A. INTRODUCTION

This analysis identifies and quantifies any significant direct and indirect air quality impacts from the proposed action. Direct effects would stem from emissions generated by stationary sources on the project site, such as emissions from fuel burned on-site for heating, ventilation, and air conditioning (HVAC) systems. Indirect effects are caused by nearby stationary sources and by mobile source emissions generated from motor vehicles traveling to and from the proposed project after completion. Because the project site is located in an area zoned for industrial use, nearby sources of air pollution are also of concern. Indirect effects due to pollutants emitted from the exhaust vents of nearby existing industrial facilities were examined for potential adverse impacts on future residents of the proposed action. In addition, since the proposed action is directly northeast of the Con Edison 59th Street Station, which is a large steam generating plant, and is also in the vicinity of several large existing and planned residential/mixed use developments, an analysis was conducted to determine the cumulative effects of these sources on future residents of the proposed action. A separate analysis to assess potential impacts from a nearby public housing complex was also conducted.

The proposed project includes a garage that would exhaust pollutants from its mechanical ventilation system and could, therefore, result in localized increases in carbon monoxide (CO) levels near vents outside the garage. Therefore, a stationary source parking garage analysis was conducted to evaluate future CO concentrations resulting from the proposed parking garage. The proposed action would also involve the rezoning of lots located near an existing large parking lot. Impacts from this parking facility were determined to ascertain whether it would result in potential adverse impacts on potential development sites.

The results discussed below show that the maximum predicted CO concentrations from mobile sources with the proposed project would be below the ambient air standards and applicable *de minimis* criteria. In addition, the parking garage analysis determined that the parking facilities under the proposed project would not cause any significant adverse air quality impacts. The stationary source screening analyses determined that there would be no potential significant adverse air quality impacts from HVAC systems associated with the proposed action, and that nearby sources of emissions such as the Con Edison 59th Street Station would not adversely affect air quality at the proposed action. In addition, an (E) Designation for air quality would be incorporated into the text of the zoning proposal, at certain projected development sites in the vicinity of existing sources, to ensure that the HVAC systems would not result in any significant impacts. Finally, a review of industrial sources found that there are no permitted sources within 400 feet of the proposed action. Thus, the proposed action is not expected to result in any significant adverse air quality impacts.

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. Typically, ambient concentrations of carbon monoxide (CO) are predominantly influenced by mobile source emissions. 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. Emissions of sulfur dioxide (SO_2) are associated mainly with stationary sources, and sources utilizing non-road diesel such as diesel trains, marine engines and non-road vehicles such as construction engines, but diesel-powered vehicles, primarily heavy duty trucks and buses, also currently contribute somewhat to these emissions; diesel fuel regulations which recently began to take effect will reduce SO_2 emissions from mobile sources to extremely low levels. Particulate matter (PM) is emitted from both stationary and mobile sources. Fine particulate matter is also formed when emissions of NO_x, sulfur oxides (SO_x), ammonia, organic compounds, and other gases react or condense in the atmosphere. Ozone is formed in the atmosphere by complex photochemical processes that include NO_x and VOCs, emitted mainly from industrial processes and mobile sources.

CARBON MONOXIDE

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 New York City, approximately 80 to 90 percent of CO emissions are from motor vehicles. Since CO is a reactive gas which does not persist in the atmosphere, CO concentrations can vary greatly over relatively short distances; elevated concentrations are usually limited to locations near crowded intersections along heavily traveled and congested roadways, parking lots, and garages. Consequently, CO concentrations must be predicted on a local, or microscale, basis.

The proposed action would increase traffic volumes on streets within and surrounding the rezoning area and could potentially result in localized increases in CO levels. Therefore, a mobile source analysis was conducted at critical intersections in the study area to evaluate future CO concentrations with and without the proposed action. Stationary source impacts for the proposed building's HVAC systems were also evaluated. Due to the proximity of the Con Edison 59th Street Station and other combustion sources, CO impacts on the proposed West 61st Street development were assessed.

The *CEQR Technical Manual* recommends assessment of actions that would result in sensitive uses adjacent to large existing parking facilities. The block immediately west of the project block (west of Eleventh/West End Avenue) is a large surface parking lot. Therefore, impacts of CO were determined at a sidewalk location adjacent to the potential development site on West End Avenue to ensure that the parking lot would not result in any adverse air quality impacts on the potential development site.

NITROGEN OXIDES, VOCS, AND OZONE

NO_x are of principal concern because of its role, together with VOCs, as 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 diffusing downwind, elevated ozone levels are often found many miles from sources of the precursor pollutants. The effects of NO_x and VOC emissions from all sources are therefore generally examined on a regional basis. The contribution of any action or project to regional emissions of these pollutants would include any added stationary or mobile source emissions; the change in regional mobile source emissions of these pollutants would be related to the total vehicle miles traveled added or subtracted on various roadway types throughout the New York metropolitan area, which is designated as a moderate non-attainment area for ozone by the U.S. Environmental Protection Agency (EPA).

The proposed action 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 is predicted. An analysis of project related emissions of these pollutants from mobile sources was therefore not warranted.

In addition, there is a standard for average annual NO_2 concentrations, which is normally examined only for fossil fuel energy sources.

Due to the proximity of the Con Edison 59th Street Station and other combustion sources, NO_2 impacts on the proposed project and potential development under the reasonable worst-case development scenarios were assessed. Potential impacts from the fuel to be burned for the proposed building's HVAC systems were also evaluated.

LEAD

Lead emissions in air are principally associated with industrial sources and motor vehicles that use gasoline containing lead additives. Most U.S. vehicles produced since 1975, and all produced after 1980, are designed to use unleaded fuel. As these newer vehicles have replaced the older ones, motor vehicle related lead emissions have decreased. As a result, ambient concentrations of lead have declined significantly. Nationally, the average measured atmospheric lead level in 1985 was only about one-quarter the level in 1975.

In 1985, EPA announced new rules drastically reducing the amount of lead permitted in leaded gasoline. The maximum allowable lead level in leaded gasoline was reduced from the previous limit of 1.1 to 0.5 grams per gallon effective July 1, 1985, and to 0.1 grams per gallon effective January 1, 1986. Monitoring results indicate that this action has been effective in significantly reducing atmospheric lead concentrations. Effective January 1, 1996, the Clean Air Act banned the sale of the small amount of leaded fuel that was still available in some parts of the country for use in on-road vehicles, concluding the 25-year effort to phase out lead in gasoline. Even at locations in the New York City area where traffic volumes are very high, atmospheric lead concentrations are far below the national standard of 1.5 micrograms per cubic meter (3-month average).

No significant sources of lead are associated with the proposed project, and, therefore, an analysis was not warranted.

RESPIRABLE PARTICULATES—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 volatile organic compounds, 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 from 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, all types of construction, agricultural activities, as well as wood-burning stoves and fireplaces. Particulate matter also acts as a substrate for the adsorption 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, or 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 adsorbed to the surfaces of the particles, and is also extremely persistent in the atmosphere. $PM_{2.5}$ is mainly derived from combustion material that has volatilized and then condensed to form primary particulate matter (often soon after the release from an exhaust pipe or stack) 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 project would not result in any significant increases in truck traffic near the project site or in the region, and therefore, an analysis of potential impacts from respirable particulate matter is not warranted. However, potential PM_{10} and $PM_{2.5}$ impacts associated with the project's potential HVAC emissions were analyzed, along with impacts on the proposed project from the Con Edison 59th Street Station and other nearby existing and proposed combustion sources.

SULFUR DIOXIDE—SO_2

SO_2 emissions are primarily associated with the combustion of sulfur-containing fuels: oil and coal. Due to the federal restrictions on the sulfur content in diesel fuel for on-road vehicles, no significant quantities are emitted from vehicular sources. Monitored SO_2 concentrations in New York City are below the national standards.

Vehicular sources of SO_2 are not significant and therefore, an analysis of this pollutant from mobile sources was not warranted.

Both natural gas and fuel oil could be used by the proposed action's HVAC sources. Therefore, potential future levels of SO_2 were examined. Additionally, potential future impacts of SO_2 on the proposed action from the Con Edison 59th Street Station and other nearby combustion sources were evaluated.

C. AIR QUALITY REGULATIONS, STANDARDS, AND BENCHMARKS

NATIONAL AND STATE AIR QUALITY STANDARDS

As required by the Clean Air Act, primary and secondary National Ambient Air Quality Standards (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 protect the public health, and represent levels at which there are no known significant effects on human health. 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. For NO_2, ozone, lead and PM, the primary and secondary standards are the same; there is no secondary standard for CO. EPA promulgated additional NAAQS which became effective September 16, 1997: a new 8-hour standard for ozone, which replaced the previous 1-hour standard, and in addition to retaining the PM_{10} standards, EPA adopted 24-hour and annual standards for $PM_{2.5}$. The standards for these pollutants are presented in Table 16-1. These standards have also been adopted as the ambient air quality standards for New York State. In addition, New York State has established ambient air quality standards for total suspended particulate, non-methane hydrocarbons, beryllium, gaseous fluorides, and hydrogen sulfide.

Table 16-1
National and New York State Ambient Air Quality Standards

Pollutant	Primary		Secondary	
	ppm	μg/m³	ppm	μg/m³
Carbon Monoxide (CO)				
Maximum 8-Hour Concentration(1)	9	10,000	None	
Maximum 1-Hour Concentration(1)	35	40,000		
Lead				
Maximum Arithmetic Mean Averaged Over 3 Consecutive Months	NA	1.5	NA	1.5
Nitrogen Dioxide (NO_2)				
Annual Arithmetic Average	0.053	100	0.053	100
Ozone (O_3)				
8-Hour Average(2)	0.08	157	0.08	157
Respirable Particulate (PM_{10})				
Average of 3 Annual Arithmetic Means revoked, effective December 18, 2006	NA	50	NA	50
24-Hour Concentration(1)	NA	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Average of 3 Annual Arithmetic Means	NA	15	NA	15
24-Hour Concentration(3)	NA	35	NA	35
Sulfur Dioxide (SO_2)				
Annual Arithmetic Mean	0.030	80	NA	NA
Maximum 24-Hour Concentration(1)	0.14	365	NA	NA
Maximum 3-Hour Concentration(1)	NA	NA	0.50	1,300

Notes:
ppm = parts per million
μg/m3 - micrograms per cubic meter
NA - not applicable
Particulate matter concentrations are in μg/m3. Concentrations of all gaseous pollutants are defined in ppm —approximately equivalent concentrations in μg/m3 are presented.
TSP levels are regulated by a New York State Standard only. All other standards are National Ambient Air Quality Standards (NAAQS).
(1) Not to be exceeded more than once a year.
(2) Three-year average of the annual fourth highest daily maximum 8-hr average concentration.
(3) Not to be exceeded by the 98th percentile averaged over 3 years.
(4) EPA reduced these standards down from 65 μg/m³, effective December 18, 2006.

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

On September 21, 2006, EPA revised the NAAQS for PM, effective December 18, 2006. The revision included lowering the level of the 24-hour $PM_{2.5}$ standard from the current level of 65 micrograms per cubic meter ($\mu g/m^3$) to 35 $\mu g/m^3$, and retaining the level of the annual fine standard at 15 $\mu g/m^3$. EPA is not proposing an annual standard for $PM_{10-2.5}$. The PM_{10} 24-hour average standard was retained and the annual average PM_{10} standard was revoked.

NAAQS ATTAINMENT STATUS AND STATE IMPLEMENTATION PLANS (SIP)

The Clean Air Act, as amended in 1990 (CAA) 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 is a state's plan on how it will meet the NAAQS under the deadlines established by the CAA.

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

Manhattan has been designated as a moderate NAA for PM_{10}. On December 17, 2004, EPA took final action designating the five boroughs of New York City as well as Nassau, Suffolk, Rockland, Westchester and Orange counties as $PM_{2.5}$ non-attainment areas under the CAA. State and local governments are required, by early 2008, to develop implementation plans designed to meet the standards by 2010. As described above, EPA has revised the PM standards. $PM_{2.5}$ attainment designations would be effective by April 2010, $PM_{2.5}$ SIPs would be due by April 2013, and would be designed to meet the $PM_{2.5}$ standards by April 2015 (may be extended in some cases up to April 2020).

Nassau, Rockland, Suffolk, Westchester and the five counties of New York City had been designated as severe non-attainment for ozone 1-hour standard. In November 1998, New York State submitted its *Phase II Alternative Attainment Demonstration for Ozone,* which was finalized and approved by EPA effective March 6, 2002, addressing attainment of the one-hour ozone NAAQS by 2007. New York State has recently submitted revisions to the SIP; these SIP revisions included additional emission reductions that EPA requested to demonstrate attainment of the standard, and an update of the SIP estimates using two recently revised EPA models—the mobile source emissions model MOBILE6, and the non-road emissions model NONROAD—which have been updated to reflect current knowledge of engine emissions, and the latest mobile and non-road engine emissions regulations. On April 15, 2004, EPA designated these same counties as moderate non-attainment for the new 8-hour ozone standard which became effective as of June 15, 2004 (the entire Orange County was moved to the Poughkeepsie moderate non-attainment area for 8-hour ozone). EPA revoked the 1-hour standard on June 15, 2005; however, the specific control measures for the 1-hour standard included in the SIP are required to stay in place until the 8-hour standard is attained. The discretionary emissions reductions in the SIP would also remain but could be revised or dropped based on modeling. A new SIP for ozone will be adopted by the state no later than June 15, 2007, with a target attainment deadline of June 15, 2010.

DETERMINING THE SIGNIFICANCE 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 16-1) would be deemed to have a potential significant adverse impact. In addition, in order to maintain concentrations lower than the NAAQS in attainment areas, or to ensure that concentrations will not be significantly increased in non-attainment areas, threshold levels have been defined for certain pollutants; any action predicted to increase the concentrations of these pollutants above the thresholds would be deemed to have a potential significant adverse impact, even in cases where violations of the NAAQS are not predicted.

DE MINIMIS CRITERIA REGARDING CO IMPACTS

New York City has developed *de minimis* criteria to assess the significance of the incremental increase in CO concentrations that would result from proposed projects or actions, as set forth in the *City Environmental Quality Review (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 ppm.

INTERIM GUIDANCE CRITERIA REGARDING $PM_{2.5}$

The New York City Department of Environmental Protection (NYCDEP) is currently employing interim guidance criteria for evaluating the potential $PM_{2.5}$ impacts from NYCDEP projects subject to City Environmental Quality Review (CEQR). The interim guidance criteria currently employed by NYCDEP[1] for determination of potential significant adverse impacts from $PM_{2.5}$ are as follows:

- Predicted 24-hour (daily) average increase in $PM_{2.5}$ concentrations greater than 5 $\mu g/m^3$ at a discrete location of public access, either at ground or elevated levels (microscale analysis); and
- Predicted annual average increase in ground-level $PM_{2.5}$ concentrations greater than 0.1 $\mu g/m^3$ 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 impact is predicted for stationary sources; or at a distance from a roadway corridor similar to the minimum distance defined for locating background monitoring stations).

In addition, NYSDEC has published a policy to provide interim direction for evaluating $PM_{2.5}$ impacts. This policy would apply only to facilities applying for permits or major permit modification under the State Environmental Quality Review Act (SEQRA) that emit 15 tons of PM_{10} or more annually. The interim guidance policy states that such a project will be deemed to have a potentially significant adverse impact if the project's maximum predicted impacts are predicted to increase $PM_{2.5}$ concentrations by more than 0.3 $\mu g/m^3$ averaged annually or more

[1] NYCDEP, Croton Water Filtration Plant EIS, January 2004.

than 5 µg/m^3 on a 24-hour basis. Projects that exceed either the annual or 24-hour threshold will be required to prepare an Environmental Impact Statement (EIS) to assess the severity of the impacts, to evaluate alternatives, and to employ reasonable and necessary mitigation measures to minimize the $PM_{2.5}$ impacts of the source to the maximum extent practicable.

Actions that would increase $PM_{2.5}$ concentrations by more than the interim guidance criteria above would be considered to have the potential to result in significant adverse impacts, depending upon the probability of occurrence, the projected duration of such impacts, the magnitude of the area and the potential number of people affected. NYCDEP recommends that actions subject to CEQR that would potentially cause exceedance of these criteria prepare an environmental impact statement and examine potential measures to reduce or eliminate such impacts.

The above NYCDEP and NYSDEC interim guidance criteria have been to evaluate the significance of predicted impacts of the proposed project on $PM_{2.5}$ concentrations, and determine the need to minimize particulate matter emissions from the proposed action.

D. METHODOLOGY FOR PREDICTING POLLUTANT CONCENTRATIONS

MOBILE SOURCES

The prediction of motor-vehicle-generated CO emissions and their dispersion in an urban environment incorporates meteorological phenomena, traffic conditions, and physical configurations. Air pollutant dispersion models mathematically simulate how traffic, meteorology, and geometry 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 it is necessary to predict the reasonable worst-case condition, most of these dispersion models predict conservatively high concentrations of pollutants, particularly under adverse meteorological conditions.

The mobile source analyses for the proposed action employs 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 action. The assumptions used in the PM analysis were based on the latest $PM_{2.5}$ interim guidance developed by the NYCDEP.

DISPERSION MODEL FOR MICROSCALE ANALYSES

Maximum CO concentrations adjacent to streets near the project site, resulting from vehicle emissions, were predicted using CAL3QHC model Version 2.0[2]. The CAL3QHC model employs a Gaussian (normal distribution) dispersion assumption and includes an algorithm for

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

estimating vehicular queue lengths at signalized intersections. CAL3QHC predicts emissions and dispersion of CO emissions from idling vehicles 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 concentrations are greater than the applicable ambient air quality standards or when *de minimis* thresholds are exceeded using the first-level 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 accumulation of pollutants at a particular prediction location (receptor), and atmospheric stability accounts for the effects of vertical mixing in the atmosphere.

Following the EPA guidelines[3], CO computations were performed using a wind speed of 1 meter per second, and 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, the wind angle that maximized the pollutant concentrations was used in the analysis regardless of frequency of occurrence. These assumptions ensured that worst case meteorology was used to estimate impacts.

ANALYSIS YEAR

The CO microscale analysis was performed for the existing conditions and 2008, the year by which the proposed action is likely to be completed. The future analysis was performed both without the proposed action (the No Build condition) and with the proposed action (the Build condition).

VEHICLE EMISSIONS DATA

Vehicular CO engine emission factors were computed using the EPA mobile source emissions model, MOBILE6.2[4]. This is the most current emissions model, 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 types, number of starts per day, and engine soak time, and various other factors that influence emissions, such as inspection maintenance programs. The inputs and use of MOBILE6.2 incorporates the most current guidance available from the NYSDEC and NYCDEP.

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

[4] EPA, User's Guide to MOBILE6.1 and MOBILE6.2: Mobile Source Emission Factor Model, EPA420-R-03-010, August 2003.

Vehicle classification data were based on field studies conducted for the proposed action. The general categories of vehicle types for specific roadways were further categorized into subcategories based on their relative fleet-wide breakdown.[5] All taxis were assumed to be in hot stabilized mode (excluding any start emissions).

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 the vehicles' exhaust systems are below emission standards. Vehicles failing the emissions test must undergo maintenance and pass a repeat test to be registered in New York State.

An ambient temperature of 50° Fahrenheit was used. The use of this temperature is recommended in the *CEQR Technical Manual* for the Borough of Manhattan and is consistent with current NYCDEP guidance.

TRAFFIC DATA

Traffic data for the air quality analysis were derived from existing traffic counts, projected future growth in traffic (as recommended by the *CEQR Technical Manual)*, and other information developed as part of the traffic analysis for the proposed action (see Chapter 14, "Traffic and Parking"). Traffic data for the future without and with the proposed action were employed in the respective air quality modeling scenarios. The weekday AM (8 to 9AM) and PM (5:30 to 6:30 PM) peak periods were subjected to microscale analysis. These time periods were selected for the mobile source analysis because they produce the maximum anticipated project-generated traffic and therefore have the greatest potential for significant air quality impacts.

BACKGROUND CONCENTRATIONS

Background concentrations are those pollutant concentrations not directly accounted for through the modeling analysis, which directly accounts for vehicle-generated emissions on the streets within 1,000 feet and line-of-sight of the receptor location. Background concentrations must be added to modeling results to obtain total pollutant concentrations at a study site.

The 8-hour average background concentration used in this analysis was 2.9 ppm for the 2008 predictions. This value, obtained from NYCDEP, is based on CO concentrations measured at NYSDEC monitoring stations and is adjusted to reflect the reduced vehicular emissions expected in the analysis year. For purposes of this adjustment, based on EPA guidance, it was assumed that 20 percent of the background value is caused by stationary source emissions that have remained relatively unchanged with time and that 80 percent of the background value is caused by mobile sources that decrease with time. This decrease reflects the increasing numbers of federally-mandated lower-emission vehicles that are projected to enter the vehicle fleet as older, higher-polluting vehicles are retired (i.e., vehicle turnover), and the continuing benefits of the New York State I&M program.

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[5] The MOBILE6.2 emissions model utilizes 28 vehicle categories by size and fuel. Traffic counts and predictions are based on broader size categories, and then broken down according to the fleet-wide distribution of subcategories and fuel types (diesel, gasoline, or alternative).

MOBILE SOURCE ANALYSIS SITES

A total of two analysis sites were selected for microscale analysis (see Table 16-2). These intersections were selected because they are the locations in the study area where the largest levels of project-generated traffic are expected, and, therefore, where the greatest air quality impacts and maximum changes in the CO concentrations would be expected. Each of these intersections was analyzed for CO.

Table 16-2
Mobile Source Analysis Intersection Locations

Analysis Site	Location
1	59th Street and West End Avenue
2	60th Street and West End Avenue

RECEPTOR LOCATIONS

Multiple receptors (i.e., precise locations at which concentrations are predicted) were modeled at each of the selected sites, receptors were placed along the approach and departure links at spaced intervals. The receptors were placed at sidewalk or roadside locations near intersections with continuous public access.

PARKING ANALYSES

PROPOSED PARKING GARAGE

The proposed project would include a parking garage with a maximum capacity of 200 spaces. Exhaust from the garage ventilation system would contain elevated levels of CO due to emissions from vehicles using the garage. The exhaust could potentially affect ambient levels of CO at receptors near the proposed exhaust vent. An analysis was performed using the methodology set forth in the *CEQR Technical Manual*, applying modeling techniques to the vent structure and calculating pollutant levels at various distances from the vent.

Emissions from vehicles entering, parking, and exiting the garage were estimated using the EPA MOBILE6.2 mobile source emission model and an ambient temperature of 50° Fahrenheit. The use of this temperature is recommended in the *CEQR Technical Manual* for the Borough of Manhattan and is consistent with current NYCDEP guidance. 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 garage 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 1-hour and 8-hour averaging periods.

To determine pollutant levels in the vicinity of the vent, the ventilation from the garage was 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 the vent by assuming that the concentration in the garage is equal to the concentration leaving the exhaust, and determining the appropriate initial horizontal and vertical dispersion coefficients at the vent face.

The CO concentrations were determined for the time periods when overall garage usage would be the greatest, for those 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. Maximum emissions would result in the highest CO levels and the greatest potential impacts. Traffic data for the parking garage analysis were derived from the trip generation analysis described in the traffic section of the EAS.

The air from the existing parking garage is vented through a single outlet at a height of approximately 12 feet. The vent face was modeled to directly discharge to West 61st Street—a “near” receptor was placed at a residential window location and a “far” receptor was placed along the sidewalk at a pedestrian height of 6 feet and at a distance of 52 feet from the vent. A persistence factor of 0.77, supplied by NYCDEP, was used to convert the calculated 1-hour average maximum concentrations to 8-hour averages, accounting for meteorological variability over the average 8-hour period.

Background and on-street CO concentrations were added to the modeling results to obtain the total ambient levels. The on-street CO concentration was determined using the methodology in Air Quality Appendix 1 of the *CEQR Technical Manual*, utilizing traffic volumes from the traffic survey conducted for the proposed action.

EXISTING PARKING LOT

The proposed rezoning area along West End Avenue would be located near a large existing parking lot. To evaluate whether emissions from vehicles using the existing parking area (located on West End Avenue between 59th Street and 64th Street) could potentially affect ambient levels of CO at adjacent projected development sites, a microscale analysis was performed. Because cold-starting automobiles leaving a parking facility would emit far higher levels of CO than vehicles entering a facility, the impact from a parking facility would be greatest during the periods with the largest number of departing vehicles. An analysis was performed using the methodology delineated in the *CEQR Technical Manual* to calculate pollutant levels.

Emissions from vehicles entering, parking, and exiting the parking lot were estimated using the EPA MOBILE6.2 mobile source emission model and an ambient temperature of 50° Fahrenheit. For all arriving and departing vehicles, an average speed of 5 miles per hour was conservatively assumed for travel within the parking lot. In addition, all departing vehicles were conservatively assumed to idle for 1 minute before proceeding to the exit. A receptor was placed at the sidewalk location adjacent to the projected development site at Block 1152, Lot 61. To determine compliance with the NAAQS, CO concentrations were determined for the maximum 1- and 8-hour average periods. The total CO concentrations were determined by adding the background and estimated on-street CO levels.

STATIONARY SOURCES

A stationary source analysis was conducted to evaluate potential impacts from the proposed action’s HVAC systems. Since the proposed action is directly northeast of the Con Edison 59th Street Station, which is a large steam generating plant, and is also in the vicinity of several large existing and planned residential/mixed use developments, an analysis was conducted to determine the cumulative effects of these sources on future residents of the proposed project and the projected development site on Lot 61. The smaller projected development sites on Lots 56, 57 and 58 were analyzed using a screening procedure since maximum impacts would be localized.

EMERGENCY GENERATORS

The proposed project would include emergency generators which would be fueled by No. 2 diesel fuel. Generators are anticipated to be installed at each of the proposed project's residential towers. The generators would be used in the event of the sudden loss of power from the electrical grid. Occasionally, the generators would be tested for a short period of time to ensure their availability and reliability in the event of an actual emergency. Emergency generators are exempt from NYSDEC air permitting requirements, but would likely require a registration issued by NYCDEP. The emergency generators would be installed and operated in accordance with NYCDEP requirements, as well as other applicable codes and standards. Potential air quality impacts from the emergency generators are considered insignificant since they would be used only for testing purposes outside of an actual emergency.

HVAC SCREENING

Projected Development Sites

A screening analysis was performed to assess air quality impacts associated with emissions from the HVAC systems from the projected developments at Lots 56, 57 and 58 under the reasonable worst-case scenario. The methodology described in the *CEQR Technical Manual* was used for the analysis and considered impacts on sensitive uses (both existing residential development as well as other residential developments under construction). The *CEQR* methodology determines the threshold of development size below which the action would not have a significant adverse impact. The screening procedures utilize information regarding the type of fuel to be burned, the maximum development size and type of development, and the HVAC exhaust stack height to evaluate whether a significant adverse impact is likely. Based on the distance from the development to the nearest building of similar or greater height, if the maximum development size is greater than the threshold size in the *CEQR Technical Manual*, there is the potential for significant air quality impacts, and a refined dispersion modeling analysis would be required. Otherwise, the source passes the screening analysis, and no further analysis is required.

Existing HVAC Systems

A screening analysis was performed to determine whether potential significant impacts would occur from the Amsterdam Houses, a public housing complex located between West 61st and West 63rd Street. Since detailed information on the Amsterdam Houses' HVAC systems was not available, a conservative assumption that the building is heated by No. 2 oil was used. The same methodology in the *CEQR Technical Manual* was performed as discussed above for the projected development sites.

DISPERSION MODELING

A detailed dispersion modeling analysis was performed using the Industrial Source Complex Short Term (ISCST3) dispersion model developed by EPA, and described in *User's Guide for the Industrial Source Complex (ISC3) Dispersion Models* (EPA-454/B-95-003a). This analysis was performed to determine the potential impacts from the proposed action on existing buildings as well on the proposed action itself, and from the Con Edison 59th Street Station, the Heschel

School, which is adjacent to the project site and the projected development site at Lot 61, and other large-scale developments on the proposed action.

The ISCST3 model calculates pollutant concentrations from one or more points (e.g., exhaust stacks) based on hourly meteorological data, and has the capability of calculating pollutant concentrations at locations when the plume from the exhaust stack is affected by the aerodynamic wakes and eddies (downwash) produced by nearby structures. The analysis of potential impacts from exhaust stacks were made assuming stack tip downwash, buoyancy-induced dispersion, gradual plume rise, urban dispersion coefficients and wind profile exponents, no collapsing of stable stability classes, with and without building downwash, and elimination of calms. The meteorological data set consisted of the latest five years of concurrent meteorological data that are available: surface data collected at La Guardia Airport (2000-2004) and concurrent upper air data collected at Brookhaven, New York. NO_2, SO_2 and particulate matter (PM_{10} and $PM_{2.5}$) concentrations were determined.

RECEPTOR LOCATIONS

Discrete receptors (i.e., locations at which concentrations are calculated) were placed on the proposed buildings, and on surrounding buildings that may be impacted by the proposed action. The model receptor network consisted of locations along the sides and roof of the buildings being analyzed, at operable windows, or otherwise accessible locations. Rows of receptors were placed in the model at spaced intervals at different sections of the buildings at multiple elevations.

EMISSION ESTIMATES AND STACK PARAMETERS

Emission estimates of the criteria pollutants of concern were input into the ISCST3 dispersion model to estimate the air quality impacts from the proposed project when added to monitored background levels.

The emission rates and stack parameters for the Con Edison 59th Street Station were obtained from various sources, including the *Berrians Turbine Project—Cumulative Air Quality Assessment* (TRC, August, 2002), and NYSDEC and NYCDEP permit records. These emissions consist of maximum short-term allowable as well as annual average emissions. For the proposed project and the 555 West 59th Street development, information was obtained on the buildings' proposed HVAC equipment and stack exhaust design. For each of the buildings on the project site (Building A, Building B and Building C), individual boiler installations would be used for heating. Annual fuel consumption was estimated based on anticipated peak heating season demand. Emission rates for other modeled sources were estimated using maximum development size information and fuel consumption factors obtained from the *CEQR Technical Manual*. Fuel consumption factors of 52.8 ft^3/ft^2-year on an annual basis and 1.45 ft^3/ft^2-day on a short-term basis were used for natural gas, and fuel consumption factors of 0.38 gal/ft^2-year on an annual basis and 0.0104 gal/ft^2-day on a short-term basis were used for fuel oil.

In cases where a source's fuel type was unknown, the fuel type resulting in the higher emission rate was used (i.e., fuel oil for NO_x, PM, and SO_2). EPA AP-42 was used to determine the emission factors for both natural gas and fuel oil combustion.

Table 16-3 presents the emission rates and stack parameters used in the dispersion modeling. Because the Con Edison 59th Street Station boilers normally do not operate at maximum (i.e., 100 percent) load conditions, 75, and 50 percent load conditions were also analyzed for this source.

Table 16-3
Stack Parameter and Emission Rate Data

	Proposed Project Algin A	Proposed Project Algin B	Proposed Project Algin C	Projected Development Site on Lot 61[3]	Con Edison Boiler Stack	Con Edison Turbine Stack	Heschel School[1] [2]	Durst Project[1] [2]	2 West End Avenue Project[1] [2]	Roosevelt Building[1]	555 West 59th Street - Boilers	555 West 59th Street - Heater	Concerto Building[1] [2]	Riverside South Parcel K3[1] [2]	Touro College[3]
Stack Height, meters	37	52	99	97	154.54	36.3	29.44	110	99	103	118	118	109	90	60
Stack Diameter, meters	0.6096	0.7112	0.8638	1.2192	5.03	3.66	0	0	0	0	0.762	0.559	0	0	0.1524
Stack Exit Velocity, meters/sec	0.001	8.7913	8.4197	10.192	18.59	41.3	0.001	0.001	0.001	0.001	7.7617	1.1546	0.001	0.001	3.90
Stack Exit Temperature, K	355.37	422.04	422.04	422.04	461	622	293	293	293	293	422.04	394.26	293	293	422.04
NO_x Annual	0.0124	0.0542	0.0759	0.0367	12.64	0.492	3.80E-03	0.122	0.0271	0.0247	0.1057	0.0083	0.0272	0.0285	0.0169
SO_2 Short-term	0.00018	0.00079	0.00111	0.5205	81.27	3.70	2.28E-04	0.00729	0.3853	0.351	0.00154	0.00012	0.387	0.4051	0.2406
SO_2 Annual	7.46E-05	3.25E-04	4.55E-04	0.0521	13.72	0.08	2.28E-05	0.00073	0.0385	0.0351	6.34E-04	4.97E-05	0.0387	0.0405	0.0241
PM_{10} Short-term	0.00230	0.01002	0.01403	0.044	6.69	1.69	2.89E-03	0.0923	0.0326	0.0296	0.01955	0.00153	0.0327	0.0342	0.0202
PM_{10} Annual	0.00094	0.00412	0.00577	0.0044	1.19	0.037	2.89E-04	0.00923	0.0033	0.003	0.00803	0.00063	0.0033	0.0034	0.0020
$PM_{2.5}$ Short-term	0.00230	0.0100	0.0140	0.039	-	-	-	-	-	-	-	-	-	-	-
$PM_{2.5}$ Annual	0.00094	0.00412	0.00577	0.0039	-	-	-	-	-	-	-	-	-	-	-

Notes:

(1) Emission rates for these sources were estimated using maximum development size and fuel consumption factors obtained from the *CEQR Technical Manual*.

(2) Stack parameters based on default values referenced in the *CEQR Technical Manual*.

(3) Stack parameters based on an assumed temperature of 300 °F (423 K). Stack diameter and velocity estimated from values typical of permitted NYC boilers in same size range. Emission parameters conservatively include the additional development size for Lot 58.

BACKGROUND CONCENTRATIONS

To estimate the maximum expected total pollutant concentrations at a given receptor, the predicted levels were added to corresponding background concentrations (See Table 16-4). The background levels for NO_2, SO_2 and PM_{10} were based on concentrations monitored at the nearest NYSDEC ambient air monitoring station. The measured background concentrations were added to the predicted contributions from the modeled sources to determine the maximum predicted total pollutant concentrations.

Table 16-4
Background Pollutant Concentrations

Pollutant	Monitoring Station	Averaging Period	Background Concentration ($\mu g/m^3$)	Ambient Standard ($\mu g/m^3$) [1]
Nitrogen Dioxide (NO_2)	PS 59	Annual	71.5	100
Sulfur Dioxide (SO_2)	PS 59	3-hour	202	1,300
		24-hour	123	365
		Annual	36.6	80
Inhalable Particulates (PM_{10})	JHS 126	24-hour	50.0	150

Notes:
[1] Background concentrations for short-term standards represent second-highest concentrations, except for PM2.5, which is the 98th percentile concentration.
[2] Annual PM_{10} standard revoked effective December 18, 2006.
Sources:
New York State Ambient Air Quality Report, NYSDEC 2000 -2004.
NYCDEP Memorandum on Background Data for Modeling NO_2, SO_2 and PM_{10} (September 27, 2005).

The 3-hour and 24-hour background levels for SO_2 are the maximum second-highest concentrations measured for the 2000-2004 period. The 24-hour background levels for $PM_{2.5}$ are the maximum of the 98th percentile concentrations measured for the 2000-2004 period. The annual average background values for NO_2 and SO_2 are the highest annual averages measured over the same period. The 24-hour background value for PM_{10} is the maximum second-highest concentration from 2002-2004. This analysis conservatively assumes that the maximum background concentrations occur on all days, regardless of when maximum impacts are predicted to occur. Also shown in Table 16-4 are the ambient air quality standards.

INDUSTRIAL SOURCES

To assess and estimate the potential effects on the proposed action from existing industrial operations in the surrounding area, an analysis was conducted. Initially, 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 boundaries of the project site with the potential for emitting air pollutants. To completely cover the study area, all of the blocks bounded by West 63rd Street, West 58th Street, Amsterdam Avenue and West End Avenue were surveyed to observe uses and to identify visible sources of emissions. It was determined from the site visit that few businesses in the area had the potential to be an air quality concern. No visible or odorous emissions were detected from any of the existing uses during the site visit.

A list of the identified buildings was then submitted to NYCDEP Bureau of Environmental Compliance (BEC) to obtain all the available certificates of operation for these locations and to determine whether manufacturing or industrial emissions are occurring. A search of Federal- and State-permitted facilities within the study area was conducted using the EPA's Envirofacts database.[6]

The NYSDEC DAR-1 software program, which contains a database of facilities with air toxics emissions, was checked to determine if any additional facilities not already identified should be included in the analysis. No additional facilities with air toxics emissions were identified.

An air quality dispersion model screening database, ISC3, was used to estimate maximum potential impacts from different sources at various distances. Impact distances selected for each source were the minimum distances between the boundary of the project sites and the source sites. Predicted worst-case impacts on the proposed project were compared with the short-term guideline concentrations (SGCs) and annual guideline concentrations (AGCs) recommended in NYSDEC's *DAR-1 AGC/SGC TABLES*.[7] These guideline concentrations present the airborne concentrations which are applied as a screening threshold to determine if the future residents of the proposed project could be significantly impacted from nearby sources of air pollution.

E. EXISTING CONDITIONS

EXISTING MONITORED AIR QUALITY CONDITIONS (2004)

NYSDEC monitors ambient air quality at a number of locations throughout New York State, including New York City. Each of the NYSDEC air monitoring stations monitors one or several regulated air pollutants. The most recent year of available data from these monitoring stations is the calendar year 2004. Ambient air quality data including concentrations of carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter (PM), nitrogen dioxide (NO_2), lead, and ozone for the Study Area are presented in Table 16-5. While Manhattan is still a non-attainment region for ozone and PM_{10}, there were no monitored violations of the National Ambient Air Quality Standards (NAAQS) for any pollutants other than annual average $PM_{2.5}$ concentration at these sites in 2004.

PREDICTED EXISTING POLLUTANT CONCENTRATIONS IN THE STUDY AREA

As noted previously, receptors were placed at multiple sidewalk locations next to the intersections under analysis. The receptor with the highest predicted CO concentrations was used to represent the intersection site for the existing condition. CO concentrations were calculated for each peak period specified above.

Table 16-6 shows the maximum predicted existing (2004) CO 8-hour average concentration at the receptor sites. (No 1-hour values are shown since predicted values are much lower than the standard.) The values shown are the highest predicted concentrations for the receptor locations for any time period analyzed. As shown below, the maximum predicted 8-hour average concentration does not exceed the national standard of 9 ppm.

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

[7] NYSDEC Division of Air Resources, December 22, 2003.

Table 16-5
Representative Monitored Ambient Air Quality Data (2004)

Pollutants	Monitoring Station	Units	Period	Concentrations			No. of Exceedances of Federal Standard	
				Mean	Highest	2nd Highest	Primary	Secondary
CO	PS 59	ppm	8-hour	-	2.1	2.0	0	-
			1-hour	-	2.9	2.6	0	
SO_2	PS 59	ppm	Annual	0.010	-	-	0	-
			24-hour	-	0.037	0.033	0	-
			3-hour	-	0.087	0.056	-	0
Respirable Particulates (PM_{10}) [3]	JHS 126	$\mu g/m^3$	Annual	17	-	-	0	0
			24-hour	-	47	32	0	0
Fine Particulates ($PM_{2.5}$) [2]	P.S. 59	$\mu g/m^3$	Annual	15.6	-	-	-	-
			24-hour [1]	-	-	41.7	-	-
NO_2	P.S. 59	ppm	Annual	0.035	-	-	0	0
Lead	Susan Wagner HS	$\mu g/m^3$	3-month	-	0.01	0.01	0	-
O_3	IS 52	ppm	1-hour	-	0.094	0.091	0	0

Notes:
[1] The 24-hour $PM_{2.5}$ concentration is a value representing the 98th percentile.
[2] The most recent monitoring data does not exceed the previous standard of 65 $\mu g/m^3$ which was in place at the time the monitoring was performed. However, the concentration does exceed the revised 24-hour $PM_{2.5}$ standard of 35$\mu g/m^3$.
[5] The annual PM_{10} standard was revoked, effective December 18, 2006.
Source: New York State Air Quality Report, NYSDEC 2004.

Table 16-6
Maximum Predicted Existing 8-Hour Average
Carbon Monoxide Concentrations for 2004 (parts per million)

Receptor Site	Location	Time Period	8-Hour Concentration (ppm)
1	59th Street and West End Avenue	PM	4.7
2	60th Street and West End Avenue	AM	4.2

Note: 8-hour standard is 9 ppm.

F. THE FUTURE WITHOUT THE PROPOSED ACTION

MOBILE SOURCES ANALYSIS

CO concentrations without the proposed action were determined for the 2008 analysis year at traffic intersections using the methodology previously described. Table 16-7 shows future maximum predicted 8-hour average CO concentrations at the analysis intersections without the proposed action (i.e., 2008 No Build values). The values shown are the highest predicted concentrations for the receptor locations for any of the time periods analyzed.

Table 16-7
Future (2008) Maximum Predicted 8-Hour Average Carbon Monoxide No Build Concentrations in the Project Study Area (parts per million)

Receptor Site	Location	Time Period	8-Hour Concentration (ppm)
1	59th Street and West End Avenue	PM	4.1
2	60th Street and West End Avenue	AM	3.8
Note: 8-hour standard is 9 ppm.			

G. PROBABLE IMPACTS OF THE PROPOSED ACTION

The proposed action would result in increased mobile source emissions in the immediate vicinity of the project site and could also affect the surrounding community by emissions from HVAC equipment. In addition, potential impacts on the proposed action from nearby manufacturing or processing facilities were addressed.

The following sections describe the results of the studies performed to analyze the potential impacts on the surrounding community from these sources. The areas of concern are discussed below.

MOBILE SOURCES ANALYSIS

CO concentrations with the proposed action were determined for the 2008 analysis year at traffic intersections using the methodology previously described. Table 16-8 shows the future maximum predicted 8-hour average CO concentrations with and without the proposed action at the intersections studied. (No 1-hour values are shown since no exceedances of the standard 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 values shown are the highest predicted concentrations for any of the time periods analyzed. The results indicate that the proposed action would not result in any violations of the CO standard or any significant impacts at the receptor locations.

Table 16-8
Future (2008) Maximum Predicted 8-Hour Average Carbon Monoxide No Build and Build Concentrations (parts per million)

Receptor Site	Location	Time Period	8-Hour Concentration (ppm)	
			No Build	Build
1	59th Street and West End Avenue	PM	4.1	4.1
2	60th Street and West End Avenue	AM	3.8	3.8
Note: 8-hour standard is 9 ppm.				

PARKING ANALYSES

PROPOSED PARKING GARAGE

As previously discussed, to assess the potential effects on ambient CO concentrations from emissions from the proposed project's parking garage, an analysis was performed using the methodology set forth in the *CEQR Technical Manual*. 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 are operating in a "cold-start" mode, emitting higher levels of CO than arriving vehicles. Maximum emissions would result in the highest CO levels and the greatest potential impacts. Traffic data for the parking garage analysis were derived from the trip generation analysis described in Chapter 14, "Traffic and Parking."

Vehicles were conservatively assumed to enter and exit the garage via a single location along West 61st Street. The exhaust from the proposed facility was assumed to be vented through a single exhaust at a height of approximately 12 feet. The vent was assumed to face directly onto West 61st Street, and a near" receptor was placed directly above the vent at a height of 6 feet, while a "far" receptor was placed along the sidewalk at a pedestrian height of 6 feet and a distance of 52 feet from the vent. An 8-hour persistence factor of 0.77 supplied by NYCDEP was used to account for meteorological variability over the average 8-hour period.

"Based on the methodology described previously, the maximum predicted 8-hour average impact from the garage on future CO levels at the near and far receptor would be 1.1 and 0.4 ppm, respectively. Including a background CO level of 2.9 ppm, the maximum predicted future (2008) 8-hour average CO level with the proposed project would be 4.0 ppm, which is below the applicable standard of 9 ppm. As these results show, the exhaust from the proposed parking garage would not result in any violations of the CO standards or any adverse air quality impacts or exceedance of *de minimis* impacts.

EXISTING PARKING LOT

Impacts of CO from the existing parking lot on West End Avenue were assessed for their potential effects on the rezoning area. Data on departing and entering vehicles were obtained from field counts taken at the parking facility. The CO concentrations were determined for the time periods when overall lot usage would be the greatest, considering the hours when the greatest number of vehicles would exit the facility. Departing vehicles are operating in a "cold-start" mode, emitting higher levels of CO than arriving vehicles.

All vehicles were conservatively assumed to enter and exit from a single location closest to the projected development site along West End Avenue. A single receptor was placed along the sidewalk adjacent to the portion of the rezoning area directly across the street from the parking lot. An 8-hour persistence factor of 0.77 supplied by NYCDEP was used to account for meteorological variability over the average 8-hour period.

Based on the methodology described previously, the maximum predicted 8-hour average impact from the existing parking lot on future CO levels at the receptor would be 0.01 ppm. Therefore, including a background level of 2.9 ppm and on-street traffic with an estimated CO concentration of 0.8 ppm the maximum predicted future (2008) 8-hour average CO level with the proposed project would be 3.7 ppm, which is substantially below the applicable standard of 9 ppm. As these results show, the existing parking lot would not result in any adverse air quality impacts on the rezoning area.

STATIONARY SOURCES

SCREENING ANALYSIS FOR HVAC SYSTEMS

Projected Development Sites

A screening analysis was performed for the projected development sites on Lots 56, 57 and 58. The primary stationary source of air pollutants associated would be the emissions from HVAC systems. Currently, these buildings use a common boiler which is capable of burning natural gas or No. 2 oil. The primary pollutant of concern when burning natural gas is nitrogen dioxide, and when burning oil, sulfur dioxide.

Lots 56 and 57. Lots 56 and 57 were analyzed as a single source since the existing HVAC system services both buildings. The nearest buildings of a similar or greater height were determined to be the projected development site on Lot 58, directly adjacent to Lots 56 and 57, and the project site, which would be approximately 35 feet distant. The HVAC screening analysis was performed to determine the minimum distance needed to ensure that no significant impacts would occur on elevated receptor locations. The analysis showed that at distances greater than approximately 39 feet and 30 feet using No. 2 oil and natural gas, respectively, no significant air quality impacts from the projected development's HVAC systems are anticipated. Accordingly, an (E) Designation would be incorporated into the rezoning proposal for the affected sites, that would ensure that there are no potential adverse air quality impacts on nearby projected development sites or the proposed project. The text of the (E) Designation is as follows:

> Block 1152, Lots 56 and 57
>
> Any new residential and/or commercial development on the above-referenced properties must ensure that the heating, ventilating and air conditioning stack(s) is located at least 39 feet and 30 feet from the lot line facing West End Avenue and parallel with West 61st Street when firing No. 2 oil and natural gas, respectively, and at least 4 feet from the lot line facing West 60th Street and parallel with West End Avenue when firing No. 2 oil, to avoid any potential significant air quality impacts.

Lot 58. The nearest buildings of a similar or greater height was determined to be the projected development site on Lot 61, directly adjacent to Lot 58. The HVAC screening analysis was performed to determine the minimum distance needed to ensure that no significant impacts would occur on elevated receptor locations. The analysis showed that at distances greater than approximately 56 feet and 38 feet using No. 2 oil and natural gas, respectively, no significant adverse air quality impacts from the projected development's HVAC systems are anticipated. Accordingly, an (E) Designation would be incorporated into the rezoning proposal for the affected sites, that would ensure that there are no potential adverse air quality impacts on nearby projected development sites or the proposed project. The text of the (E) Designation is as follows:

Block 1152, Lot 58

Any new residential and/or commercial development on the above-referenced properties must ensure that the heating, ventilating and air conditioning stack(s) is located at least 56 feet and 38 feet from the lot line facing West End Avenue and parallel with West 61st Street when firing No. 2 oil and natural gas, respectively, and at least 19 feet and 1 foot from the lot line facing West 60th Street and parallel with West End Avenue when firing No. 2 oil and natural gas, respectively, to avoid any potential significant air quality impacts.

Existing HVAC Systems

Stationary source impacts associated with the Amsterdam Houses were analyzed. Based on the HVAC screening methodology in the *CEQR Technical Manual*, the analysis was performed using the distance from the nearest single building to the rezoning area (utilizing an approximate development size of 82,548 square feet), as well as the distance from the center of the housing complex utilizing the entire development size (approximately 825,480 square feet). The results determined that the proposed action would not be adversely affected by this source since the maximum allowable development size is greater than the estimated size of the development determined using the screening procedure.

HVAC SYSTEMS MODELING

Potential impacts were analyzed for HVAC systems of the proposed project and the projected development site on Block 1152, Lot 61 using ISCST3 modeling, following the methodology previously described. The maximum predicted concentrations of NO_2, SO_2 and PM_{10} were added to the background concentrations to estimate the ambient air quality at potential elevated receptor locations near the project site. The results of this analysis are presented in Table 16-9. As shown in the table, the maximum predicted pollutant concentrations are less than their respective standards for all of the pollutant time averaging periods.

Table 16-9
Maximum Predicted Pollutant Concentrations from the Proposed Action

Pollutants	Averaging Period	Background Concentration (μg/m^3)	Predicted Concentration (μg/m^3)	Total Predicted Concentration (μg/m^3)	Ambient Standard (μg/m^3)
Nitrogen Dioxide (NO_2)	Annual	71.5	3.2	74.7	100
Sulfur Dioxide (SO_2)	3-hour	202	130	332	1,300
	24-hour	123	38	161	365
	Annual	36.6	0.37	37.0	80
Inhalable Particulates (PM_{10})	24-hour	50.0	4.7	54.7	150

The air quality modeling analysis determined that the highest predicted increase in the 24-hour average and annual average $PM_{2.5}$ concentrations is 4.7 μg/m^3 and 0.25 μg/m^3, respectively. These concentrations are below the NYCDEP interim guidance criteria and NYSDEC policy of 5 μg/m^3 on a 24-hour basis and 0.3 μg/m^3 on an annual basis. In addition, the annual average $PM_{2.5}$ concentration from the neighborhood scale analysis was 0.015 μg/m^3, which is below the NYSDEC policy of 0.1 μg/m^3 on a neighborhood scale basis.

Therefore, the results of this analysis show that there would be no significant air quality impacts from the proposed action's HVAC systems.

ANALYSIS OF EFFECTS FROM STATIONARY SOURCES

Con Edison 59th Street Station and HVAC Systems

Potential stationary source impacts on the proposed action from nearby emission sources in Table 16-3 were determined using the methodology previously described. The estimated concentrations from the modeling were added to the background concentrations to estimate total air quality concentrations at the proposed project. The results of this analysis are presented in Table 16-10. The receptors within the proposed building selected for this analysis were the worst-case locations, i.e., elevated locations where operable windows or air intake vents would be located.

Table 16-10
Stationary Source Analysis: Maximum Predicted Pollutant Concentrations on the Project Site

Pollutants	Averaging Period	Background Concentration (μg/m³)	Predicted Concentration (μg/m³)	Total Predicted Concentration (μg/m³)	Ambient Standard (μg/m³)
Nitrogen Dioxide (NO_2)	Annual	71.5	14.5	86.0	100
Sulfur Dioxide (SO_2)	3-hour	31.4	1,239.3	1,270.7	1,300
	24-hour	18.3	297.9	316.2	365
	Annual	36.6	2.03	38.7	80
Inhalable Particulates (PM_{10})	24-hour	50.0	29.5	79.5	150
	Annual	19.0	1.1	20.1	50

Several receptors on the upper portion of the main tower of the proposed project were initially identified as having a potential exceedance of the 3-hour and 24-hour SO_2 NAAQS, due to impacts from the nearby Touro College development. Therefore, further investigation and analysis of the maximum short-term SO_2 impacts were conducted. The analysis was conducted assuming the maximum second-highest background concentration measured over a five-year period. This is very conservative since it assumes this maximum background concentration occurs each day. The actual monitored concentrations vary greatly on a day-to-day basis, but with a trend toward higher concentrations in the winter and lower concentrations in the summer, corresponding with the use of sulfur-containing fossil fuels such as oil during the heating season.

As discussed in the *CEQR Technical Manual*, to further refine the modeling procedure yet still yield acceptable conservative estimates of pollutant concentrations, actual SO_2 monitored background levels may be used on the days that result in the highest predicted 24-hour concentrations. The actual monitored SO_2 concentration for the dates with the maximum potential modeled impacts was 31.4 micrograms per cubic meter (μg/m³) on a 3-hour average and 18.3 μg/m³ on a 24-hour average.[8] These concentrations are well below the maximum monitored background concentration of 202 μg/m³ on a 3-hour average and 123 μg/m³ on a 24-hour average. Therefore, adding the actual background concentrations to the modeled concentrations results in a total predicted concentration below the SO_2 ambient air quality standard.

[8] On the date the maximum 3-hour SO_2 concentration occurred, the NYSDEC monitoring at P.S. 59 was not in operation. Therefore, other NYC SO_2 monitoring stations were surveyed, and the highest concentration, at IS52 in the Bronx, was used.

As shown in Table 16-10, the predicted pollutant concentrations for all of the pollutant time averaging periods are below their respective standards. Therefore, no significant adverse air quality impacts would occur on the proposed project.

Industrial Sources

As discussed above, a field survey was conducted to identify manufacturing and industrial uses within 400 feet of the proposed action. Addresses with potential industrial emissions were identified, based on existing on-site uses as well as the presence of visible venting apparatus.

Sources having the potential for pollutant emissions were identified and a list of addresses were submitted to NYCDEP to determine if any of them had emission source permits. Of the six addresses identified to have the potential for pollutant emissions, none of the businesses are active or on file with BEC. Therefore, no significant adverse air quality impacts are anticipated from industrial sources.

AIR QUALITY ASSESSMENT WITH PROPOSED TRAFFIC MITIGATION

Table 16-11 shows the effect of the proposed traffic mitigation measures on maximum predicted CO concentrations with the proposed action. The values shown are the highest predicted concentrations for the receptor location. Table 16-11 shows that the proposed traffic mitigation measures would reduce the maximum predicted 8-hour CO concentrations at the West 59th Street and West End Avenue intersection, back to No Build levels.

Table 16-11
Future (2008) Maximum Predicted 8-Hour Average Carbon Monoxide Build and Build with Mitigation Concentrations (parts per million)

Receptor Site	Location	Time Period	No Build	Build	Build with Traffic Mitigation
1	59th Street and West End Avenue	AM	4.0	4.1	4.1
2	60th Street and West End Avenue	AM	3.8	3.8	3.8
Note: 8-hour standard is 9 ppm.					

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