the potential for adverse construction impacts from these concurrent efforts. ✷