Chapter 17: Air Quality

A. INTRODUCTION

Air quality impacts can be either direct or indirect. Direct impacts could stem from emissions generated by stationary sources at a development site, such as emissions from the development parcels' garage ventilation systems or boiler systems. Indirect impacts could result from existing pollutant emission sources impacting air quality at the development parcels, or from the impact of the Proposed Actions on traffic volumes and conditions.

The illustrative development programs analyzed in the FGEIS included parking garages and boilers for heat and hot water—direct sources which could potentially result in local increases in pollutant concentrations. Analyses were conducted to evaluate potential future pollutant concentrations in the future Build condition with the parking garages and boiler exhaust stacks. Indirect impacts at intersections along the access routes from the mobile-source emissions related to vehicle trips generated by the development parcels and their impact on traffic were analyzed as well. Predicted impacts from the various sources were also combined, where appropriate, to assess the cumulative impact of all sources. Some carbon monoxide (CO) impacts from mobile sources related to the illustrative development programs were predicted to exceed the *de minimis* criterion defined in the CO New York State Implementation Plan (SIP) which was in effect at the time the FGEIS was completed. The *de minimis* criterion from the SIP is not included in the current CO maintenance plan which replaced the SIP. As stated in the FGEIS, the predicted CO concentration increments did not exceed the *de minimis* significant adverse impact criterion defined in the *CEQR Technical Manual*, which is less stringent than the former SIP *de minimis* criterion. As stated in the FGEIS, the exceedance of the SIP *de minimis* criterion would have been mitigated with the traffic mitigation measures proposed in the FGEIS. Although the parking garage analysis in the FGEIS did not predict significant adverse impacts, such impacts could not be ruled out since the detailed parking and ventilation plans were not available, but possible mitigation for potential impacts was identified. Potential significant adverse impacts from the boiler systems and from the Queens Midtown Tunnel (QMT) ventilation system on the 708 First Avenue development parcel were predicted in the FGEIS, and mitigation measures for such impacts were identified. More details regarding the findings of the FGEIS are presented below.

Since more detail now exists about the proposed buildings, parking facilities, and ventilation systems, and since some changes in projected traffic conditions have been identified, the parking ventilation systems, mobile sources, and heating systems were analyzed once more for this Draft SEIS. Indirect impacts from nearby industrial sources on air quality at the development parcels were analyzed as well. In addition, refinements to the analysis of the impacts from the QMT have been made since the FGEIS, based on newly available tunnel traffic information, and new U.S Environmental Protection Agency (EPA) vehicle emission and air dispersion models, and that analysis is presented here as well. Analysis of air quality during construction of the proposed development program is presented in Chapter 20, "Construction Impacts."

As discussed below, this Draft SEIS analysis finds that the maximum predicted pollutant concentrations and concentration increments from mobile sources with the Proposed Actions and from the development parcels' parking garages would be below the applicable criteria for determining the significance of potential impacts. Based on the new EPA emissions model, vehicular emissions applied in this Draft SEIS (on roadways and within garages and tunnels) are significantly lower than those applied in the FGEIS.[1] There would be no significant adverse air quality impacts from industrial facilities or the QMT ventilation system on the development parcels. The operation of the proposed development program's boilers would not result in any new exceedances of the National Ambient Air Quality Standards (NAAQS). The maximum increment in $PM_{2.5}$ concentrations is predicted to slightly exceed the interim guidance threshold level of 2 micrograms per cubic meter ($\mu g/m^3$), at two floors at 616 First Avenue (616-1) and a single floor at Waterside 1 Building 1 (WS1-1) (see Figure 1-4 for building locations). Due to their limited frequency, duration, and extent, however, these exceedances would not constitute significant adverse air quality impacts.

The Proposed Actions were also analyzed assuming the United Nation Development Corporation (UNDC) project would be in place. The analyses conducted found that there would be no significant adverse air quality impacts from the Proposed Actions; however, the proposed UNDC project's emissions from heating, ventilation and air conditioning (HVAC) systems could potentially adversely affect the 708 First Avenue office development without measures designed to reduce emissions or increase the dispersion of air pollutants.

B. SUMMARY OF FGEIS FINDINGS

The FGEIS included an analysis of mobile sources, conducted to determine the effects of emissions from parking facilities and traffic generated by the proposed development program and other changes to traffic due to the rezoning on pollutant levels in the study area; analysis of stationary sources, assessing the effects of the development parcels' heating systems; and an analysis of the effects of the QMT ventilation building on the proposed towers of the adjacent 708 First Avenue development parcels.

CO impacts from mobile sources related to the illustrative development programs at up to three analysis sites for the FGEIS Residential and Mixed-Use Development Programs under the 12.0 FAR Rezoning Scenario were predicted to exceed the *de minimis* criterion defined in the CO New York SIP which was in effect at the time the FGEIS was completed. The *de minimis* criterion from the SIP is not included in the current CO maintenance plan which replaced the SIP. As stated in the FGEIS, the predicted CO concentration increments did not exceed the *de minimis* significant adverse impact criterion defined in the *CEQR Technical Manual*, which is less stringent than the SIP *de minimis* criterion. As stated in the FGEIS, the de minimis impacts would have been mitigated with the application of the range of network and intersection improvement measures outlined in the review of traffic mitigation in the FGEIS.

Because the site plans examined in the FGEIS were illustrative and there were not yet detailed plans for the parking garage locations and their mechanical systems, impacts from parking garage emissions could not be ruled out. Possible mitigation measures to avoid such impacts were identified, including modifications in ventilation rates and exhaust locations.

[1] The latest EPA mobile source emissions model predicts lower vehicular emission factors mainly because it has been updated to reflect the latest federal emissions regulations.

Assuming that No. 2 oil were to be used in boilers for heating and hot water, the maximum potential increase in 24-hour average $PM_{2.5}$ concentrations on the upper floors of the development parcels was predicted, in the FGEIS, to be greater than the 24-hour interim guidance criterion applicable at the time the FGEIS was published (5 µg/m^3). Measures to mitigate such potential impacts were identified, including optimal stack location or the use of electric power or steam.

The highest predicted total CO and PM_{10} concentrations within the development parcels from the emission of particulate matter from the QMT ventilation exhaust were less than the applicable NAAQS. The FGEIS concluded that potential significant adverse 24-hour average $PM_{2.5}$ impacts on the development parcels could result from the QMT ventilation emissions, and stated that when a specific project plan is formulated and proposed, additional analyses would be undertaken to determine if there would be potential for significant adverse impacts. Potential mitigation measures were identified for the possible eventuality that the additional analysis on a specific project design should result in the predicted potential for significant adverse impacts, including the placement of operable windows and fresh air intakes in areas predicted not to be significantly affected by this source.

C. POLLUTANTS FOR ANALYSIS

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

CARBON MONOXIDE

CO, a colorless and odorless gas, is produced in the urban environment primarily by the incomplete combustion of gasoline and other fossil fuels. In urban areas, approximately 80 to 90 percent of CO emissions are from motor vehicles. Since CO is a reactive gas 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, 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 changes in traffic patterns and an increase in traffic volume in the study areas and could potentially result in local increases in CO concentrations. Therefore, a mobile-source analysis was conducted at critical intersections in the study areas to evaluate future CO concentrations with and without the Proposed Actions.

A parking garage analysis was also conducted to evaluate future CO concentrations with the operation of the proposed parking garages.

NITROGEN OXIDES, VOCS, AND OZONE

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

The Proposed Actions would not have a significant effect on the overall volume of vehicular travel in the metropolitan area; therefore, no significant impact on regional VOC and NO_x emissions or on ozone levels is predicted. An analysis of emissions of VOC and NO_x from mobile sources related to the Proposed Actions was therefore not warranted.

In addition, there is a standard for average annual NO_2 concentrations. The impact of emissions from the development parcels' boiler systems on NO_2 concentrations was analyzed.

LEAD

Airborne lead emissions 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 that drastically reduced 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 Actions and, therefore, analysis was 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 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. PM 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 the smaller $PM_{2.5}$. $PM_{2.5}$ 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 mainly derived from combustion material that has volatilized and then condensed to form primary PM (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. An analysis was conducted to assess the worst case PM impacts due to the increased traffic associated with the Proposed Actions. In addition, PM concentrations were determined at elevated locations within the development parcels that would be in close proximity to the QMT ventilation system, to determine whether impacts to future residents of the project would be potentially significant at these locations. The impact of PM emissions from the boiler systems at the development parcels on local $PM_{2.5}$ and PM_{10} concentrations has also been analyzed.

SULFUR DIOXIDE

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 SO_2 from mobile sources was not warranted.

Since the Proposed Actions' boiler systems would utilize No. 2 oil, the impact of sulfur emissions from the boiler systems at the development parcels on SO_2 concentrations has been analyzed.

AIR TOXICS

In addition to the criteria pollutants discussed above, air toxics are of concern. Air toxics are emitted by a wide range of man-made and naturally occurring sources. Emissions of air toxics from industries are regulated by EPA. Federal ambient air quality standards do not exist for non criteria air toxics; however, the New York State Department of Environmental Conservation (NYSDEC) has issued standards for certain non-criteria compounds, including beryllium, gaseous fluorides, and hydrogen sulfide. NYSDEC has also developed guideline concentrations for numerous air toxic compounds. The NYSDEC guidance document DAR-1 (December 2003) contains a compilation of annual and short term (1-hour) guideline concentrations (AGC and SGC, respectively) for these compounds. The NYSDEC guidance thresholds represent ambient levels that are considered safe for public exposure.

EPA has also developed guidelines for assessing exposure to air toxics. These exposure guidelines are used in health risk assessments to determine the potential effects to the public. A screening analysis of toxic air emissions from existing industrial sources was performed for the vicinity of the development parcels to determine the potential effect of local toxic emissions on air toxic concentrations at the development parcels.

D. AIR QUALITY REGULATIONS, STANDARDS, AND BENCHMARKS

NATIONAL AND STATE AIR QUALITY STANDARDS

As required by the Clean Air Act, 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, ozone, lead, and PM, and there is no secondary standard for CO. The NAAQS are presented in Table 17-1. The NAAQS for CO, NO_2, and SO_2 standards 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 particulate matter (TSP) and ozone which correspond to federal standards which have since been revoked or replaced, and for settleable particles, beryllium, fluoride, and hydrogen sulfide (H_2S). New York State ambient air quality standards are presented in Table 17-2.

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 standard at 15 $\mu g/m^3$. 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

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 SIP, which delineates how a state plans to achieve air quality that meets 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.

Table 17-1
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				
3-Month Average	NA	1.5	NA	1.5
Nitrogen Dioxide (NO_2)				
Annual Average	0.053	100	0.053	100
Ozone (O_3)				
8-Hour Average [(2)]	0.08	160	0.08	160
Respirable Particulate Matter (PM_{10})				
Average of 3 Annual Means — revoked, effective December 18, 2006	NA	50	NA	50
24-Hour Average [(1)]	NA	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Average of 3 Annual Means	NA	15	NA	15
24-Hour Average [(3,4)]	NA	35	NA	35
Sulfur Dioxide (SO_2)				
Annual Arithmetic Mean	0.03	80	NA	NA
Maximum 24-Hour Average [(1)]	0.14	365	NA	NA
Maximum 3-Hour Average [(1)]	NA	NA	0.50	1,300

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

All annual periods refer to calendar year.

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

(1) Not to be exceeded more than once a year.
(2) 3-year average of the annual fourth highest daily maximum 8-hr average concentration.
(3) Not to be exceeded by the annual 98th percentile when averaged over 3 years.
(4) EPA has reduced these standards down from 65 µg/m³, effective December 18, 2006.

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

Table 17-2
New York State Ambient Air Quality Standards

Pollutant	Standard		Objective
	ppm	μg/m^3	
CO, NO_2,[(2)] and SO_2 standards are the same as NAAQS, but refer to any consecutive 12 months, not just calendar years as defined in the NAAQS. See previous table.			
Ozone (O_3)			
1-Hour Average[(1,3)]	0.12	240	Health and Welfare
Total Suspended Particles (TSP) [(3)]			
Annual Geometric Mean (New York City)	NA	75	Health
24-Hour Average [(1)]	NA	250	
Settleable Particles (Dustfall). [(3)]			
In Any 12 Consecutive Months, 50 Percent of 30-Day Averages (New York City)	0.60 mg/cm^2/mo		Alleviate Nuisance and Economic
In Any 12 Consecutive Months, 84 Percent of 30-Day Averages (New York City)	0.90 mg/cm^2/mo		
Fluorides			
12-Hour Average	4.5	3.7	Protect Vegetation
24-Hour Average	3.5	2.85	
1-Week Average	2.0	1.65	
1-Month Average	1.0	0.8	
Total Fluorides in and on Forage for Consumption by Grazing Ruminants			
Growing Season (<6 Consecutive Months)	40	NA	Protect Grazing Ruminants
Any 60 Day Period	60	NA	
Any 30 Day Period	80	NA	
Non Methane Hydrocarbons (NMHC) [(1, 3)]			
Averaged from 6 AM to 9 AM	0.24	160	Ozone Prevention
Beryllium			
Any Detected	None	0.01	Health
Hydrogen Sulfide (H_2S)			
1-Hour Average	0.01	14	Odor Prevention

Notes: ppm – parts per million
μg/m^3 – micrograms per cubic meter
NA – not applicable
TSP concentrations are in μg/m^3 only since ppm is a measure for gas concentrations.
(1) Not to be exceeded more than once a year.
(2) The standard is based on the 100 μg/m^3 value given in the federal standard; however, the federal standard approximated this value more accurately as 0.053 ppm.
(3) Based on Federal standard which has since been revoked.
Source: 6 NYCRR Part 257: Air Quality Standards.

Manhattan has been designated as a moderate NAA for PM_{10}. On December 17, 2004, EPA took final action designating the five New York City counties and Nassau, Suffolk, Rockland, Westchester, and Orange counties as $PM_{2.5}$ non-attainment areas under the CAA. State and local governments are required to develop SIPs by early 2008, which will be designed to meet the standards by 2010. As described above, EPA has revised the PM standards. Attainment designations for the new 24-hour $PM_{2.5}$ standard would be effective by April 2010, $PM_{2.5}$ SIPs would be due by April 2013, and would be designed to meet the 24-hour $PM_{2.5}$ standard by April 2015, although this may be extended in some cases up to April 2020.

Nassau, Rockland, Suffolk, Westchester, Lower Orange County Metropolitan Area (LOCMA), and the five counties of New York City had been designated as a severe non-attainment area 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 1-hour ozone NAAQS by 2007. New York State has recently submitted revisions to the SIP, which included additional emission reductions that EPA requested to demonstrate attainment of the standard, and an update of the SIP estimates using two revised EPA models (the mobile-source emissions model MOBILE6, and the non-road emissions model NONROAD). The models were updated to reflect current knowledge of engine emissions and the latest mobile and non-road engine emission regulations. On April 15, 2004, EPA designated these same counties as a moderate non-attainment area for the new 8-hour ozone standard which became effective as of June 15, 2004 (LOCMA 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. New York State is currently formulating a new SIP for ozone, which is expected to be adopted in the near future. The SIP will have a target attainment deadline of June 15, 2010.

DETERMINING THE SIGNIFICANCE OF AIR QUALITY IMPACTS

The State Environmental Quality Review Act (SEQRA) regulations and the *City Environmental Quality Review (CEQR) Technical Manual* state that the significance of a likely consequence (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. 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 17-1) 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; actions predicted to increase the concentrations of these pollutants above threshold levels in non-attainment areas (where EPA has designated the area as not meeting the NAAQS for a particular pollutant), or even in cases where violations of the NAAQS are not predicted, would require a detailed analysis to determine the potential for significant impacts. For actions with predicted exceedances of the thresholds levels, the significance of impacts is further determined in consideration of the various factors listed above.

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

INTERIM GUIDANCE CRITERIA REGARDING $PM_{2.5}$ IMPACTS

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

- 24-hour (daily) average $PM_{2.5}$ concentration increments which are predicted to be greater than 5 $\mu g/m^3$ at a discrete receptor location would be considered a significant adverse impact on air quality under operational conditions (i.e., a permanent condition predicted to exist for many years regardless of the frequency of occurrence); or
- 24-hour average $PM_{2.5}$ concentration increments which are predicted to be greater than 2 $\mu g/m^3$ but no greater than 5 $\mu g/m^3$ would be considered a significant adverse impact on air quality based on the magnitude, frequency, duration, location, and size of the area of the predicted concentrations;
- Predicted annual average $PM_{2.5}$ concentration increments 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 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
- Predicted annual average $PM_{2.5}$ concentration increments greater than 0.3 $\mu g/m^3$ at a discrete or ground-level receptor location.

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 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 than 5 $\mu g/m^3$ on a 24-hour basis.

Actions under CEQR that would increase $PM_{2.5}$ concentrations in excess of the NYCDEP or NYSDEC interim guidance criteria above will be considered to have significant adverse impacts. NYCDEP recommends that actions subject to CEQR that fail the interim guidance criteria prepare an EIS and examine potential measures to reduce or eliminate such potential significant adverse impacts.

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

E. METHODOLOGY FOR PREDICTING POLLUTANT CONCENTRATIONS

The methods used for predicting air quality in the Future Conditions with the Proposed Actions (Build) and the impact of the Proposed Actions on air quality as compared to the No Build are presented in this section. As a worst-case assumption, the mobile source analysis presented in the Draft SEIS assumed that the UNDC project would be in place in the No Build condition—an assumption which results in higher background traffic and higher total concentrations in the No Build and Build conditions. The key finding of the traffic analyses in the Draft SEIS was that projected conditions with the UNDC project included were not appreciably different than projected conditions without the UNDC project. These Draft SEIS findings confirmed the findings of the FGEIS, namely that traffic conditions with and without the potential UNDC project were not appreciably different. Therefore, detailed traffic analyses were not re-conducted for this final SEIS, and the mobile source air quality analysis focused on projected conditions without the UNDC project. The HVAC analysis considered potential impacts both with and without the UNDC Project. The analysis of the QMT ventilation building conservatively does not account for the effect of nearby buildings (including the UNDC) on the dispersion of pollutants. The parking and industrial source analyses would also not be affected by the UNDC Project.

MOBILE SOURCES

The prediction of vehicle-generated CO and PM 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 Actions 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. The assumptions used in the PM analysis were based on the latest $PM_{2.5}$ draft interim guidance developed by NYCDEP.

Mobile-source impacts were analyzed in the FGEIS as well. See Chapter 15, “Traffic and Parking” for details on the changes in the predicted traffic levels, which are the basis for the mobile-source air quality analysis. In addition, vehicular emission factors used in the FGEIS were based on the previous EPA emissions model, MOBILE5b. The current emissions model used in this study, MOBILE6.2, reflects the most recent engine emissions regulations, and therefore produces significantly lower emission factors than were used in the FGEIS.

DISPERSION MODEL FOR MICROSCALE ANALYSES

Maximum CO concentrations adjacent to the intersection selected for analysis, resulting from vehicle emissions, were predicted using the CAL3QHC model Version 2.0.[1] 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 concentrations are greater than the applicable ambient air quality standards or when *de minimis* thresholds are exceeded using the first level of CAL3QHC modeling.

To determine motor vehicle generated PM concentrations adjacent to streets near the intersections selected for analysis, the CAL3QHCR model was applied. This refined version of the model can utilize hourly traffic and meteorology data, and is therefore more appropriate for calculating 24-hour and annual average concentrations.

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 location.

Tier I Analyses of CO—the CAL3QHC Model

CO calculations were performed using the CAL3QHC model. In applying the CAL3QHC model, the wind angle was varied to determine the wind direction resulting in the maximum concentrations at each precise location at which concentrations are predicted (receptor).

Following the EPA guidelines,[2] CO 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 in Midtown Manhattan and 0.70 elsewhere to account for persistence of meteorological conditions and fluctuations in traffic volumes. A surface roughness of 3.21 meters and a mixing height of 1,000 meters were 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.

---

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

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

Tier II Analyses of PM—the CAL3QHCR Model

A Tier II analysis performed with the CAL3QHCR model, which includes the modeling of hourly concentrations based on hourly traffic data and five years of monitored hourly meteorological data, was performed to predict maximum 24-hour and annual average PM levels. The data consist of surface data collected at LaGuardia Airport and upper air data collected at Brookhaven, New York for the period 2000-2004. All hours were modeled, and the highest resulting concentration for each averaging period is presented.

ANALYSIS YEAR

The microscale analyses were performed for existing conditions and 2014, the year by which the Proposed Actions are likely to be completed. The future analysis was performed both without the Proposed Actions (the No Build condition) and with the Proposed Actions (the Build condition).

VEHICLE EMISSIONS DATA

Engine Emissions

Vehicular CO and PM engine emission factors were computed using the EPA mobile-source emissions model, MOBILE6.2.[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 types, 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 MOBILE6.2 incorporate the most current guidance available from NYSDEC and NYCDEP.

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

All taxis were assumed to be in hot stabilized mode (i.e. excluding any start emissions). The general categories of vehicle types for specific roadways were further categorized into subcategories based on their relative breakdown within the fleet.[2]

An ambient temperature of 50° and 43° Fahrenheit was used for Manhattan and Queens intersections, respectively. The use of these temperatures is recommended in the *CEQR Technical Manual* and is consistent with current NYCDEP guidance.

Road Dust

The contribution of re-entrained road dust to PM_{10} concentrations, as presented in the PM_{10} SIP, is considered to be significant; therefore, the PM_{10} estimates include both exhaust and road dust. Road dust emission factors were calculated according to the latest procedure delineated by

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

[2] 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).

EPA.[1] Fugitive road dust was not included in the $PM_{2.5}$ microscale analyses based on the current EPA protocol for determining fugitive dust from paved roads.

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 15, "Traffic and Parking"). Traffic data for the future without and with the Proposed Actions were employed in the respective air quality modeling scenarios. The weekday morning (8:00 to 9:00 AM) and evening (5:30 to 6:30 PM) peak periods were analyzed. These time periods were selected for the mobile-source analysis because they would produce the maximum anticipated project-generated traffic and therefore have the greatest potential for significant air quality impacts.

For particulate matter, where 24-hour and annual averages are modeled, the peak morning, midday, and evening period traffic volumes were used as a baseline for determining off-peak volumes. Off-peak traffic volumes in the existing condition and in the future without the Proposed Actions, and off-peak increments from the Proposed Actions, were determined by adjusting the peak period volumes by the 24-hour distributions of actual vehicle counts collected at appropriate locations.

BACKGROUND CONCENTRATIONS

Background concentrations are those pollutant concentrations originating from distant sources 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 highest background concentrations monitored at the nearest NYSDEC background monitoring station in the most recent three-year period were used. It was conservatively assumed that the maximum background concentrations occur on all days.

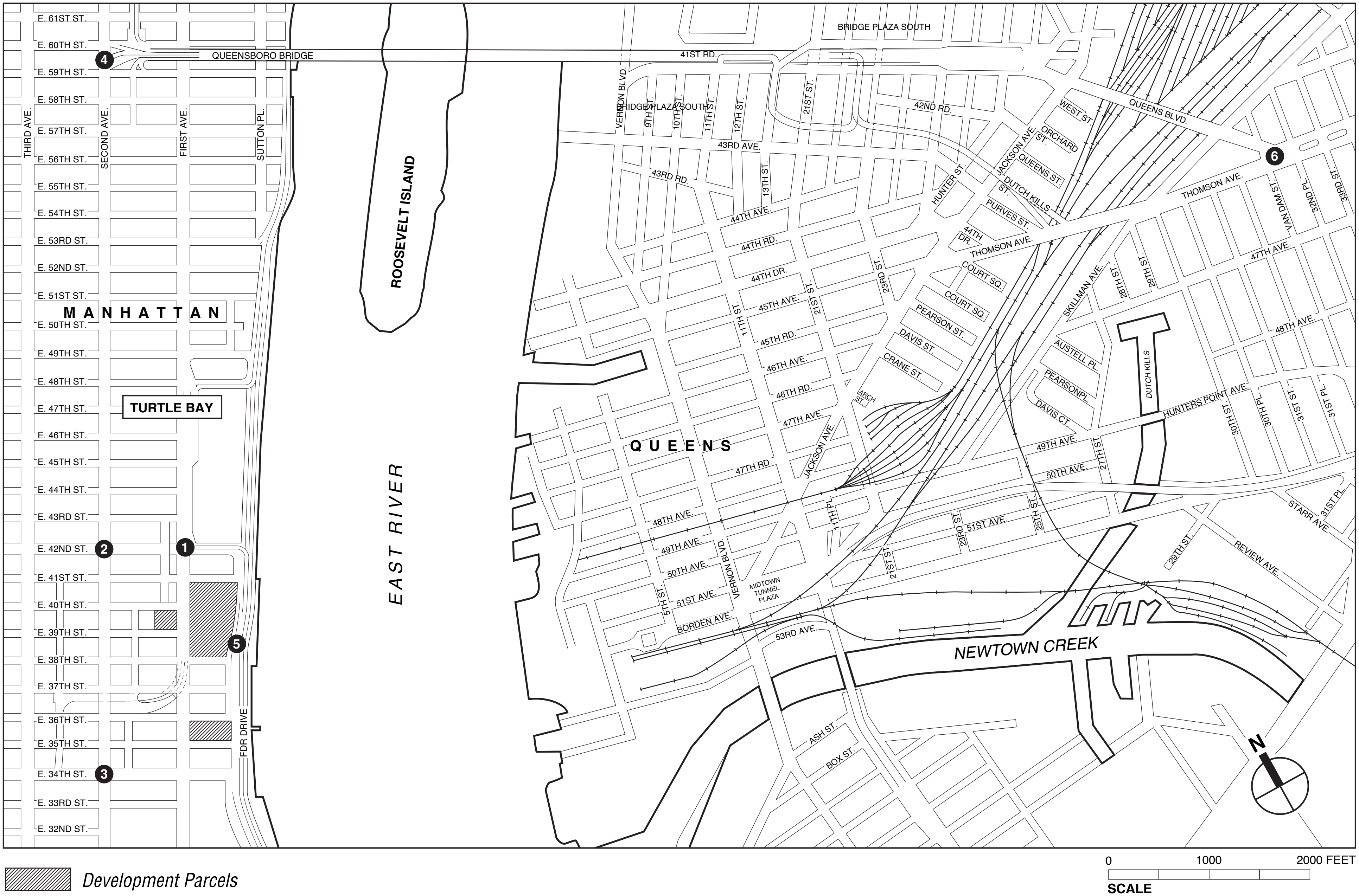
The background concentrations for the area of the development parcels are presented in Table 17-3. PM_{10} backgrounds are the highest measured concentrations from the latest available three years of monitored data (2003–2004 and 2006), consistent with the NAAQS. All other pollutants are based on the latest five years of monitored data (2001–2005). Consistent with the NAAQS for each pollutant, for averaging periods shorter than a year the second-highest value is used. These values were used as the background concentrations for all analyses, including mobile-source analyses.

ANALYSIS SITES

A total of six analysis sites were selected for microscale analysis (see Table 17-4 and Figure 17-1). The intersections at Sites 1, 2, and 3 were selected because they are the locations in the study area where the highest levels of project-generated traffic, total Build condition traffic, and worst levels of service are expected, and, therefore, where the greatest air quality impacts and maximum changes in concentrations would be expected. Each of these intersections was analyzed for CO and PM.

[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, December 2003.

5.31.07



Development Parcels

Analysis Site

Mobile-Source Analysis Sites
Figure 17-1

Table 17-3
Maximum Background Pollutant Concentrations (μg/m³)

Pollutant	Average Period	Location	Concentration	NAAQS
NO_2	Annual	P.S. 59. Manhattan	71.5	100
SO_2	3-hour	P.S. 59, Manhattan	201	1,300
	24-hour		123	365
	Annual		37	80
CO	1-hour	P.S. 59, Manhattan	4.0 ppm	35 ppm
	8-hour		2.5 ppm	9 ppm
PM_{10} (1)	24-hour	P.S. 59, Manhattan	60	150

Notes:
Consistent with the NAAQS, PM_{10} values are the highest of the latest available 3 years; all other pollutants are the highest of the latest 5 years. Consistent with the NAAQS for each pollutant, for averaging periods shorter than a year the second highest value is used.
1. 2003–2004 data were obtained from J.H.S. 126 in Brooklyn. 2006 data was obtained from P.S. 59. Monitoring at this station commenced on 1/1/06.

Sources: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2002–2006.

Table 17-4
Mobile-Source Analysis Sites

Site	Location
1	First Avenue at 42nd Street
2	Second Avenue at 42nd Street
3	Second Avenue at 34th Street
4	Second Avenue at the Queensboro Bridge
5	FDR at 39th Street
6	Queens Boulevard at Van Dam Street

In addition, although the highest traffic increments were not predicted at this location, Site 4, the intersections of the entrances and exits from the Queensboro Bridge at Second Avenue, was analyzed. The projected number of vehicles generated due to the Proposed Actions at Site 4 would exceed the *CEQR Technical Manual* threshold of 75 vehicles, the background traffic levels there are very high, and the unique physical layout of elevated and at-grade roadways does not enable drawing conclusions about air quality at this location without explicitly modeling it. Since the overall traffic volume increments at this site would be lower than at Sites 1, 2, and 3, and since the peak hour truck increments at Site 4 would be lower than the NYCDEP threshold for mobile-source PM analysis Site 4 was analyzed for CO only.

Although no significant traffic increment was expected on the FDR, concentrations were analyzed along the FDR to assess the impact of the FDR near the project. This site (Site 5) was analyzed for CO only since trucks are not permitted on the FDR.

Finally, at a number of locations at the Queens Plaza approach to the Queensboro Bridge, total Build increments would exceed the *CEQR Technical Manual* threshold of 50 vehicles for Long Island City. Although the volume of traffic that the Proposed Actions would generate through this area would constitute a very small percentage of the total traffic that uses the Queensboro Bridge, an analysis was undertaken to determine its effect on air quality. Site 6, at Queens Boulevard and Van Dam Street, was chosen due to the overall high levels of background traffic and poor levels of service. Since peak hour truck increments would be lower than the NYCDEP threshold for mobile-source PM analysis, Site 6 was analyzed for CO only.

RECEPTOR PLACEMENT

Multiple receptors were modeled at each of the selected sites; receptors were placed along the approach and departure links at spaced intervals. Receptors in all analysis models for predicting local concentrations were placed at sidewalk or roadside locations near intersections with continuous public access and, when elevated roadways are present, at elevated residential locations. Receptors in the analysis models for predicting annual average neighborhood-scale $PM_{2.5}$ concentrations were placed at a distance of 15 meters, from the nearest moving lane at each analysis location, based on the NYCDEP procedure for neighborhood-scale corridor $PM_{2.5}$ modeling.

PARKING FACILITIES

The Proposed Actions would result in the operation of three parking garages—two parking levels under the 708 First Avenue and Waterside parcels, two levels under the 685 First Avenue parcel, and two levels under the 616 First Avenue parcel, with a total of 1,554 spaces. The outlet air from the garage's ventilation systems could contain elevated levels of pollutants due to emissions from vehicular exhaust emissions in the garage. Emissions from the vents could potentially affect ambient pollutant concentrations at nearby locations. 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 *CEQR Technical Manual*.

Parking garage impacts were previously analyzed in the FGEIS. As described above for the mobile-source analysis, current vehicular emissions factors are lower than those used in the parking garage analysis presented in the FGEIS due to changes in the EPA emissions model. In addition, more detailed information on the parking facilities now exists and was used for this study.

Emissions from vehicles entering, parking, and exiting the garages were estimated using the EPA MOBILE6.2 mobile-source emission model, as described above for mobile sources. 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 because departing drivers often take some time after starting the engine before leaving. The concentrations within the garage were 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 predicted for the maximum 8-hour average period. (No exceedances of the 1-hour CO standard would occur and the 8-hour values are the most critical for impact assessment.)

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 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 15, “Traffic and Parking”.

Since the detailed ventilation plans have not yet been laid out, worst-case assumptions were made regarding the design of the garages’ mechanical ventilation systems. It was conservatively assumed that the air from each parking garage would be vented through a single outlet at a height of approximately 10 feet. The vent face was modeled to directly discharge above the sidewalk, and receptors were placed along the sidewalks on both sides of the street (both near the vent and across the street) at a pedestrian height of 6 feet and at distances of 7.5 feet, 55 feet, and 90 feet from the vent to account for receptors near the vent and for receptors on the opposite side of a street or an avenue, respectively. The vent was also analyzed assuming a residential receptor located at a height of six feet above the vent. A persistence factor of 0.77, supplied by NYCDEP, was used to convert the calculated 1-hour average maximum CO concentrations to 8-hour averages, accounting for meteorological variability over the average 8-hour period.

Background and on-street CO concentrations, predicted in the mobile-source analysis at nearby locations (see Table 17-3), were added to the modeling results to obtain the total ambient levels. The predicted on-street levels are conservatively high for the parking analysis since those represented peak results from intersections that would experience the highest concentrations, whereas the intersections near the parking garage ventilation outlets would have lower background and project-related traffic and the vents may be located mid-block.

INDUSTRIAL SOURCES

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

As the first step in this analysis, a request was made to NYCDEP’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 project site that have the potential for emitting air pollutants. The survey was conducted on August 9, 2005. Four dry cleaning businesses were identified in the field survey and permit search.

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 screening database in the *CEQR Technical Manual*. The database provides factors for estimating maximum concentrations based on emissions levels at the source, which were derived from generic ISC3 dispersion modeling for the New York City area. Impact distances selected for each source were the minimum distances between the boundary of the project site and the source site. Predicted worst-case impacts on the proposed development parcels were compared with the short-term guideline concentrations (SGCs) and annual guideline

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

concentrations (AGCs) recommended in NYSDEC's *DAR-1 AGC/SGC Tables.*[1] 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.

HEATING, VENTILATION, AND COOLING SYSTEMS

HVAC emissions impacts were studied for the FGEIS. The current analysis is based on detailed information on the proposed systems and stack locations, and the final layout of the buildings and heights (the study in the FGEIS was based on the illustrative programs.) In addition, the current analysis utilizes the latest EPA stationary-source dispersion model, AERMOD.

The buildings on the proposed parcels would use either central steam, supplied by Con Edison, or boilers to supply heat and hot water. If steam is used, there would be no fuel combustion on-site, and no ensuing emissions. There would be no other ventilation or cooling systems using local fuel combustion on-site.

The analysis was performed assuming that utility steam would be provided to serve the heating and hot water needs of Waterside 2 Building 1 (WS2-1). All other buildings for the Proposed Actions were analyzed assuming they would be equipped with boiler systems that would have the capability of combusting either No. 2 oil or natural gas. Limitations on the types of fuels would be included in a restrictive declaration.

EMISSION ESTIMATES AND STACK PARAMETERS.

Short-term emissions rates were calculated based on emission factors obtained from the EPA *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources*. PM_{10} and $PM_{2.5}$ emissions include both the filterable and condensable fractions.

The HVAC stack heights for each building were assumed to be equivalent to the top of the building's mechanical zone, except for 708 First Avenue office tower and WS1-2, which would have HVAC exhaust stacks with a maximum height of 20 feet above the buildings' mechanical zone located on the top of the roof. Limitations on the minimum stack heights would be included in a restrictive declaration. In addition, the restrictive declaration would include a restriction on the placement of HVAC exhaust stacks for these buildings, as well as well as 616-2, to ensure no significant adverse air quality impacts occur.

Multiple scenarios were modeled to estimate emissions and predict impacts. The boilers would be capable of operating at various loads depending on the heating and hot water demands of the proposed development program's buildings. Therefore, the boiler operation was modeled at loads of 25, 50, 75 and 100 percent to calculate impacts over a full range of operating conditions. The stack exhaust parameters and the estimated emission rates are provided in Appendix E.

[1] DEC Division of Air Resources, Bureau of Stationary Sources, December, 2003.

Since the boilers would operate primarily during colder periods, the annual impact analysis used average monthly weather data for New York City to adjust the nominal 100 percent boiler load for each month of the year to approximate the average monthly boiler demand.

DISPERSION MODELING

Potential impacts from boiler stack emissions were evaluated using the EPA/AMS AERMOD dispersion model. The AERMOD model was designed as a replacement to the EPA Industrial Source Complex (ISC3) model and was recently approved for use by the EPA. AERMOD is a state-of-the-art dispersion model, applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources (including point, area, and volume sources). AERMOD is a steady-state plume model that incorporates current concepts about flow and dispersion in complex terrain, including updated treatments of the boundary layer theory, understanding of turbulence and dispersion, and includes handling of terrain interactions.

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

The AERMOD Model also incorporates the algorithms from the PRIME model, which is designed to predict impacts in the “cavity region” (i.e., the area around a structure which 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 at elevated receptors close to the height of the sources, which would occur without downwash, as well as the worst-case at lower elevations and ground level, which would occur with downwash. The AERMOD analysis was run with and without the proposed UNDC development.

METEOROLOGICAL DATA

The meteorological data set consisted of five consecutive years of meteorological data: surface data collected at La Guardia Airport (2001–2005) 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

Discrete receptors were analyzed, including locations on the proposed and other nearby buildings, at operable windows, air intakes, and at publicly accessible ground-level locations.

The model also included elevated and ground level receptor grids in order to address more distant locations and to identify the highest ground level impact.

BACKGROUND CONCENTRATIONS

To estimate the maximum expected total pollutant concentrations, the predicted levels were added to corresponding background concentrations, presented in Table 17-3 above. It was conservatively assumed that the maximum background concentrations occur on all days.

QUEENS MIDTOWN TUNNEL VENTILATION BUILDING

Since the 708 First Avenue parcel is located near a ventilation building of the QMT, an air quality analysis was conducted to determine whether the emissions released through the exhaust ducts of this building would have the potential to cause significant air quality impacts at receptor sites associated with the development parcels. Following modeling guidelines established by EPA, the potential for air quality impacts from the tunnel exhaust emissions at elevated and ground-level locations on the development parcels were estimated using a detailed analysis.

The impact of the QMT ventilation system on air quality at 708 First Avenue was studied in the FGEIS as well. The current analysis is based on newer, more detailed tunnel traffic data which became available since that study. In addition, as described above for the mobile-source analysis, the current analysis uses lower vehicular emission factors due to changes in the EPA mobile-source emissions model.

Vehicular engine emission factors were obtained using the EPA MOBILE6.2 emissions model, and resuspended road dust was calculated according to the EPA AP-42 procedure, as described above for mobile-source analyses. Vehicle classifications and volumes by hour of the day were obtained from the latest information from Metropolitan Transportation Authority (MTA) Bridges and Tunnels.

Concentration increments from the tunnel exhaust vent at locations on the disposition parcels were calculated by modeling the dispersion of the pollutants from the vents. In order to model the dispersion, it was necessary first to calculate the emissions from the tunnel vents, which was achieved by modeling the dispersal of vehicular emissions within the tunnel itself and the ventilation ducts, as follows: Total emissions from the tunnel exhaust vents were calculated by calculating emissions within each tunnel ventilation zone based on vehicle speeds, classification, and volumes. The air within the tunnels (two tunnels, one eastbound and one westbound) moves along the axis of the tunnel with the traffic (piston velocity) and is also vented via ducts all along the tunnels, one duct from each of four ventilation zones to a separate outlet vent (four vents in each direction). Concentrations within each zone were then calculated by adding the pollutant mass added to the zone from the previous zone due to piston velocity in the tunnel, and subtracting the mass removed via ventilation based on the ventilation rates in each section. The total mass emitted from the vent building on East 41st Street from each vent was equal to the concentration in the corresponding ventilation zone multiplied by the ventilation rate for that zone. The final result was emission rates for each vent at the ventilation building on East 41st Street, corresponding to four ventilation zones: two in each direction, representing the western half (Manhattan side) of the tunnel. (The exhaust from the eastern half of the tunnel is released in Queens.)

In the FGEIS, the ISC3 and ISC-PRIME models were applied to estimate the plume impact from the exhaust ducts, and to estimate the impact of the exhaust plumes in the wake of the ventilation building. The ISC-PRIME model was used to calculate dispersion including building wake effects (that is, the downward mixing of air pollutants on the downwind side of the building from which they were emitted or downwind of other buildings that may affect the plume). This model was considered the most suitable EPA dispersion modeling tool available to simulate the potential enhanced mixing of air exhausted from the QMT resulting from nearby structures. While downwash effects may occur, at times there may not be a substantial downwash effect, and therefore, as recommended in the *CEQR Technical Manual*, the ISC3 model was also employed. ISC3 was run without the building downwash effect due to the fact that when calculating the downwash effect, the entire area of interest was within the wake region of neighboring buildings, where the ISC3 model is incapable of computing the potential effect of these structures.

The focus of the analysis is on identifying the impact of those emissions on the proposed buildings adjacent to the source. Therefore, the objective of the modeling effort was to identify the maximum predicted impact at the new elevated locations, and the modeling was performed without downwash, which produces the highest predicted impacts overall which would be at elevated locations. Furthermore, the highest concentrations in FGEIS analysis were predicted using the ISC3 model without downwash (not the ISC-PRIME model). The QMT analysis for the Draft SEIS was performed using the AERMOD model since it has replaced the ISC3 model.

Estimated impacts from the ventilation building's emissions at each receptor location were added to impacts from the local roadway network, to obtain total pollutant increments at each receptor location, which were then compared with CO *de minimis* levels and $PM_{2.5}$ threshold guidance levels. The CO increments were added to appropriate background levels (Table 17-3 above) to obtain total pollutant concentrations, which were then compared with the NAAQS.

EXISTING HVAC EMISSION SOURCES

Existing commercial, industrial, institutional and large-scale residential sources of combustion (HVAC) emissions were surveyed to determine their potential for air quality impacts on the Proposed Actions. A 400-foot study area around the Proposed Actions' site boundaries was used to identify Buildings with NYSDEC-issued permits. None of the buildings within the study were found to possess either a Title V permit or state facility permit. Therefore, emissions from existing HVAC sources would be considered minor and would not have a significant impact on the Proposed Actions.

HVAC EMISSIONS FROM THE UNDC PROJECT

An analysis was performed to determine whether potential significant impacts would occur from any HVAC systems associated with the UNDC project. Since detailed information on the UNDC project's HVAC systems was not available, the analysis conservatively assumes that the building would be heated by No. 4 oil. Emissions and stack parameters were input to the AERMOD model to predict future maximum concentrations of pollutants with the Proposed Actions.

F. EXISTING CONDITIONS

Air quality in the existing condition is discussed for informative purposes only, since the baseline condition for air quality in the future condition with the Proposed Actions is the future condition without the Proposed Actions. This is because vehicular emission rates and background traffic conditions would change in the future, regardless of the Proposed Actions.

EXISTING MONITORED AIR QUALITY CONDITIONS

The most recent concentrations of all criteria pollutants at NYSDEC air quality monitoring stations nearest the study area are presented in Table 17-5. All data statistical forms and averaging periods are consistent with the definitions of the NAAQS. The only criteria pollutant concentrations which exceeded the NAAQS were the annual and 24-hour average concentrations of $PM_{2.5}$. It should be noted that these values are somewhat different than the background concentrations presented in Table 17-3, above. These existing concentrations are the latest (2006) measured, averaged according to the NAAQS (e.g., $PM_{2.5}$ concentrations are averaged over 3 years); the background concentrations are the highest values in past years, and are used as a conservative estimate of the highest background concentrations for future conditions.

Table 17-5
Representative Monitored Ambient Air Quality Data

Pollutant	Location	Units	Averaging Period	Concentration	NAAQS
CO	P.S. 59, Manhattan	ppm	8-hour	1.7	9
	P.S. 59, Manhattan		1-hour	2.3	35
SO_2	P.S. 59, Manhattan	µg/m³	Annual	26	80
			24-hour	84	365
			3-hour	183	1,300
PM_{10}	P.S. 59, Manhattan	µg/m³	24-hour	60	150
$PM_{2.5}$	P.S. 59, Manhattan	µg/m³	Annual	15.7	15
			24-hour	40.6	35
NO_2	P.S. 59, Manhattan	µg/m³	Annual	64	100
Lead	J.H.S. 126, Brooklyn	µg/m³	3-month	0.02	1.5
Ozone	I.S. 52, Bronx	ppm	1-hour	0.094(1)	none
			8-hour	0.072	0.08

Notes:

Based on the NAAQS definitions, the CO and SO_2 concentrations for short-term averages are the second highest from the year. $PM_{2.5}$ annual concentrations are the average of 2004, 2005, and 2006, and the 24-hour concentration is the average of the annual 98th percentiles in 2004, 2005, and 2006. 8-hour average ozone concentrations are the average of the 4th highest-daily value in 2004, 2005, and 2006.

1. The 1-hour ozone NAAQS has been replaced with the 8-hour standard; however, the maximum monitored concentration is provided for informational purposes.

Source: NYSDEC, New York State Ambient Air Quality Data.

EXISTING SIMULATED POLLUTANT CONCENTRATIONS IN THE STUDY AREA

The monitored concentrations (presented above) represent general air quality in the study area. However, the concentrations adjacent to the mobile-source analysis sites in the existing condition may be higher than at the monitoring stations, due to the adjacent vehicular emissions. The highest simulated existing 8-hour average CO concentrations at the mobile-source analysis sites are presented in Table 17-6. (One-hour average values are not shown since predicted values are much lower than the 1-hour standard of 35 ppm.)

Table 17-6
Maximum Simulated Existing 8-Hour Average CO Concentrations for 2006

Site Number	Location	Time Period	8-Hour Concentration (ppm)
1	First Avenue at 42nd Street	AM	5.4
2	Second Avenue at 42nd Street	AM	6.3
3	Second Avenue at 34th Street	AM	7.8
4	Second Avenue at the Queensboro Bridge	AM	8.2
5	FDR at 39th Street	PM	5.3
6	Queens Boulevard at Van Dam Street	AM	6.1
Note: 8-hour standard is 9 ppm.			

G. FUTURE WITHOUT THE PROPOSED ACTIONS

In the future condition without the Proposed Actions (No Build), traffic volumes would be higher than in the existing condition, but vehicular emission factors would be lower due to improvements in engine technologies in the general fleet. Since the development parcels would not be developed, there would be no associated parking ventilation or boiler emissions.

Since the significance of projected air quality impacts from the Proposed Actions is determined based on the change from the No Build condition, the predicted mobile-source concentrations for the No Build are presented alongside the concentrations in the future with the Proposed Actions as the baseline for that condition.

H. PROBABLE IMPACTS OF THE PROPOSED ACTIONS

Predicted air quality in the future condition with the Proposed Actions (Build) and the impact of the Proposed Actions on air quality as compared to the No Build are presented in this section.

MOBILE SOURCES

The Proposed Actions would result in changes in traffic patterns and an increase in traffic volume in the study areas and could potentially result in local increases in CO concentrations. Total predicted CO and PM_{10} concentrations at the selected mobile-source analysis sites for the No Build and Build conditions, and the increment from the No Build to the Build condition, are presented in Table 17-7. Predicted PM_{10} and CO concentrations, in all scenarios, would be lower than the applicable NAAQS. As presented in Tables 17-8 and 17-9, all $PM_{2.5}$ increments were predicted to be lower than the threshold guidance values. CO increments were predicted to be lower than the applicable *de minimis* levels. Therefore, the Proposed Actions would have no significant adverse impact on air quality due to changes in traffic patterns and volumes.

Table 17-7
Pollutant Concentrations and Increments at Mobile-Source Sites (µg/m³)

Pollutant	Average Time	No Build Total	Build Increment	Build Total	NAAQS	Incremental Threshold
Site 1: First Avenue at 42nd Street						
CO	8-hour	3.9	1.0	4.9	9 ppm	2.5
PM_{10}	24-hour	68.0	0.4	68.3	150	None
Site 2: Second Avenue at 42nd Street						
CO	8-hour	5.0	0.3	5.3	9 ppm	2.1
PM_{10}	24-hour	74.7	0.5	75.2	150	None
Site 3: Second Avenue at 34th Street						
CO	8-hour	5.5	0.0	5.5	9 ppm	1.7
PM_{10}	24-hour	75.5	0.2	75.7	150	None
Site 4: Second Avenue at the Queensboro Bridge						
CO	8-hour	5.3	0.2	5.5	9 ppm	1.8
Site 5: FDR at 39th Street						
CO	8-hour	4.0	0.0	4.0	9 ppm	None
Site 6: Queens Boulevard at Van Dam Street						
CO	8-hour	5.4	0.0	5.4	9 ppm	1.8

Note: All totals include background concentrations. The increments may not equal the difference between the two conditions due to rounding.

Table 17-8
Future Maximum Predicted
24-Hour Average $PM_{2.5}$ Concentration Increments (µg/m³)

Receptor Site	Location	Increment
1	First Avenue at 42nd Street	0.04
2	Second Avenue at 42nd Street	0.06
3	Second Avenue at 34th Street	0.02

Notes:
$PM_{2.5}$ interim guidance criteria—24-hour average, 2 µg/m³ (5 µg/m³ not-to-exceed value), based on the magnitude, frequency duration, location, and size of the area of the predicted concentrations...

Table 17-9
Future Maximum Predicted
Annual Average $PM_{2.5}$ Concentration Increments (µg/m³)

Receptor Site	Location	Increment
1	First Avenue at 42nd Street	0.01
2	Second Avenue at 42nd Street	0.01
3	Second Avenue at 34th Street	0.01

Notes:
$PM_{2.5}$ interim guidance criteria—annual (neighborhood scale), 0.1 µg/m³.

PARKING FACILITIES

Maximum predicted total CO concentrations near the garage ventilation outlets and across the local street or First Avenue are presented in Table 17-10. The total concentrations include the maximum background concentration of 2.5 ppm, and (at sidewalk locations) the maximum predicted on-street No-Build and project increments from mobile source Site 1. All CO concentration increments and totals were predicted to be lower than the applicable significance criteria. Therefore, the operation of parking garages on the development parcels would not have significant adverse air quality impacts.

Table 17-10
Total 8-Hour CO Concentrations Near Garage Ventilation Outlets (ppm)

Development Parcel	Peak Period	Residence	Near Sidewalk	Across Local Street	Across First Avenue
708 First Avenue	AM	N/A	5.4	5.1	5.0
	PM	N/A	6.4	5.7	5.5
685 First Avenue	AM	2.8	4.9	4.8	4.7
	PM	3.0	5.2	5.0	4.9
616 First Avenue	AM	3.8	5.9	5.2	5.0
	PM	4.3	6.6	5.6	5.3

Notes: The concentrations include the background concentration of 2.5 ppm, and the maximum predicted on-street No-Build increments of 4.0 and 3.9 ppm for the AM and PM peak periods respectively, and project increment of 0.7 and 1.0 ppm, respectively, from mobile-source Site 1.

INDUSTRIAL SOURCES

As discussed above, a study was conducted to identify manufacturing and industrial uses within 400 feet of the development parcels. NYCDEP-BEC and EPA permit databases were used to identify existing sources of industrial emissions. A total of four permitted facilities were identified within 400 feet of the development parcels in the 2014 Build condition.

The screening procedure used to estimate the emissions from these businesses is based on information contained in the operational permits obtained from NYCDEP-BEC and NYCDEC. 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).

The four facilities identified were all dry cleaning establishments. The main pollutant of concern from this type of source is tetrachloroethylene (CAS No. 127-18-4, also known as “perc”). The maximum 1-hour and annual average cumulative concentrations were predicted to be 383 $\mu g/m^3$ and 0.89 $\mu g/m^3$. These values are lower than the applicable SGC and AGC—1,000 $\mu g/m^3$ and 1.0 $\mu g/m^3$, respectively. Therefore, industrial sources would have no significant adverse impact on air quality at the development parcels.

HEATING, VENTILATION, AND COOLING SYSTEMS

The air quality analysis accounted for a plan in which utility steam would be provided to serve the heating and hot water needs of W2-1. All other buildings for the Proposed Actions were analyzed assuming they would be equipped with boiler systems. Emissions from the Proposed

Actions' boiler systems were analyzed based on the assumption that the systems would utilize No. 2 fuel oil. The systems would be dual fuel systems, which can utilize natural gas or fuel oil. Since the boilers would at times utilize natural gas, the modeled annual $PM_{2.5}$ and SO_2 concentration increments are overestimated because emissions of those pollutants from natural gas systems are much lower.

Predicted increments and total concentrations resulting from the operation of the Proposed Actions' boilers are presented in Table 17-11. The operation of the boilers would not result in any new exceedances of the NAAQS and would therefore not result in any significant adverse PM_{10}, SO_2, NO_2 , or CO impacts.

Table 17-11
Highest Predicted Pollutant Concentrations from Boiler Emissions (μg/m³)

Pollutant	Averaging Period	Background	Proposed Actions	Increment	Interim Guidance Threshold	NAAQS
Maximum Concentrations on Project Buildings						
PM_{10}	24-hour	60	65.8	5.8	—	150
SO_2	3-hour	201	490.5	289.5	—	1,300
	24-hour	123	192.9	69.9	—	365
	Annual	37	39.3	2.32	—	80
NO_2	Annual	71.5	72.4	0.88	—	100
CO	1-hour	4.0 ppm	4.2 ppm	0.2 ppm	—	35 ppm
	8-hour	2.5 ppm	2.6 ppm	0.1 ppm	—	9 ppm
Maximum Concentrations on Non-Project Buildings						
PM_{10}	24-hour	60	61.7	1.7	—	150
SO_2	3-hour	201	256.6	55.6	—	1,300
	24-hour	123	143.5	20.5	—	365
	Annual	37	38.3	1.33	—	80
NO_2	Annual	71.5	72.0	0.5	—	100
CO	1-hour	4.0 ppm	4.0 ppm	0.03 ppm	—	35 ppm
	8-hour	2.5 ppm	2.51 ppm	0.01 ppm	—	9 ppm
Maximum Ground-Level Concentrations						
PM_{10}	24-hour	60	61.7	1.7	—	150
SO_2	3-hour	201	237.4	36.4	—	1,300
	24-hour	123	144	21	—	365
	Annual	37	38.5	1.45	—	80
NO_2	Annual	71.5	72.1	0.6	—	100
CO	1-hour	4.0 ppm	4.0 ppm	0.01 ppm	—	35 ppm
	8-hour	2.5 ppm	2.51 ppm	0.01 ppm	—	9 ppm

Notes:
Results for any other locations other than these sites would be lower.

The air quality modeling analysis also determined the highest predicted increase in 24-hour and annual average $PM_{2.5}$ concentrations from the Proposed Actions. As shown in Table 17-12, the maximum 24-hour incremental impacts at any discrete receptor location would be less than the applicable interim guidance criterion of 5 $\mu g/m^3$. On an annual basis, the projected $PM_{2.5}$ impacts would be less than the applicable interim guidance criterion of 0.3 $\mu g/m^3$ for local impacts, and the DEP interim guidance criterion of 0.1 $\mu g/m^3$ for neighborhood scale impacts.

The predicted annual concentration increments are conservatively high, since the predictions are based on the assumption that fuel oil would be used year round; as described above, the systems would most likely be dual fuel systems. Since natural gas emissions are much lower than fuel oil, the annual results presented are conservatively high.

Table 17-12
Future Maximum Predicted $PM_{2.5}$ Concentration Increments

Pollutant	Averaging Period	Maximum Increment	Incremental Threshold ($\mu g/m^3$)
Maximum Concentrations on Project Buildings			
$PM_{2.5}$	24-hour	2.32	5/2
	Annual (discrete)	0.17	0.3
Maximum Concentrations on Non-Project Buildings			
$PM_{2.5}$	24-hour	1.51	5/2
	Annual (discrete)	0.098	0.3
Maximum Concentrations on Ground-Level Concentrations			
$PM_{2.5}$	24-hour	1.55	5/2
	Annual (discrete)	0.11	0.3
Maximum Neighborhood Scale Concentrations			
$PM_{2.5}$	Annual (neighborhood scale)	0.016	0.1

As mentioned above, the 24-hour average interim guidance threshold level for discrete receptor locations has been revised to incorporate the interim guideline criterion of 2 $\mu g/m^3$. The assessment examined the magnitude, duration, frequency, and extent of the increments at locations where exposure above the 2 $\mu g/m^3$ threshold averaged over a 24-hour period could occur. The receptor location with the maximum continual 24-hour exposure would be at the proposed development at WS1-1, at an elevation of 636 feet. At this location, maximum 24-hour $PM_{2.5}$ impacts would be 2.32 $\mu g/m^3$. Concentrations exceeding 2 $\mu g/m^3$ on this building were predicted at two discrete locations. At each of these receptors, 24-hour average concentrations were predicted to exceed 2 $\mu g/m^3$ at a maximum frequency of only two times per year, and with an annual average frequency of less than once per year. In addition, a total of four discrete locations (on two floors, two at an elevation of 443 feet and two at 452 feet) on the proposed development of 616-1 had maximum predicted concentrations exceeding 2 $\mu g/m^3$. At each of these receptors, the 24-hour average concentrations were predicted to exceed 2 $\mu g/m^3$ at a maximum frequency of only once per year and with an average frequency of less than once per year. At other locations on the proposed developments and within the community, maximum 24-hour average concentrations of $PM_{2.5}$ would be less than the updated $PM_{2.5}$ interim guidance criterion of 2 $\mu g/m^3$. The magnitude, frequency, location, and size of the area of concentrations above 2 $\mu g/m^3$ is very low. Since elevated levels would occur during the coldest months, when the boilers would be operating at high loads, and since the buildings would be new, well sealed buildings, it is most likely that residential windows would be closed and residences would not be affected by these increments. Considering their limited duration, frequency and extent, these exceedances are not considered to be significant. Therefore, no potential significant stationary source air quality impacts related to $PM_{2.5}$ are expected to occur with the Proposed Actions.

To preclude the potential for significant adverse air quality impacts from the proposed development programs emissions, the restrictive declaration would have the following requirements for each of the proposed developments:

Block 967, Lot 1 (616 First Avenue). Any new development on this property must ensure that the heating, ventilating and air conditioning stack(s) utilize either No. 2 fuel oil or natural gas, to avoid any potential significant air quality impacts.

616 First Avenue, Building 1. Boiler exhaust stacks on this property must have a minimum exhaust height of 512.8 feet above Manhattan Datum to avoid any potential significant air quality impacts.

616 First Avenue, Building 2. Boiler exhaust stacks on this property must have a minimum exhaust height of 438.2 feet above Manhattan Datum, and must be located at least 305 feet from the lot line facing First Avenue, to avoid any potential significant air quality impacts.

Block 945, Lot 33 (685 First Avenue). Any new development on this property must ensure that the heating, ventilating and air conditioning stack(s) utilize either No. 2 fuel oil or natural gas, to avoid any potential significant air quality impacts. Boiler exhaust stacks on this property must have a minimum exhaust height of 746 feet above Manhattan Datum.

Block 970 Lot 1

Waterside 1, Building 1. Any new development on this property must ensure that the heating, ventilating and air conditioning stack(s) utilize either No. 2 fuel oil or natural gas, to avoid any potential significant air quality impacts. Boiler exhaust stacks on this property must have a minimum exhaust height of 717 feet above Manhattan Datum, to avoid any potential significant air quality impacts.

Waterside 1, Building 2. Any new development on this property must ensure that the heating, ventilating and air conditioning stack(s) utilize either No. 2 fuel oil or natural gas, to avoid any potential significant air quality impacts. Boiler exhaust stacks on this property must have a minimum exhaust height of 679 feet above Manhattan Datum, and must be located at least 305 feet from the lot line facing First Avenue, to avoid any potential significant air quality impacts.

Waterside 2, Building 1. Any new development on this property must ensure that utility steam would be utilized to serve its heating and hot water needs to avoid any potential significant air quality impacts.

708 First Avenue. A*ny new development on this property must ensure that the heating, ventilating and air conditioning stack(s) utilize either No. 2 fuel oil or natural gas, to avoid any potential significant air quality impacts.Boiler exhaust stacks on this property must have a minimum exhaust height of 717 feet above Manhattan Datum, and must be located at least 268 feet from the lot line facing First Avenue, to avoid any potential significant air quality impacts.

With these restrictions, emissions from the boiler exhaust stacks would not result in any significant adverse air quality impacts.

QUEENS MIDTOWN TUNNEL VENTILATION BUILDING

The highest pollutant increments from the QMT ventilation and total concentrations that were predicted to occur at the northernmost façades of the 708 First Avenue parcel—the parcel nearest the QMT ventilation building—are presented in Tables 17-13 for CO and PM_{10} and 17-14 for $PM_{2.5}$. The highest concentration increments under worst-case meteorological conditions would be at an elevation of approximately 100 feet above street level. Increments at other levels would be much lower (less than one tenth of the maximums would be expected at ground level and at

Table 17-13
CO and PM_{10} Concentrations and Increments on 708 First Avenue from the QMT Ventillation System ($\mu g/m^3$)

Pollutant	Average Time	Background	Increment	Total	NAAQS
CO	1-hour	4.0 ppm	7.3 ppm	11.3 ppm	35 ppm
	8-hour	2.5 ppm	1.6 ppm	4.1 ppm	9 ppm
PM_{10}	24-hour	60	15.2	75.2	150

Table 17-14
$PM_{2.5}$ Increments on 708 First Avenue from the QMT Ventillation System ($\mu g/m^3$)

Pollutant	Average Time	Increment	Incremental Threshold
$PM_{2.5}$	24-hour	2.2(1)	5/2
	Annual	0.298	0.3
$PM_{2.5}$ Annual Neighborhood-Scale		0.004(2)	n/a(2)

Notes:
(1) $PM_{2.5}$ increments at this location could occur a maximum of once per year, if at all. The building on 708 First Avenue is not a residential building and no operable windows would be located in the near vicinity of the QMT. $PM_{2.5}$ concentration increments at other buildings would be considerably lower.
(2) The neighborhood-scale increment is presented for informational purposes only. Since the source is an existing one, the impact on the neighborhood is an existing condition. For the purposed of this analysis, $PM_{2.5}$ impacts are considered on the project buildings only.

200 feet above street level and higher). These results represent the direct impact, not accounting for building wake effects and downwash. Wake effects and downwash could result in higher ground-level concentrations, but those concentrations would be lower than the maximum concentrations presented here, which were predicted at elevated locations. Furthermore, the impact on sidewalks would be the same in the No Build condition and is therefore not of concern for this analysis. Therefore, the inclusion of building effects, such as the UNDC building, would result in overall lower impacts than those presented here.

PM_{10} and CO concentrations were predicted to be lower than the corresponding NAAQS. $PM_{2.5}$ concentrations exceed the NAAQS in the background condition, and the significance of $PM_{2.5}$ impacts is therefore determined based on comparing the increments to the interim guidance thresholds. As shown in Table 17-14, the maximum 24-hour incremental impacts at any discrete receptor location would be less than the applicable interim guidance criterion of 5 $\mu g/m^3$. On an annual basis, the projected $PM_{2.5}$ impacts would be less than the applicable interim guidance criterion of 0.3 $\mu g/m^3$, and the DEP interim guidance criterion of 0.1 $\mu g/m^3$ for neighborhood scale impacts. Impacts were also compared with the 24-hour average interim guidance threshold level of 2 $\mu g/m^3$. The assessment examined the magnitude, duration, frequency, and extent of the increments at locations where exposure above the 2 $\mu g/m^3$ threshold averaged over a 24-hour period could occur. A maximum of two receptor locations with maximum continual 24-hour exposure greater than 2 $\mu g/m^3$ were identified with an overall maximum concentration of 2.2 $\mu g/m^3$. At each of these receptors, the concentrations above 2 $\mu g/m^3$ were predicted to occur at a maximum frequency of only one per year, with the average frequency being much less. The concentrations reported in Table 17-10 are not at locations where continuous 24-hour exposure would occur. At other locations on the proposed developments, maximum 24-hour concentrations of $PM_{2.5}$ would be less than 2 $\mu g/m^3$, the updated $PM_{2.5}$ interim guidance criterion. The magnitude, frequency, location, and size of the area of concentrations above 2 $\mu g/m^3$ is very low and would not occur at locations where continuous 24-hour exposure would occur. Therefore, the ventilation from the QMT would not significantly impact air quality on the 708 First Avenue parcel, or on any of the development parcels which are further away from the ventilation building emissions source.

I. FUTURE CONDITIONS WITH THE UNDC PROJECT

MOBILE SOURCES

As a worst-case assumption, the mobile source analysis presented in the Draft SEIS assumed that the UNDC project would be in place in the No Build condition—an assumption which results in higher background traffic and higher total concentrations in the No Build and Build conditions. The mobile source air quality results presented in the Draft SEIS demonstrated that the proposed action would not result in any significant adverse air quality impact with the proposed UNDC development.

CONDITIONS WITH SPECIAL EVENTS AT THE UNITED NATIONS

As described in the Chapter 15, "Traffic and Parking", there are times when special events at the United Nations (UN) cause the New York Police Department (NYPD) to implement lane closures and other traffic operations measures aimed at maintaining security at the UN and along key streets leading to the UN. These measures may result in increased traffic volumes and changes in vehicle speeds in certain areas, and could affect local background air quality. During such events, diverted traffic would include traffic generated by the Proposed Actions.

Based on the worst-case mobile source analysis above, background concentrations of CO and PM_{10} are considerably lower than the NAAQS, and therefore it is not expected that total concentrations would exceed the NAAQS even during such events. It should be noted that background conditions are measured at NYSDEC monitoring stations, and do include source-oriented conditions such as these. Since maximum background levels of $PM_{2.5}$ exceed the NAAQS, the significance of project impacts was determined based on project increments and not total concentrations. The predicted project increments were considerably lower than the interim guidance threshold levels, and would be similar in such events as well. Therefore, no significant adverse impacts on air quality would occur as a result of the operation of the project during special events at the UN.

HEATING, VENTILATION, AND COOLING SYSTEMS

The HVAC analysis presented in Section H of this chapter was revised to assess the potential effects of the UNDC project on the dispersion of air pollutants from the Proposed Actions. The AERMOD was run with the addition of the proposed UNDC project. The results of the analysis determined that maximum predicted concentrations from the Proposed Actions are identical to the analysis presented for the Proposed Actions without the UNDC project. Therefore, no significant adverse air quality impacts are predicted due to HVAC emissions from the Proposed Actions with the UNDC project, either on the proposed UNDC building or at any other location. A summary of the results of this analysis is presented in Appendix E.

HVAC EMISSIONS FROM THE UNDC PROJECT

Stationary source impacts associated with the proposed UNDC project were also analyzed for its potential affect on air quality on the Proposed Actions. An analysis was performed utilizing the

AERMOD model, utilizing worst-case assumptions on fuel type and stack exhausts for the proposed UNDC project. The analysis determined that emissions from HVAC systems associated with the proposed UNDC project could potentially affect the proposed 708 First Avenue office development at various locations on the north façade of the building. Since no specific mechanical design information on the UNDC project is available, and potential locations for air intakes on the proposed 708 First Avenue development are not yet known at this time, a specific determination cannot be made. However, the proposed UNDC project would be subject to its own environmental review, which would need to demonstrate that no significant air quality impacts would occur, including those from the HVAC emissions on the Proposed Actions. Such measures may include use of cleaner burning fuels or utility steam, heat, and/or installing higher stacks or boosting the exhaust on these buildings so as to ensure that the plume would clear the height of the proposed 708 First Avenue building. Potential significant adverse impacts would also be avoided by placement of air intake locations away from areas where maximum concentrations of pollutants from the UNDC project's HVAC emissions were predicted. ✷