Chapter 12: Air Quality

A. INTRODUCTION

This chapter examines the potential for air quality impacts from the proposed actions. As described in Chapter 1, "Project Description," the applicant proposes a rezoning of a portion of the block bounded by West 56th and West 57th Streets and Eleventh and Twelfth Avenues from M1-5 and M2-3 to C4-7, along with other related land use actions. The proposed actions would facilitate the development on the proposed project site (development site 1) of a mixed-use building of approximately 1.2 million gross square feet (gsf). In addition, the proposed actions are assumed to result in the redevelopment of one additional site (development site 2) with a new, approximately 117,612 gsf hotel with 181 hotel rooms.

This analysis assesses the potential impacts resulting from redevelopment of both sites. The mobile source air quality analysis is based on the transportation analysis presented in Chapter 11, "Transportation." The transportation analysis assume as a conservative measure that the proposed project site is redeveloped with the Mixed-Use Reasonable Worse Case Development Scenario (RWCDS 2), which has a greater potential to result in transportation-related impacts than would the proposed project (RWCDS 1). Therefore, the mobile source analysis (including the analysis of potential impact due to the proposed project's parking) is based on RWCDS 2. In analyzing potential stationary source impacts due to the proposed actions, development that maximizes emissions was assumed (RWCDS 1). To determine potential stationary source impacts on buildings that would result from the proposed actions from new or existing sources, the development that maximizes sensitive uses was assumed (RWCDS 1).

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 a proposed project.

Heating, ventilation, and air conditioning (HVAC) systems would be included to provide heating and cooling to the new buildings under the proposed actions. This air quality analysis assesses the impacts of fossil fuel-fired HVAC systems on the environment. In addition the analysis examines the impacts of emissions from the potential automotive showroom service area.

The potential effects on the proposed building and potential new hotel on development site 2 from nearby existing emission sources, including the Consolidated Edison Power House, are examined. In addition, since the proposed rezoning area is adjacent to a zoned industrial area, air quality impacts from nearby industrial sources of air pollution (e.g., from manufacturing or processing facilities) are also examined. The Proposed Project is also adjacent to an existing garage operated by the Department of Sanitation (DSNY). Therefore, potential air quality effects from DSNY vehicles traveling to and from the garage are evaluated.

Based on the traffic analysis (see Chapter 11, "Transportation"), the maximum hourly incremental traffic from the proposed actions is predicted to exceed the 2012 *CEQR Technical Manual* carbon monoxide (CO) screening threshold of 140 peak hour trips at one intersection in the traffic study area. Therefore, a quantified assessment of CO emissions from project-generated traffic is warranted. However, it would not exceed the particulate matter emission screening threshold discussed in Chapter 17, Sections 210 and 311 of the 2012 *CEQR Technical Manual*. The proposed project would include below-grade parking with up to 500 spaces; therefore, an analysis was conducted to evaluate potential future pollutant concentrations in the vicinity of the ventilation outlets with the proposed parking garage.

PRINCIPAL CONCLUSIONS

A summary of the general findings of the air quality analyses is presented below. With the assignment of (E) designations related to air quality, and with restrictions on development site 1's proposed building height and massing in place in the Restrictive Declaration to be recorded, no significant adverse impacts related to air quality would result from the proposed actions.

Concentrations of CO due to the proposed parking garage 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 HVAC sources with the proposed actions 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 $PM_{2.5}$ *de minimis* criteria, which determined that the maximum predicted $PM_{2.5}$ increments from the proposed actions would be less than the applicable annual average criterion of 0.3 $\mu g/m^3$ for local impacts and 0.1 for neighborhood-scale impacts. The air quality modeling analysis also determined the highest predicted increase in 24-hour average $PM_{2.5}$ concentrations would not exceed the applicable *de minimis* criterion. To ensure that there are no significant adverse impacts resulting from the proposed actions due to HVAC emissions, certain restrictions would be included in (E) designations for both the proposed project site (development site 1) and development site 2.

Emissions from testing of vehicles in the potential automotive showroom service area were determined to not result in any violations of NAAQS.

Nearby existing sources from manufacturing or processing facilities were analyzed for their potential impacts on new development within the rezoning area. The results of the analysis demonstrated that there would be no significant adverse air quality impacts from industrial sources of emissions on either the proposed project site 1 or 2.

$PM_{2.5}$ concentrations related to the DSNY vehicles traveling to and from the garage were analyzed, and the results demonstrated that there would be no significant adverse air quality impacts on the Proposed Project.

The proposed actions would result in the development of new residential and commercial uses in 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 proposed 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 boiler and combustion turbine stacks on the building on the proposed project site would 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 Power House boiler and combustion turbine stacks would not exceed the city's *de minimis* criteria.

The analysis of the Con Edison Power House boilers and combustion turbine was performed considering modifications Con Edison is making so that all equipment would fire natural gas instead of distillate fuel under normal operations. Under these modifications, 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. Con Edison has started construction of the gas pipeline to provide the necessary gas service to the Consolidated Edison Power House, and conversion of the boilers and combustion turbine is anticipated to be completed in 2014, well before the 2017 analysis year. The New York City Department of Environmental Protection (DEP) has issued a certificate to operate, and the existing Title V permit for the Con Edison Power House has been modified by the New York State Department of Environmental Conservation (NYSDEC), for the combustion turbine and boiler natural gas conversion and operation.

Concentrations of pollutants from commercial, institutional and residential developments within 400 feet of the proposed project site were estimated for their potential impacts on the proposed project. It was determined that concentrations of NO_2, SO_2 and PM_{10} from these sources would not result in any violations of the NAAQS for these pollutants, and it was determined that incremental increases in $PM_{2.5}$ would not exceed the city's *de minimis* criteria.

In addition, potential cumulative impacts from the Con Edison Power House and commercial, institutional and residential developments within 400 feet of the proposed project site were estimated for their potential impacts on the proposed project. It was determined that maximum concentrations of NO_2, SO_2 and PM_{10} would not result in any violations of the NAAQS for these pollutants, and it was determined that incremental increases in $PM_{2.5}$ would not exceed the city's *de minimis* criteria.

Existing and proposed developments near the proposed project site were evaluated to assess whether the effect on plume dispersion from the Consolidated Edison Power House combustion turbine and boiler emissions due to the proposed actions would result in any significant adverse air quality impacts. The analysis demonstrated that the effect on plume dispersion from the Consolidated Edison Power House due to the proposed actions would not result in any significant adverse air quality impacts on buildings in the area, including Riverside Center Building 5 and the Durst West 57th Street development.

B. 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 some sources utilizing non-road diesel such as large international marine engines. On-road diesel vehicles currently contribute 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. Ambient concentrations of CO, PM, NO2, SO_2, and lead are regulated by the U.S. Environmental Protection Agency (EPA) under the Clean Air Act, and are referred to as 'criteria pollutants'; emissions of VOCs, NO_x, and other precursors to criteria pollutants are also regulated by EPA.

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. CO concentrations can diminish rapidly 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 actions would result in an increase in vehicle trips higher than the 2012 *CEQR Technical Manual* screening threshold of 140 trips at one nearby intersection. Therefore, a mobile source analysis was conducted to evaluate future CO concentrations with and without the proposed actions. In addition, 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 proposed actions 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

[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.

become of greater concern for this pollutant. Emissions of NO_2 were analyzed for natural gas-fired HVAC equipment under the proposed actions. In addition, potential impacts of NO_2 emissions from existing sources in the vicinity of the rezoning area were evaluated.

LEAD

Airborne lead emissions are currently associated principally with industrial sources. Lead in gasoline has been banned under the Clean Air Act, and therefore, lead is not a pollutant of concern for the proposed actions; 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.

Diesel-powered vehicles, especially heavy duty trucks and buses, are a significant source of respirable PM, most of which is $PM_{2.5}$; PM concentrations may, consequently, be locally elevated near roadways with high volumes of heavy diesel powered vehicles. The proposed actions would not result in any significant increases in truck traffic near the rezoning area 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 of PM from the proposed project was not warranted. However, an analysis of $PM_{2.5}$ from vehicles traveling to and from the DSNY garage was performed to determine the potential for an air quality impact on the proposed project.

An analysis was conducted to assess the PM impacts due to natural gas-fired HVAC systems with the proposed actions. In addition, potential impacts of PM emissions from existing sources in the vicinity of the rezoning area were evaluated.

SULFUR DIOXIDE

SO_2 emissions are primarily associated with the combustion of sulfur-containing fuels (oil and coal). SO_2 is also of concern as a precursor to $PM_{2.5}$ and is regulated as a $PM_{2.5}$ precursor under the New Source Review permitting program for large sources. 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 stationary sources with the proposed actions 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 rezoning area were evaluated.

AIR TOXICS

In addition to the criteria pollutants discussed above, non-criteria air pollutants, also called air toxics, may be of 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.

As the rezoning area is adjacent to a zoned industrial area, an analysis to examine the potential for impacts from industrial emissions was performed.

C. 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 12-1**. 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 total suspended PM, settleable particles, non-methane hydrocarbons, and ozone that correspond to federal standards that have since been revoked or replaced, and for beryllium, fluoride, and hydrogen sulfide.

EPA recently lowered the primary annual-average standard from 15 $\mu g/m^3$ to 12 $\mu g/m^3$, effective March 2013.

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 and instituting a secondary ozone 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 these standards has been postponed and is currently in review.

Table 12-1
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 (2)	NA	0.15	NA	0.15
Nitrogen Dioxide (NO_2)				
1-Hour Average (3)	0.100	188	None	
Annual Average	0.053	100	0.053	100
Ozone (O_3)				
8-Hour Average (4) (5)	0.075	150	0.075	150
Respirable Particulate Matter (PM_{10})				
24-Hour Average (1)	NA	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Annual Mean (6)	NA	12	NA	15
24-Hour Average (7)	NA	35	NA	35
Sulfur Dioxide (SO_2) (8)				
Maximum 3-Hour Average (1)	NA	NA	0.50	1,300
1-Hour Average (9)	0.075	196	NA	NA

Notes:
ppm – parts per million (unit of measure for gases only)
µg/m³ – micrograms per cubic meter (unit of measure for gases and particles, including lead)
NA – not applicable
All annual periods refer to calendar year.
Standards are defined in ppm. Approximately equivalent concentrations in µg/m³ are presented.
(1) Not to be exceeded more than once a year.
(2) EPA has lowered the NAAQS down from 1.5 µg/m³, effective January 12, 2009.
(3) 3-Year average of the annual 98th percentile daily maximum 1-hr average concentration. Effective April 12, 2010.
(4) 3-year average of the annual fourth-highest daily maximum 8-hr average concentration.
(5) 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 these standards has been postponed and is currently in review.
(6) 3-Year average of annual mean. EPA has lowered the primary standard from 15 µg/m³, effective March 2013.
(7) Not to be exceeded by the annual 98th percentile when averaged over 3 years.
(8) EPA revoked the 24-hour and annual primary standards, replacing them with a 1-hour average standard. Effective August 23, 2010
(9) 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.

EPA lowered the primary and secondary standards for lead to 0.15 µg/m³, 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.

EPA established a new 1-hour average NO_2 standard of 0.100 ppm, effective April 10, 2010, 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 also established a 1-hour average SO_2 standard of 0.075 ppm, replacing the 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 (the 4th highest daily maximum corresponds approximately to 99th percentile for a year.)

Federal ambient air quality standards do not exist for non-criteria compounds. However, the NYSDEC has issued standards for certain non-criteria compounds, including beryllium, gaseous fluorides, and hydrogen sulfide. NYSDEC has also developed ambient guideline concentrations for numerous air toxic non-criteria compounds. The NYSDEC guidance document DAR-1 (October 2010) contains a compilation of annual and short term (1-hour) guideline concentrations for these compounds. The NYSDEC guidance thresholds represent ambient levels that are considered safe for public exposure.

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, followed by a plan for maintaining attainment status once the area is in attainment.

In 2002, EPA re-designated New York City as in attainment for CO. Under the resulting maintenance plans New York City is 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 January 30, 2013, New York State requested that EPA approve its withdrawal of the 1995 SIP and redesignation request for the 1987 PM_{10} NAAQS, and that EPA make a clean data finding instead, based on data monitored from 2009-2011 indicating PM_{10} concentrations well below the 1987 NAAQS. Although not yet a redesignation to attainment status, if approved, this determination would remove further requirements for related SIP submissions.

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. Based on recent monitoring data (2006-2011), annual average concentrations of $PM_{2.5}$ in New York City no longer exceed the annual standard. EPA has determined that the area has attained the 1997 annual $PM_{2.5}$ NAAQS, effective December 15, 2010. Although not yet a redesignation to attainment status, this determination removes further requirements for related SIP submissions~~. New York State submitted a redesignation request and maintenance plan to EPA in February 2013~~. On February 11, 2014, EPA proposed to approve New York State's request to redesignate the area to attainment with the 1997 annual NAAQS and the associated maintenance plan. EPA will make initial attainment designations for the new 12 µg/m^3 NAAQS by December 2014. Based on analysis of 2009-2011 monitoring data, it is possible that the region will be in attainment for the new standard.

As described above, EPA has revised the 24-hour average $PM_{2.5}$ standard. In November 2009 EPA designated the New York City Metropolitan Area as nonattainment with the 2006 24-hour $PM_{2.5}$ NAAQS. 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 (2007-2011), EPA determined that the area has attained the standard. Although not yet a redesignation to attainment status, this determination removes further requirements for related SIP submissions. New York State submitted a redesignation request and maintenance plan to EPA in February 2013. On February 11, 2014, EPA proposed to approve New York State's request to redesignate the area to attainment with the 2006 24-hour NAAQS and the associated maintenance plan.

Nassau, Rockland, Suffolk, Westchester, Lower Orange County Metropolitan Area (LOCMA), and the five New York City counties (the New York–New Jersey–Long Island Nonattainment Area, New York portion) had been designated as a severe non-attainment area for ozone (1-hour average standard, 0.12 ppm). Effective June 15, 2004, EPA designated these same counties as moderate non-attainment for the 1997 8-hour average ozone standard. On June 18 2012, EPA determined that these areas have attained both the 1990 1-hour ozone NAAQS (0.12 ppm) and the 1997 8-hour ozone NAAQS (0.08 ppm). Although not yet a redesignation to attainment status, this determination removes further requirements under the 1-hour and 1997 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 will be 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 former 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. Additional monitoring will be required. Draft attainment designations were published by EPA in February 2013, indicating that EPA is deferring action to designate areas in New York State and expects to proceed with designations once additional data are gathered.

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 12-1**) would

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

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.

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.

DE MINIMIS CRITERIA REGARDING $PM_{2.5}$ IMPACTS

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

- Predicted increase of more than half the difference between the background concentration and the 24-hour standard; or
- 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 or ground level receptor location.

Actions under CEQR predicted to increase $PM_{2.5}$ concentrations by more than the CEQR *de minimis* criteria above will be considered to have a potential significant adverse impact.

The above *de minimis* criteria have been used to evaluate the significance of predicted impacts on $PM_{2.5}$ concentrations and determine the need to minimize particulate matter emissions resulting from the proposed actions. The *de minimis* criteria have also been used to assess the significance of predicted discrete impacts from nearby emissions sources on the new development that would take place with the proposed actions.

D. METHODOLOGY FOR PREDICTING POLLUTANT CONCENTRATIONS

INTRODUCTION

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

- Mobile Source Analysis
  - Impacts at intersections in the study area due to project-generated vehicles
  - Impacts due to the proposed parking garage; and
  - Impacts on the proposed project due to DSNY vehicles.
- Stationary Source Analysis
  - Impacts from fossil fuel-fired HVAC systems with the proposed actions;
  - Impacts from a potential auto showroom service center emissions;
  - Impacts from nearby industrial sources on new development that would take place with the proposed actions;
  - Impacts from the Consolidated Edison Power House and other existing sources; and
  - Impacts of the massing of new buildings with the proposed actions on concentrations of pollutants from the Consolidated Edison Power House at nearby buildings.

MOBILE SOURCES

As stated above, the proposed actions are not expected to exceed the $PM_{2.5}$ 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 actions.

Potential impacts of CO due to mobile sources from the proposed actions were evaluated, as follows.

INTERSECTION ANALYSIS

The prediction of vehicle-generated emissions and their dispersion in an urban environment incorporates meteorological phenomena, traffic conditions, and physical configuration. Air pollutant dispersion models mathematically simulate how traffic, meteorology, and physical configuration combine to affect pollutant concentrations. The mathematical expressions and formulations contained in the various models attempt to describe an extremely complex physical phenomenon as closely as possible. However, because all models contain simplifications and approximations of actual conditions and interactions, and since it is necessary to predict the reasonable worst-case condition, most dispersion analyses predict conservatively high concentrations of pollutants, particularly under adverse meteorological conditions.

The mobile source analyses employ a model approved by EPA that has been widely used for evaluating air quality impacts of projects in New York City, other parts of New York State, and throughout the country. The modeling approach includes a series of conservative assumptions relating to meteorology, traffic, and background concentration levels resulting in a conservatively high estimate of expected pollutant concentrations that could ensue from the proposed actions.

Vehicle Emissions

Vehicular CO engine emission factors were computed using the EPA mobile source emissions model, MOVES.[1] This emissions model is capable of calculating engine emission factors for various vehicle types, based on the fuel type (gasoline, diesel, or natural gas), meteorological conditions, vehicle speeds, vehicle age, roadway type and grade, number of starts per day, engine soak time, and various other factors that influence emissions, such as inspection maintenance programs. The inputs and use of MOVES incorporate the most current guidance available from NYSDEC.

Vehicle classification data were based on field studies. Appropriate credits were used to accurately reflect the inspection and maintenance program. The inspection and maintenance programs require inspections of automobiles and light trucks to determine if pollutant emissions from each vehicle exhaust system are lower than emission standards. Vehicles failing the emissions test must undergo maintenance and pass a repeat test to be registered in New York State.

County-specific hourly temperature and relative humidity data obtained from NYSDEC were used.

Traffic Data

Traffic data for the air quality analysis were derived from existing traffic counts, projected future growth in traffic, and other information developed as part of the traffic analysis for the proposed actions (see Chapter 11, "Transportation"). Traffic data for the future No Build and Build conditions was employed in the respective air quality modeling scenarios. The Weekday Midday (11:00 AM to 12:00 PM), Weekday PM (6:00 PM to 7:00 PM) and Saturday Midday (3:00 PM to 4:00 PM) peak periods were analyzed.

Dispersion Model for Microscale Analyses

Maximum CO concentrations adjacent to streets within the surrounding area, resulting from vehicle emissions, were predicted using the CAL3QHC model Version 2.0.[2] The CAL3QHC model employs a Gaussian (normal distribution) dispersion assumption and includes an algorithm for estimating vehicular queue lengths at signalized intersections. CAL3QHC predicts emissions and dispersion of CO from idling and moving vehicles. The queuing algorithm includes site-specific traffic parameters, such as signal timing and delay calculations (from the 2000 *Highway Capacity Manual* traffic forecasting model), saturation flow rate, vehicle arrival type, and signal actuation (i.e., pre-timed or actuated signal) characteristics to accurately predict the number of idling vehicles. The CAL3QHC model has been updated with an extended module, CAL3QHCR, which allows for the incorporation of hourly meteorological data into the modeling, instead of worst-case assumptions regarding meteorological parameters. This refined version of the model, CAL3QHCR, is employed if maximum predicted future CO

---

[1] EPA, Motor Vehicle Emission Simulator (MOVES), User Guide for MOVES2010b, June 2012.

[2] EPA, User's Guide to CAL3QHC, A Modeling Methodology for Predicted Pollutant Concentrations Near Roadway Intersections, Office of Air Quality, Planning Standards, Research Triangle Park, North Carolina, EPA-454/R-92-006.

concentrations are greater than the applicable ambient air quality standards or when *de minimis* thresholds are exceeded using the first level of CAL3QHC modeling.

Meteorology

In general, the transport and concentration of pollutants from vehicular sources are influenced by three principal meteorological factors: wind direction, wind speed, and atmospheric stability. Wind direction influences the direction in which pollutants are dispersed, and atmospheric stability accounts for the effects of vertical mixing in the atmosphere. These factors, therefore, influence the concentration at a particular prediction location (receptor).

In applying the CAL3QHC model, the wind angle was varied to determine the wind direction resulting in the maximum concentrations at each receptor. Following the EPA guidelines[1], CAL3QHC computations were performed using a wind speed of 1 meter per second, and the neutral stability class D. The 8-hour average CO concentrations were estimated by multiplying the predicted 1-hour average CO concentrations by a factor of 0.77 to account for persistence of meteorological conditions and fluctuations in traffic volumes. A surface roughness of 3.21 meters was chosen. At each receptor location, concentrations were calculated for all wind directions, and the highest predicted concentration was reported, regardless of frequency of occurrence. These assumptions ensured that worst-case meteorology was used to estimate impacts.

Analysis Year

The microscale analyses were performed for existing conditions and 2017, the analysis year for the proposed actions. The future analysis was performed with and without the proposed actions.

Background Concentrations

Background concentrations are those pollutant concentrations originating from distant sources that are not directly included in the modeling analysis, which directly accounts for vehicular emissions on the streets within 1,000 feet and in the line of sight of the analysis site. Background concentrations must be added to modeling results to obtain total pollutant concentrations at an analysis site.

The background concentrations for the nearest monitored location are presented in **Table 12-2**. CO concentrations are based on the latest available five years of monitored data (2007–2011). Consistent with the NAAQS, the second-highest value is used. These values were used as the background concentrations for the mobile source analysis.

Table 12-2
Maximum Background Pollutant Concentrations
For Mobile Source Sites (μg/m^3)

Pollutant	Average Period	Location	Concentration	NAAQS
CO	1-hour	CCNY, New York	2.7	35 ppm
	8-hour		1.8	9 ppm

Note: CO values are the highest of the latest 5 years.
Source: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2007–2011.

---

[1] *Guidelines for Modeling Carbon Monoxide from Roadway Intersections*, EPA Office of Air Quality Planning and Standards, Publication EPA-454/R-92-005.

Analysis Site

One analysis site was selected for microscale analysis, at 11th Avenue and West 57th Street. This site was selected because it is the only location in the study area where levels of project-generated traffic are predicted to exceed the CO *CEQR Technical Manual* screening threshold of 140 peak hour trips at an intersection.

Receptor Placement

Multiple receptors (i.e., precise locations at which concentrations are predicted) were modeled at the selected site; receptors were placed along the approach and departure links at spaced intervals. Ground level receptors were placed at sidewalk or roadside locations near intersections with continuous public access, at a pedestrian height of 1.8 meters.

PARKING ANALYSIS

The proposed project would include a below-grade parking garage with a capacity up to 500 spaces. 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 parking garage 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 MOVES mobile source emission model 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 11, "Transportation."

The new parking garage would be located on three below-grade levels, with entrance/egress from both West 56th Street and West 57th Street, but alternately access and egress may be provided from West 57th Street only. 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 north façade of the proposed project site, and "near" and "far" receptors were placed along the sidewalks at a pedestrian height of 6 feet at a distance of 10 feet and 90 feet, respectively, from the vent. West 57th Street was assumed for the vent location since background traffic volumes are higher than West 56th 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. A persistence factor of 0.77 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, as referenced in the 2012 *CEQR Technical Manual*.

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.

DSNY VEHICLE ANALYSIS

The rezoning area is adjacent to an existing garage operated by the Department of Sanitation (DSNY). Therefore, potential air quality effects on the proposed project from DSNY vehicles traveling to and from the garage were evaluated.

Information was obtained from DSNY on the number of vehicles that operate from the DSNY garage. From this information, it was estimated that up to 84 DSNY vehicles would operate on a typical peak day (primarily collection trucks and street sweepers). It was assumed that all of the vehicles would depart the garage during the 6 AM to 7 AM period, and would take routes along West 57th Street, 11th Avenue and West 56th Street. Since there are a number of garage entrances and exits, not all of the vehicles would utilize these routes. A conservative estimate of 50 percent was used for travel along West 57th Street and 11th Avenue, and 75 percent along West 56th Street. In addition to DSNY vehicles, employee trips were accounted for, since the garage includes a 100 below grade accessory parking area for DSNY employees.

The EPA MOVES model, described earlier, was used to estimate vehicle emissions of $PM_{2.5}$. In accordance with the $PM_{2.5}$ *de minimis* criteria methodology, $PM_{2.5}$ emission rates were determined with fugitive road dust to account for their impacts in local microscale analyses. However, fugitive road dust was not included in the neighborhood-scale $PM_{2.5}$ microscale analysis, since the DEP considers it to have an insignificant contribution on that scale. Road dust emission factors were calculated according to the latest procedure delineated by EPA[1] and the *CEQR Technical Manual*.

To determine motor vehicle generated PM concentrations on the proposed project adjacent to streets within the study area, the EPA AERMOD model was applied. $PM_{2.5}$ emissions were modeled using line source option, and includes the modeling of hourly concentrations based on estimated hourly DSNY vehicle data and five years of monitored hourly meteorological data. The data consists of surface data collected at LaGuardia Airport and upper air data collected at Brookhaven, New York for the period of 2007-2011. DSNY garage operating hours were modeled, and the highest resulting concentration for each averaging period is presented.

$PM_{2.5}$ impacts are assessed on an incremental basis and compared with the $PM_{2.5}$ *de minimis* criteria. The $PM_{2.5}$ 24-hour average background concentration of 27 $\mu g/m^3$ (based on the 2009 to

[1] EPA, Compilations of Air Pollutant Emission Factors AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, Ch. 13.2.1, NC, http://www.epa.gov/ttn/chief/ap42, January 2011.

2011 average of 98th percentile concentrations) was used to establish the *de minimis* value, consistent with the background concentration provided for PS 19 in the *CEQR Technical Manual.*

Receptors were placed at sensitive locations, i.e., at potential operable windows and outdoor spaces at the lowest occupied floor of the proposed buildings.

STATIONARY SOURCES

HVAC SYSTEMS

The proposed building on development site 1 would include fossil fuel-fired HVAC equipment. Therefore, a stationary source analysis was conducted to evaluate potential air quality impacts.

The building on development site 1 would include natural gas-fired condensing boilers 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 and NO_x emission rates for the proposed building were estimated using the maximum number of boilers that would be operating under peak load conditions. The annual average emission rates were developed using annual fuel consumption estimates based on energy modeling data. Emissions rates for NO_x and PM 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 potential hotel assumed for development site 2, design information is not available. Therefore, for this site, stack exhaust parameters and HVAC emissions were conservatively estimated using 2012 *CEQR Technical Manual* guidance. Based on initial, worst-case assumptions of fuel type (No. 2 fuel oil) and NO_x emissions, potential significant adverse air quality impacts were identified on projected development site 1. Therefore, to avoid a potential significant adverse impact, development site 2 was analyzed assuming natural gas-fired boilers equipped with low NO_x burners (30 ppm or less)

Table 12-3 summarizes the emissions rates and stack parameters for the modeled HVAC sources.

Table 12-3
Estimated HVAC Emissions from the Proposed Actions

Parameter	Development Site 1 (1) (Proposed Project Site)	Development Site 2 (1)(2)
Exhaust Height (ft)	450.4	323
Inside Diameter (ft)	2.5	1
Exit Velocity (ft/s)	25.6	16.0
Exit Temperature (F)	148	300
NO_x Emission Rate (1-hour) (g/s)	0.45	0.0131
NO_x Emission Rate (Annual) (g/s)	0.072	0.0099
PM Emission Rate (24-hour) (g/s)	0.0345	0.0027
PM Emission Rate (Annual) (g/s)	0.0055	0.00075

Notes:
(1) The stack exhaust flow rate and velocity are estimated based on the type of fuel and heat input rates.
(2) The stack exhaust diameter and temperature are based on similar sized equipment.

Dispersion Modeling

Potential impacts from HVAC emissions were evaluated using the EPA AERMOD dispersion model. 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 the interaction between the plume and terrain.

The AERMOD model calculates pollutant concentrations from one or more points (e.g., exhaust stacks) based on hourly meteorological data, and has the capability to calculate 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, consistent with the recommendations in the 2012 *CEQR Technical Manual*.

Annual NO_2 concentrations from HVAC sources were estimated using a NO_2 to NO_x ratio of 0.75, as described in EPA's *Guideline on Air Quality Models* at 40 CFR part 51 Appendix W, Section 5.2.4.[1]

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 potential impacts of the 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.

---

[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 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 nearest available NYSDEC ozone monitoring stations, i.e., the Queens College monitoring station in Queens for 2007 and the City College of New York (CCNY) monitoring station, for the years 2008-2011. An initial NO_2 to NO_x ratio of 10 percent at the source exhaust stack was assumed, which is considered representative for boilers.

Total 1-hour NO_2 concentrations were determined following methodologies that are accepted by the EPA as appropriate and conservative. The methodology used to determine the compliance of total 1-hour NO_2 concentrations from the proposed sources with the 1-hour NO_2 NAAQS[1] was based on adding the monitored background to modeled concentrations, as follows: hourly modeled concentrations from proposed 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. This refined approach is recognized as being conservative by EPA and the City and is referenced in EPA modeling guidance.

Meteorological Data

The meteorological data set consisted of five consecutive years of meteorological data: surface data collected at La Guardia Airport (2007–2011) 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 sidewalk receptors 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 12-4**). The background levels are based on concentrations monitored at the nearest NYSDEC ambient air monitoring stations over a recent five-year period for which data are available (2007-2011), with the exception of PM_{10}, which is

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

Table 12-4
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	(1)	188
NO_2	Annual	Botanical Garden, Bronx	46	100
SO_2	1-Hour	Botanical Garden, Bronx	134	196
SO_2	3-Hour	Botanical Garden, Bronx	162	1,300
PM_{10}	24-hour	P.S. 19, New York	44	150
$PM_{2.5}$	24-hour	P.S. 19, New York	27	35

Note:
(1) The 1-Hour NO_2 background concentration is not presented in the table since the AERMOD model determines the total 98th percentile 1-Hour NO_2 concentration at each receptor, so a single representative background concentration is not used.
Source: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2007–2011.

based on three years of data (2009-2011), consistent with current DEP guidance. Consistent with the form of the standard, for the 1-hour NO_2 averaging period, the 3-year average of the annual 98th percentile daily maximum 1-hour average concentration was used. The 1-hour average SO_2 concentration is based on the 3-year average of the annual 99th percentile of the daily maximum 1-hour SO_2 concentrations. 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.

$PM_{2.5}$ impacts are assessed on an incremental basis and compared with the $PM_{2.5}$ *de minimis* criteria. The $PM_{2.5}$ 24-hour average background concentration of 27 µg/m³ (based on the 98th percentile concentrations, averaged over 2009 to 2011) was used to establish the *de minimis* value, consistent with the background concentration provided for PS19 in the *CEQR Technical Manual.*

EMERGENCY GENERATOR FOR DEVELOPMENT SITE 1

A 1 megawatt natural gas-fueled emergency generator would be installed to serve development site 1 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 NYSDEC 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.

[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.

POTENTIAL AUTO SHOWROOM SERVICE CENTER

In the event that the proposed project includes an automotive showroom with repairs, air emissions would occur from the servicing of vehicles. Vehicles undergoing engine testing and maintenance would emit tailpipe pollutants which would be mechanically ventilated to the outside air. Consequently, an analysis of the emissions from the outlet vent and their dispersion in the environment was performed, calculating pollutant levels in the surrounding area. Emissions were estimated based on existing automotive showroom service area operations which have been issued a NYCDEP air permit.

Concentrations of the pollutants of concern (CO, nitric oxide [NO] and hydrocarbons) were determined using the EPA AERSCREEN model. The AERSCREEN model was endorsed by EPA[1] as a replacement to the SCREEN3 model. Similar to SCREEN3, AERSCREEN predicts worst-case 1-hour impacts downwind from a point, area, or volume source. AERSCREEN generates application-specific worst-case meteorology using representative minimum and maximum ambient air temperatures, and site-specific surface characteristics such as albedo, Bowen ratio, and surface roughness. The model incorporates the PRIME downwash algorithms that are part of the AERMOD refined model and utilizes BPIPRIM to provide a detailed analysis of downwash influences on a direction-specific basis. AERSCREEN also incorporates AERMOD's complex terrain algorithms and utilizes the AERMAP terrain processor to account for the actual terrain in the vicinity of the source on a direction-specific basis. The model was run both with and without the influence of building downwash and with urban diffusion coefficients based on a review of land-use maps of the area. Other model options were selected based upon EPA guidance.

Since design information regarding the automotive showroom service area's mechanical ventilation system is not available, the worst-case assumption was used that the air from the auto showroom service ~~area~~ tailpipe exhaust ventilation system would be vented through a single outlet. The vent face was modeled to discharge at two alternative locations: a horizontal discharge at height of approximately 10 feet above sidewalk grade along the façade of the proposed project site, and a vertical discharge at a distance of 10 feet from an elevated sensitive receptor such as an operable window or air intake. The ventilation system for the tailpipe exhaust ventilation system would need to comply with New York City Department of Buildings (DOB) Code restrictions governing placement of low temperature chimneys or gas vents for which the provisions of the existing New York City Building Code are as or more stringent than the assumptions used in this analysis.

Existing auto showroom service centers with ~~permitted~~ tailpipe exhaust systems were surveyed to estimate potential emissions for the proposed project, based on the number of tailpipe ventilation hoses in the service area, and the total size of the auto dealer operation, including auto servicing. ~~Existing facilities that are similar in size to the potential auto showroom were evaluated, and the facility with the largest number of service bays (8) was analyzed.~~ Based on the maximum area on the proposed project site that could be utilized for the auto showroom and associated service areas (approximately 52,000 gsf), a maximum of 12 service bays with tailpipe vents was determined. Emissions were estimated using data from a permitted auto service facility, with an adjustment to account for the difference in the number of tailpipe ventilation hoses.

---

[1] Memorandum, "AERSCREEN Released as the EPA Recommended Screening Model", April, 22, 2011.

INDUSTRIAL SOURCES

Potential air quality impacts from existing industrial operations in the surrounding area were analyzed. Industrial air pollutant emission sources within 400 feet of the rezoning area 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 NYSDEC to obtain all the available certificates of operation for these locations and to determine whether manufacturing or industrial emissions occur. In addition, a 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 rezoning area that have the potential for emitting air pollutants. The survey was conducted on June 6, 2013.

The results of the industrial source surveys and permit searches identified six permitted facilities within 400 feet of the proposed rezoning area. 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 development sites 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 NYSDEC'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 were within 400 feet of the development parcels were combined and compared to the NYSDEC 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.

---

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

[2] DEC Division of Air Resources, Bureau of Stationary Sources, October 2010.

To assess the potential effects of these existing sources on the proposed project site, a review of existing permitted facilities was conducted. Within the study area boundaries, sources permitted under NYSDEC'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 study area, the analysis focused on existing and proposed developments that have a combined HVAC equipment heat input rating of 20 million BTU/hour[1] or greater. Developments below this size within 400 feet of the proposed 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. One development was identified with a combined HVAC equipment heat input rating of 20 million BTU/hour or greater: the Durst development at 625 West 57th Street, which is currently under construction.

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). 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 (less than 1 percent of the year 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 site 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 stationary sources of the proposed project and development site 2. Due the proximity of the Consolidated Edison Power House, 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.

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 and a potential new building on development site 2, the Con Edison Power House, 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 the building on the proposed project site. The building on development site 2 would be much lower than the height of the building on the proposed project site, and is farther away from the Con Edison Power House emission stacks. Furthermore, there is no direct pathway from the Con Edison Power House emission stacks to this development, since it is located directly south of the proposed project site. Therefore, maximum concentrations

---

[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.

at projected development site 2 from both the boiler stack and combustion turbine stack would be lower than at the proposed project site. Therefore, no significant adverse air quality impacts would be predicted at projected development site 2 as long as no significant impacts are predicted at the proposed project site.

Rowan Williams Davies & Irwin (RWDI), Inc. constructed a scale model of the proposed project and its surroundings, for the purpose of analysis in a boundary layer wind tunnel. A 1:400 scale model of the proposed project (and all surrounding buildings and structures within a 1,600 foot radius) was constructed on an 8 foot circular disk. The atmospheric turbulence was simulated in the long working section of a wind tunnel by means of spires at the upwind end of the tunnel and roughness blocks to create the atmosphere boundary layer characteristic for the site. For each wind direction, the spires and roughness were selected to produce wind velocity profiles similar to what would be expected at the site, based on the terrain upwind of the site.

The wind tunnel tests were conducted by emitting a tracer gas at a known concentration and scaled flow rate from the Con Edison Power House exhaust stack using established scaling procedures. Mean concentrations of tracer gas (carbon monoxide) 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, RWDI measured concentrations in the wind tunnel for five minutes for each speed/wind angle combination, which represents full scale concentration measurements of 15 minutes to 1 hour. In addition, to reduce potential variability with respect to the wind angle, an increment of every 5° was used. A 3-point average was used to represent each of the 15°-increment values required for the post-processing analysis (e.g., 180° was represented by an average of values measured at 175°, 180°, and 185°). The combustion turbine and boilers were assessed independently in the wind tunnel to quantify the pollutant contribution from each exhaust source.

The analysis of the Con Edison Power House considered modifications to the plant so that all equipment would fire natural gas instead of distillate fuel for normal operation, and that the boilers would operate using natural gas except during periods of testing, maintenance or during temporary, limited periods when natural gas service may be curtailed or interrupted. Under this operation, 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. Con Edison has started construction of the gas pipeline to provide the necessary gas service to the Con Edison Power House, and conversion of the boilers and combustion turbine is anticipated to be completed in 2014, well before the proposed project's Build year. DEP has issued a certificate to operate for the conversion of the combustion turbine, and the Title V permit for the Con Edison Power House has been modified by NYSDEC, for the combustion turbine and boiler natural gas conversion and operation.

The wind tunnel analysis employed a post-processing step using RWDI's HOURGAS software program. The HOURGAS analysis accounts for the time variation in wind conditions to predict concentrations over the five years of meteorological data considered. This was achieved by calculating the appropriate dilution factor for each hour, based on the wind speed and direction during that hour from the LaGuardia Airport meteorological station over a period of five years. The actual dilution factor for a specific wind speed and direction was calculated by interpolating the data for the nearest wind speed and direction. Boiler load was accounted for indirectly by applying the dilution factor resulting from the 25, 50 or 90 percent load scenario results, based on the load that occurred at the specific hour corresponding to the same date and time as the meteorological conditions over the 5-year period.

The wind tunnel analysis adjusted the hourly boiler operating load to the nearest higher tested load (i.e., operating loads of 25 and 50 percent and lower were assumed to be at 25 and 50 percent, respectively, and loads greater than 50 percent were assumed to be at 90 percent). This is a very conservative assumption. As an illustration of this, using the procedure outlined above, the air quality analysis of the Con Edison Power House boilers was performed with an average annual capacity factor of approximately 33 to 44 percent, which is on average more than 45 percent greater than the actual load over the 2007-2011 period, which ranged from approximately 22 percent to 31 percent. Short-term pollutant emissions were also conservatively modeled using this procedure.

Emission Data

Information on the Con Edison Power House was obtained from several sources. Stack exhaust parameters were obtained primarily from 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 NYSDEC. 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. NO_2 emissions from the boilers were estimated based on NYSDEC NO_x Reasonably Available Control Technology (RACT) emission factor limits, as per 6 NYCRR Subpart 227-2[2], which the boilers would have to comply with by July 1, 2014. SO_2 emissions from the boilers when firing No. 6 oil was estimated based on the maximum annual average sulfur content using data from 2009 to 2011. 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.

As previously indicated, the analysis of the Con Edison Power House was performed considered modifications to the plant so that all equipment would fire natural gas instead of distillate fuel for normal operation, and that the boilers would operate using natural gas except during period of testing, maintenance and training, or due to temporary, limited periods when natural gas service may be curtailed or interrupted. The EPA MACT regulations allow for up to 48 hours per year for testing, maintenance and training. Curtailment or interruption of natural gas service can occur due to supply constraints during periods of high demand during the heating season. Natural gas customers that have the ability to burn fuel oil as a back-up typically operate using gas unless required to switch to fuel oil by the gas supplier, based on specific ambient temperature conditions. For the analysis of the Con Edison Power House boilers, the number of hours that natural gas was assumed to be interrupted was determined based on periods beginning when the ambient temperature is 18°F or less, and ending when the ambient temperature reaches 23°F, using the five years of meteorology for the modeling analysis (2007-2011). The average number of hours that are predicted to be potentially interrupted was used to determine the

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

[2] http://www.dec.ny.gov/regs/4218.html

number of interruptible hours over the five years of meteorology (95 hours). Consequently, the analysis assumed that fuel oil is used up to 143 hours per year.

The 95 hours of interruptible gas usage was modeled as an average emission rate over the winter season since this condition would likely only occur during peak winter demand conditions. The 48 hours per year of oil usage for testing, etc. was modeled as an average emission rate throughout the year since this type of operation that would be minimal and is intermittent and therefore would be consistent with EPA modeling guidance for other types of intermittent emissions sources.

Since Con Edison has stated that it is given a higher priority than its interruptible gas customers (including customers that are required to switch to fuel oil during low temperatures and given the past history of gas usage at other Con Edison facilities with natural gas, such as the East River Power Plant, which has utilized natural gas exclusively, without interruption, for at least the last four years), this reasonable worst-case operating scenario is considered very conservative.

A summary of the stack parameters and emission rates is presented in **Table 12-5** for each of the selected boiler loads and the combustion turbine. The combustion turbine is assumed to operate at maximum load when it is operating, based on information obtained from Con Edison.

Table 12-5
Con Edison Power House Stack Parameters and Emission Rates (g/sec)

		Boilers[2]		
Stack Parameters	**Combustion Turbine**	**90 Percent Load**	**50 Percent Load**	**25 Percent Load**
Height (ft)	119	507	507	507
Stack Exhaust Diameter (ft)	12	16.5	16.5	16.5
Exhaust Velocity (ft/min)	4,447	4,145	2,303	1,151
Temp (°F)	888	403	403	403
NO_2 (oil)	N/A[1]	36.57	20.32	10.16
NO_2 (gas)	13.64[3]	36.57	20.32	10.16
SO_2 (oil)	N/A[1]	75.01	41.67	20.84
SO_2 (gas)	0.09	0.14	0.08	0.04
PM_{10} (oil)	N/A[1]	12.14	6.75	3.37
PM_{10} (gas)	0.18	1.83	1.02	0.51
$PM_{2.5}$ (oil)	N/A[1]	9.51	5.28	2.64
$PM_{2.5}$ (gas)	0.18	1.83	1.02	0.51

Notes:
Emission rates are reported in grams/second.
(1) The combustion turbine is assumed to be modified to combust natural gas, and operates at 100 percent load only.
(2) NO_2 boiler emissions are based on NYSDEC Part 227-2 RACT limits for large/very large dual fuel boilers.
(3) NO_2 turbine emissions are based on NO_x RACT compliance plan submitted by Con Edison to NYSDEC in December 2011.
Sources : Con Edison, EPA AP-42, NYSDEC Part 227-2.

The full boiler load was established at 90 percent through examination of the hourly operating data for the Con Edison Power House, which found that loads exceeding this level did not occur for any period during the five years for which the analysis was conducted (2007-2011). The operating loads of 25 and 50 percent were considered to be representative of reduced operation over a wide range of operating conditions. The operating loads for the boilers were determined by proportionately adjusting the stack flow for the load condition measured during the stack test.

As discussed earlier, the combustion turbine is used very infrequently (primarily for testing to ensure its reliability and availability), with an annual capacity factor of less than 1 percent. (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.

Receptors

Receptors were placed to represent a broad area of the proposed project's building façades where potential impacts were most likely to occur. 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 for the proposed project's HVAC systems, the EPA AERMOD dispersion model was used to estimate maximum 1-hour incremental concentrations of SO_2 from the Con Edison Power House. Total hourly $_{SO2}$ 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 $_{SO2}$ NAAQS.

OTHER SOURCES

Existing and proposed developments with emission sources within 400 feet of the proposed project site were analyzed to assess the potential for air quality impacts on the proposed project, consistent with the recommendations in the *CEQR Technical Manual*. The Durst development at 625 West 57th Street was identified as having HVAC equipment with a total estimated heat input capacity greater than 20 MMBtu/hr, and was therefore included in the analysis. Other sites were found to have a total heat input capacity of less than 20 MMBtu/hr, or use Con Edison steam rather than fossil fuels for heating and hot water systems (e.g., adjacent DSNY garage) and were therefore not analyzed.

As with the analysis of the Con Edison Power House, the analysis of the Durst development focused on the building on the proposed project site due to the lower height of the proposed building on development site 2 and further distance away from the Durst emission stack.

Stack exhaust parameters and emission for the combustion equipment were obtained from the proposed project information. The stack exhaust parameters and the estimated emission rates are provided in **Table 12-6**.

Potential air quality impacts from Durst boilers on the proposed project site were evaluated using the EPA AERMOD dispersion model, following the same general procedures used to assess concentrations from stationary sources with the proposed actions.

Table 12-6
Stack Parameters and Emissions from the Durst West 57th St Development

Parameter	Value
Exhaust Height (ft)	429.3
Inside Diameter (ft)	2.33
Exit Velocity (ft/s)	31.4
Exit Temperature (F)	212
NO_x Emission Rate (1-hour) (g/s)	0.1428
NO_x Emission Rate (Annual) (g/s)	0.0207
PM Emission Rate (24-hour) (g/s)	0.0185
PM Emission Rate (Annual) (g/s)	0.0043

POTENTIAL CUMULATIVE IMPACTS FROM THE CON EDISON POWER HOUSE AND OTHER SOURCES

Potential cumulative impacts on the proposed project site from the Con Edison Power House and the Durst West 57th Street development were evaluated. Potential cumulative impacts are not considered to be significant since the stack exhaust velocities and locations for the Con Edison Power House and other sources are substantially different and due to the locations of the sources relative to each other. These factors would generally result in maximum impacts on the proposed project's buildings at different locations, and on a short-term basis, under different meteorological conditions. However, to confirm that these different sources would not result in a significant adverse air quality impact on the proposed project, the impacts from these separate analyses were also evaluated on a cumulative basis. Impacts of NO_2, SO_2 and PM_{10} were analyzed using the AERMOD model. For $PM_{2.5}$, concentrations from the Con Edison Power House were determined using the wind tunnel, while concentrations from the Durst West 57th St development were determined using the AERMOD model. Concentrations from each model were added together for each meteorological hour at each receptor, to determine the maximum cumulative impact.

EFFECT OF PROPOSED ACTIONS ON PLUME DISPERSION FROM THE CONSOLIDATED EDISON POWER HOUSE

Existing and proposed developments near the proposed project site were evaluated to assess whether the effect on plume dispersion from the Consolidated Edison Power House due to the proposed actions would result in any significant adverse air quality impact.

AERMOD Analysis

Existing and proposed developments within 400 feet of the proposed project site were initially studied using the AERMOD model. The same stack and emission parameters to estimate potential impacts on the proposed project from the Consolidated Edison Power House were used. Impacts were calculated using the downwash assumptions in the AERMOD model to assess the effects of the proposed actions on plume dispersion.

Wind Tunnel Analysis

Based on the results of the AERMOD analysis, it was determined that concentrations of $PM_{2.5}$ had the potential for significant adverse air quality impacts on a small portion of the Durst development at 625 West 57th Street and Riverside Center Building 5. Therefore, a wind tunnel study was performed for $PM_{2.5}$. 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. To determine incremental concentrations of $PM_{2.5}$ at affected receptors, the wind tunnel analysis was performed both with and without the proposed actions.

E. EXISTING CONDITIONS

Recent concentrations of all criteria pollutants at DEC air quality monitoring stations nearest the study area are presented in **Table 12-7**. 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 12-4**, above.

Table 12-7
Representative Monitored Ambient Air Quality Data

Pollutant	Location	Units	Averaging Period	Concentration	NAAQS
CO	CCNY, Manhattan	ppm	8-hour	1.7	9
	CCNY, Manhattan		1-hour	2.7	35
SO_2	Botanical Garden, Bronx	µg/m^3	3-hour	102.6	1,300
			1-hour	134	196
PM_{10}	P.S. 19, Manhattan	µg/m^3	24-hour	40	150
$PM_{2.5}$	P.S. 19, Manhattan	µg/m^3	Annual	11.9	12
			24-hour	27	35
NO_2	Botanical Garden, Bronx	µg/m^3	Annual	39	100
	Queens College, Queens		1-hour	126	189
Lead	Morrisania, Bronx	µg/m^3	3-month	0.008	0.15
Ozone	CCNY, Manhattan	ppm	8-hour	0.072	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 2009, 2010, and 2011, and the 24-hour concentration is the average of the annual 98th percentiles in 2009, 2010 and 2011. 8-hour average ozone concentrations are the average of the 4th highest-daily values from 2009 to 2011. 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 2009 to 20111.
Source: DEC, New York State Ambient Air Quality Data.

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.

There were no monitored violations of the NAAQS for the pollutants at these sites in 2011.

MODELED CO CONCENTRATIONS FOR EXISTING TRAFFIC CONDITIONS

As noted previously, receptors were placed at multiple sidewalk locations next to the intersection selected for the analysis. **Table 12-8** shows the maximum modeled existing (2013) CO 8-hour average concentration. (No 1-hour values are shown since predicted values are much lower than the 1-hour standard of 35 ppm.) At the receptor site, the maximum predicted 8-hour average concentration is well below the national standard of 9 ppm.

Table 12-8
Modeled Existing 8-Hour Average
CO Concentration (2013)

Receptor Site	Location	Time Period	8-Hour Concentration (ppm)
1	11th Avenue and West 57th Street	Weekday PM	2.6

Notes: Eight-hour standard (NAAQS) is 9 ppm.
Concentration includes a background concentration of 1.8 ppm.

F. THE FUTURE WITHOUT THE PROPOSED ACTIONS

MOBILE SOURCES

INTERSECTION ANALYSIS

CO concentrations in the No Build condition were determined for future 2017 conditions using the methodology previously described. **Table 12-9** shows the future maximum predicted 8-hour average CO concentration, including background concentration, at the analysis intersection in the No Build condition. The value shown is the highest predicted concentration for the receptor locations for any of the time periods analyzed.

Table 12-9
Maximum Predicted Future (2017) 8-Hour
Average Carbon Monoxide No Build Concentration

Receptor Site	Location	Time Period	8-Hour Concentration (ppm)
1	11th Avenue and West 57th Street	Weekday MD/ Weekday PM	2.3

Notes: 8-hour standard (NAAQS) is 9 ppm.
Concentration includes a background concentration of 1.8 ppm.

As shown in **Table 12-9**, 2017 No-Build values are predicted to be well below the 8-hour CO standard of 9 ppm.

STATIONARY SOURCES

In the future without the proposed actions, the proposed rezoning area will continue in active use as in the existing condition. Therefore, stationary sources of emissions would be expected to be similar to existing conditions.

G. PROBABLE IMPACTS OF THE PROPOSED ACTIONS

The proposed actions would result in increased mobile source emissions in the immediate vicinity of the rezoning area and also have the potential to 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 2017 analysis year. In addition, existing industrial facilities, as well as large combustion sources including the Consolidated Edison Power House, were assessed for potential adverse impacts. As discussed in this section, the results of these analyses determined that the proposed actions would not result in any significant adverse air quality impacts.

MOBILE SOURCES

INTERSECTION ANALYSIS

CO concentrations for future conditions in the 2017 analysis year were predicted using the methodology previously described. **Table 12-10** shows the future maximum predicted 8-hour average CO concentration at the intersection studied. (No 1-hour values are shown, since no exceedances of the NAAQS would occur and the *de minimis* criteria are only applicable to 8-hour concentrations; therefore, the 8-hour values are the most critical for impact assessment.) The value shown is the highest predicted concentration. The results indicate that the proposed actions would not result in any violations of the 8-hour CO standard. In addition, the incremental increases in 8-hour average CO concentrations are very small, and consequently would not result in a violation of the CEQR *de minimis* CO criteria. Therefore, mobile source CO emissions with the proposed actions would not result in a significant adverse impact on air quality.

Table 12-10
Maximum Predicted Future (2017)
Carbon Monoxide Build Concentration

Receptor Site	Location	Time Period	8-Hour Concentration (ppm)		*De Minimis*
			No Action	Build	
1	11th Avenue and West 57th Street	Weekday PM	2.3	2.4	3.3

Notes: 8-hour standard is 9 ppm.
Concentration includes a background concentration of 1.8 ppm.

PARKING ANALYSIS

Based on the methodology previously described, the maximum predicted 8-hour average CO concentrations from the proposed parking facility 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.

The maximum predicted 8-hour average CO concentration of all the sensitive receptors described above would be ~~2.1~~ 2.2 ppm for the ~~far side~~ building façade receptor. This value includes a predicted concentration of ~~0.08~~ 0.44 ppm from the parking garage vent, ~~0.26 ppm from on-street traffic~~ 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 ~~2.1~~ 2.2 ppm is below the CEQR *de minimis* criteria, which is approximately 3.6 ppm. As the results show, the proposed parking garage would not result in any significant adverse air quality impacts.

DSNY VEHICLE ANALYSIS

Using the methodology previously described, maximum predicted 24-hour and annual average $PM_{2.5}$ concentration increments from DSNY vehicles were calculated so that they could be compared to the *de minimis* criteria that would determine the potential significance of any impacts at the Proposed Project. Based on this analysis, the maximum predicted localized 24-hour average $PM_{2.5}$ concentration is predicted to be 0.06 µg/m^3. This concentration is substantially below the *de minimis* criteria of 4 µg/m^3. The maximum predicted annual average incremental $PM_{2.5}$ concentration is predicted to be 0.004 µg/m^3, which is well below the *de minimis* criteria of 0.1 µg/m^3.

The results show that the annual and 24-hour $PM_{2.5}$ increments are predicted to be below the *de minimis* criteria. Therefore, there would be no potential for significant adverse impacts on air quality from DSNY vehicles on the proposed project.

STATIONARY SOURCES

HVAC SYSTEMS

Table 12- 11 shows maximum overall predicted concentrations for NO_2 and PM_{10} from HVAC systems with the proposed actions, which were predicted to occur due to HVAC emissions from the projected development site on elevated locations on the development at the proposed project site. Maximum predicted concentrations on other existing and proposed buildings, as well as at ground level receptors, would be lower, as shown in **Table 12- 12**. As shown in the tables, the predicted pollutant concentrations for each of the pollutant time averaging periods shown are below their respective standards.

Table 12-11
Future Maximum NO_2 and PM_{10} Concentrations from Development Site 2 on Development Site 1 (Project-on-Project) (in µg/m^3)

Pollutant	Averaging Period	Concentration Due to Stack Emission	Maximum Background Concentration	Total Concentration	Standard
NO_2	Annual(1)	1	46	47	100
	1-hour(2)	-	-	159.6	188
PM_{10}	24-hour	3.5	44	47.5	150

Notes:
(1) Annual NO_2 impacts were estimated using a NO_2 /NO_x ratio of 0.75.
(2) Reported concentration is the maximum total 98th percentile concentration at any receptor using seasonal-hourly background concentrations.

The air quality modeling analysis also determined the highest predicted increase in $PM_{2.5}$ concentrations. The maximum predicted 24-hour and localized annual average incremental $PM_{2.5}$ increments are presented in **Table 12-13**. The maximum 24-hour incremental impacts at any discrete receptor location would be less than the applicable *de minimis* criteria. On an annual basis, the maximum projected $PM_{2.5}$ increments would be less than the applicable *de minimis* criterion of 0.3 µg/m^3 for local impacts and 0.1 for neighborhood scale impacts.

Table 12-12
Future Maximum NO_2 and PM_{10} Concentrations from Development Site 1 on Existing Receptors (Project-on-Existing) (in µg/m³)

Pollutant	Averaging Period	Concentration Due to Stack Emission	Maximum Background Concentration	Total Concentration	Standard
NO_2	Annual[1]	0.4	46	46.4	100
	1-hour[2]	-	-	183.6	188
PM_{10}	24-hour	2.8	44	46.8	150

Notes:
(1) Annual NO_2 impacts were estimated using a NO_2/NO_x ratio of 0.75.
(2) Reported concentration is the maximum total 98th percentile concentration at any receptor using seasonal-hourly background concentrations.

Table 12-13
Future Maximum Predicted $PM_{2.5}$ Concentrations from Development Site 2 on Development Site 1 (Project-on-Project) (in µg/m³)

Pollutant	Averaging Period	Maximum Concentration	*De Minimis*
$PM_{2.5}$	24-hour	3.53	4[1]
	Annual (discrete)	0.10	0.3
	Annual (Neighborhood Scale)	0.002	0.1

Note:
(1) $PM_{2.5}$ *de minimis* criteria — 24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 µg/m³.

In addition, as shown in **Table 12-14**, maximum concentrations of $PM_{2.5}$ are predicted to be below the applicable *de minimis* criteria at elevated receptors on existing and No Build developments, and at ground level locations.

Table 12-14
Future Maximum Predicted $PM_{2.5}$ Concentrations from Development Site 1 on Existing Receptors (Project-on-Existing) (in µg/m³)

Pollutant	Averaging Period	Maximum Concentration	*De Minimis*
$PM_{2.5}$	24-hour	2.82	4[1]
	Annual (discrete)	0.04	0.3

Note:
(1) $PM_{2.5}$ *de minimis* criteria — 24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 µg/m³.

Overall, there would not be any significant adverse air quality impacts due to HVAC systems with the proposed actions. To ensure that there are no significant adverse impacts of $PM_{2.5}$ from 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 1104, Lots 31, 40, 44 and 55 (Proposed Project Site—Development Site 1)

  Any new development on the above-referenced property must utilize only natural gas in any fossil fuel-fired heating and hot water equipment and any heating and hot water equipment exhaust stack(s) must be located at least 450 feet above grade, to avoid any potential significant air quality impacts.

- Block 1104 Lots 25 and 29 (Development Site 2)

  Any new development on the above-referenced property must utilize only natural gas in any fossil fuel-fired heating and hot water equipment, and any heating and hot water equipment exhaust stack(s) must be located at least 323 feet above grade and no more than 44 feet away from the lot line facing 11th Avenue, 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 HVAC emission sources as a result of the proposed actions.

POTENTIAL AUTO SHOWROOM SERVICE CENTER

Based on the methodology previously described, the maximum predicted pollutant concentrations from the potential automotive showroom service area were analyzed. Receptors were placed at a sidewalk location and on the façade of development site 1.

The maximum predicted concentrations are presented in **Table 12- 15**. As the results show, the analyzed automotive showroom service area would not result in any significant adverse air quality impacts. ~~Between the Draft and Final EIS, further evaluation of existing auto showroom facilities will be conducted, to determine whether restrictions are necessary to ensure that emissions from auto servicing operations do not result in any significant adverse air quality impact.~~

Table 12-15
Maximum Predicted Impacts from Potential Automotive Showroom Service Area

Potential Contaminants	Estimated Short-term Impact (μg/m³)	SGC[1] (μg/m³)	Estimated Long-term Impact (μg/m³)	AGC[2] (μg/m³)
Hydrocarbons	~~174.0~~ 261.0	98,000	~~33.5~~ 50.2	7,000
Carbon Monoxide	~~870.1~~ 1,305.1	14,000	~~167.3~~ 251.0	--
Nitrogen Oxide	~~174.0~~ 261.0	--	~~33.5~~ 50.2	74

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

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. Six permitted facilities were identified within 400 feet of the rezoning area 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 rezoning area, 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 12-16 presents the maximum impacts on the rezoning area. 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 rezoning area from existing industries in the area.

Table 12-16
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	0.45	2,400	0.000004	100
Carbon Monoxide	1,439.1	14,000	21.51	--
Isopropyl Alcohol	486.4	98,000	0.73	7,000
Nitrogen Dioxide	49.1	188	0.52	100
Particulates	38.2	380	0.02	45
Propane	7.6	--	0.07	43,000

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

ADDITIONAL SOURCES

Potential stationary source impacts on the proposed project site 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 Power House combustion turbine and boilers would be modified to fire natural gas.

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 12-17**. As shown in the table, the predicted pollutant concentrations for all of the pollutant time averaging periods shown are below their respective standards.

Table 12-17
Future Maximum Predicted Concentrations on the Proposed Project Site 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	3.0	46	49	100
	1-hour [(1) (2)]	-	-	132.4	188
SO_2	3-hour	25.0	162	187	1,300
	1-hour [(3)]	23.7	134	157.7	196
PM_{10}	24-hour	10.7	44	54.7	150

Notes:
(1) 1-Hour NO_2 concentrations were estimated using AERMOD PVMRM.
(2) Reported concentration is the maximum total 98th percentile concentration at any receptor using seasonal-hourly background concentrations.
(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.

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 site (see **Table 12-18**). As presented in **Table 12-18,** the maximum 24-hour $PM_{2.5}$ incremental concentration from the Con Edison Power House was predicted to be 3.14 µg/m^3. On an annual basis, the maximum projected $PM_{2.5}$ increments would be below the applicable $PM_{2.5}$ *de minimis* criterion of 0.3 µg/m^3 for local impacts.

Therefore, no significant adverse air quality impacts are predicted from the Consolidated Edison Power House on the proposed project site.

Table 12-18
Future Maximum Predicted $PM_{2.5}$ Increments On the Proposed Project Site from the Consolidated Edison Power House (in µg/m3)

Pollutant	Averaging Period	Maximum Concentration	*De Minimis*
$PM_{2.5}$	24-hour	3.14	4[(1)]
	Annual (discrete)	0.19	0.3

Note:
(1) $PM_{2.5}$ *de minimis* criteria — 24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 µg/m^3.

OTHER SOURCES (DURST WEST 57TH STREET)

Potential stationary source impacts on the proposed project site from the Durst West 57th Street boilers were determined using the AERMOD model. 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 12-19**. As shown in the table, the predicted pollutant concentrations for all of the pollutant time averaging periods shown are below their respective standards.

Table 12-19
Future Maximum Predicted Concentrations on the Proposed Project Site from Other Sources (Durst West 57th Street) (in µg/m^3)

Pollutant	Averaging Period	Concentration Due to Stack Emission	Maximum Background Concentration	Total Concentration	Standard
NO_2	Annual[(1)]	0.1	46	46.1	100
	1-hour[(2)]	-	-	139.5	188
PM_{10}	24-hour	3.0	44	47.0	150

Notes:
(1) Annual NO_2 impacts were estimated using a NO_2 /NO_x ratio of 0.75.
(2) Reported concentration is the maximum total 98th percentile concentration at any receptor using seasonal-hourly background concentrations.

The air quality modeling analysis also determined the highest predicted increase in $PM_{2.5}$ concentrations. The maximum predicted 24-hour and localized annual average incremental $PM_{2.5}$ increments are presented in **Table 12-20**. As presented in **Table 12-20,** the maximum 24-hour $PM_{2.5}$ incremental concentration from the Durst boilers was predicted to be 2.99 µg/m^3. On an annual basis, the maximum projected $PM_{2.5}$ increments would be below the applicable $PM_{2.5}$ *de minimis* criterion of 0.3 µg/m^3 for local impacts.

Table 12-20
Future Maximum Predicted $PM_{2.5}$ Increments on the Proposed Project Site from Other Sources (Durst West 57th Street) (in $\mu g/m^3$)

Pollutant	Averaging Period	Maximum Concentration	*De Minimis*
$PM_{2.5}$	24-hour	2.99	4 (1)
	Annual (discrete)	0.04	0.3

Note:
(1) $PM_{2.5}$ *de minimis* criteria — 24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 $\mu g/m^3$.

Therefore, no significant adverse air quality impacts are predicted from the Durst boilers on the proposed project site.

POTENTIAL CUMULATIVE IMPACTS FROM THE CON EDISON POWER HOUSE AND OTHER SOURCES (DURST)

Impacts from the Consolidated Edison Power House and Durst development within 400 feet of the proposed project site were evaluated for their potential cumulative impacts.

The results of the cumulative impact analysis are presented in **Table 12-21** for NO_2, SO_2 and PM_{10}. As shown in the table, the predicted pollutant concentrations for all of the pollutant time averaging periods shown are below their respective standards.

Table 12-21
Future Maximum Predicted Cumulative Concentrations on the Proposed Project Site (in $\mu g/m^3$)

Pollutant	Averaging Period	Concentration Due to Stack Emission	Maximum Background Concentration	Total Concentration	Standard
NO_2	Annual	3.0	46	49	100
	1-hour (1) (2)	-	-	139.9	188
SO_2	3-hour	25.0	162	187	1,300
	1-hour (3)	23.7	134	157.7	196
PM_{10}	24-hour	10.8	44	54.8	150

Notes:
(1) 1-Hour NO_2 concentrations were estimated using AERMOD PVMRM.
(2) Reported concentration is the maximum total 98th percentile concentration at any receptor using seasonal-hourly background concentrations.
(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.

The cumulative air quality modeling analysis also determined the highest predicted increase in $PM_{2.5}$ concentrations. The maximum predicted 24-hour and localized annual average incremental $PM_{2.5}$ increments are presented in **Table 12-22**. As presented in **Table 12-22,** the maximum 24-hour $PM_{2.5}$ incremental concentration from the Con Edison Power House and proposed boilers was predicted to be 3.59 $\mu g/m^3$. On an annual basis, the maximum projected $PM_{2.5}$ increments would be below the applicable $PM_{2.5}$ *de minimis* criterion of 0.3 $\mu g/m^3$ for local impacts.

Table 12-22
Future Maximum Predicted Cumulative $PM_{2.5}$ Increments on the Proposed Project Site (in μg/m³)

Pollutant	Averaging Period	Maximum Concentration	*De Minimis*
$PM_{2.5}$	24-hour	3.59	4 (1)
	Annual (discrete)	0.21	0.3

Note:
(1) $PM_{2.5}$ *de minimis* criteria — 24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 μg/m³.

Therefore, no significant adverse cumulative air quality impacts are predicted on the proposed project site.

EFFECT OF PROPOSED ACTIONS ON PLUME DISPERSION FROM THE CONSOLIDATED EDISON POWER HOUSE

Existing and proposed developments near the proposed project were evaluated to assess whether the effect on plume dispersion from the Consolidated Edison Power House due to new structures with the proposed actions would result in any significant adverse air quality impact. The AERMOD analysis showed that based on a comparison of pollutant concentrations with and without the proposed actions, the proposed actions would not significantly affect pollutant concentration levels from the Consolidated Edison Power House on existing and proposed buildings within a 400 foot area around the proposed project site, except for a small portion of the future developments at 625 West 57th Street and Riverside Center Building 5, with respect to $PM_{2.5}$.

Consequently, concentrations of NO_2, PM_{10} and SO_2 were evaluated using the AERMOD dispersion model, while concentrations of $PM_{2.5}$ were evaluated using wind tunnel modeling. The analysis was performed for conditions with and without the proposed actions to determine whether exceedances predicted in the build condition were attributable to the proposed actions.

AERMOD Analysis

The results of the AERMOD analysis are presented in **Table 12-23** for NO_2, SO_2 and PM_{10}. As shown in the table, the maximum predicted pollutant concentrations are below their respective standards. Therefore, no significant adverse air quality impacts are predicted for these pollutant standards.

Table 12-23
Future Maximum Predicted Concentrations from the Consolidated Edison Power House on Developments Within 400 feet of the Proposed Project Site (in μg/m³)

Pollutant	Averaging Period	Maximum Modeled Concentration	Maximum Background Concentration	Total Concentration	Standard
NO_2	Annual	23.1	46	69.1	100
	1-hour (1)	-	-	167.0	188
SO_2	3-hour	53.2	162	215.2	1,300
	1-hour (3)	45.2	134	179.2	196
PM_{10}	24-hour	17.8	44	61.8	150

Note:
(1) 1-Hour NO_2 concentrations were estimated using AERMOD with the PVMRM module.
(2) Reported concentration is the maximum total 98th percentile concentration at any receptor using seasonal-hourly background concentrations.
(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.

Wind Tunnel Analysis

Using wind tunnel modeling, 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 site (see **Table 12-24**). As shown in **Table 12-24**, the results of the wind tunnel analysis determined that the maximum predicted incremental concentrations of $PM_{2.5}$ would not exceed the City's $PM_{2.5}$ *de minimis* criteria.

Table 12-24
Future Maximum Predicted $PM_{2.5}$ Increments from the Consolidated Edison Power House on Developments Within 400 feet of the Proposed Project Site (in µg/m³)

Pollutant	Averaging Period	Maximum Concentration	*De Minimis*
$PM_{2.5}$	24-hour	0.75	4[(1)]
	Annual (discrete)	0.06	0.3

Note:
(1) $PM_{2.5}$ *de minimis* criteria — 24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 µg/m³.

The analysis demonstrates that the effect on plume dispersion from the Consolidated Edison Power House due to proposed actions would not result in any significant adverse air quality impacts.

Based on the results of the wind tunnel analysis, no significant adverse air quality impacts from the Consolidated Edison Power House are predicted on 625 West 57th Street or Riverside Center Building 5 due to the proposed actions. Therefore, the proposed actions would not result in any significant adverse air quality impacts. ✷