Chapter 11: Air Quality

A. INTRODUCTION

This chapter examines the potential for air quality impacts from the proposed project. Air quality impacts can be either direct or indirect. Direct impacts result from emissions generated by stationary sources at a development site, such as emissions from fuel burned on site for heating. Indirect effects include emissions from motor vehicles ("mobile sources") traveling to and from a project, or from existing pollutant emission sources impacting air quality on the proposed project.

This analysis presents the air quality impacts from the future operation of the proposed project. The analysis updates changes in background conditions since the 2001 *FEIS* and assesses whether any changed background conditions and the differences in program elements between the proposed development program and those assessed in the 2001 *FEIS* for the project block would result in any significant adverse impacts on air quality that were not addressed in the 2001 *FEIS*.

Heating, ventilation, and air conditioning (HVAC) systems would be included to provide heating and cooling to the proposed project's buildings. This air quality analysis assesses the impacts of fossil fuel-fired HVAC systems on the environment. The potential effects on the proposed project from nearby existing emission sources, including the Consolidated Edison Power House, are examined. Portions of the proposed project site are located adjacent to a zoned industrial area; therefore, air quality impacts from nearby industrial sources of air pollution (e.g., from manufacturing or processing facilities) are also examined.

The proposed project is not expected to significantly alter traffic conditions in the study area. Based on the traffic study performed (see Chapter 10, "Transportation"), the maximum hourly incremental traffic from the proposed project would not exceed the 2012 *CEQR Technical Manual* carbon monoxide (CO) screening threshold of 140 peak hour trips at nearby intersections in the study area, nor would it exceed the particulate matter emission screening threshold discussed in Chapter 17, Sections 210 and 311 of the 2012 *CEQR Technical Manual*. This level of traffic will not have the potential to significantly change air quality conditions; therefore, a quantified assessment of on-street mobile source emissions is not warranted. However, the proposed project would include a 285-space accessory parking garage on projected development site 1. Therefore, an analysis was conducted to evaluate potential future pollutant concentrations in the vicinity of the proposed parking garage's ventilation exhausts.

PRINCIPAL CONCLUSIONS

~~The air quality stationary source analyses conclude that the proposed project would potentially result in significant adverse air quality impacts (affecting $PM_{2.5}$, SO_2 and NO_2 concentrations) on Riverside Center Building 5. This impact would be the result of the proposed project's mixed-use building (on projected development site 1) affecting the dispersion of the exhaust plume from the~~

adjacent Consolidated Edison Powerhouse boiler stack. As a result, higher concentrations of pollutants may occur on the Riverside Center Building 5. As discussed in Chapter 20, "Mitigation Measures," a potential mitigation measure that has been identified is the reduction of the proposed project's building height by 77 feet; this mitigation measure would fully mitigate and avoid the significant adverse air quality impacts on Riverside Center Building 5. In addition, other alternative building configurations would be considered for projected development site 1, as described in Chapter 20, "Mitigation Measures." This mitigation measure would not be required if wind tunnel modeling, to be conducted between the Draft SEIS and Final SEIS, determines that the proposed project and/or any of the alternative building configurations would not result in any significant adverse air quality impacts.

A summary of the general findings of the air quality analyses is presented below. By comparison, the 2001 *FEIS* did not identify any significant adverse air quality impacts; it should be noted that at the time of the 2001 *FEIS*, CEQR guidance for the analysis of $PM_{2.5}$ emissions had not been developed.

Concentrations of CO due to the proposed project's parking facilities would not result in any violations of National Ambient Air Quality Standards (NAAQS) or the City's *de minimis* criteria for CO.

Analysis of the emissions and dispersion of nitrogen dioxide (NO_2) and particulate matter less than 10 microns in diameter (PM_{10}) from the proposed project's HVAC sources indicate that such emissions would not result in a violation of NAAQS. Emissions of particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) were analyzed in accordance with the City's current $PM_{2.5}$ interim guidance criteria, which determined that the maximum predicted $PM_{2.5}$ increments from the proposed project would be less than the applicable annual average interim guidance criterion of 0.3 $\mu g/m^3$ for local impacts and 0.1 for neighborhood scale impacts. The air quality modeling analysis determined the highest predicted increase in 24-hour average $PM_{2.5}$ concentrations would not exceed the applicable interim guidance criterion of 5 $\mu g/m^3$, while at some sensitive receptor locations, the maximum incremental increases in 24-hour average $PM_{2.5}$ concentrations from stationary sources was predicted to exceed the City's interim criterion of 2 $\mu g/m^3$. However, based on an examination of the magnitude, frequency and extent of these impacts, it was determined that these predicted exceedances would not result in a significant impact. To ensure that there are no significant adverse impacts from the proposed project's HVAC emissions, certain restrictions would be required regarding fuel type, emissions of nitrogen oxides (NO_x) and exhaust stack location or height. These restrictions would be mapped as (E) designations for the project property.

Nearby existing sources from manufacturing or processing facilities were analyzed for their potential impacts on the proposed project. The results of the analysis demonstrated that there would be no significant adverse air quality impacts on the proposed project from industrial sources of emissions.

The proposed project would result in the development of new residential and commercial uses in close proximity to the Consolidated Edison Power House (also known as the 59th Street Steam Station), a steam plant that operates pursuant to and in compliance with federal and state air permitting requirements. Concentrations of pollutants from the Consolidated Edison Power House were therefore estimated for their potential impacts on the proposed project. Concentrations of NO_2, sulfur dioxide (SO_2) and PM_{10} were estimated using computer based dispersion modeling; however, due to the proximity of the Consolidated Edison Power House to the project site, concentrations of $PM_{2.5}$ were estimated using a wind tunnel test procedure, which allows for more accurate predictions of pollutant concentrations from stationary sources. The analyses demonstrated that concentrations of NO_2, SO_2 and PM_{10} from the Consolidated Edison Power House's approximately 500 foot boiler stack on the proposed project would be negligible and would therefore not result in any violations of the NAAQS for these pollutants. It was likewise determined that incremental increases in $PM_{2.5}$ concentrations from the Con Edison boiler stack would not exceed the city's current interim guidance criteria that are applicable to the proposed project. The air quality analyses determined that emissions from the combustion turbine at the Consolidated Edison Power House would not result in any violations of the NAAQS for NO_2, SO_2 and PM_{10}. 24-Hour average incremental concentrations of $PM_{2.5}$ were found to exceed the City's current interim guidance criterion at elevated receptors along portions of the north façade of projected development site 1. However, the magnitude, extent and frequencies of these occurrences would not result in a significant impact based on the City's interim guidance criteria.

The analysis of the Con Edison combustion turbine was performed assuming a modification of the combustion turbine so that it would fire natural gas instead of kerosene for normal operation and testing. Under this option, natural gas would be delivered to the Consolidated Edison Power House via a dedicated pipeline that would be directly connected to a nearby gas transmission main. This modification was considered as part of the Riverside Center development, which was subject to the City's CEQR process and the subject of a final supplemental environmental impact statement completed in 2010. Con Edison has started construction of the gas pipeline to provide the necessary gas service to the Consolidated Edison Power House. The New York City Department of Environmental Protection (DEP) has issued a certificate to operate, and the Title V permit for the Con Edison facility has been modified by the New York State Department of Environmental Conservation (DEC), for the combustion turbine natural gas conversion and operation. Based on this information, it is anticipated that the conversion of the combustion turbine will be completed prior to the Build year for the proposed project. The proposed project's Restrictive Declaration will include provisions requiring completion of modifications related to the combustion turbine at the 59th Street Station to address elevated $PM_{2.5}$ levels at the proposed project.

The wind tunnel analysis of the proposed project that was performed for ~~this~~ the Draft Supplemental Environmental Impact Statement (DSEIS) included existing buildings within the study area and development expected to be completed by the proposed project's 2015 Build year. The Riverside Center development includes three additional approved buildings (identified as 1, 3 and 4) that would be completed after the proposed project's Build year. ~~To assess whether these additional buildings (1, 3 and 4) would affect the dispersion of emissions from the Con Edison Power House and the concentrations of pollutants on the proposed project, an analysis was conducted using the EPA AERMOD model, which determined that the additional Riverside Center buildings do not affect the levels of predicted pollutant concentrations on the proposed project.~~ An additional wind tunnel analysis of the proposed project ~~will be~~ has been performed ~~between the DSEIS and Final Supplemental Environmental Impact Statement (FSEIS)~~ to account for the full development of the Riverside Center Site. The results of this analysis ~~will be presented in the FSEIS~~ determined that the Consolidated Edison Power House would not cause incremental increases in $PM_{2.5}$ concentrations at the proposed project that would exceed the city's current interim guidance criteria with the full development of the Riverside Center development.

Existing and proposed developments near the proposed project were evaluated to assess whether the effect on plume dispersion from the ~~Con Edison 59th Street Station~~ Consolidated Edison Power House combustion turbine and boiler emissions due to projected development site 1 would result in any significant adverse air quality impact. The initial AERMOD analysis performed for the DSEIS showed that concentrations of 1-hour NO_2, 1-hour SO_2 and $PM_{2.5}$ were predicted had the potential to exceed the NAAQS and $PM_{2.5}$ interim guidance criteria, respectively, on a small portion of proposed Riverside Center Building 5, on the north and east façades. This would be considered a significant adverse air quality impact. Therefore, mitigation measures, including reducing the maximum height of projected development site 1, and/or other changes in the building proposed for projected development site 1, may need to be implemented to avoid potential significant impacts. An additional as stated in the DSEIS, a wind tunnel analysis will be was performed between subsequent to the DSEIS and FSEIS to examine building configurations that would avoid significant adverse air quality impacts on Riverside Center Building 5. The analysis demonstrated that the effect on plume dispersion from the Consolidated Edison Power House due to projected development site 1 would not result in any significant adverse air quality impacts on Riverside Center Building 5 for any of the evaluated building designs for projected development site 1. Mitigation measures are discussed in Chapter 20, "Mitigation Measures."

B. SUMMARY OF 2001 FEIS FINDINGS

The 2001 *FEIS* analyzed the potential impacts on air quality resulting from the proposed redevelopment of the project block, which comprised towers on the avenues and a connecting lower-rise Midblock Building in the area bounded by West 58th Street on the north, Eleventh Avenue on the east, West 57th Street on the south, and Twelfth Avenue to the west.

For the stationary source air quality analysis, potential impacts were analyzed for the project's HVAC systems and for emissions from the Consolidated Edison Power House. The only stationary source of air pollutants associated with the proposed project would be the emissions from the gas-fired HVAC systems. A screening analysis was performed that showed that with the stack centrally located on the roof of the east tower, which is the worst-case scenario, given its proximity to proposed residential buildings, there would be no significant air quality impacts from the proposed project's HVAC systems. The potential stationary source impact on the project from the Consolidated Edison Power House was also analyzed. The analysis concluded that the predicted pollutant concentrations for all of the pollutant time averaging periods are below their respective standards. Therefore, no significant adverse air quality impacts were predicted to occur.[1]

C. POLLUTANTS FOR ANALYSIS

Ambient air quality is affected by air pollutants produced by both motor vehicles and stationary sources. Emissions from motor vehicles are referred to as mobile source emissions, while emissions from fixed facilities are referred to as stationary source emissions. Ambient concentrations of CO are predominantly influenced by mobile source emissions. Particulate matter (PM), volatile organic compounds (VOCs), and nitrogen oxides (NO and NO_2, collectively referred to as NO_x) are emitted from both mobile and stationary sources. Fine PM is also formed when emissions of NO_x, sulfur oxides (SO_x), ammonia, organic compounds, and other gases react or condense in the atmosphere. Emissions of SO_2 are associated mainly with stationary sources, and sources utilizing non-road diesel such as diesel trains, marine engines, and non-road vehicles (e.g., construction engines). On-road diesel vehicles currently contribute

[1] At the time of the FEIS, CEQR guidance for analysis of $PM_{2.5}$ emissions had not been developed.

very little to SO_2 emissions since the sulfur content of on-road diesel fuel, which is federally regulated, is extremely low. Ozone is formed in the atmosphere by complex photochemical processes that include NO_x and VOCs.

CARBON MONOXIDE

CO, a colorless and odorless gas, is produced in the urban environment primarily by the incomplete combustion of gasoline and other fossil fuels. In urban areas, approximately 80 to 90 percent of CO emissions are from motor vehicles. Since CO is a reactive gas that does not persist in the atmosphere, CO concentrations can vary greatly over relatively short distances; elevated concentrations are usually limited to locations near crowded intersections, heavily traveled and congested roadways, parking lots, and garages. Consequently, CO concentrations must be predicted on a local, or microscale, basis.

The proposed project is not expected to significantly alter traffic conditions (see Chapter 10, "Transportation"). Since the proposed actions would result in fewer new peak hour vehicle trips than the 2012 *CEQR Technical Manual* screening threshold of 140 trips at nearby intersections in the study area, a quantified assessment of on-street CO emissions is not warranted. However, an analysis was conducted to evaluate future CO concentrations with the operation of the proposed parking garage (see Section D, "Methodology for Predicting Pollutant Concentrations").

NITROGEN OXIDES, VOCS, AND OZONE

NO_x together with VOCs, are precursors in the formation of ozone. Ozone is formed through a series of reactions that take place in the atmosphere in the presence of sunlight. Because the reactions are slow, and occur as the pollutants are advected downwind, elevated ozone levels are often found many miles from sources of the precursor pollutants. The effects of NO_x and VOC emissions from all sources are therefore generally examined on a regional basis. The contribution of any action or project to regional emissions of these pollutants would include any added stationary or mobile source emissions. The change in regional mobile source emissions of these pollutants would be related to the total vehicle miles traveled added or subtracted on various roadway types throughout the New York metropolitan area, which is designated as a moderate non-attainment area for ozone by the U.S. Environmental Protection Agency (EPA).

The proposed project would not have a significant effect on the overall volume of vehicular travel in the metropolitan area; therefore, no measurable impact on regional NO_x emissions or on ozone levels would result. An analysis of project-related emissions of these pollutants from mobile sources is therefore not warranted.

In addition to being a precursor to the formation of ozone, NO_2 (one component of NO_x) is also a regulated pollutant. Since NO_2 is mostly formed from the transformation of NO in the atmosphere, it has mostly been of concern further downwind from large stationary point sources, and is not a local concern from mobile sources. (NO_x emissions from fuel combustion are typically greater than 90 percent NO with the remaining fraction primarily NO_2 at the source.[1]) However, with the promulgation of the 2010 1-hour average standard for NO_2, local sources such as mobile sources become of greater concern for this pollutant. Emissions of NO_2 were analyzed from the proposed

[1] EPA Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: *Stationary Point and Area Sources*, Section 1.3, Table 1.3-1.

project's natural gas fired HVAC equipment. In addition, potential impacts of NO_2 emissions from existing sources in the vicinity of the proposed project site were evaluated.

LEAD

Airborne lead emissions are currently associated principally with industrial sources. Effective January 1, 1996, the Clean Air Act (CAA) banned the sale of the small amount of leaded fuel that was still available in some parts of the country for use in on-road vehicles, concluding a 25-year effort to phase out lead in gasoline. Even at locations in the New York City area where traffic volumes are very high, atmospheric lead concentrations are far below the 3-month average national standard of 0.15 micrograms per cubic meter ($\mu g/m^3$).

No significant sources of lead are associated with the proposed project, and, therefore, an analysis of this pollutant from stationary or mobile sources is not warranted.

RESPIRABLE PARTICULATE MATTER—PM_{10} AND $PM_{2.5}$

PM is a broad class of air pollutants that includes discrete particles of a wide range of sizes and chemical compositions, as either liquid droplets (aerosols) or solids suspended in the atmosphere. The constituents of PM are both numerous and varied, and they are emitted from a wide variety of sources (both natural and anthropogenic). Natural sources include the condensed and reacted forms of naturally occurring VOCs; salt particles resulting from the evaporation of sea spray; wind-borne pollen, fungi, molds, algae, yeasts, rusts, bacteria, and material from live and decaying plant and animal life; particles eroded from beaches, soil, and rock; and particles emitted from volcanic and geothermal eruptions, and forest fires. Naturally occurring PM is generally greater than 2.5 micrometers in diameter. Major anthropogenic sources include the combustion of fossil fuels (e.g., vehicular exhaust, power generation, boilers, engines, and home heating), chemical and manufacturing processes, construction and agricultural activities, and wood-burning stoves and fireplaces. PM also acts as a substrate for the adsorption (accumulation of gases, liquids, or solutes on the surface of a solid or liquid) of other pollutants, often toxic, and some likely carcinogenic compounds.

As described below, PM is regulated in two size categories: particles with an aerodynamic diameter of less than or equal to 2.5 micrometers, or $PM_{2.5}$, and particles with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}, which includes $PM_{2.5}$). $PM_{2.5}$ has the ability to reach the lower regions of the respiratory tract, delivering with it other compounds that adsorb to the surfaces of the particles, and is also extremely persistent in the atmosphere. $PM_{2.5}$ is directly emitted from combustion material that has volatilized and then condensed to form primary PM (often soon after the release from a source exhaust) or from precursor gases reacting in the atmosphere to form secondary PM.

There is also a New York standard for total suspended particulate matter (TSP), which represents both coarse and fine particles. However, DEC no longer conducts monitoring for this pollutant.

The proposed project would not result in any significant increases in truck traffic near the project site or in the region or other potentially significant increase in $PM_{2.5}$ vehicle emissions as defined in Chapter 17, Sections 210 and 311 of the 2012 *CEQR Technical Manual*. Therefore, an analysis of potential mobile source impacts from PM was not warranted.

An analysis was conducted to assess the PM impacts due to the proposed project's natural gas-fired HVAC systems. In addition, potential impacts of PM emissions from the Consolidated Edison Power

House and other existing sources of concern were evaluated for their potential impact on the proposed project.

SULFUR DIOXIDE

SO_2 emissions are primarily associated with the combustion of sulfur-containing fuels (oil and coal). Monitored SO_2 concentrations in New York City are lower than the current national standards. Due to the federal restrictions on the sulfur content in diesel fuel for on-road vehicles, no significant quantities are emitted from vehicular sources. Vehicular sources of SO_2 are not significant, and, therefore, an analysis of SO_2 from mobile sources is not warranted.

Emissions of SO_2 from the proposed project's stationary sources would be negligible since they would use natural gas exclusively; therefore, no analysis was conducted. However, potential impacts of SO_2 emissions from existing sources in the vicinity of the proposed project site were evaluated.

AIR TOXICS

In addition to the criteria pollutants discussed above, non-criteria air pollutants, also called air toxics, are of potential concern. Air toxics are those pollutants that are known or suspected to cause serious health effects in small doses. Air toxics are emitted by a wide range of man-made and naturally occurring sources. Emissions of air toxics from industries are regulated by EPA. Federal ambient air quality standards do not exist for non-criteria compounds. However, DEC has issued standards for certain non-criteria compounds, including beryllium, gaseous fluorides, and hydrogen sulfide. DEC has also developed ambient guideline concentrations for numerous air toxic non-criteria compounds. The DEC guidance document DAR-1 (October 2010) contains a compilation of annual and short term (1-hour) guideline concentrations for these compounds. The DEC guidance thresholds represent ambient levels that are considered safe for public exposure. As portions of the proposed project site are adjacent to a zoned industrial area, an analysis to examine the potential for impacts on the proposed project from industrial emissions was performed.

D. AIR QUALITY STANDARDS, REGULATIONS AND BENCHMARKS

NATIONAL AND STATE AIR QUALITY STANDARDS

As required by the CAA, primary and secondary NAAQS have been established for six major air pollutants: CO, NO_2, ozone, respirable PM (both $PM_{2.5}$ and PM_{10}), SO_2, and lead. The primary standards represent levels that are requisite to protect the public health, allowing an adequate margin of safety. The secondary standards are intended to protect the nation's welfare, and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the environment. The primary and secondary standards are the same for NO_2 (annual), ozone, lead, and PM, and there is no secondary standard for CO and the 1-hour NO_2 standard. The NAAQS are presented in **Table 11-1**. The NAAQS for CO, annual NO_2, and SO_2 have also been adopted as the ambient air quality standards for New York State, but are defined on a running 12-month basis rather than for calendar years only. New York State also has standards for TSP, settleable particles, non-methane hydrocarbons (NMHC), and ozone that correspond to federal standards that have since been revoked or replaced, and for beryllium, fluoride, and hydrogen sulfide (H_2S).

Table 11-1
National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary		Secondary	
	ppm	µg/m³	ppm	µg/m³
Carbon Monoxide (CO)				
8-Hour Average (1)	9	10,000	None	
1-Hour Average (1)	35	40,000		
Lead				
Rolling 3-Month Average (4)	NA	0.15	NA	0.15
Nitrogen Dioxide (NO_2)				
1-Hour Average (5)	0.100	188	None	
Annual Average	0.053	100	0.053	100
Ozone (O_3)				
8-Hour Average (2) (6)	0.075	150	0.075	150
Respirable Particulate Matter (PM_{10})				
24-Hour Average (1)	NA	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Average of 3 Annual Means	NA	15	NA	15
24-Hour Average (3)	NA	35	NA	35
Sulfur Dioxide (SO_2)				
Maximum 3-Hour Average (1)	NA	NA	0.50	1,300
1-Hour Average (7, 8)	0.075	196	NA	NA

Notes: ppm – parts per million
µg/m³ – micrograms per cubic meter
NA – not applicable

All annual periods refer to calendar year.
PM concentrations (including lead) are in µg/m³ since ppm is a measure for gas concentrations. Concentrations of all gaseous pollutants are defined in ppm and approximately equivalent concentrations in µg/m³ are presented.

(1) Not to be exceeded more than once a year.
(2) 3-year average of the annual fourth highest daily maximum 8-hr average concentration. EPA has reduced these standards down from 0.08 ppm, effective May 27, 2008.
(3) Not to be exceeded by the annual 98th percentile when averaged over 3 years.
(4) EPA has lowered the NAAQS down from 1.5 µg/m³, effective January 12, 2009.
(5) 3-Year average of the annual 98th percentile daily maximum 1-hr average concentration. Effective April 12, 2010.
(6) EPA has proposed lowering the primary standard further to within the range 0.060-0.070 ppm, and adding a secondary standard measured as a cumulative concentration within the range of 7 to 15 ppm-hours aimed mainly at protecting sensitive vegetation. A final decision on this standard has been postponed but is expected to occur in 2013.
(7) EPA revoked the 24-hour and annual primary standards, replacing them with a 1-hour average standard. Effective August 23, 2010
(8) 3-Year average of the annual 99th percentile daily maximum 1-hour average concentration. Effective August 23, 2010.

Source: 40 CFR Part 50: National Primary and Secondary Ambient Air Quality Standards.

The current NAAQS for PM became effective December 18, 2006. EPA recently proposed lowering the concentration level of the annual standard for $PM_{2.5}$ to between 12 µg/m^3 and 13 µg/m^3. ~~The revised~~ A final decision on this standard is expected ~~to be final~~ by December 14, 2012.

The current 8-hour ozone standard of 0.075 parts per million (ppm) is effective as of May 2008. On January 6, 2010, EPA proposed a change in the 2008 ozone NAAQS, lowering the primary NAAQS from the current 0.075 ppm level to within the range of 0.060-0.070 ppm.

EPA lowered the primary and secondary standards for lead to 0.15 µg/m^3, effective January 12, 2009. EPA revised the averaging time to a rolling 3-month average and the form of the standard to not-to-exceed across a 3-year span.

On January 22, 2010, EPA established a new 1-hour average NO_2 standard of 0.100 ppm, in addition to the current annual standard. The statistical form is the 3-year average of the 98th percentile of daily maximum 1-hour average concentration in a year.

EPA established a new 1-hour average SO_2 standard of 0.075 ppm, replacing the current 24-hour and annual primary standards, effective August 23, 2010. The statistical form is the 3-year average of the 99th percentile of the annual distribution of the daily maximum 1-hour average concentration.

NAAQS ATTAINMENT STATUS AND STATE IMPLEMENTATION PLANS

The CAA, as amended in 1990, defines non-attainment areas (NAA) as geographic regions that have been designated as not meeting one or more of the NAAQS. When an area is designated as non-attainment by EPA, the state is required to develop and implement a State Implementation Plan (SIP), which delineates how a state plans to achieve air quality that meets the NAAQS under the deadlines established by the CAA.

In 2002, EPA re-designated New York City as in attainment for CO. The CAA requires that a maintenance plan ensure continued compliance with the CO NAAQS for former non-attainment areas. New York City is also committed to implementing site-specific control measures throughout the city to reduce CO levels, should unanticipated localized growth result in elevated CO levels during the maintenance period.

Manhattan has been designated as a moderate NAA for PM_{10}. On December 17, 2004, EPA designated the five New York City counties, Nassau, Suffolk, Rockland, Westchester, and Orange counties as a $PM_{2.5}$ non-attainment area under the CAA due to exceedance of the annual average standard. New York State has submitted a final SIP to EPA, dated October 2009, designed to meet the annual average standard by April 5, 2010. Based on recent monitoring data (2006-2009), annual average concentrations of $PM_{2.5}$ in New York City no longer exceed the annual standard. On August 2, 2010, EPA proposed to determine that the New York–Northern New Jersey–Long Island $PM_{2.5}$ nonattainment area has attained the 1997 annual NAAQS.

As described above, EPA has revised the 24-hour average $PM_{2.5}$ standard. In October 2009 EPA finalized the designation of the New York City Metropolitan Area as nonattainment with the 2006 24-hour $PM_{2.5}$ NAAQS, effective in November 2009. The nonattainment area includes the same 10-county area EPA designated as nonattainment with the 1997 annual $PM_{2.5}$ NAAQS. Based on recent monitoring data (2007-2009), 24-hour average concentrations of $PM_{2.5}$ in this area no longer exceed the standard. ~~New York has submitted a "Clean Data" request to the USEPA. Any requirement to submit a SIP is stayed until EPA acts on New York's request~~. On

August 29, 2012, EPA proposed to determine that the area has attained the standard; if this determination is finalized, certain requirements for related SIP submissions would be suspended.

Nassau, Rockland, Suffolk, Westchester, Lower Orange County Metropolitan Area (LOCMA), and the five New York City counties had been designated as a severe non-attainment area for ozone under the former 1-hour average standard. On April 15, 2004, EPA designated these same counties as moderate non-attainment for the 1997 8-hour average ozone standard. EPA revoked the 1-hour standard on June 15, 2005; however, some control measures for the 1-hour standard included in the SIP are required to stay in place until the 8-hour standard is attained. On June ~~16, 2011~~ 18 2012, ~~New York State petitioned~~ EPA ~~to determine~~ determined that ~~the NYMA has~~ these areas have attained both the 1990 1-hour ozone NAAQS (0.12 ppm) and the 1997 8-hour ozone NAAQS (0.08 ppm)~~, and on January 25, 2012, EPA proposed to make a determination that these areas are in attainment with the 1990 ozone 1-hour and 1997 8-hour standards~~. Although not yet a redesignation to attainment status, this determination removes further requirements under the 1-hour and 8-hour standards.

In March 2008 EPA strengthened the 8-hour ozone standards. EPA designated the counties of Suffolk, Nassau, Bronx, Kings, New York, Queens, Richmond, Rockland, and Westchester as a marginal non-attainment area for the 2008 ozone NAAQS, effective July 20, 2012. SIPs are due in 2015.

New York City is currently in attainment of the annual average NO_2 standard. EPA has designated the entire state of New York as “unclassifiable/attainment” for the new 1-hour NO_2 standard effective February 29, 2012. Since additional monitoring is required for the 1-hour standard, areas will be reclassified once three years of monitoring data are available (2016 or 2017).

EPA has established a new 1-hour SO_2 standard, replacing the 24-hour and annual standards, effective August 23, 2010. Based on the available monitoring data, all New York State counties currently meet the 1-hour standard. EPA plans to make final attainment designations in June 2013 ~~2012, based on 2008 to 2010 monitoring data and refined modeling~~.

DETERMINING THE SIGNIFICANCE OF AIR QUALITY IMPACTS

The State Environmental Quality Review Act (SEQRA) regulations and the 2012 *CEQR Technical Manual* state that the significance of a predicted consequence of a project (i.e., whether it is material, substantial, large or important) should be assessed in connection with its setting (e.g., urban or rural), its probability of occurrence, its duration, its irreversibility, its geographic scope, its magnitude, and the number of people affected.[1] In terms of the magnitude of air quality impacts, any action predicted to increase the concentration of a criteria air pollutant to a level that would exceed the concentrations defined by the NAAQS (see **Table 11-1**) would be deemed to have a potential significant adverse impact. In addition, in order to maintain concentrations lower than the NAAQS in attainment areas, or to ensure that concentrations will not be significantly increased in non-attainment areas, threshold levels have been defined for certain pollutants; any action predicted to increase the concentrations of these pollutants above the thresholds would be deemed to have a potential significant adverse impact, even in cases where violations of the NAAQS are not predicted.

[1] 2012 *CEQR Technical Manual*, Section 222, 2001; and 6NYCRR Part 617.7.

DE MINIMIS CRITERIA REGARDING CO IMPACTS

New York City has developed *de minimis* criteria to assess the significance of the increase in CO concentrations that would result from the impact of proposed projects or actions on mobile sources, as set forth in the 2012 *CEQR Technical Manual*. These criteria set the minimum change in CO concentration that defines a significant environmental impact. Significant increases of CO concentrations in New York City are defined as: (1) an increase of 0.5 ppm or more in the maximum 8-hour average CO concentration at a location where the predicted No Action 8-hour concentration is equal to or between 8 and 9 ppm; or (2) an increase of more than half the difference between baseline (i.e., No Action) concentrations and the 8-hour standard, when No Action concentrations are below 8.0 ppm.

INTERIM GUIDANCE CRITERIA REGARDING $PM_{2.5}$ IMPACTS

DEC has published a policy to provide interim direction for evaluating $PM_{2.5}$ impacts.[1] This policy applies only to facilities applying for permits or major permit modifications under SEQRA that emit 15 tons of PM_{10} or more annually. DEC deems projects with emissions below this threshold to be insignificant with respect to $PM_{2.5}$ and does not require further assessment under the policy. The policy states that a project will be deemed to have a potentially significant adverse impact if the project's maximum impacts are predicted to increase $PM_{2.5}$ concentrations by more than 0.3 $\mu g/m^3$ averaged annually or more than 5 $\mu g/m^3$ on a 24-hour basis. Projects that exceed either the annual or 24-hour threshold will be required to prepare an EIS to assess the severity of the impacts, to evaluate alternatives, and to employ reasonable and necessary mitigation measures to minimize the $PM_{2.5}$ impacts of the source to the maximum extent practicable.

For projects subject to CEQR, the interim guidance criteria currently employed for determination of potential significant adverse $PM_{2.5}$ impacts are as follows:

- 24-hour average $PM_{2.5}$ concentration increments that are predicted to be greater than 5 $\mu g/m^3$ at a discrete receptor location would be considered a significant adverse impact on air quality under operational conditions (i.e., a permanent condition predicted to exist for many years regardless of the frequency of occurrence);
- 24-hour average $PM_{2.5}$ concentration increments that are predicted to be greater than 2 $\mu g/m^3$ but no greater than 5 $\mu g/m^3$ would be considered a significant adverse impact on air quality based on the magnitude, frequency, duration, location, and size of the area of the predicted concentrations;
- Annual average $PM_{2.5}$ concentration increments that are predicted to be greater than 0.1 $\mu g/m^3$ at ground level on a neighborhood scale (i.e., the annual increase in concentration representing the average over an area of approximately 1 square kilometer, centered on the location where the maximum ground-level impact is predicted for stationary sources; or at a distance from a roadway corridor similar to the minimum distance defined for locating neighborhood scale monitoring stations); or
- Annual average $PM_{2.5}$ concentration increments that are predicted to be greater than 0.3 $\mu g/m^3$ at a discrete receptor location (elevated or ground level).

[1] CP33/Assessing and Mitigating Impacts of Fine Particulate Emissions, DEC 12/29/2003.

Actions under CEQR predicted to increase $PM_{2.5}$ concentrations by more than the DEC or CEQR interim guidance criteria above will be considered to have a potential significant adverse impact. Actions subject to CEQR that fail the interim guidance criteria should prepare an EIS and examine potential measures to reduce or eliminate such potential significant adverse impacts.

The proposed project's annual emissions of PM_{10} are estimated to be well below the 15-ton-per-year threshold under DEC's $PM_{2.5}$ policy guidance. The above interim guidance criteria have been used to evaluate the significance of predicted impacts of the proposed project on $PM_{2.5}$ concentrations and determine the need to minimize particulate matter emissions from the proposed project. The interim guidance criteria have also been used to assess the significance of predicted impacts from nearby emissions sources on the proposed project.

E. METHODOLOGY FOR PREDICTING POLLUTANT CONCENTRATIONS

INTRODUCTION

This section presents the methodologies, data, and assumptions used to conduct the air quality analyses for the proposed project. The analyses presented below are as follows:

- Mobile Source Analysis
  - Impacts due to the proposed project's parking facilities.
- Stationary Source Analysis
  - Impacts from the proposed project's fossil fuel-fired HVAC systems;
  - Impacts on the proposed project from nearby industrial sources; ~~and~~
  - Impacts from the Consolidated Edison Power House on the proposed project~~.~~; and
  - Impacts of the proposed project's massing on concentrations of pollutants from the Consolidated Edison Power House at nearby buildings.

MOBILE SOURCES

As stated above, the proposed project is not expected to significantly alter traffic conditions in the study area. The maximum hourly incremental traffic from the proposed project would not exceed the 2012 *CEQR Technical Manual* CO screening threshold of 140 peak hour trips at nearby intersections in the study area, nor would it exceed the particulate matter emission screening thresholds discussed in Chapter 17, Sections 210 and 311 of the 2012 *CEQR Technical Manual*. In terms of emissions of NO_2 from mobile sources, the incremental increases in NO_2 concentrations are primarily due to relatively small increases in the number of vehicles (as compared to existing or No Build traffic in the study area). This increase would not be expected to significantly affect levels of NO_2 experienced near roadways without the proposed project.

Overall level of traffic will not have the potential to significantly change air quality conditions; therefore, a quantified assessment of on-street mobile source emissions is not warranted.

PARKING FACILITIES

The proposed project would include a new 285-space, 50,000 sf above-grade accessory parking garage on projected development site 1. The air exhausted from the garage's ventilation system would contain elevated levels of pollutants due to emissions from vehicles using the garage.

Ventilation air from the proposed project's parking facility would be directed to various exhausts located above street level.

An analysis of the emissions from the outlet vents and their dispersion in the environment was performed, calculating pollutant levels in the surrounding area, using the methodology set forth in the 2012 *CEQR Technical Manual*. Emissions from vehicles entering, parking, and exiting the garages were estimated using the EPA MOBILE6.2 mobile source emission model and an ambient temperature of 50°F, as referenced in the 2012 *CEQR Technical Manual*. For all arriving and departing vehicles, an average speed of 5 miles per hour was conservatively assumed for travel within the parking garages. In addition, all departing vehicles were assumed to idle for 1 minute before proceeding to the exit. The concentration of CO within the garages was calculated assuming a minimum ventilation rate, based on New York City Building Code requirements, of 1 cubic foot per minute of fresh air per gross square foot of garage area. To determine compliance with the NAAQS, CO concentrations were determined for the maximum 8-hour average period.

To determine pollutant concentrations, the outlet vents were analyzed as a "virtual point source" using the methodology in EPA's *Workbook of Atmospheric Dispersion Estimates, AP-26*. This methodology estimates CO concentrations at various distances from an outlet vent by assuming that the concentration in the garage is equal to the concentration leaving the vent, and determining the appropriate initial horizontal and vertical dispersion coefficients at the vent faces.

The CO concentrations were determined for the time periods when overall garage usage would be the greatest, considering the hours when the greatest number of vehicles would exit the facility. Departing vehicles were assumed to be operating in a "cold-start" mode, emitting higher levels of CO than arriving vehicles. Traffic data for the parking garage analysis were derived from the trip generation analysis described in Chapter 10, "Transportation."

The new accessory parking garage would be located on the ground floor and ground floor mezzanine in the mid-block portion of the project site, with an entrance on West 58th Street (see Chapter 1, "Project Description", Figures 1-5a and 1-5b). Since design information regarding the garage's mechanical ventilation system is not available, the worst-case assumption that the air from the proposed parking garage would be vented through a single outlet. The vent face was modeled to directly discharge at a height of approximately 10 feet above grade along the south façade of projected development site 1, and "near" and "far" receptors were placed along the sidewalks at a pedestrian height of 6 feet at a distance of 7 feet and 74 feet, respectively, from the vent. West 57th Street was assumed for the vent location since background traffic volumes are higher than West 58th Street, and therefore, has a higher potential for total pollutant concentrations. In addition, receptors were placed on the building façade at a height of 6 feet above the vent, and within the open space at a pedestrian height of 6 feet at a distance of 5 feet. A persistence factor of 0.77, supplied by DEP, was used to convert the calculated 1-hour average maximum concentrations to 8-hour averages, accounting for meteorological variability over the average 8-hour period.

Background and on-street CO concentrations were added to the modeling results to obtain the total ambient levels. The on-street CO concentration was determined using the methodology in Air Quality Appendix 1 of the 2012 *CEQR Technical Manual*, utilizing traffic volumes utilized in the mobile source analysis.

STATIONARY SOURCES

PROPOSED PROJECT'S HVAC SYSTEMS

The proposed project would include fossil fuel-fired HVAC equipment. Therefore, a stationary source analysis was conducted to evaluate potential air quality impacts.

The new mixed-use building on the western and midblock portions of the project block at projected development site 1 would include natural gas-fired condensing boilers equipped with low NO_x burners (30 ppm or less) for heating and gas-fired hot water heaters for domestic hot water. Design information on the equipment was used to estimate emissions. The exhaust for the boiler system would be directed to the top of the roof of the proposed building.

Short-term PM emission rates for the new mixed-use building at projected development site 1 were estimated using peak daily heat-input from energy modeling data and NO_x emissions were based on peak hourly fuel usage. The annual average emission rates were developed using annual fuel consumption estimates based on energy modeling data. Emissions rates for NO_x were calculated based on representative vendor data. PM emissions rates were calculated based on emission factors obtained from the EPA *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources*.

For the community facility building at projected development site 1 and projected development site 2, design information was not available. Therefore, for these buildings, stack exhaust parameters and emissions for the development HVAC installations were conservatively estimated using 2012 *CEQR Technical Manual* guidance. Projected development site 2 would include natural gas-fired boilers equipped with low NO_x burners (30 ppm or less)

Table 11-2 summarizes the emissions rates and stack parameters for the modeled HVAC sources.

Table 11-2
Estimated HVAC Emissions from the Proposed Project

Parameter	Projected Development Site 1		Projected Development Site 2(1)
	Mixed-Use Building	Community Facility Building	
Exhaust Height (ft)	413.5	48	137.8
Inside Diameter (ft)	2.67	(2)	1.0
Exit Velocity (ft/s)	31.4	(2)	25.6
Exit Temperature (F)	212	(2)	300
NO_x Emission Rate (1-hour) (g/s)	0.1428	0.0039	0.0097
NO_x Emission Rate (Annual) (g/s)	0.0207	0.0011	0.0073
PM Emission Rate (24-hour) (g/s)	0.0185	0.0003	0.0020
PM Emission Rate (Annual) (g/s)	0.0043	0.0001	0.00055

Notes:
(1) The stack diameter, exhaust velocity, and exhaust temperature are based on a survey of New York City building boilers of similar size.
(2) 2012 *CEQR Technical Manual* default stack parameters used.

Dispersion Modeling

Potential impacts from the proposed project's HVAC emissions were evaluated using the EPA AERMOD dispersion model. The AERMOD model was designed as a replacement to the EPA Industrial Source Complex (ISC3) model and has been approved for use by the EPA. AERMOD is a state-of-the-art dispersion model, 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, and includes handling of terrain interactions.

The AERMOD model calculates pollutant concentrations from one or more points (e.g., exhaust stacks) based on hourly meteorological data, and has the capability of calculating pollutant concentrations at locations when the plume from the exhaust stack is affected by the aerodynamic wakes and eddies (downwash) produced by nearby structures. The analyses of potential impacts from exhaust stacks were made assuming stack tip downwash, urban dispersion and surface roughness length, with and without building downwash, and elimination of calms.

The AERMOD Model also incorporates the algorithms from the PRIME model, which is designed to predict impacts in the "cavity region" (i.e., the area around a structure that under certain conditions may affect an exhaust plume, causing a portion of the plume to become entrained in a recirculation region). The Building Profile Input Program (BPIP) program for the PRIME model (BPIPRM) was used to determine the projected building dimensions modeling with the building downwash algorithm enabled. The modeling of downwash from sources accounts for all obstructions within a radius equal to five obstruction heights of the stack.

The analysis was performed both with and without downwash in order to assess the worst-case impacts at elevated receptors close to the height of the sources, which would occur without downwash, as well as the worst-case impacts at lower elevations and ground level, which would occur with downwash.

Annual NO_2 concentrations from HVAC sources were estimated using a NO_2 to NO_x ratio of 0.70, which is based on the ambient annual average NO_2 to NO_x ratio as measured at New York City monitoring station Queens College 2 in the recent three year period (2008-2010), as described in EPA's *Guideline on Air Quality Models* at 40 CFR part 51 Appendix W, Section 5.2.4.[1]

Methodology Utilized for Estimating 1-Hour NO_2 Concentrations

EPA has recently prepared guidance for assessing 1-hour average NO_2 concentrations for compliance with NAAQS.[2] Background concentrations are currently monitored at several sites within New York City, which are used for reporting concentrations on a "community" scale. Because this data is compiled on a 1-hour average format, it can be used for comparison with the new 1-hour standards. Therefore, background 1-hour NO_2 concentrations currently measured at the community-scale monitors can be considered representative of background concentrations for purposes of assessing the impact of the proposed project's HVAC systems.

EPA's preferred regulatory stationary source model, AERMOD, is capable of producing detailed output data that can be analyzed at the hourly level required for the form of the 1-hour standards. EPA has also developed guidance to estimate the transformation ratio of NO_2 to NO_x, applicable to HVAC sources, as discussed further below. Therefore, an analysis was prepared.

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[1] http://www.epa.gov/scram001/guidance/guide/appw_05.pdf

[2] EPA Memorandum, "Additional Clarification Regarding Application of Appendix W, Modeling Guidance for the 1-Hour NO_2 National Ambient Air Quality Standard," March 1, 2011.

1-Hour average NO_2 concentration increments from the proposed project's HVAC systems were estimated using AERMOD model's Plume Volume Molar Ratio Method (PVMRM) module to analyze chemical transformation within the model. The PVMRM module incorporates hourly background ozone concentrations to estimate NO_x transformation within the source plume. Ozone concentrations were taken from the DEC Queens College monitoring station that is the nearest ozone monitoring station and had complete five years of hourly data available. An initial NO_2 to NO_x ratio of 10 percent at the source exhaust stack was assumed, which is considered representative for boilers.

The results represent the five-year average of the annual 98th percentile of the maximum daily 1-hour average, added to background concentrations (see below).

Meteorological Data

The meteorological data set consisted of five consecutive years of meteorological data: surface data collected at La Guardia Airport (2006–2010) and concurrent upper air data collected at Brookhaven, New York. The meteorological data provide hour-by-hour wind speeds and directions, stability states, and temperature inversion elevation over the five-year period. These data were processed using the EPA AERMET program to develop data in a format which can be readily processed by the AERMOD model. The land uses around the site where meteorological surface data were available were classified using categories defined in digital United States Geological Survey (USGS) maps to determine surface parameters used by the AERMET program.

Receptor Placement

A comprehensive receptor network (i.e., locations with continuous public access) was developed for the modeling analyses. Discrete receptors were analyzed, including locations on the proposed project site and other nearby buildings, at operable windows, air intakes, and at publicly accessible ground-level locations. The model also included elevated and ground-level receptor grids in order to address more distant locations and to identify the highest ground-level impact.

Background Concentrations

To estimate the maximum expected total pollutant concentrations, the calculated impacts from the emission sources must be added to a background value that accounts for existing pollutant concentrations from other sources (see **Table 11-3**). The background levels are based on concentrations monitored at the nearest DEC ambient air monitoring stations over a recent five-year period for which data are available (2006-2010), with the exception of PM_{10}, which is based on three years of data (2008-2010), consistent with current DEP guidance. For the 24-hour PM_{10} concentration the highest second-highest measured values over the specified period were used. The annual average background values are the highest measured average concentrations for these pollutants. The measured background concentration was added to the predicted contribution from the modeled source to determine the maximum predicted total pollutant concentration. It was conservatively assumed that the maximum background concentrations occur on all days.

Total 1-hour NO_2 concentrations were determined following a methodology that is one of several accepted by the EPA, and which was accepted by the lead agency, in consultation with DEP, as appropriate and conservative for this review. The methodology used to determine the total 1-hour NO_2 concentrations compliance with the 1-hour NO_2 NAAQS[1] was based on adding

[1] http://www.epa.gov/ttn/scram/guidance/clarification/Additional_Clarifications_AppendixW_Hourly-NO2-NAAQS_FINAL_03-01-2011.pdf

the monitored background to modeled concentrations, as follows: modeled concentrations from existing and proposed project sources were added to the 98th percentile background monitored concentrations, predominantly from a major source that operates on a limited, intermittent basis (in this case, the existing Con Edison combustion turbine stack) averaged over the latest 3 years. This simplified approach is recognized as being conservative by EPA and the City.

Table 11-3
Maximum Background Pollutant Concentrations For Stationary Source Analysis

Pollutant	Average Period	Location	Concentration (µg/m³)	NAAQS (µg/m³)
NO_2	1-Hour	Queens College, Queens	126.1	188
NO_2	Annual	Queens College, Queens	67.7	100
SO_2	1-Hour	Queens College, Queens	78.5	196
SO_2	3-Hour	Queens College, Queens	183.2	1,300
PM_{10}	24-hour	Madison Ave, NY	63	150

Notes: The 1-Hour NO_2 background concentration is the annual 98th percentile of daily maximum 1-hour average concentration, averaged over the recent 3-years (2009-2011).
The 1-Hour SO_2 background concentration is the annual 99th percentile of daily maximum 1-hour average concentration, averaged over the recent 3-years (2009-2011).
Source: New York State Air Quality Report Ambient Air Monitoring System, DEC, 2006–2010.

PROPOSED PROJECT'S EMERGENCY GENERATOR

An emergency diesel-fueled generator would be installed to serve the proposed development in the event of the loss of utility electrical power. The emergency generator would be tested periodically for a short period to ensure its availability and reliability in the event of a sudden loss in utility electrical power. It would not be utilized in a peak load shaving program,[1] minimizing the use of this equipment during non-emergency periods. Emergency generators are exempt from DEC air permitting requirements, but would require a permit or registration issued by DEP, depending on the generator capacity. The emergency generator would be installed and operated in accordance with DEP requirements, as well as other applicable codes and standards. Potential air quality impacts from the emergency generator would be insignificant, since it would be used only for testing purposes on a periodic basis for limited durations outside of an actual emergency use.

INDUSTRIAL SOURCES

Potential air quality impacts from existing industrial operations in the surrounding area on the development parcel were analyzed. Industrial air pollutant emission sources within 400 feet of the development parcels' boundaries were considered for inclusion in the air quality impact analysis, as recommended in the 2012 *CEQR Technical Manual*.

As the first step in this analysis, a request was made to DEP's Bureau of Environmental Compliance (BEC) and DEC to obtain all the available certificates of operation for these locations and to determine whether manufacturing or industrial emissions occur. In addition, a

[1] The term "peak load shaving" refers to the use of customer-operated (non-utility) generators to produce electricity at the request of the local electrical utility in order to reduce the electrical demand during peak demand periods, particularly during the summer period.

search of federal and state-permitted facilities within the study area was conducted using the EPA's Envirofacts database.[1]

Land use and Sanborn maps were reviewed to identify potential sources of emissions from manufacturing/industrial operations. Next, a field survey was conducted to identify buildings within 400 feet of the proposed project site that have the potential for emitting air pollutants. The survey was conducted on April 6, 2011.

The results of the industrial source surveys and permit searches identified seven permitted facilities within 400 feet of the project site. Two waterside facilities in the vicinity of the proposed project site were also evaluated, a fuel oil transfer station operated by Con Edison, and the West 59th Street Marine Transfer Station (MTS) operated by the Department of Sanitation (DSNY). The Con Edison fuel oil transfer station located at Pier 98 is used to transfer fuel oil to the Consolidated Edison Power House. Fuel is delivered to the facility by barges, where it is temporarily stored prior to pumping from the barges to the plant. No fossil fuel-fired equipment is located at this transfer facility. The only source of emissions would be fugitive emissions of VOCs from the barges due to storage and filling of oil tanks on the barges. These emissions are considered minor in nature and would not result in any significant adverse air quality impact on the proposed project. The city has announced plans to convert the MTS to containerize DSNY waste delivered to the facility for transfer to barge for disposal outside of the city. It would also have the capability of receiving recyclable materials from DSNY vehicles and private haulers. An analysis of the potential air quality and odor impacts from on-site operations at the converted MTS was conducted as part of the FEIS for the city's Comprehensive Solid Waste Management Plan (DSNY April 2005). The results of the toxic air pollutant analysis from that FEIS determined that there would be no significant adverse air quality impacts on nearby receptors. Odors impacts were similarly determined to be insignificant. Since the MTS processing building itself is more than 400 feet from the project site, which is where solid wastes would be loaded from collection vehicles onto barges, and modeled concentrations were well below levels of concern, potential impacts from that facility on the proposed project are considered negligible.

After compiling the information on facilities with manufacturing or process operations in the study area, maximum potential pollutant concentrations from different sources, at various distances from the site, were estimated based on the reference values found in Table 17-3 in the 2012 *CEQR Technical Manual*. The database provides factors for estimating maximum concentrations based on emissions levels at the source, which were derived from generic AERMOD dispersion modeling for the New York City area. Impact distances selected for each source were the minimum distances between the boundary of the proposed project site and the source site. Predicted worst-case impacts on the proposed development parcels were compared with the short-term guideline concentrations (SGCs) and annual guideline concentrations (AGCs) recommended in DEC's *DAR-1 AGC/SGC Tables.*[2] These guideline concentrations present the airborne concentrations, which are applied as a screening threshold to determine whether future occupants in the development parcels could be significantly impacted from nearby sources of air pollution.

To assess the effects of multiple sources emitting the same pollutants, cumulative source impacts were conservatively estimated. Concentrations of the same pollutant from industrial sources that

[1] http://oaspub.epa.gov/enviro/ef_home2.air

[2] DEC Division of Air Resources, Bureau of Stationary Sources, September 10, 2007.

were within 400 feet of the development parcels were combined and compared to the DEC AGCs and SGCs.

ADDITIONAL SOURCES

The 2012 *CEQR Technical Manual* requires an assessment of any actions that could result in the location of sensitive uses within 1,000 feet of a "large" emission source (examples of large emission sources provided in the 2012 *CEQR Technical Manual* include solid and medical waste incinerators, cogeneration plants, asphalt and concrete plants, or power plants) or within 400 feet of emission sources associated with commercial, institutional, or large-scale residential developments where the proposed structure would be of a height similar to or greater than the height of an existing emission stack.

To assess the potential effects of these existing sources on the proposed project, a review of existing permitted facilities was conducted. Within the study area boundaries, sources permitted under DEC's Title V program and State Facility permit program were considered. Other sources of information reviewed included the DEP permit data, and EPA's Envirofacts database.

One facility with a Title V permit was identified: the Consolidated Edison Power House, which lies within the 1,000-foot study area and is considered a large source according to the example classifications provided in the 2012 *CEQR Technical Manual*. Within the 400 foot area, analysis focused on existing and proposed developments that have a combined heat input rating of 20 million BTU/hour[1] or greater. Developments below this size within 400 feet of the project site were excluded from the analysis since they are typical of the area, and are therefore already included in the types of sources accounted for in the monitored background concentrations. No such sources were identified with the 400 feet study area, and hence no analysis of these developments is warranted.

The Consolidated Edison Power House has two permitted emission points, referenced as Stack 00001 and GT001 in the current Title V permit. Stack 00001 is used to exhaust emissions from a total of five steam boilers (identified as boilers 114, 115, 116, 117, and 118), while GT001 exhausts emissions from a combustion turbine with a maximum output of approximately 17 megawatts (MW). **Figure 11-1** shows the emission stack locations. The boilers produce steam for the Con Edison district steam system; they do not produce electricity. The combustion turbine is used on a very limited basis (about 1 percent of the year or less on average) to provide peaking power to the electrical grid as well as for periodic testing to ensure its availability and reliability to provide emergency back-up power to Con Edison equipment.

Pollutant concentrations were estimated on the proposed project from the Consolidated Edison Power House. Concentrations of NO_2, SO_2 and PM_{10} were estimated using the EPA AERMOD dispersion model, following the same general procedures used to assess concentrations from the proposed project's stationary sources. Due the proximity of the Consolidated Edison Power House to the project site, concentrations of $PM_{2.5}$ were analyzed using physical modeling (in a wind tunnel), which allows for more accurate predictions of pollutant concentrations from stationary sources.

[1] British Thermal Units, or BTUs, are a measure of energy used to compare consumption of energy from different sources, such as gasoline, electricity, etc., taking into consideration how efficiently those sources are converted to energy. One BTU is the quantity of heat required to raise the temperature of one pound of water by one Fahrenheit degree.

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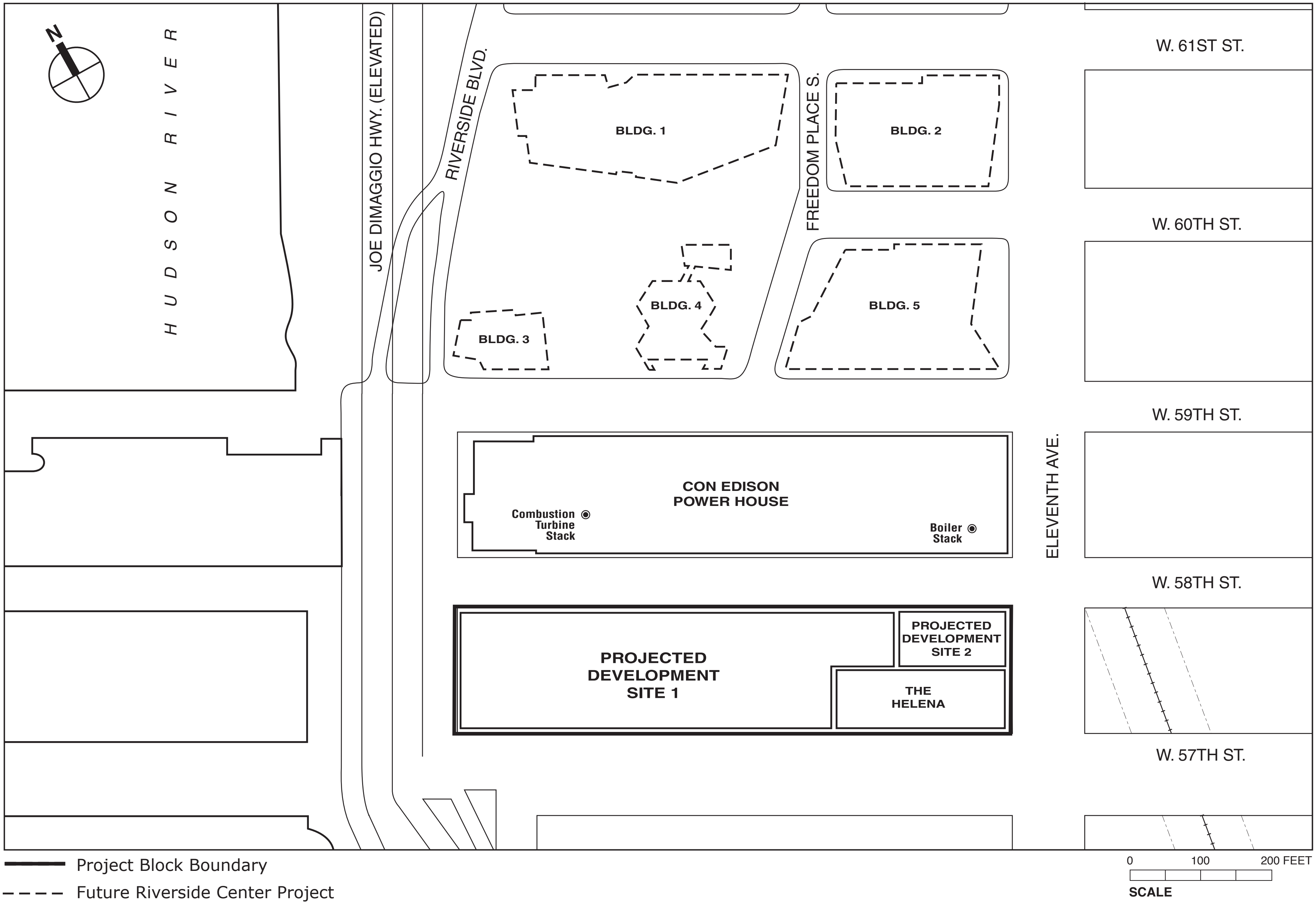

625 WEST 57TH STREET

Analysis of Con Edison Power House

Figure 11-1

Wind Tunnel Test Procedure

$PM_{2.5}$ concentrations from the Consolidated Edison Power House were estimated through wind tunnel tests on a scale model of the proposed project, the Con Edison facility, and their surroundings. The wind tunnel data were analyzed in combination with historical hour-by-hour wind conditions and pollutant background levels, in addition to variations in the boiler and combustion turbine operation.

The wind tunnel analysis focused on projected development site 1. Projected development site 2 would be much lower than the height of projected development site 1, and is farther away from the Con Edison emission stacks. Consequently, maximum plume concentrations at projected development site 2 from both the boiler stack and combustion turbine stack would be lower than at projected development site 1, due to the increase distance from the exhaust plumes. Therefore, no significant adverse air quality impacts would be predicted at projected development site 2 as long as no significant impacts are predicted at projected development site 1.

Cermak, Peterka, Petersen (CPP), Inc. constructed a scale model of the proposed project and its surroundings, for the purpose of analysis in a boundary layer wind tunnel. A 1:300 scale model of the proposed project (and all surrounding buildings and structures within a 1,700 foot radius) was constructed on a 3.45 meter (approximately 11.25 ft) circular disk. The atmospheric turbulence was simulated in the long working section of a wind tunnel by means of roughness elements placed in repeating patterns to create the atmosphere boundary layer characteristic for the site. Surface roughness was determined using the EPA AERSURFACE program and aerial photographs.

The wind tunnel tests were conducted by emitting a tracer gas at a known concentration and scaled flow rate from the Consolidated Edison Power House exhaust stack using established scaling procedures. Mean concentrations of tracer gas (a mixture of ethane, helium and nitrogen) were measured at receptor locations by drawing samples through flush-mounted tubes leading to a bank of infrared gas analyzers. The mean tracer gas concentration measured at each receptor was then recorded in the form of a dilution ratio.

To reduce the potential for stack exhaust plume meandering in the horizontal and vertical axis, and to properly represent steady-state conditions, CPP measured concentrations in the wind tunnel for 60 seconds for each speed/wind angle combination, which represents full scale concentration measurements of 15 minutes to 1 hour. At each receptor, concentrations were measured for a range of wind directions and wind speeds. The measured modeled concentrations were converted to full-scale normalized concentrations based on EPA model guidance[1]. The combustion turbine and boilers were assessed independently in the wind tunnel to quantify the pollutant contribution from each exhaust source.

The air quality analysis of the Con Edison combustion turbine was performed assuming a modification would take place so that it would fire natural gas instead of kerosene for normal operation and testing. Under this option, natural gas would be delivered to the Consolidated Edison Power House via a dedicated pipeline that would be directly connected to a nearby gas transmission main. This modification was considered as part of the Riverside Center development, which was subject to the City’s CEQR process and the subject of a final environmental impact statement completed in 2010. Con Edison has started construction of the

[1] Guideline for Use of Fluid Modeling of Atmospheric Diffusion (EPA, 1981)

gas pipeline to provide the necessary gas service to the Consolidated Edison Power House. The New York City Department of Environmental Protection (DEP) has issued a certificate to operate, and the Title V permit for the Con Edison facility has been modified by the DEC for the combustion turbine natural gas conversion and operation. Based on this information, it is anticipated that the conversion of the combustion turbine will be completed prior to the Build year for the proposed project. The proposed project's Restrictive Declaration will include provisions requiring completion of modifications related to the combustion turbine at the 59th Street Station Consolidated Edison Power House to address elevated $PM_{2.5}$ levels at the proposed project.

The wind tunnel testing for the boilers was performed at 50 percent load as the boilers most commonly operate at 50 percent load or less. The purpose of the testing was to verify that the boilers would not result in any potential significant adverse air quality impacts on the proposed project, since the Con Edison boiler stack is approximately 60 feet taller than the tallest point on projected development site 1.

The wind tunnel analysis employed post-processing steps to convert the normalized concentrations to full scale. For a specific source/receptor combination, normalized concentrations are measured for a variety of wind directions and wind speeds such that sufficient data is obtained to develop an equation describing the normalized concentration as a function of all wind directions and wind speeds. This functional dependence is used with hourly meteorological data to predict 1-hour average concentrations at each measurement location. The overall maximum predicted concentration for a specific source/receptor combination is obtained by ranking all predicted concentrations over the averaging time of interest and taking the highest one.

CPP utilized a procedure to estimate the pollutant concentrations versus wind speed and wind direction at each receptor, using a dispersion equation fit to the wind tunnel observations that was derived from the equation used by the EPA AERMOD model. Therefore, the analysis can account for the variation in wind conditions to predict concentrations over the five years of meteorological data considered.

The wind tunnel model was constructed and analyzed based on existing buildings within the study area and two different development timeframes: (1) development expected to be completed by the proposed project's 2015 Build year; and (2) development that is expected to occur subsequent to 2015. As discussed in Chapter 2, "Land Use, Zoning and Public Policy", this development by 2015 is expected to include Riverside Center buildings 2 and 5. The Riverside Center development includes three additional, approved buildings (identified as 1, 3 and 4) that would be completed after the proposed project's Build year. To assess whether these additional buildings (1, 3 and 4) would affect the dispersion of emissions from the Consolidated Edison Power House and to analyze the concentrations of pollutants on the proposed project, an analysis was conducted using the EPA AERMOD model. The analysis determined that the additional Riverside Center buildings do not affect the levels of predicted pollutant concentrations on the proposed project. To confirm this finding, additional wind tunnel modeling of the proposed project will be was performed between the DSEIS and FSEIS to account for the full development of the Riverside Center Site (buildings 1-5). The results of each of these wind tunnel analyses are this analysis will be presented in the FSEIS Section H, "Probable Impacts of the Proposed Project."

Emission Data

Information on the Con Edison boilers was obtained from several sources. Stack exhaust parameters were obtained primarily from the most recent performance tests conducted by Con

Edison. Additional information on historical operations was obtained from the EPA Clean Air Markets Division website[1] and monthly reports submitted by Con Edison to DEC. NO_2 emissions from the boilers were determined based on actual NO_x monitoring data. SO_2 emissions from the boilers when firing No. 6 oil was estimated based on the quantities of fuel used and the maximum annual average sulfur content of the fuel based on data from 2006 to 2008. PM emission factors from the boilers were provided by Con Edison along with estimates of filterable and condensable fractions from EPA AP-42 to estimate PM_{10} and $PM_{2.5}$ emissions.

For the combustion turbine, stack exhaust parameters were obtained from the most recent performance tests conducted by Con Edison.

The NO_2, SO_2 and PM emissions from the facility's combustion turbine were estimated based on the EPA AP-42 emission factors and detailed, hourly records of turbine use. As reported by Con Edison, the combustion turbine operates at peak load only, so emissions do not vary on an hourly basis when the turbine is operating, unlike the facility's boilers.

A summary of the stack parameters and emission rates is presented in **Table 11-4** for the selected boiler load, and with the turbine operating. The turbine is assumed to operate at maximum load when it is operating, based on information obtained from Con Edison.

Table 11-4
Con Edison Plant Stack Parameters and Emission Rates (g/sec)

Stack Parameters	Combustion Turbine	Boilers
Height (ft)	119	507
Stack Exhaust Diameter (ft)	12	16.5
Exhaust Velocity (ft/min)	4,447	2,303
Temp (°F)	888	403
NO_2 (oil)	N/A[3]	NA
NO_2 (gas)	8.87	NA
SO_2 (oil)	N/A[3]	39.7
SO_2 (gas)	0.09	0.08
PM_{10} (oil)	N/A[3]	6.75
PM_{10} (gas)	0.18	1.02
$PM_{2.5}$ (oil)	N/A[3]	5.29
$PM_{2.5}$ (gas)	0.18	1.02

Notes:
Emission rates are reported in grams/second.
NA - NO_2 emissions from the boilers were calculated based on actual NO_x monitoring data.
(1) For this ~~DSEIS~~ FSEIS, the combustion turbine is assumed to be modified to combust natural gas.
Sources: Con Edison, EPA AP-42.

As discussed earlier, the combustion turbine is used very infrequently (primarily for testing to ensure its reliability and availability), with an approximately 1 percent annual capacity factor. (For example, in 2011. the combustion turbine operated 20 times, and for a total of approximately 58 hours). Pollutant concentrations with the peaking turbine were determined based on the actual hours of operation from available operating records over the study period.

The analysis of the Con Edison facility assumed that the boilers operate on either No. 6 fuel oil or natural gas. Historically, natural gas usage for the Con Edison boiler represents approximately 40 percent of the total fuel usage on an annual heat input basis. Daily records on boiler fuel usage were used to determine the proportion of each fuel type.

[1] http://camddataandmaps.epa.gov/gdm/index.cfm?fuseaction=emissions.wizard

Receptors

Receptors were placed to represent the general impacts over a broad area of the proposed project's building façades. A higher density of receptors was placed on the locations where higher concentrations of pollutants from the combustion turbine and boiler stacks are anticipated.

Methodology Utilized for Estimating 1-Hour SO_2 Concentrations

Similar to the 1-hour NO_2 analysis described above, the EPA AERMOD dispersion model was used to estimate maximum 1-hour incremental concentrations of SO_2. Total hourly SO_2 concentrations throughout the modeling period were determined by adding the 4th-highest daily 1-hour maximum modeled concentrations (representing the 99th percentile value, which is the form of the 1-hour SO_2 NAAQS) averaged over five years to the 4th-highest daily maximum monitored background concentration averaged over recent three years consistent with the EPA guidance. Total concentrations were then compared with the 1-hour SO_2 NAAQS.

EFFECT OF PROPOSED PROJECT ON PLUME DISPERSION FROM THE CONSOLIDATED EDISON ~~59TH STREET STATION~~ POWER HOUSE

Existing and proposed developments near the project site were evaluated to assess whether the effect on plume dispersion from the Consolidated Edison ~~59th Street Station~~ Power House due to projected development site 1 would result in any significant adverse air quality impact.

AERMOD Analysis

Existing and proposed developments within 400 feet of projected development site 1 were initially studied using the AERMOD model (see **Figure 11-1**). The same stack and emission parameters to estimate potential impacts on the proposed project from the Consolidated Edison ~~59th Street Station~~ Power House were used. Impacts were calculated using the downwash assumptions in the AERMOD model to assess the effects of ~~the~~ projected development site 1 on plume dispersion ~~(see Section H. of this chapter, "*Probable Impacts of the Proposed Project*")~~.

For this analysis, the methodology used to determine total 1-hour NO_2 concentrations from the Consolidated Edison Power House was based on adding the monitored background to modeled concentrations, as follows: hourly modeled concentrations from emission sources were first added to the seasonal hourly background monitored concentrations; then the highest combined daily 1-hour NO_2 concentration was determined at each receptor location and the 98th percentile daily 1-hour maximum concentration for each modeled year was calculated within the AERMOD model; finally the 98th percentile concentrations were averaged over the latest five years. Total 1-hour NO_2 concentrations were determined following a methodology that is referenced in EPA modeling guidance[1], and is recognized by EPA and the City.[2]

Wind Tunnel Analysis

Based on the results of the AERMOD analysis, it was determined that concentrations of $PM_{2.5}$ and SO_2 (1-hour average) had the potential for significant adverse air quality impacts on a small portion

[1] http://www.epa.gov/ttn/scram/guidance/clarification/Additional_Clarifications_AppendixW_Hourly-NO2-NAAQS_FINAL_03-01-2011.pdf

[2] Hudson Square Rezoning Draft Environmental Impact Statement, August 17, 2012.

of proposed development at Riverside Center Building 5. Therefore, a wind tunnel study was performed for these pollutants.

The wind tunnel study followed the same general methodology as described for the analysis of $PM_{2.5}$ on the proposed project from the Consolidated Edison Power House. However, emissions from heating and hot water equipment at projected development site 1 were included in the wind tunnel analysis, since this source could potentially contribute to impacts at the affected locations at Riverside Center Building 5.

F. EXISTING CONDITIONS

Recent concentrations of all criteria pollutants at DEC air quality monitoring stations nearest the study area are presented in **Table 11-5**. All data statistical forms and averaging periods are consistent with the definitions of the NAAQS. It should be noted that these values are somewhat different than the background concentrations presented in **Table 11-3**, above. These existing concentrations are based on recent published measurements, averaged according to the NAAQS (e.g., $PM_{2.5}$ concentrations are averaged over the three years); the background concentrations are the highest values in past years, and are used as a conservative estimate of the highest background concentrations for future conditions.

Table 11-5
Representative Monitored Ambient Air Quality Data

Pollutant	Location	Units	Averaging Period	Concentration	NAAQS
CO	CCNY, Manhattan	ppm	8-hour	1.8	9
	CCNY, Manhattan		1-hour	2.3	35
SO_2	Queens College, Queens	µg/m^3	3-hour	65	1,300
			1-hour	78.2	196
PM_{10}	Madison Avenue, Manhattan	µg/m^3	24-hour	52	150
$PM_{2.5}$	P.S. 19, Manhattan	µg/m^3	Annual	12.2	15
			24-hour	27	35
NO_2	Queens College, Queens	µg/m^3	Annual	68	100
			1-hour	127.1	188
Lead	J.H.S. 126, Brooklyn	µg/m^3	3-month	0.019	0.15
Ozone	CCNY, Manhattan	ppm	8-hour	0.073	0.075

Notes: Based on the NAAQS definitions, the CO and 3-hour SO_2 concentrations for short-term averages are the second-highest from the year. $PM_{2.5}$ annual concentrations are the average of 2008, 2009, and 2010, and the 24-hour concentration is the average of the annual 98th percentiles in 2008, 2009 and 2010. 8-hour average ozone concentrations are the average of the 4th highest-daily values from 2008 to 2010. SO_2 1-hour and NO_2 1-hour concentrations are the average of the 99th percentile and 98th percentile, respectively, of the highest daily 1-hour maximum from 2008 to 2010.
Source: DEC, New York State Ambient Air Quality Data.

There were no monitored violations of the NAAQS for the pollutants at these sites in 2010.

G. THE FUTURE WITHOUT THE PROPOSED PROJECT

In the future without the proposed project, it is assumed that development on the projected development sites would be within the envelope of the development analyzed in the 2001 *FEIS*, but with a commercial building containing approximately 331,300 gsf of office use, 67,500 gsf of retail use and 239 public parking spaces on projected development site 1. The assumption regarding projected development site 1 is based on the fact that the applicant has applied for a building permit for such a building (the permitted building). The permitted building can be constructed under the land use approvals granted in 2001 without further discretionary approvals or actions. Absent the approvals, there would be no change in the assumed development of projected development site 2—the existing mini-storage building would remain.

In terms of mobile sources without the proposed project, vehicle emissions would be slightly higher than existing conditions, based on the permitted building and parking facility, and background growth. In the future without the proposed project, HVAC emissions in the area would be somewhat higher than existing conditions due to the development of the permitted building.

H. PROBABLE IMPACTS OF THE PROPOSED PROJECT

The proposed project would result in increased mobile source emissions in the immediate vicinity of the project area and could also affect the surrounding community with emissions from HVAC equipment. The following sections describe the results of the studies performed to analyze the potential impacts on the surrounding community from these sources for the Build year. In addition, existing industrial facilities, as well as large combustion sources including the Consolidated Edison Power House, were assessed for potential adverse impacts on the proposed project's buildings. As discussed in this section, the results of these analyses determined that the proposed project would not result in any significant adverse air quality impact.

MOBILE SOURCES

Based on the methodology previously described, the maximum predicted 8-hour average CO concentrations from the proposed parking facility at projected development site 1 were analyzed using several receptor points, a near side receptor on the same side of West 57th Street as the parking facility and a far side receptor on the opposite side of West 57th Street from the parking facility for a street side vent. The total CO impacts included both background CO levels and contributions from traffic on adjacent roadways (for the far side receptor only). There was also a receptor placed on the façade of the building above the parking garage and receptor in the courtyard.

The maximum predicted 8-hour average CO concentration of all the sensitive receptors described above would be 2.9 ppm for the building facade receptor. This value includes a predicted concentration of 1.1 ppm from the parking garage vent, and includes a background level of 1.8 ppm. This concentration is substantially below the applicable standard of 9 ppm. In addition, the prediction concentration of 1.1 ppm is below the CEQR *de minimis* criteria, which is approximately 6 ppm. As the results show, the proposed parking garage would not result in any significant adverse air quality impacts.

STATIONARY SOURCES

PROPOSED PROJECT'S HVAC SYSTEMS

Table 11-6 shows maximum predicted concentrations for NO_2 and PM_{10} from the proposed project's HVAC systems. As shown in the table, the predicted pollutant concentrations for each of the pollutant time averaging periods shown are below their respective standards.

The air quality modeling analysis also determined the highest predicted increase in annual average $PM_{2.5}$ concentrations (see **Table 11-7**). As shown in Table 11-7, the maximum projected $PM_{2.5}$ increments from the proposed project would be less than the applicable interim guidance criterion of 0.3 µg/m^3 for local impacts and 0.1 for neighborhood scale impacts.

Table 11-6
Future Maximum NO_2 and PM_{10} Concentrations from the Proposed Project's HVAC Sources (in µg/m³)

Pollutant	Averaging Period	Concentration Due to Stack Emission	Maximum Background Concentration	Total Concentration	Standard
NO_2	Annual(1)	0.7	67.7	68.4	100
	1-hour(2)	56.1	126.1	182.2	188
PM_{10}	24-hour	2.9	63	65.9	150

Notes:
(1) Annual NO_2 impacts were estimated using a NO_2 /NO_x ratio of 0.70.
(2) Reported concentration is the maximum total 98th percentile concentration at all receptors.

Table 11-7
Maximum Predicted $PM_{2.5}$ Annual Average Concentrations from the Proposed Project's HVAC Sources (in µg/m³)

Pollutant	Averaging Period	Maximum Concentration	Threshold Concentration
$PM_{2.5}$	Annual (discrete)	0.07	0.3

Note: The annual average neighborhood scale was not required to be modeled since the maximum concentration at any receptor is less than 0.1 µg/m³ criterion.

The air quality modeling analysis also determined the highest predicted increase in 24-hour average $PM_{2.5}$ concentrations. The 24-hour average $PM_{2.5}$ concentration increments with the proposed project were compared to the 24-hour average interim guidance criterion of 2 µg/m³ for discrete receptor locations (see Section D., *Air Quality Standards, Regulations Benchmarks* for a description of the City's $PM_{2.5}$ interim guidance criteria). The assessment examined the magnitude, duration, frequency, and extent of the increments at locations where exposure above the 2 µg/m³ threshold averaged over a 24-hour period could occur.

Table 11-8 presents a summary of the frequency, magnitude and location of predicted $PM_{2.5}$ concentration increments at receptor locations which exceed 2 µg/m³ (there are no receptor locations where the maximum predicted incremental concentrations of $PM_{2.5}$ would exceed 5 µg/m³). The results presented in **Table 11-8** represent the maximum incremental concentrations of $PM_{2.5}$ for a period of five years (2006 to 2010).

Projected Development Site 1 - The maximum 24-hour average incremental $PM_{2.5}$ concentration from projected development site 1, 2.92 µg/m³ (shown in **Table 11-8**), was predicted on the southwest corner of the proposed residential building at the northwest corner of West 59th street and West End Avenue (known as Riverside Center building 5) at a height of 431 feet. At the location where the maximum 24-hour average concentration was predicted, the maximum annual frequency of concentrations greater than 2 µg/m³ was six times per year, with the average frequency of less than two times per year, over five years. At the same elevation, on the north, south and west façades of the building, there were locations with incremental concentrations exceeding 2 µg/m³ At these locations, 24-hour average incremental concentrations from the proposed project were predicted to exceed 2 µg/m³ at a maximum frequency ranging from one to four times per year, with an average frequency of less than two times per year. Three other floors on this building were found to have locations with incremental concentrations exceeding 2 µg/m³, on the south façade at heights of 415 feet and 448 feet, and on the west façade at a height of 420 feet. At these locations, 24-hour average incremental concentrations from the proposed project were predicted to exceed 2 µg/m³ at a maximum frequency ranging from one to three times per year, but with an average frequency of once per year or less.

Table 11-8
Magnitude, Frequency and Location of
24-hour $PM_{2.5}$ Impacts > 2 µg/m³
From the Proposed Project's HVAC Sources

Building	Receptor Elevation	Façade	2006	2007	2008	2009	2010	Total	Max Conc. (µg/m³)	2nd Max Conc. (µg/m³)
Helena	118	North	1	0	0	1	0	2	2.29	2.21
Helena	118	North	1	1	0	2	2	6	2.64	2.19
Helena	128	North	0	1	0	1	0	2	2.14	2.00
Helena	138	North	0	0	0	1	0	1	2.02	<2
Helena	148	North	0	1	0	3	0	4	2.40	2.29
Helena	148	North	0	0	0	0	1	1	2.21	<2
Riverside Building 5	415	South	2	0	0	0	0	2	2.11	2.11
Riverside Building 5	415	South	1	1	0	0	0	2	2.22	2.03
Riverside Building 5	415	SW Corner	2	3	0	0	0	5	2.42	2.34
Riverside Building 5	420	West	2	3	0	0	0	5	2.50	2.48
Riverside Building 5	431	West	1	0	0	0	0	1	2.10	<2
Riverside Building 5	431	North	1	1	0	0	0	2	2.10	2.04
Riverside Building 5	431	South	2	0	0	0	0	2	2.26	2.10
Riverside Building 5	431	South	3	4	0	0	0	7	2.39	2.34
Riverside Building 5	431	SW corner	6	3	0	0	0	9	**2.92**	2.71
Riverside Building 5	431	West	1	1	0	0	0	2	2.46	2.24
Riverside Building 5	448	South	1	0	0	0	0	1	2.07	<2
Riverside Building 5	448	SW corner	1	1	0	0	0	2	2.16	2.13

Notes:
(1) Maximum predicated 24-hour average concentration increment shown in bold. Represents the maximum predicted 24-hour concentration over a five year period (2006-2010).
(2) Maximum concentrations predicted at the Helena are due to projected development site 2, and maximum concentrations predicted at Riverside Center Building 5 are due to projected development site 1.

Projected Development Site 2 - The maximum 24-hour average incremental $PM_{2.5}$ concentration from projected development site 2, 2.64 µg/m³ (shown in **Table 11-8)**, was predicted on the southwest corner of the Helena residential building at a height of 118 feet. Six locations on the existing Helena residential building also had incremental concentrations exceeding 2 µg/m³ on the north façade at heights ranging between 118 feet to 148 feet. At these receptors, 24-hour incremental concentrations from the proposed project were predicted to exceed 2 µg/m³ at a maximum frequency ranging from one to three times per year, but with an average frequency of less than two times per year.

This analysis is very conservative in the prediction of 24-hour average $PM_{2.5}$ incremental concentrations from the proposed project. The analysis of projected development site 1 is based on a worst-case (i.e., winter) operating scenario. Most of the exceedances of the 24-hour average interim guidance criteria are predicted to occur during non-winter months, when the fossil fuel-fired HVAC equipment (other than for domestic hot water heating) would operate at a much lower, or possibly not at all. Furthermore, $PM_{2.5}$ concentrations are examined on an incremental basis. However, the predicted concentrations of $PM_{2.5}$ from the proposed project do not take into account the $PM_{2.5}$ emissions that would occur without the proposed project.

Overall, the magnitude, extent, and frequency of 24-hour average $PM_{2.5}$ concentrations above 2.0 µg/m³ are low. Therefore, it would not result in a significant impact based on the City's interim guidance criteria. Overall, the proposed project's HVAC systems would not result in any significant adverse air quality impacts that were not addressed in the 2001 *FEIS*.

Projected Development Sites

To ensure that there are no significant adverse impacts of $PM_{2.5}$ from the proposed project's HVAC emissions, certain restrictions would be required regarding fuel type and exhaust stack location. The text of the (E) designations would be as follows:

- Block 1105, Lots 1, 5, 14, 19, p/o 36, and 43 (The new mixed-use building on projected development site 1 on the western and midblock portions of the project block)

  Any new development on the above-referenced property must ensure that fossil fuel fired heating and hot water equipment utilize only natural gas, and that heating and hot water equipment exhaust stack(s) are at least 413.5 feet above grade, and must be fitted with low NO_x burners with a maximum emission concentration of 30 ppm.

- Block 1105, p/o Lot 36 bounded by the north, west, and south lot lines of Lot 36 and a line parallel to and 150 feet west of the Lot 36 lot line along Eleventh Avenue (the midblock community facility use building)

  Any new development on the above-referenced property must ensure that fossil fuel fired heating and hot water equipment utilize only natural gas, and that heating and hot water equipment exhaust stack(s) are located at least 219 feet from the lot line facing Eleventh Avenue, and no more than 47 feet from the lot line facing West 58th Street, to avoid any potential significant air quality impacts.

- Block 1105, p/o Lot 36 bounded by the north, east, and south lot lines of Lot 36 and a line parallel to and 100 feet east of the Lot 36 west lot line (projected development site 2)

  Any new development on the above-referenced property must ensure that fossil fuel fired heating and hot water equipment utilize only natural gas, and that heating and hot water equipment exhaust stack(s) are no more than 30 feet from the lot line facing Eleventh Avenue, and no more than 20 feet from the lot line facing West 58th Street, and must be fitted with low NO_x burners with a maximum emission concentration of 30 ppm to avoid any potential significant air quality impacts.

With these restrictions in place, no significant adverse air quality impacts are predicted from the proposed project's HVAC emission sources.

INDUSTRIAL SOURCE ANALYSIS

As discussed above, a study was conducted to identify manufacturing and industrial uses within the 400-foot study area. DEP-BEC and EPA permit databases were used to identify existing sources of industrial emissions. Seven permitted facilities were identified within 400 feet of the project site in the Build scenario. This is a very conservative approach since the maximum concentrations from all of the sources analyzed were added together to determine their cumulative impact on the project site, regardless of where the maximum impact was predicted to occur.

The screening procedure used to estimate the pollutant concentrations from facilities with industrial emissions is based on information contained in the certificates to operate obtained from DEP-BEC. The information describes potential contaminants emitted by the permitted processes, hours per day, and days per year in which there may be emissions (which is related to the hours of business operation), and the characteristics of the emission exhaust systems (temperature, exhaust velocity, height, and dimensions of exhaust).

Table 11-9 presents the maximum impacts at the proposed site. The table also lists the SGC and AGC for each toxic air pollutant. The results of the industrial source analysis demonstrate that there would be no predicted significant adverse air quality impacts on the proposed project from existing industries in the area.

Table 11-9
Maximum Predicted Impacts from Industrial Sources

Potential Contaminants	Estimated Short-term Impact (μg/m³)	SGC[a] (μg/m³)	Estimated Long-term Impact (μg/m³)	AGC[a] (μg/m³)
Ammonium Hydroxide	0.40	2,400	0.000003	100
Carbon Monoxide	82.05	14,000	0.6501	--
Ethylene Glycol	1.09	10,000	0.0145	400
Isopropyl Alcohol	396.69	98,000	0.296	7,000
Methanol	0.08	33,000	0.0011	4,000
Nitrogen Dioxide	1.79	188.1	0.0135	100
Particulate	88.34	380	0.301	45
Tetrachloroethylene	1.36	1,000	0.0169	1

Notes:
[a] DEC DAR-1 (Air Guide-1) AGC/SGC Tables, October, 2010.
AGC-Annual Guideline Concentrations.
SGC-Short-term Guideline Concentrations.

ADDITIONAL SOURCES

~~*Consolidated Edison Power House*~~

Potential stationary source impacts on the proposed project from the Consolidated Edison Power House combustion turbine and boiler emissions were determined using the AERMOD model and wind tunnel analysis methodologies previously described. The analysis was performed assuming the Con Edison facility combustion turbine would be modified to fire natural gas, consistent with the analysis performed for the Riverside Center development, which was subject to the City's CEQR process and the subject of a final environmental impact statement completed in 2010. As discussed earlier, the wind tunnel analysis was performed for two timeframes: (1) development expected to be completed by the proposed project's 2015 Build year; and (2) development that is expected to occur subsequent to 2015.

The maximum estimated concentrations from the modeling were added to the background concentrations to estimate total air quality concentrations on the proposed project. The results of the AERMOD model analysis for NO_2, SO_2 and PM_{10} are presented in **Table 11-10**. As shown in the table, the predicted pollutant concentrations for all of the pollutant time averaging periods shown are below their respective standards.

The wind tunnel analysis determined the maximum predicted increase in 24-hour and annual average $PM_{2.5}$ increments from the Consolidated Edison Power House combustion turbine and boiler emissions on the proposed project (see **Table 11-11**). On an annual basis, the maximum projected $PM_{2.5}$ increments would be below the applicable interim guidance criterion of 0.3 $\mu g/m^3$ for local impacts for each wind tunnel scenario modeled.

Table 11-10
Future Maximum Predicted Concentrations on the Proposed Project from the Consolidated Edison Power House (in μg/m³)

Pollutant	Averaging Period	Concentration Due to Stack Emission	Maximum Background Concentration	Total Concentration	Standard
NO_2	Annual	2.5	67.7	70.2	100
	1-hour (1) (2)	32.1	126.1	158.2	188
SO_2	3-hour	31.3	183.2	214.5	1,300
	1-hour (3)	7.6	78.5	86.1	196
PM_{10}	24-hour	14.7	63	77.7	150

Notes:
(1) 1-Hour NO_2 concentrations were estimated using AERMOD PVMRM.
(2) Reported concentration is the maximum five-year average of the 98th percentile of daily maximum 1-hr modeled concentration added to the three-year average of the 98th percentile monitored background concentration.
(3) Reported concentration is the maximum five-year average of the 99th percentile of daily maximum 1-hr modeled concentration added to the three-year average of the 99th percentile monitored background concentration.

Table 11-11
Future Maximum Predicted $PM_{2.5}$ Annual Average Increments On the Proposed Project from the Consolidated Edison Power House (in μg/m³)

Maximum Increment	Incremental Threshold
Riverside Center Buildings 2 and 5	
0.05	0.30
Riverside Center Buildings 1-5	
0.044	0.30

The air quality analysis also evaluated concentration increments with the 24-hour average interim guidance criteria for discrete receptor locations. As described in the Section D., *Air Quality Standards, Regulations and Benchmarks*, the city's interim guidance criteria for $PM_{2.5}$ states that 24-hour average $PM_{2.5}$ concentration increments that are predicted to be greater than 2 μg/m³ but no greater than 5 μg/m³ would be considered a significant adverse impact on air quality based on the magnitude, frequency, duration, location, and size of the area of the predicted concentrations. Therefore, the assessment examined the magnitude, duration, frequency, and extent of the increments at locations where exposure above the 2 μg/m³ threshold averaged over a 24-hour period could occur. **Table 11-12** presents a summary of the frequency, magnitude and location of predicted $PM_{2.5}$ concentration increments at receptor locations that exceed 2 μg/m³ (there are no receptor locations where the maximum predicted incremental concentrations of $PM_{2.5}$ would exceed 5 μg/m³). The results presented in **Table 11-12** represent the maximum incremental concentrations of $PM_{2.5}$ for a period of five years (2006 to 2010). A detailed summary of the $PM_{2.5}$ results is included in **Appendix B** of the DSEIS.

Table 11-12
Magnitude, Frequency and Location of 24-hour $PM_{2.5}$ Impacts > 2 μg/m³ on the Proposed Project from the Consolidated Edison Power House

Receptor Elevation (1)	Façade (1)	2006	2007	2008	2009	2010	Total	Maximum Conc. (μg/m³)	2nd Maximum Conc. (μg/m³)
Riverside Center Buildings 2 and 5									
427	North	0	0	1	0	0	1	2.29	<2
357	North	0	0	2	0	0	2	3.60	2.42
347	North	0	0	1	0	0	1	2.22	<2
277	North	0	0	3	0	0	3	4.57	2.45
267	North	0	0	2	0	1	3	4.45	2.94
257	North	1	0	3	0	2	6	**4.97** (2)	4.38
197	North	1	0	2	0	2	5	4.00	2.46
187	North	3	0	3	0	5	11	4.87	4.82
187	North	1	0	0	1	4	6	4.40	3.87
187	North	0	0	1	0	1	2	3.53	3.25
127	North	1	0	0	0	3	4	3.32	2.87
127	North	0	0	0	0	2	2	2.46	2.03
Mid-roof	North	0	0	0	0	4	4	2.65	2.55
Mid-roof	North	0	0	0	0	1	1	2.09	<2
Mid-roof	North	0	0	2	0	0	2	4.33	2.56
Riverside Center Buildings 1-5									
427	North	0	0	1	0	0	1	3.04	≤2
357	North	0	0	1	0	0	1	3.51	≤2
347	North	0	1	1	0	0	2	**4.09** (2)	2.21
277	North	0	0	2	0	0	2	2.74	2.52
267	North	0	0	1	0	1	2	2.42	2.08
257	North	1	0	0	0	4	5	3.84	3.43
197	North	0	0	2	0	1	3	2.69	2.36
187	North	1	0	0	0	2	3	3.52	3.51
187	North	1	0	0	0	2	3	3.18	3.18
187	North	0	0	0	0	1	1	2.31	≤2
127	North	1	0	0	0	2	3	3.02	2.94
127	North	1	0	0	0	1	2	2.17	2.16
Mid-roof	North	0	0	0	0	0	0	≤2	≤2
Mid-roof	North	0	0	0	0	0	0	≤2	≤2
Mid-roof	North	0	0	0	0	0	0	≤2	≤2

Notes:
(1) Receptor elevations on projected development site 1.
(2) Maximum predicated 24-hour average concentration increment shown in bold. Represents the maximum predicted 24-hour incremental concentration over a five year period (2006-2010).

As presented in **Table 11-12**, the maximum concentrations are predicted to occur with Riverside Center buildings 2 and 5 (i.e., before Riverside Center buildings 1, 3, and 4 are constructed). For the wind tunnel analysis conducted with Riverside Center buildings 2 and 5, ~~T~~the receptor location with the maximum continual 24-hour exposure was predicted on the north façade of the projected development site 1, at an elevation of approximately 257 feet above Manhattan datum (which is equivalent to 259.75 feet above sea level). At this location, the maximum 24-hour $PM_{2.5}$ incremental concentration from the Con Edison turbine stack was predicted to be 4.97 μg/m³~~. At this location~~, and the 24-hour incremental concentrations from the Con Edison turbine stack were predicted to exceed 2 µg/m^3 at a maximum annual frequency of three times per year. In addition, ~~and at an average~~ the frequency of exceeding a $PM_{2.5}$ concentration threshold of 2.0 µg/m^3 is less than twice per year, averaged over the five modeled years. Fourteen other locations with incremental concentrations exceeding 2 µg/m^3 on projected development site 1 were predicted, on the north façade at various receptors. At these receptors, 24-hour incremental concentrations from the Con Edison turbine stack were predicted to exceed 2 µg/m^3 at a maximum frequency ranging from zero to five times per year, but with an average frequency of less than three times per year.

For the wind tunnel analysis conducted with Riverside Center buildings 1-5, the receptor location with the maximum continual 24-hour exposure was predicted on the north façade of the projected development site 1, at an elevation of approximately 347 feet above Manhattan datum. At this location, the maximum 24-hour $PM_{2.5}$ incremental concentration from the Con Edison turbine stack was predicted to be 4.09 µg/m^3, and the 24-hour incremental concentrations from the Con Edison combustion turbine and boiler stacks were predicted to exceed 2 µg/m^3 at a maximum annual frequency of once per year. In addition, the frequency of $PM_{2.5}$ concentrations exceeding 2.0 µg/m^3 is less than once per year, averaged over the five modeled years. Eleven other locations with incremental concentrations exceeding 2 µg/m^3 on projected development site 1 were predicted, on the north façade at various receptors. At these receptors, 24-hour incremental concentrations from the Con Edison combustion turbine and boiler stacks were predicted to exceed 2 µg/m^3 at a maximum frequency ranging of four times per year, but with an average frequency of once per year or less.

Overall, the magnitude, frequency, location, and size of the area of concentrations above 2 µg/m^3 is low and would not occur at locations where continuous 24-hour exposure would occur. Therefore, no significant adverse air quality impacts are predicted from the Consolidated Edison Power House on the proposed project.

While not accounted for in this analysis, the evaluation of $PM_{2.5}$ impacts should take into account future conditions that can be reasonably expected to occur. Con Edison has since 2002 invested over $15 billion on capital programs, which in part were designed to upgrade the Con Edison electrical transmission and distribution infrastructure, in order to increase equipment reliability and improve system performance. These improvements, both current and scheduled, include specific upgrades to substations in the area near the project site, new transmission capacity to the nearby load pocket and new in-city generation capacity. These investments are expected to lessen the circumstances under which the Con Edison combustion turbine would be called for dispatch in the event of a defined contingency in the future. Con Edison has indicated that, as a result of the programs and projects that it has implemented and will implement, system contingencies will be expected to be reduced and mitigated and the resultant operation of the combustion turbine is expected to be in line with the levels experienced recently, which are lower than levels experienced in the past, including the years analyzed for the air quality analysis (particularly 2006-2008).

In addition, Con Edison has commenced construction of a pipeline to provide dedicated natural gas service to the Consolidated Edison Power House's boilers and combustion turbine. There are a number of new and proposed air quality regulations and federal and state level which apply to Con Edison's steam system equipment and operations. Compliance with these regulations will ~~likely~~ necessitate reductions in the emissions of regulated pollutants such as NO_x prior to the proposed project's completion, requiring a greater reliance on cleaner burning fuels such as lower sulfur oil and natural gas compared to No. 6 oil. Since these fuels emit lower levels of particulate matter than

No. 6 oil, this will have a secondary benefit in reducing the $PM_{2.5}$ concentrations on the proposed project from the boiler stack. More broadly, future air quality in New York City is expected to improve, as presented in the DEC $PM_{2.5}$ SIP. As discussed earlier, NYSDEC has made a "Clean Data" request to the USEPA to petition for the reclassification of the NYC Metropolitan Area as attaining the 24-hour standard for $PM_{2.5}$. Taken together, these reductions are anticipated to result in an improvement in air quality at the project site, further reducing the 24-hour average $PM_{2.5}$ concentrations from the Con Edison facility, as well as from other sources in the ambient air.

Overall, both the incremental $PM_{2.5}$ concentrations from the Consolidated Edison Power House and the ambient background $PM_{2.5}$ concentrations are anticipated to be significantly reduced from the current levels.

EFFECT OF PROPOSED PROJECT ON PLUME DISPERSION FROM THE CONSOLIDATED EDISON ~~59TH STREET STATION~~ POWER HOUSE

Existing and proposed developments near the proposed project were evaluated ~~using the AERMOD model~~ to assess whether the effect on plume dispersion from the Consolidated Edison ~~59th Street Station~~ Power House due to projected development site 1 would result in any significant adverse air quality impact. The AERMOD analysis presented in the DSEIS showed that based on a comparison of pollutant concentrations for the no action scenario and the proposed project, the proposed project does not significantly affect pollutant concentration levels from the Consolidated Edison ~~59th Street Station~~ Power House on existing and proposed buildings within a 400 foot area around projected development site 1, except for a small portion on the proposed Riverside Center Building 5, on the north and east facades, with respect to certain pollutants.

Consequently, concentrations of NO_2, PM_{10} and SO_2 were evaluated using the AERMOD dispersion model, while concentrations of 1-hour SO_2 and $PM_{2.5}$ were evaluated using wind tunnel modeling. The analysis was performed for the no action scenario as well as for the proposed project to determine whether exceedances predicted in the build condition were attributable to the proposed project.

AERMOD Analysis

The results of the AERMOD analysis are presented in **Table 11-13** for NO_2, SO_2 and PM_{10}. As shown in the table, the maximum predicted pollutant concentrations are below their respective standards ~~for the annual NO_2, 3-hour SO_2 and PM_{10} NAAQS~~. Therefore, no significant adverse air quality impacts are predicted for these pollutant standards. 1-Hour SO_2 ~~and 1-Hour NO_2~~ concentrations were predicted to exceed the NAAQS on a small portion of proposed Riverside Center Building 5, ~~which would be considered a significant adverse air quality impact~~; therefore, a more refined analysis using wind tunnel modeling was performed for this pollutant, as discussed below.

Wind Tunnel Analysis

As discussed earlier, three building configurations were analyzed for the Build condition: (1) the solid top building presented in the DSEIS; (2) a design which would have on the top 77 feet portion of the building a more open design with structural elements on the south façade, and louvers on the north and east façades (Option A); and (3) a design which would have on the top 77 feet portion of the building a more open design with structural elements on the south, north and east façades (Option B). Figures 20-1 and 20-2 of Chapter 20, "Mitigation," show views of

Option A and Option B, respectively, while Figure 1-9 of Chapter 1, "Project Description," shows a more detailed view of the top section of Option A.

Table 11-13
Future Maximum Predicted Concentrations from the Consolidated Edison Power House on Developments Within 400 feet of the Proposed Project (in μg/m³)

Pollutant	Averaging Period	Maximum Modeled Concentration Due to Stack Emission	Maximum Background Concentration	Total Concentration	Standard
NO_2	Annual	9.6	67.7	77.3	100
	1-hour (1)	-- 79.4	126.1 --	205.5 171.6 (2)	188
SO_2	3-hour	686	183.2	869.2	1,300
	1-hour (3) (4)	639.2	78.5	717.7	196
PM_{10}	24-hour	42.4	63	105.4	150

Note:
(1) 1-Hour NO_2 concentrations were estimated using AERMOD with the PVMRM module.
(2) Reported concentration is the maximum five-year average of the 98th percentile of daily maximum 1-hr modeled concentration added to the three five-year average of the 98th percentile monitored seasonal-hourly background concentration. Thus the concentration includes the background.
(3) Reported concentration is the maximum five-year average of the 99th percentile of daily maximum 1-hr modeled concentration added to the three-year average of the 99th percentile monitored background concentration.
(4) The results presented are based on the AERMOD analysis presented in the DSEIS. A more refined analysis using wind tunnel modeling (see Table 11-14).

The results of the wind tunnel analysis are presented in **Table 11-14** for 1-hour SO_2. As shown in the table, for each of the project building designs modeled, the maximum predicted 1-hour SO_2 concentrations from the Consolidated Edison Power House and the proposed heating and hot water systems stack for projected development site 1 are less than the maximum predicted SO_2 concentrations for the No Build condition. Therefore, irrespective of the magnitude of the predicted SO_2 concentrations, the proposed project would not have adverse effects on the 1-hour SO_2 concentrations from the Consolidated Edison Power House.

The analysis also determined the maximum predicted increase in 24-hour and annual average $PM_{2.5}$ incremental concentrations on developments within 400 feet of the proposed project (see **Table 11-14 11-15**). As shown in **Table 11-15**, for any of the analyzed building configurations, there are no receptor locations where the maximum predicted 24-hour average incremental concentrations of $PM_{2.5}$ would exceed 2 μg/m³, or maximum predicted annual average incremental concentrations of $PM_{2.5}$ that would exceed 0.3 μg/m³. Therefore, Tthe results of the AERMOD wind tunnel analysis determined that the maximum predicted incremental concentrations of $PM_{2.5}$ were predicted to would not exceed the City's $PM_{2.5}$ interim guidance criteria on a small portion of proposed Riverside Center Building 5, on the north and east facades.

Table 11-14
Future Maximum Predicted 1-Hour SO_2 Concentrations from the Consolidated Edison Power House and Projected Development Site 1 on Riverside Building 5 (in µg/m^3)

Receptor Height (ft)	480	480	465	480	465	450	465	450	465	470
Façade	North	North	East	North	East	East	North	North	North	South
Solid Top										
Max Conc. (Proposed Project)	62.4	67.1	278.4	65.5	446.6	324.8	79.8	52.7	53.9	247.2
Max Conc. (No Action)	112.2	109.2	415.0	85.2	487.2	380.6	118.7	86.5	101.0	340.0
Increment (Proposed Project - No Action)	-49.8	-42.0	-136.7	-19.7	-40.5	-55.8	-38.9	-33.8	-47.1	-92.7
Option A (Louvered Top)										
Max Conc. (Option A)	66.0	68.3	334.5	56.7	348.0	354.0	83.6	49.8	55.0	339.2
Max Conc. (No Action)	112.2	109.2	415.0	85.2	487.2	380.6	118.7	86.5	101.0	348.6
Increment (Option A- No Action)	-46.2	-40.8	-80.5	-28.5	-139.2	-26.6	-35.1	-36.7	-46.0	-9.4
Option B (Open Top)										
Max Conc. (Option B)	67.7	67.9	327.5	57.2	392.7	336.8	94.4	58.7	62.4	299.6
Max Conc. (No Action)	112.2	109.2	415.0	85.2	487.2	380.6	118.7	86.5	101.0	358.0
Increment (Option B- No Action)	-44.5	-41.3	-87.6	-28.0	-94.4	-43.8	-24.4	-27.8	-38.6	-58.3

Note:
Reported concentrations are based on the 99th percentile of daily maximum 1-hr modeled SO_2 concentrations consistent with the form of the standard.
Results do not include the background concentration since concentrations are evaluated based on a comparison of the No Action and With Action conditions.

Table 11-15
Future Maximum Predicted $PM_{2.5}$ Incremental Concentrations from the Consolidated Edison Power House and Projected Development Site 1 on Riverside Building 5 (in µg/m^3)

Receptor Ht (ft)	480	480	465	480	465	450	465	450	465	470
Façade	North	North	East	North	East	East	North	North	North	South
Solid Top										
Max 24-Hour Avg	0.43	0.79	0.44	0.59	0.56	0.37	1.40	0.50	0.41	0.61
Annual Avg	-0.016	-0.019	-0.008	0.055	-0.038	-0.021	-0.001	-0.010	-0.033	-0.006
Option A (Louvered Top)										
Max 24-Hour Avg	1.90	0.46	0.52	0.39	0.49	1.23	1.42	0.39	0.42	0.75
Annual Avg	-0.010	-0.007	0.002	0.033	-0.052	0.014	0.003	-0.022	-0.029	0.090
Option B (Open Top)										
Max 24-Hour Avg	0.35	0.46	0.25	0.51	0.10	0.10	1.96	0.47	0.46	0.14
Annual Avg	-0.028	-0.014	-0.033	0.020	-0.075	-0.041	0.060	0.001	-0.003	-0.029

Note: $PM_{2.5}$ interim guidance criteria—24-hour average, 2 µg/m^3 (5 µg/m^3 not-to-exceed value) and annual average, 0.3 µg/m^3 not-to-exceed value.

Table 11-15 presents a summary of magnitude and location of predicted impacts for 1-hour NO_2, 1-hour SO_2 at receptor locations which exceed the NAAQS and 24-hour average $PM_{2.5}$ where it exceeds the City's $PM_{2.5}$ interim guidance criteria.

Table 11-14
Future Maximum Predicted $PM_{2.5}$ Increments from the Consolidated Edison Power House on Developments Within 400 feet of the Proposed Project (in µg/m³)

Averaging Period	Maximum Increment	Incremental Threshold
24-Hour	31.6	5/2
Annual	1.7	0.30
Note: 24-hour $PM_{2.5}$ interim guidance criterion, > 2 µg/m³ (5 µg/m³ not-to-exceed value), depending on the magnitude, frequency, duration, location, and size of the area of the predicted concentrations.		

Since maximum concentrations of $PM_{2.5}$ and 1-hour SO_2 and 1-hour NO_2 are predicted to exceed standards, this would be considered a significant adverse air quality impact. Therefore, mitigation measures, including reducing the maximum height of projected development site 1, or other changes in the building proposed for projected development site 1, may need to be implemented to avoid potential significant impacts. A wind tunnel analysis will also be performed between the DSEIS and FSEIS to examine building configurations that would avoid significant adverse air quality impacts on Riverside Center Building 5. Mitigation measures are discussed in Chapter 20.

Table 11-15
Potential Impacts from the Consolidated Edison Power House on Developments Within 400 feet of the Proposed Project (in µg/m³)

			Predicted Impact (µg/m³)			
Building	**Receptor Elevation**	**Façade**	**$PM_{2.5}$ 24-Hour**	**$PM_{2.5}$ Annual**	**SO_2 1-Hour**	**NO_2 1-Hour**
Riverside Building 5	480	North	N/A	N/A	257.2	N/A
Riverside Building 5	480	North	13.2	0.8	482.1	N/A
Riverside Building 5	480	NE Corner	31.6	1.7	717.7	205.5
Riverside Building 5	470	SE Corner	N/A	N/A	249.3	N/A
Riverside Building 5	465	North	8.1	0.5	327.4	N/A
Riverside Building 5	465	NE Corner	18.8	1.1	492.3	N/A
Riverside Building 5	465	East	14.0	0.8	430.5	N/A
Riverside Building 5	465	East	6.6	0.4	306.3	N/A
Riverside Building 5	465	SE Corner	N/A	N/A	210.1	N/A
Riverside Building 5	450	North	N/A	N/A	222.8	N/A
Riverside Building 5	450	NE Corner	9.7	0.6	325.7	N/A
Riverside Building 5	450	East	6.5	0.4	276.9	N/A
Riverside Building 5	430	NE Corner	N/A	N/A	213.6	N/A
Total Number of Receptors Impacted	--	--	8 Receptors	8 Receptors	13 Receptors	1 Receptor

Notes:
1-Hour NO_2 and 1-hour SO_2 concentrations presented are the sum of modeled concentrations added to the background concentrations according to the form of the standard.
N/A – Predicted concentrations are below the NAAQS or City's $PM_{2.5}$ interim guidance criteria.

The analysis demonstrates that the effect on plume dispersion from the Consolidated Edison Power House due to projected development site 1 would not result in any significant adverse air quality impacts. The analyses presented are based on Con Edison's historical utilization of No. 6 oil in the steam boilers. However, it is anticipated that, to comply with DEC regulations (6NYCRR Part 227-2) governing emission of nitrogen oxides (NO_x), which will take effect on July 1, 2014, and EPA regulations (40 CFR Part 63 Subpart DDDDD) governing emissions of hazardous air pollutants (HAPs) from steam boilers, which are scheduled to take effect on March 21, 2014, two of the boilers at the Consolidated Edison Power House (identified as Boiler 114 and 115) will be retrofitted to be capable of burning natural gas under full load, eliminating the need to utilize No. 6 oil except when required due to a gas supply curtailment or gas emergency. In addition, Con Edison will retrofit some of the existing boilers to reduce NO_x emissions to meet these regulations. These retrofits are scheduled to be completed before the proposed project's Build year, and will result in significant reductions in emissions of NO_2, as well as SO_2 and $PM_{2.5}$. Therefore, although not reflected in this analysis, maximum concentrations of these pollutants on Riverside Center Building 5 from the Consolidated Power House would be significantly lower as well.

Based on the results of the wind tunnel analysis, no significant adverse air quality impacts from the Consolidated Edison Power House are predicted on Riverside Center Building 5 due to the proposed project, and consequently, no mitigation measures are necessary. Therefore, any of the building configurations for projected development site 1 analyzed are considerable feasible. ✷