Chapter 15: Air Quality

A. INTRODUCTION

The potential for air quality impacts from the Proposed Actions is examined in this chapter. Air quality impacts can be either direct or indirect. Direct impacts result from emissions generated by stationary sources at a development site, such as emissions from on-site fuel combustion for heat and hot water systems, or emissions from parking garage ventilation systems. Indirect impacts are caused by off-site emissions associated with a project, such as emissions from nearby existing stationary sources (i.e., impacts on the projected and potential development sites) or by emissions from on-road vehicle trips generated by the Proposed Actions or other changes to future traffic conditions due to a project.

The Proposed Actions would not be expected to significantly alter traffic conditions. The maximum hourly incremental traffic from the Proposed Actions would not exceed the 2014 *City Environmental Quality Review (CEQR) Technical Manual* carbon monoxide screening threshold of 170 peak hour trips at nearby intersections in the study area, nor would it exceed the particulate matter emissions screening threshold discussed in Chapter 17, Sections 210 and 311 of the *CEQR Technical Manual*. Therefore, there is no potential for mobile-source impacts from the Proposed Actions, and a quantified assessment of mobile-source emissions is not warranted.

It is anticipated that each of the projected and potential development sites would include fossil fuel-fired heat and hot water systems. Therefore, a stationary source analysis was conducted to evaluate potential future pollutant concentrations with the Proposed Actions.

The Proposed Actions would include accessory parking at certain development sites within the rezoning area. Therefore, an analysis was conducted to evaluate potential future pollutant concentrations from the proposed parking facilities.

Since portions of the affected area are within areas zoned for manufacturing uses, potential effects of stationary source emissions from existing nearby industrial facilities on the Proposed Actions were assessed. In addition, potential effects from large and major sources of emissions in the study area on the Proposed Actions were evaluated.

PRINCIPAL CONCLUSIONS

The analyses conclude that the Proposed Actions would not result in any significant adverse air quality impacts on sensitive uses in the surrounding community, and the Proposed Actions would not be adversely affected by existing sources of air emissions in the rezoning area. A summary of the general findings is presented below.

The stationary source analyses determined that there would be no potential significant adverse air quality impacts from fossil fuel-fired heat and hot water systems at the projected and potential development sites. At certain sites, an (E) Designation (E-422) would be mapped in connection with the Proposed Actions to ensure that future developments would not result in any significant air quality impacts from fossil fuel-fired heat and hot water systems emissions. For the City-owned parcels (located within Projected Development Sites 4, 5 and 27), restrictions would be necessary to ensure that emissions from fossil fuel-fired heat and hot water systems would not result in any significant air quality impacts. These restrictions would be set forth in a Land Disposition Agreement (LDA) to ensure that the developer(s) satisfy these restrictions with oversight provided through the Department of Housing Preservation and Development (HPD).

An analysis of the cumulative impacts of industrial sources on projected and potential development sites was performed. Maximum concentration levels at projected and potential development sites were found to be below the air toxic guideline levels and health risk criteria established by regulatory agencies, and below National Ambient Air Quality Standards (NAAQS). Large and major emissions sources within 1,000 feet of a projected or potential development site were also analyzed, and the analysis concluded that these sources would not result in significant adverse air quality impacts on any projected or potential development sites.

The parking facilities assumed to be developed as a result of the Proposed Actions were analyzed for potential air quality effects. The analysis found that these parking facilities would not be expected to result in any significant adverse air quality impacts.

Since the Proposed Actions would not exceed the thresholds referenced in the *CEQR Technical Manual* for mobile source analyses during any traffic peak period, no analysis is required. Based on the CEQR Technical Manual guidelines, since the relevant thresholds were not exceeded, the Proposed Actions would not have any significant impact on air quality from mobile sources.

B. POLLUTANTS FOR ANALYSIS

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 carbon monoxide (CO) are predominantly influenced by mobile source emissions. Particulate matter (PM), volatile organic compounds (VOCs), and nitrogen oxides (nitric oxide [NO] and nitrogen dioxide [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 some sources utilizing non-road diesel such as large international marine engines. On-road diesel vehicles currently contribute very little to SO_2 emissions since the sulfur content of on-road diesel fuel, which is federally regulated, is extremely low. Ozone is formed in the atmosphere by complex photochemical processes that include NO_x and VOCs. Ambient concentrations of CO, PM, NO_2, SO_2, ozone, and lead are regulated by the U.S. Environmental Protection Agency (EPA) under the Clean Air Act (CAA), and are referred to as criteria pollutants; emissions of VOCs, NO_x, and other precursors to criteria pollutants are also regulated by EPA.

CARBON MONOXIDE

CO, a colorless and odorless gas, is produced in the urban environment primarily by the incomplete combustion of gasoline and other fossil fuels. In urban areas, approximately 80 to 90 percent of CO emissions are from motor vehicles. CO concentrations can diminish rapidly over relatively short distances; elevated concentrations are usually limited to locations near crowded intersections, heavily traveled and congested roadways, parking lots, and garages. Consequently, CO concentrations must be analyzed on a local (microscale) basis.

The Proposed Actions would include parking facilities at certain development sites. Therefore, an analysis was conducted to evaluate future CO concentrations with the operation of the parking facilities assumed to be developed as a result of the Proposed Actions.

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

In addition to being a precursor to the formation of ozone, NO_2 (one component of NO_x) is also a regulated pollutant. Since NO_2 is mostly formed from the transformation of NO in the atmosphere, it has mostly been of concern further downwind from large stationary sources, and not a local concern from mobile sources. (NO_x emissions from fuel combustion consist of approximately 90 percent NO and 10 percent NO_2 at the source.) With the promulgation of the 2010 1-hour average standard for NO_2, local sources such as vehicular emissions may be of greater concern. However, any increase in NO_2 associated with the Proposed Actions would be relatively small due to the very small increases in the number of vehicles. This increase would not be expected to significantly affect levels of NO_2 experienced near roadways.

Potential impacts on local NO_2 concentrations from the fuel combustion for the Projected and potential development sites' heat and hot water systems were evaluated.

LEAD

Airborne lead emissions are currently associated principally with industrial sources. Lead in gasoline has been banned under the CAA and would not be emitted from any other component of the Proposed Project. Therefore, an analysis of this pollutant 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 VOC; 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 (accumulation of gases, liquids, or solutes on the surface of a solid or liquid) of other pollutants, often toxic, and some likely carcinogenic compounds.

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

Gasoline-powered and diesel-powered vehicles, especially heavy-duty trucks and buses operating on diesel fuel, are a significant source of respirable PM, most of which is $PM_{2.5}$; PM concentrations may, consequently, be locally elevated near roadways. The Proposed Actions would not result in any significant increases in truck traffic near the Project Area or in the region, or other potentially significant increase in $PM_{2.5}$ vehicle emissions as defined in Chapter 17, Sections 210 and 311 of the *CEQR Technical Manual*. Therefore, an analysis of potential impacts from PM was not warranted. However, an analysis was conducted to evaluate future PM concentrations with the operation of the parking facilities assumed to be developed as a result of the Proposed Actions.

An assessment of PM emissions from heat and hot water systems at the projected and potential development sites was conducted, following the *CEQR Technical Manual* and EPA guidance.

SULFUR DIOXIDE

SO_2 emissions are primarily associated with the combustion of sulfur-containing fuels (oil and coal). SO_2 is also of concern as a precursor to $PM_{2.5}$ and is regulated as a $PM_{2.5}$ precursor under the New Source Review permitting program for large sources. Due to the federal restrictions on the sulfur content in diesel fuel for on-road and non-road vehicles, no significant quantities are emitted from vehicular sources. Vehicular sources of SO_2 are not significant and therefore, analysis of SO_2 from mobile and/or non-road sources was not warranted.

As part of the Proposed Actions, No. 2 fuel could be burned in heat and hot water systems of the projected and potential development sites. Therefore, potential future levels of SO_2 from these sources were examined.

NONCRITERIA POLLUTANTS

In addition to the criteria pollutants discussed above, noncriteria pollutants may be of concern. Noncriteria pollutants are emitted by a wide range of man-made and naturally occurring sources. These pollutants are sometimes referred to as hazardous air pollutants (HAP) and when emitted from mobile sources, as Mobile Source Air Toxics (MSATs). Emissions of noncriteria pollutants from industries are regulated by EPA.

Federal ambient air quality standards do not exist for noncriteria pollutants; however, the New York State Department of Environmental Conservation (NYSDEC) has issued standards for certain noncriteria compounds, including beryllium, gaseous fluorides, and hydrogen sulfide. NYSDEC has also developed guideline concentrations for numerous noncriteria pollutants. The

NYSDEC guidance document DAR-1[1] contains a compilation of annual and short-term (1-hour) guideline concentrations for these compounds. The NYSDEC guidance thresholds represent ambient levels that are considered safe for public exposure. EPA has also developed guidelines for assessing exposure to noncriteria pollutants. These exposure guidelines are used in health risk assessments to determine the potential effects to the public.

The Project Area contains existing manufacturing-zoned areas, which would remain in the Proposed Actions. Therefore, an analysis to examine the potential for impacts to the Proposed Actions from industrial emissions was performed.

C. AIR QUALITY REGULATIONS, STANDARDS, AND BENCHMARKS

NATIONAL AND STATE AIR QUALITY STANDARDS

As required by the CAA, primary and secondary National Ambient Air Quality Standards (NAAQS) have been established for six major air pollutants: CO, NO_2, ozone, respirable PM (both $PM_{2.5}$ and PM_{10}), SO_2, and lead. The primary standards 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 standards are generally either the same as the secondary standards or more restrictive. The NAAQS are presented in **Table 15-1**. The NAAQS for CO, annual NO_2, and 3-hour SO_2 have also been adopted as the ambient air quality standards for New York State, but are defined on a running 12-month basis rather than for calendar years only. New York State also has standards for total suspended particles, settleable particles, non-methane hydrocarbons, 24-hour and annual SO_2, and ozone which correspond to federal standards that have since been revoked or replaced, and for the noncriteria pollutants beryllium, fluoride, and hydrogen sulfide.

EPA has revised the NAAQS for PM, effective December 18, 2006. The revision included lowering the level of the 24-hour $PM_{2.5}$ standard from 65 $\mu g/m^3$ 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. EPA later lowered the primary annual $PM_{2.5}$ average standard from 15 $\mu g/m^3$ to 12 $\mu g/m^3$, effective March 2013.

EPA has also revised the 8-hour ozone standard, lowering it from 0.08 to 0.075 parts per million (ppm), effective as of May 2008, and the previous 1997 ozone standard was fully revoked effective April 1, 2015. Effective December 2015, EPA lowered the 2008 primary and secondary NAAQS from 0.075 ppm to 0.070. EPA expects to issue final area designations by October 1, 2017; those designations likely would be based on 2014–2016 air quality data.

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

EPA established a 1-hour average NO_2 standard of 0.100 ppm, effective April 12, 2010, in addition to the annual standard. The statistical form is the 3-year average of the 98th percentile of daily maximum 1-hour average concentration in a year.

EPA also established a 1-hour average SO_2 standard of 0.075 ppm, replacing the 24-hour and annual primary standards, effective August 23, 2010. The statistical form is the 3-year average

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[1] NYSDEC. DAR-1 (Air Guide-1) AGC/SGC Tables. August 2016.

of the 99th percentile of the annual distribution of daily maximum 1-hour concentrations. In January 2017, New York State recommended that EPA designate most of New York State, including New York City, as in attainment for this standard.

Table 15-1
National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary		Secondary	
	ppm	µg/m^3	ppm	µg/m^3
Carbon Monoxide (CO)				
8-Hour Average	9 (1)	10,000	None	
1-Hour Average	35 (1)	40,000		
Lead				
Rolling 3-Month Average (2)	NA	0.15	NA	0.15
Nitrogen Dioxide (NO_2)				
1-Hour Average (3)	0.100	188	None	
Annual Average	0.053	100	0.053	100
Ozone (O_3)				
8-Hour Average (4,5)	0.070	140	0.070	140
Respirable Particulate Matter (PM_{10})				
24-Hour Average (1)	NA	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Annual Mean (6)	NA	12	NA	15
24-Hour Average (7)	NA	35	NA	35
Sulfur Dioxide (SO_2) (8)				
1-Hour Average (9)	0.075	196	NA	NA
Maximum 3-Hour Average (1)	NA	NA	0.50	1,300

Notes: ppm—parts per million (unit of measure for gases only)
µg/m^3—micrograms per cubic meter (unit of measure for gases and particles, including lead)
NA—not applicable
All annual periods refer to calendar year.
Standards are defined in ppm. Approximately equivalent concentrations in µg/m^3 are presented.
1. Not to be exceeded more than once a year.
2. EPA has lowered the NAAQS down from 1.5 µg/m^3, effective January 12, 2009.
3. 3-year average of the annual 98th percentile daily maximum 1-hr average concentration. Effective April 12, 2010.
4. 3-year average of the annual fourth highest daily maximum 8-hr average concentration.
5. EPA lowered the NAAQS from 0.075 ppm, effective December 2015.
6. 3-year average of annual mean. EPA has lowered the primary standard from 15 µg/m^3, effective March 2013.
7. Not to be exceeded by the annual 98th percentile when averaged over 3 years.
8. EPA revoked the 24-hour and annual primary standards, replacing them with a 1-hour average standard. Effective August 23, 2010.
9. 3-year average of the annual 99th percentile daily maximum 1-hr average concentration.

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

Federal ambient air quality standards do not exist for noncriteria pollutants; however, as mentioned above, NYSDEC has issued standards for three noncriteria compounds. NYSDEC has also developed a guidance document DAR-1 (August 2016), which contains a compilation of annual and short term (1-hour) guideline concentrations for numerous other noncriteria compounds. The NYSDEC guidance thresholds represent ambient levels that are considered safe for public exposure.

NAAQS ATTAINMENT STATUS AND STATE IMPLEMENTATION PLANS

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

In 2002, EPA re-designated New York City as in attainment for CO. Under the resulting maintenance plans, New York is committed to implementing site-specific control measures throughout the city to reduce CO levels, should unanticipated localized growth result in elevated CO levels during the maintenance period. The second CO maintenance plan for the region was approved by EPA on May 30, 2014.

Manhattan, which had been designated as a moderate NAA for PM_{10}, was reclassified by EPA as in attainment on July 29, 2015.

The five New York City counties and Nassau, Suffolk, Rockland, Westchester, and Orange Counties had been designated as a $PM_{2.5}$ NAA (New York Portion of the New York–Northern New Jersey–Long Island, NY–NJ–CT NAA) since 2004 under the CAA due to exceedance of the 1997 annual average standard, and were also nonattainment with the 2006 24-hour $PM_{2.5}$ NAAQS since November 2009. The area was redesignated as in attainment for that standard effective April 18, 2014, and is now under a maintenance plan. As stated above, EPA lowered the annual average primary standard to 12 $\mu g/m^3$ effective March 2013. EPA designated the area as in attainment for the new 12 $\mu g/m^3$ NAAQS effective April 15, 2015.

Effective June 15, 2004, EPA designated Nassau, Rockland, Suffolk, Westchester, and the five New York City counties (NY portion of the New York–Northern New Jersey–Long Island, NY-NJ-CT, NAA) as a moderate non-attainment area for the 1997 8-hour average ozone standard. In March 2008 EPA strengthened the 8–hour ozone standards. EPA designated the same NAA as a marginal NAA for the 2008 ozone NAAQS, effective July 20, 2012. On April 11, 2016, as requested by New York State, EPA reclassified the area as a moderate NAA. New York State has begun submitting SIP documents in December 2014. The State is expected to be able to meet its SIP obligations for both the 1997 and 2008 standards by satisfying the requirements for a moderate area attainment plan for the 2008 ozone NAAQS.

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

EPA has established a 1-hour SO_2 standard, replacing the former 24-hour and annual standards, effective August 23, 2010. Based on the available monitoring data, all New York State counties currently meet the 1-hour standard. Additional monitoring will be required. Draft attainment designations were published by EPA in February 2013, indicating that EPA is deferring action to designate areas in New York State and expects to proceed with designations once additional data are gathered.

DETERMINING THE SIGNIFICANCE OF AIR QUALITY IMPACTS

The State Environmental Quality Review Act (SEQRA) regulations and the *CEQR Technical Manual* state that the significance of a predicted consequence of a project (i.e., whether it is material, substantial, large or important) should be assessed in connection with its setting (e.g., urban or rural), its probability of occurrence, its duration, its irreversibility, its geographic scope, its magnitude, and the number of people affected.[2] 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 15-1**) would be deemed to have a potential significant adverse impact. Similarly, for non-criteria pollutants, predicted exceedance of the DAR-1 guideline concentrations would be considered a potential significant adverse impact.

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

CO DE MINIMIS CRITERIA

New York City has developed *de minimis* criteria to assess the significance of the increase in CO concentrations that would result from the impact of proposed projects or actions on mobile sources, as set forth in the *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.

$PM_{2.5}$ DE MINIMIS CRITERIA

New York City uses *de minimis* criteria to determine the potential for significant adverse $PM_{2.5}$ impacts under CEQR are as follows:

- Predicted increase of more than half the difference between the background concentration and the 24-hour standard;
- Annual average $PM_{2.5}$ concentration increments which are predicted to be greater than 0.1 $\mu g/m^3$ at ground level on a neighborhood scale (i.e., the annual increase in concentration representing the average over an area of approximately 1 square kilometer, centered on the location where the maximum ground-level impact is predicted for stationary sources; or at a distance from a roadway corridor similar to the minimum distance defined for locating neighborhood scale monitoring stations); or
- Annual average $PM_{2.5}$ concentration increments that are predicted to be greater than 0.3 $\mu g/m^3$ at a discrete receptor location (elevated or ground level).

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[2] New York City. *CEQR Technical Manual*. Chapter 1, section 222. March 2014; and SEQR Regulations. 6 NYCRR § 617.7

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

The above *de minimis* criteria have been used to evaluate the significance of predicted impacts of the Proposed Actions on $PM_{2.5}$ concentrations.

NON-CRITERIA POLLUTANT THRESHOLDS

Non-criteria, or toxic, air pollutants include a multitude of pollutants of ranging toxicity. No federal ambient air quality standards have been promulgated for toxic air pollutants. However, EPA and NYSDEC have issued guidelines that establish acceptable ambient levels for these pollutants based on human exposure.

The NYSDEC DAR-1 guidance document presents guideline concentrations in micrograms per cubic meter for the one-hour and annual average time periods for various air toxic compounds. These values are provided in **Table 15-2** for the compounds affecting receptors located at projected and potential development sites. The compounds listed are those emitted by existing sources of air toxics in the rezoning area.

Table 15-2
Industrial Source Analysis: Relevant NYSDEC Air Guideline Concentrations

Pollutant	CAS Number	SGC (μg/m^3)	AGC (μg/m^3)
Particulates(1)	NY075-02-5	35	12
Acetone	00067-64-1	180,000	30,000
Butyl Acetate	00123-86-4	95,000	17,000
Toluene	00108-88-3	37,000	5,000
Isopropyl Alcohol	00067-63-0	98,000	7,000
Misc. VOC	NY999-00-0	98,000	7,000
Xylene	01330-20-7	22,000	100

Note: (1) Conservatively assumes all particulate emissions would be PM2.5. EPA 24-hour and annual standard from Particulate ($PM_{2.5}$) used.
Source: NYSDEC, DAR-1 AGC/SGC Tables, August 2016.

In order to evaluate impacts of non-carcinogenic toxic air emissions, EPA developed a methodology called the "Hazard Index Approach." The acute hazard index is based on short-term exposure, while the chronic non-carcinogenic hazard index is based on annual exposure limits. If the combined ratio of pollutant concentration divided by its respective short-term or annual exposure threshold for each of the toxic pollutants is found to be less than 1, no significant air quality impacts are predicted to occur due to these pollutant releases.

In addition, EPA has developed unit risk factors for carcinogenic pollutants. EPA considers an overall incremental cancer risk from a proposed action of less than one-in-one million to be insignificant. Using these factors, the potential cancer risk associated with each carcinogenic pollutant, as well as the total cancer risk of the releases of all of the carcinogenic toxic pollutants combined, can be estimated. If the total incremental cancer risk of all of the carcinogenic toxic pollutants combined is less than one-in-one million, no significant air quality impacts are predicted to occur due to these pollutant releases.

D. METHODOLOGY

MOBILE SOURCES

INTERSECTION SCREENING

An intersection screening analysis was conducted to determine potential for impacts from CO, and PM due to vehicular traffic anticipated to be generated by the Proposed Actions using the methodology set forth in the *CEQR Technical Manual*. Projected incremental traffic data were evaluated for each intersection in the traffic network. These data included project total and truck incremental traffic for each of the peak periods (weekday AM, MD, PM, and weekend).

For the CO screening, the total incremental increase in the number of project-generated trips at each intersection was compared with the *CEQR Technical Manual* of 170 vehicles. For the PM screening, the $PM_{2.5}$ screening worksheet referenced in Section 201 of the *CEQR Technical Manual* was utilized to calculate the number of heavy-duty truck equivalents at each intersection. This worksheet calculates the number of project-generated vehicles based on vehicle classification and roadway classification information.

For the PM screening, all trucks that would be generated by the Proposed Actions were classified using the HDDV8B vehicle category, although the actual trucks types associated with the Proposed Actions would consist of a mix of delivery and trailer trucks. All other vehicles were classified as LDGT1, which is considered most representative of the automobile category among the vehicle types listed in the worksheet. Roadway classifications were determined at each intersection, based on New York City Department of Transportation Functional Classification maps[3] and With Action traffic volumes.

PARKING ANALYSIS

The Proposed Actions would include parking facilities to account for the new parking demand and supply. Emissions from vehicles using the parking areas could potentially affect ambient levels of CO and PM in the immediate vicinity in the With Action Condition. Of the parking associated with the projected development sites, the prototypical parking garages at Projected Development Sites 6 and 7 were analyzed. Projected Development Site 6 was analyzed since it has the maximum overall capacity (68 parking spaces) and the maximum predicted number of vehicle ins/outs, and therefore, the highest potential incremental concentrations of pollutants. Projected Development Site 7 was selected due to its proximity to Projected Development Site 6.

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*. Emissions from vehicles entering, parking, and exiting the garages were estimated using the EPA MOVES mobile source emission model, as referenced in the *CEQR Technical Manual*. For all arriving and departing vehicles, an average speed of five miles per hour was conservatively assumed for travel within the parking garages. In addition, all departing vehicles were assumed to idle for one minute before proceeding to the exit. The concentrations of CO and PM within the garages were calculated assuming a minimum ventilation rate, based on New York City Building Code requirements, of one cubic foot per minute of fresh air per gross square foot of garage area. To determine compliance with the

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[3] New York State Department of Transportation Functional Classification. http://gis3.dot.ny.gov/html5viewer/?viewer=FC

NAAQS, CO concentrations were determined for the maximum eight-hour average period. (No exceedances of the one-hour standard would occur, and the eight-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 CO and PM 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 (PM concentrations were determined on a 24-hour and annual average basis). Traffic data for the parking garage analysis was derived from the trip generation analysis described in the traffic section of this Final Environmental Impact Statement (FEIS). Background and on-street concentrations were added to the modeling results to obtain the total ambient levels for CO and PM_{10}. The 24-hour average $PM_{2.5}$ background concentration was used to determine the *de minimis* criteria threshold.

STATIONARY SOURCES

A stationary source analysis was conducted to evaluate potential impacts from the projected and potential development sites' heat and hot water systems. In addition, an assessment was conducted to determine the potential for impacts due to industrial activities within the affected area, and from any nearby large emission sources.

INDIVIDUAL HEAT AND HOT WATER SYSTEMS

Screening Analysis

A screening analysis was performed to assess air quality impacts associated with emissions from heat and hot water systems for each projected and potential development site. The methodology described in the *CEQR Technical Manual* was used for the analysis, and considered impacts on sensitive uses (i.e., existing residences and proposed developments).

The methodology determines the threshold of development size below which the action would not have a significant adverse impact. The screening procedures utilize information regarding the type of fuel to be used, the maximum development size, and the heat and hot water systems' exhaust stack height, to evaluate whether a significant adverse impact may occur. Based on the distance from the development site to the nearest building of similar or greater height, if the maximum development size is greater than the threshold size shown in the *CEQR Technical Manual*, there is the potential for significant air quality impacts, and a refined dispersion modeling analysis would be required. Otherwise, the source passes the screening analysis, and no further analysis is required.

Since information on the heat and hot water systems' design was not available, each projected and potential development site was evaluated with the nearest existing or proposed residential development of a similar or greater height analyzed as a potential receptor. The maximum gross floor area of each projected and potential development site from the Reasonable Worst Case Development Scenario (RWCDS) was used as input for the screening analysis.

It was assumed that No. 2 fuel oil or natural gas would be used in the projected and potential development sites' heat and hot water systems, and that the exhaust stack(s) would be located three feet above roof height (the default assumption in the *CEQR Technical Manual*). If the results pass the screening analysis, the projected or potential development site is determined to result in no potential significant adverse air quality impacts using No. 2 fuel oil or natural gas. For sources that did not pass the screening analyses using the *CEQR Technical Manual* procedures, a refined modeling analysis was performed. For fuel oil, the primary pollutants of concern are SO_2 and PM, while for natural gas, the primary pollutant of concern is NO_2.

Under the RWCDS, it is assumed that commercial uses could be potentially developed on New York City Housing Authority (NYCHA) campuses (Potential Development Sites K, L, M, N, AF, and AG). Heating and hot water systems serving the existing NYCHA campuses could be modified to serve future commercial development, or new heating and hot water systems could be installed to service the new uses. Since there is no specific development scenario proposed at this time for these sites, no information is available regarding the heating and hot water systems and associated exhaust stack(s), and therefore, a heating and hot water system analysis was not performed for these sites. However, potential significant adverse impacts on air quality from heating and hot water systems would be minimized by connecting to existing NYCHA heating and hot water systems, which are routed to the roofs of the existing NYCHA buildings, or by exhausting new heat and hot water system stacks to the roofs of these buildings. Alternatively, potential significant adverse impacts on air quality could be avoided by using natural gas-fired heating and hot water systems with exhausts stacks located on the new development set back at a sufficient distance from existing buildings. Future development on these parcels would be subject to a separate discretionary approval and environmental analyses that would identify and establish controls as needed to avoid a potential significant adverse air quality impact. These modifications would be subject to an LDA to ensure that the developer(s) satisfy these restrictions.

Refined Dispersion Analysis

Projected and potential development sites that did not pass the screening analysis were further analyzed using a refined dispersion model, the EPA/AMS AERMOD dispersion model. AERMOD is a state-of-the-art dispersion model, applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources (including point, area, and volume sources). AERMOD is a steady-state plume model that incorporates current concepts about flow and dispersion in complex terrain, including updated treatments of the boundary layer theory, understanding of turbulence and dispersion, and includes handling of 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 to calculate pollutant concentrations at locations where 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, and elimination of calms. AERMOD can be run with and without building downwash (the downwash option accounts for the effects on plume dispersion created by the structure the stack is located on, and other nearby structures). In general, modeling "without" building downwash produces higher estimates of pollutant concentrations when assessing the impact of elevated sources on elevated receptor locations. Therefore, the analysis was performed using the AERMOD model with the no downwash option only.

For the refined analysis, the exhaust stacks for the heat and hot water systems were assumed to be located at the edge of the development massing closest to the receptor, unless the source and receptor were immediately adjacent to each other. In these cases, the stack was assumed to be located at an initial distance of 10 feet from the nearest receptor.

The refined dispersion modeling analysis was performed for $PM_{2.5}$, PM_{10}, NO_2, and SO_2 (for sites where fuel oil was modeled). The analysis was performed using calculated emission rates for fuel oil and natural gas. If a source could not meet the NAAQS or $PM_{2.5}$ *de minimis* criteria using the initial heating and hot water system stack assumptions, the stack would then be set back in 10-foot increments until the source met the respective criteria. If necessary, further restrictive measures were considered, including use of low NO_x burners, increasing stack heights, or a combination of these measures.

Receptor Placement

Discrete receptors (i.e., locations at which concentrations are calculated) were modeled along the existing and proposed building façades to represent potentially sensitive locations such as operable windows and intake vents. Receptors were placed at elevated locations on all façades and at multiple elevations on buildings, to identify maximum pollutant concentrations. Generally, receptors were spaced at 10-foot intervals vertically to represent individual floors of a building; horizontally, receptor spacing was a minimum of 15 feet.

Emission Estimates and Stack Parameters

Fuel consumption was estimated based on procedures outlined in the *CEQR Technical Manual* as discussed above. Using worst-case assumptions, fuel was assumed to be No. 2 fuel oil for SO_2 and PM, and natural gas for NO_2.

Emission factors from the fuel oil and natural gas combustion sections of EPA's AP-42 were used to calculate emission rates for the projected and potential development sites' heat and hot water systems. Annual NO_2 concentrations from heating and hot water sources were estimated using a NO_2 to NO_x ratio of 0.75, as described in EPA's *Guideline on Air Quality Models* at 40 CFR part 51 Appendix W, Section 5.2.4.

One-hour average NO_2 concentration increments associated with the projected and potential development sites' hot water systems were estimated using AERMOD model's Plume Volume Molar Ratio Method (PVMRM) module to analyze chemical transformation within the model. The PVMRM module incorporates hourly background ozone concentrations to estimate NO_x transformation within the source plume. Ozone concentrations were taken from the NYSDEC Botanical Garden monitoring station, which is the nearest ozone monitoring station to the rezoning area that has complete five years of hourly data available (2012–2016). An initial NO_2 to NO_x ratio of 10 percent at the source exhaust stack was assumed, which is considered representative for boilers.

The methodology used to determine the compliance of total one-hour NO_2 concentrations from the proposed sources with the one-hour NO_2 NAAQS was based on adding the monitored background to modeled concentrations, as follows: hourly modeled concentrations from proposed sources were first added to the seasonal hourly background monitored concentrations; then the highest combined daily one-hour NO_2 concentration was determined at each receptor location and the 98th percentile daily one-hour maximum concentration for each modeled year was calculated within the AERMOD model; finally, the 98th percentile concentrations were averaged over the latest five years. This methodology is recognized by EPA and the City and is referenced in EPA modeling guidance.

Background Concentrations

To estimate the maximum expected pollutant concentration at a given location (receptor), the predicted impacts must be added to a background value that accounts for existing pollutant concentrations from other sources that are not directly accounted for in the model (see **Table 15-3**). To develop background levels, concentrations measured at the most representative NYSDEC ambient monitoring station over the latest available five-year period (2011–2015) were used for annual average NO_2 and three-hour average SO_2 background (consistent with DEP guidance), while the latest available three-year period was used for the 24-hour PM_{10} background concentration.

Table 15-3
Maximum Background Pollutant Concentrations

Pollutant	Average Period	Location	Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
NO_2	1-hour	IS 52, Bronx	121.0	188
	Annual	IS 52, Bronx	39.1	100
SO_2	1-hour	IS 52, Bronx	36.9	196
	3-hour	IS 52, Bronx	136.1(1)	1,300
$PM_{2.5}$	24-hour	JHS 45, Manhattan	23.7	35
PM_{10}	24-hour	IS 52, Bronx	39	150

Notes:

[1] The three-hour SO_2 background concentration is based on the five-year highest second-highest measured value from 2008–2012, which is the latest available NYSDEC published data.

Source: New York State Air Quality Report Ambient Air Monitoring System, DEC, 2008–2015.

$PM_{2.5}$ annual average impacts are assessed on an incremental basis and compared with the $PM_{2.5}$ *de minimis* criteria, without considering the annual background. Therefore, the annual $PM_{2.5}$ background is not presented in the table. The $PM_{2.5}$ 24-hour average background concentration of 23.7 $\mu g/m^3$ (based on the 2013 to 2015 average of 98th percentile concentrations measured at the JHS 45 monitoring station) was used to establish the *de minimis* value for the 24-hour increment, consistent with the guidance provided in the *CEQR Technical Manual*.

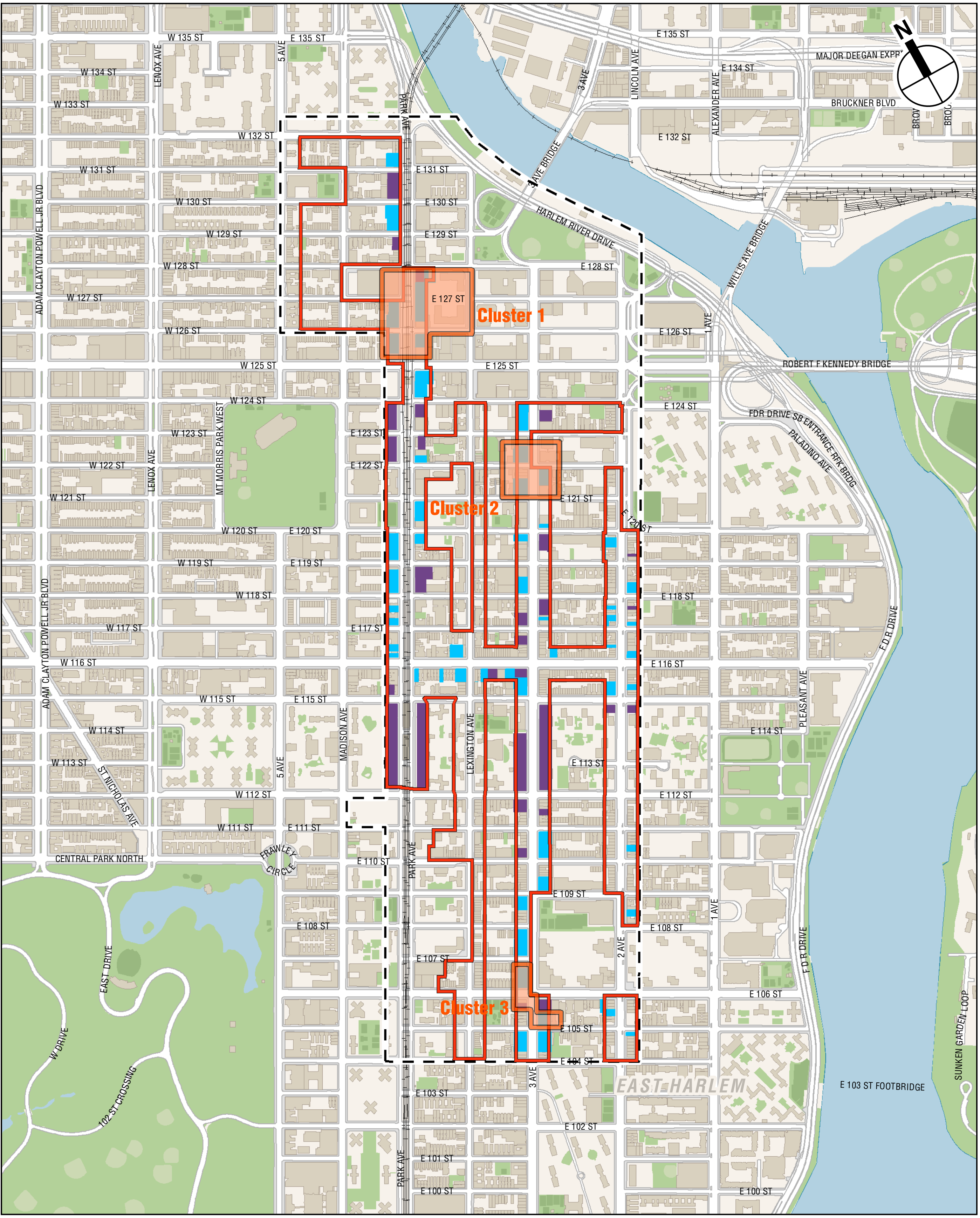
Cumulative Impacts from Heat and Hot Water Systems

In addition to the individual source analysis, groups or “clusters” of heat and hot water sources with similar stack heights were analyzed, to address the cumulative impacts of multiple sources. The rezoning area and RWCDS were reviewed to determine areas where clusters with high density of development sites with similar building heights would be located which could result in cumulative impacts on nearby buildings of a similar or greater height. A total of three clusters were selected for analysis. The development sites associated with each cluster and their location are presented in **Table 15-4** and **Figure 15-1**.

Table 15-4
Cluster Analysis Sites

Cluster	Development Sites
1	Projected Development Sites 4, 5, 8, 9,and Potential Development Site V
2	Projected Development Sites 12, 13, and 22
3	Projected Development Sites 19, 33, and Potential Development Site H

4/20/2017



🟥 *Project Area*

⬚ *East Harlem Neighborhood Plan Study Area*

🟦 *Projected Development Sites*

🟪 *Potential Development Sites*

0 1,000 FEET

EAST HARLEM REZONING

HVAC Cluster Locations

Figure 15-1

The cluster analysis was performed using the EPA-approved AERSCREEN model (Version 16216, EPA, 2016). AERSCREEN predicts worst-case one-hour impacts downwind from a point, area, or volume source. The model generates worst-case meteorology using representative minimum and maximum ambient air temperatures, and site-specific surface characteristics such as albedo, Bowen ratio, and surface roughness. If the worst-case concentrations predicted by AERSCREEN are above significant impact levels for each pollutant analyzed, further analysis with AERMOD is required to determine the potential for air quality impacts from the Proposed Actions. However, if the worst-case concentrations predicted by the AERSCREEN model are below impact levels for an analyzed pollutant, there is no potential for impact and no further analysis is required.

The AERSCREEN model predicts impacts over a 1-hour average using default meteorology. In order to predict pollutant concentrations over longer periods of time, EPA-referenced persistence factors were used. These consist of 0.6 and 0.1 for the 24-hour and annual average periods, respectively.

The AERSCREEN model considered each cluster as a single area source. The cluster analysis was performed to identify impacts of SO_2, NO_2, PM_{10}, and $PM_{2.5}$. Using information in the Air Quality Appendix of the *CEQR Technical Manual*, an estimate of the emissions from the cluster development's heat and hot water systems was made. The appendix includes tables that can be used to estimate emissions based on the development size, type of fuel used and type of construction. Fuel consumption factors of 58.5 ft^3/ft^2-year and 0.43 gal/ft^2-year were used for natural gas and fuel oil, respectively, for residential developments. Mixed-use developments used the residential fuel consumption factors since they are more conservative. Short-term factors were determined by using peak hourly fuel consumption estimates for heating and cooling systems.

Emission factors for each fuel were obtained from the EPA Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources. The SO_2 emissions rates were calculated based on a maximum fuel oil sulfur content of 0.0015 percent (based on use of ultra-low sulfur No. 2 oil) the fuel using the appropriate AP-42 formula.

The average minimum distance from the sites within the source clusters to the nearest buildings were used in the modeling analysis. The analysis focused on existing buildings or other projected and potential development sites that are of a similar or greater height than the source cluster.

To estimate the maximum expected pollutant concentration at a given receptor, the calculated impact must be added to a background value that accounts for existing pollutant concentrations from other sources (see **Table 15-3**).

INDUSTRIAL SOURCES

Pollutants emitted from the exhaust vents of existing permitted industrial facilities were examined to identify potential adverse impacts on future residents of the projected and potential development sites. All industrial air pollutant emission sources within 400 feet of a projected and potential development site boundary were considered for inclusion in the air quality impact analyses.

A request was made to DEP's Bureau of Environmental Compliance (BEC) and NYSDEC for information regarding the release of air pollutants from these potential sources within the entire study area. The DEP and NYSDEC air permit data provided was compiled into a database of source locations, air emission rates, and other data pertinent to determining source impacts. A comprehensive search was also performed to identify NYSDEC Title V permits and permits listed in the EPA Envirofacts database.

Based on the initial permit search, eight DEP-permitted dry cleaning facilities were identified within the rezoning area. These dry cleaners use best available technology for controlling dry cleaning emissions and meet the stringent DEP regulations. Based on this information, it was determined that the contaminants emitted by these dry cleaning facilities would not lead to any significant adverse impacts on any of the projected and potential development sites. In addition, one facility was identified with registration for an emergency generator which is not considered to be an industrial source of emissions, and furthermore, the operation of this type of source would be very limited. Therefore, an analysis of these sources was not required.

A field survey was conducted on December 12 and 14, 2016, to determine the operating status of permitted industries and identify any potential industrial sites not included in the original permit request or the permit databases. Overall, two permitted sources were determined to be active.

Two permitted industrial sources were found at the Potential Development Site O. To be conservative, at this site, which may not be developed by the Proposed Action’s Build Year, the industrial analysis was performed two ways, as follows:

- Assuming the site is developed, in which case the industrial source is not assumed to be operating in the With Action Condition. In this case, potential air quality impacts from other industrial sources in the study area were studied to evaluate their potential effects on the development site.
- Assuming the site is not developed, in which case the industrial source is assumed to be operating in the With Action Condition, and its potential effects on other projected and potential development sites were determined.

For sources that perform paint spraying, such as woodworking shops, in some cases the solvent emissions were not listed as individual air toxic compounds. To estimate the individual air toxic emissions in these cases, material safety data sheet information from representative sources was used, which provides maximum percentage by weight for individual air toxics that are commonly found in coatings used in paint spraying operations. The solvent usage from the source permit was multiplied by the weight percentage for each air toxic to estimate the maximum emission rate for the air toxics, by source.

Refined Dispersion Analysis

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 projected and potential development sites, were evaluated with a refined modeling analysis using the EPA/AMS AERMOD dispersion model. The AERMOD model calculates pollutant concentrations from one or more points (e.g., exhaust stacks) based on emission rates, source parameters and hourly meteorological data, stack tip downwash, urban dispersion and surface roughness length, and elimination of calms. Since the highest concentrations were predicted to occur at nearby elevated locations, the AERMOD model was run without downwash—a procedure which produces the highest concentrations at elevated locations. The meteorological data set consisted of five years of meteorological data: surface data collected at LaGuardia Airport (2012–2016) and concurrent upper air data collected at Brookhaven, Suffolk County, New York.

Predicted worst-case impacts on the projected and potential development sites were compared with the short-term guideline concentrations (SGCs) and annual guideline concentrations (AGCs) recommended in NYSDEC's DAR-1 AGC/SGC Tables. These guidelines present the airborne concentrations that are applied as a screening threshold to determine if the future residents of the projected and potential development sites could be significantly impacted by nearby sources of air pollution.

To assess the effects of multiple sources emitting the same pollutants, cumulative source impacts were determined. Concentrations of the same pollutant from industrial sources that were within 400 feet of an individual development site were combined and compared to the guideline concentrations discussed above.

Discrete receptors (i.e., locations at which concentrations were calculated) were placed on the potentially affected projected and potential development sites. The receptor network consisted of receptors located at spaced intervals along the sides of the development site from the ground floor to the upper level.

Emission rates and stack parameters, obtained from the DEP permits, were input into the AERMOD dispersion model.

Health Risk Assessment

Potential cumulative impacts were evaluated based on EPA's Hazard Index Approach for non-carcinogenic compounds and EPA's Unit Risk Factors for carcinogenic compounds. Both methods are based on equations that use EPA health risk information at referenced concentrations for individual compounds to determine the level of health risk posed by an expected ambient concentration of these compounds at a sensitive receptor. For non-carcinogenic compounds, EPA considers a concentration-to-reference dose level ratio of less than 1.0 to be acceptable. For carcinogenic compounds, the EPA unit risk factors represent the concentration at which an excess cancer risk of one-in-one million is predicted. In cases where an EPA reference dose or unit risk factor did not exist, the NYSDEC AGC was used.

ADDITIONAL SOURCES

The *CEQR Technical Manual* requires an analysis of projects that may result in a significant adverse impact due to certain types of new uses located near a "large" or "major" emissions source. Major sources are defined as those located at facilities that have a Title V or Prevention of Significant Deterioration air permit, while large sources are defined as those located at facilities that require a State Facility Permit. To assess the potential effects of these existing sources on the projected and potential development sites, a review of existing permitted facilities was conducted. Sources of information reviewed included EPA's Envirofacts database, the NYSDEC Title V and State Facility Permit websites, the New York City Department of Buildings website, and DEP permit data.

Two facilities with a Title V permit were identified: (1) the Franklin Plaza Apartments, which is within 1,000 feet of Projected Development Sites 15, 17, 18, 19, 20, 21, 26, 29, 33, 35, 46, 65, 66, and 67, and Potential Development Sites H, U, and AH; and (2) Taino Towers, which is within 1,000 feet of Projected Development Sites 11, 12, 13, 22, 27, 32, 36, 37, 52, 53, 54, 55, and 56, and Potential Development Sites P, X, Y, and AI. One facility with a state facility permit was identified: 1199 Housing Corporation, which is within 1,000 feet of Projected Development Sites 65, 66, and 67, and Potential Development Site AA. Note that NYCHA development sites within the study area (Potential Development Sites K, L, M, N, AF, and AG) were included in the permit search.

Pollutant concentrations were estimated from these facilities to evaluate their potential impacts on the Proposed Actions. The AERMOD dispersion model was used in the analysis, with the same set of meteorological data and the same background concentration values. Note that the cumulative effects of emissions from the Franklin Plaza Apartments and the 1199 Housing Corporations were assessed for Projected Development Sites 65, 66, and 67, since both of these sources are within 1,000 feet of these proposed development sites.

The facility emissions were estimated using the information developed for the air permits, and applying the EPA's Compilations of Air Pollutant Emission Factors (AP-42)[4] emission factors for boilers. For Taino Towers and 1199 Housing Corporation, the boiler plants primarily use natural gas, with No. 2 oil as a back-up fuel, while Franklin Plaza uses natural gas exclusively. **Tables 15-5a**, **15-5b, and 15-5c** present the emission rates and stack parameters used in the AERMOD analysis for the analyzed facilities.

Table 15-5a
Stack Parameters and Emission Rates from Franklin Plaza Apartments

Parameter	Value	
	2085 2nd Avenue Boiler Plant	**2086 2nd Avenue Boiler Plant**
Stack Height (ft)	183(2)	200
Stack Diameter (ft)	4.50(2)	4.50
Exhaust Flow Rate (acfm) (1)	20,786(2)	17,452(3)
Exhaust Temperature (°F)	296(2)	397(4)
Fuel Type	Natural Gas	Natural Gas
NO_x Short Term Emission Rate (g/s)	0.767	0.778
NO_x Annual Emission Rate (g/s) (5)	0.130	0.132
SO_2 Short Term Emission Rate (g/s)	0.005	0.005
PM_{10} Short Term Emission Rate (g/s)	0.058	0.059
$PM_{2.5}$ Short Term Emission Rate (g/s)	0.058	0.059
$PM_{2.5}$ Annual Emission Rate (g/s)(5)	0.010	0.010

Notes:
1 acfm = actual cubic feet per minute.
2 The stack exhaust height, diameter, flow rate, and Temperature are based on DEP permit information.
3 The stack exhaust flow rate estimated based on the type of fuel and heat input rate.
4 The stack exhaust temperature based on manufacture information.
5 The annual emissions are based on annual fuel consumption reported in the DEC Title V permit.

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

Table 15-5b
Stack Parameters and Emission Rates from Taino Towers

Parameter	Value	
Stack Height (ft)(1)	360	
Stack Diameter (ft)(1)	4.51	
Exhaust Flow Rate (acfm) (2,3)	24,549 / 21,824	
Exhaust Temperature (°F)(4)	150	
Fuel Type	Fuel Oil	Natural Gas
NO$_x$ Short Term Emission Rate (g/s) (5)	2.011	1.367
NO$_x$ Annual Emission Rate (g/s)(6)	0.010	0.204
SO$_2$ Short Term Emission Rate (g/s) (5)	0.021	0.008
PM$_{10}$ Short Term Emission Rate (g/s) (5)	0.239	0.104
PM$_{2.5}$ Short Term Emission Rate (g/s) (5)	0.214	0.104
PM$_{2.5}$ Annual Emission Rate (g/s) (6)	0.001	0.015

Notes:

[1] The stack height and diameter are based on DEC Title V permit.

[2] acfm = actual cubic feet per minute.

[3] The stack exhaust flow rate estimated based on the type of fuel and heat input rate. The second number presents the acfm for natural gas.

[4] The stack exhaust temperature is based on DEP permit.

[5] The short-term emissions conservatively assume No. 2 fuel oil is used.

[6] The annual emissions are based on annual fuel consumption reported in the DEC Title V permit.

Table 15-5c
Stack Parameters and Emission Rates from 1199 Housing Corp

Parameter	Value	
Stack Height (ft)(3)	334	
Stack Diameter (ft)(3)	5.58	
Exhaust Flow Rate (acfm) (1,2)	25,467 / 22,640	
Exhaust Temperature (°F)(4)	96	
Fuel Type	Fuel Oil	Natural Gas
NO$_x$ Short Term Emission Rate (g/s) (5)	2.289	1.556
NO$_x$ Annual Emission Rate (g/s) (6)	2.289	1.556
SO$_2$ Short Term Emission Rate (g/s) (5)	0.024	0.009
PM$_{10}$ Short Term Emission Rate (g/s) (5)	0.272	0.118
PM$_{2.5}$ Short Term Emission Rate (g/s) (5)	0.244	0.118
PM$_{2.5}$ Annual Emission Rate (g/s) (6)	0.244	0.118

Notes:

(1) ACFM= actual cubic feet per minute.

(2) The stack exhaust flow rate estimated based on the type of fuel and heat input rate. The second number presents the acfm for natural gas.

(3) The stack height and diameter are based on DEC Title V permit.

(4) The stack exhaust temperature is based on DEP permit.

(5) The short-term emissions conservatively assume No. 2 fuel oil is used.

(6) The annual emissions conservatively assume No. 2 fuel oil is used exclusively during the winter, and natural gas during the rest of the year.

METRO-NORTH RAILROAD DIESEL LOCOMOTIVES

Metro-North Railroad trains operate within the rezoning area along the Park Avenue Viaduct. Metro-North uses a combination of electric and dual mode (diesel-electric) trains on this track corridor. The dual mode locomotives are designed to provide service on non-electrified portions of the Metro-North rail system, well north of New York City. According to Metro-North, all dual mode trains operate on electric service on the Park Avenue Viaduct corridor. Therefore, no diesel engines emissions would occur from rail passenger service. Accordingly, no significant adverse air quality impacts would be expected to occur on projected and potential development sites along the Park Avenue corridor from Metro-North operations, and no further analysis is required.

E. EXISTING CONDITIONS

The representative criteria pollutant concentrations measured in recent years at NYSDEC air quality monitoring stations nearest to the Project Area are presented in **Table 15-6**. The values presented are consistent with the form of the NAAQS. As shown in the table, the recently monitored levels did not exceed the NAAQS. It should be noted that these values are somewhat different from the background concentrations used in the stationary source and mobile source analyses, since these are the most recent reported monitored values, rather than more conservative values used for dispersion modeling. The concentrations presented in **Table 15-6** provide a comparison of the air quality in the rezoning area with the NAAQS, while background concentrations are obtained from several years of monitoring data, and represent a conservative estimate of the highest concentrations for future ambient conditions.

Table 15-6
Representative Monitored Ambient Air Quality Data

Pollutant	Location	Units	Averaging Period	Concentration	NAAQS
CO	CCNY, Manhattan	ppm	1-hour	2.3	35
	CCNY, Manhattan		8-hour	1.5	9
SO_2	IS 52, Bronx	µg/m^3	3-hour	46.6	1,300
			1-hour	36.9	196
PM_{10}	IS 52, Bronx	µg/m^3	24-hour	39	150
$PM_{2.5}$	JHS 45, Manhattan	µg/m^3	Annual	8.8	12
			24-hour	23.7	35
NO_2	IS 52, Bronx	µg/m^3	Annual	37.9	100
	IS 52, Bronx		1-hour	121.0	188
Lead	IS 52, Bronx	µg/m^3	3-month	0.0061	0.15
Ozone	CCNY, Manhattan	ppm	8-hour	0.066	0.070

Notes:

(1) The CO, PM_{10}, and 3-hour SO_2 concentrations for short-term averages are the second-highest from the most recent year with available data.

(2) PM2.5 annual concentrations are the average of 2013–2015 annual concentrations, and the 24-hour concentration is the average of the annual 98th percentiles in the same period.

(3) The SO2 1-hour and NO2 1-hour concentrations are the average of the 99th percentile and 98th percentile, respectively, of the highest daily 1-hour maximum from 2013 to 2015.

(4) The lead concentrations is based on the highest quarterly average concentration measured in 2015.

(5) The ozone concentration is based on the 3-year average (2013–2015) of the 4th highest daily maximum 8-hour average concentrations.

Source: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2012–2015.

F. THE FUTURE WITHOUT THE PROPOSED ACTIONS (NO ACTION CONDITION)

In the No Action Condition, the identified projected development sites are assumed to either remain unchanged from existing conditions, or become occupied by uses that are as-of-right under existing zoning and reflect current trends that are deemed likely to support more active uses. The Proposed Actions would likely result in more development, and therefore, the emissions from heat and hot water systems associated with the Proposed Actions would cumulatively be greater than the emissions from heat and hot water systems under the No Action Condition.

G. THE FUTURE WITH THE PROPOSED ACTIONS (WITH ACTION CONDITION)

MOBILE SOURCES

INTERSECTION SCREENING

The maximum hourly traffic increment from the Proposed Actions would exceed neither the *CEQR Technical Manual* CO screening threshold of 170 peak hour trips at any intersections in the traffic network, nor the particulate matter (PM) emission screening thresholds discussed in Chapter 17, Sections 210 and 311 of the *CEQR Technical Manual*. Therefore, no mobile source intersection analysis of CO or PM emissions is required and the Proposed Actions would not have a significant impact on air quality from mobile sources at any intersection.

PARKING ANALYSIS

Based on the methodology previously described, the maximum predicted CO and PM concentrations from the proposed parking facilities at Projected Development Sites 6 and 7 were analyzed, assuming a near side sidewalk receptor on the same side of the street (seven feet) as the parking facility, and a far side sidewalk receptor on the opposite side of the street from the parking facility. To be conservative, maximum concentrations from the near side receptor of each facility was added to the far side receptor of the other facility on East 119th Street.

The maximum predicted eight-hour average CO concentration of all the receptors modeled at either Projected Development Site 6 or 7 is 1.59 ppm. This value includes a predicted concentration of 0.02 ppm from emissions within the parking garage, on-street contribution of 0.07 ppm, and a background level of 1.5 ppm. The maximum predicted concentration is substantially below the applicable standard of 9 ppm and the *de minimis* CO criteria.

The maximum predicted 24-hour and annual average $PM_{2.5}$ increments are 0.22 µg/m^3 and 0.04 µg/m^3, respectively. The maximum predicted $PM_{2.5}$ increments are well below the respective $PM_{2.5}$ *de minimis* criteria of 5.65 µg/m^3 for the 24-hour average concentration and 0.3 µg/m^3 for the annual concentration. Therefore, the proposed parking garages would not result in any significant adverse air quality impacts.

STATIONARY SOURCES

INDIVIDUAL HEAT AND HOT WATER SYSTEMS

Screening Analysis

The screening analysis was performed to evaluate whether potential air quality impacts from the heat and hot water systems associated with the projected and potential development sites could potentially impact other projected and potential development sites, or existing or other proposed buildings.

A total of 21 projected and 10 potential development sites failed the screening analysis using No. 2 fuel oil as the fuel source. Therefore, each of these development sites required a refined modeling analysis for the use of No. 2 fuel oil. Of the sites that failed the screening analysis for No. 2 oil, 14 projected and 6 potential development sites were found to also fail using natural gas as the fuel source. Therefore, a refined modeling analysis for the use of natural gas was performed for these sites.

Refined Dispersion Analysis

As indicated above, 30 projected and potential development sites (21 projected and 9 potential development sites) required a refined modeling analysis to determine the potential for air quality impacts. The results of the refined modeling analysis determined the following:

- If the fuel type is restricted to natural gas, no significant adverse impacts are predicted at 11 of the sites (6 projected and five potential development sites)[5].
- If the fuel type is restricted to natural gas only, and low NO_x burners are required to address NO_2 emissions, no significant adverse impacts are predicted at two of the projected development sites[6].
- If the fuel type is restricted to natural gas only, and heating and hot water system stacks are set back from the building edge to address $PM_{2.5}$ and NO_2 emissions, no significant adverse impacts are predicted at seven of the projected development sites[7].
- If the fuel type is restricted to natural gas only, heating and hot water system stacks are set back from the building edge to address $PM_{2.5}$ and NO_2 emissions, and low NO_x burners are required to address NO_2 emissions, no significant adverse impacts are predicted at three of the sites (two projected and one potential development sites)[8].
- If the fuel type is restricted to natural gas only, and the height of the exhaust stack is increased where feasible to address $PM_{2.5}$ and NO_2 emissions, no significant adverse impacts are predicted at three of the sites (one projected and two potential development sites)[9].

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[5] For the City-owned parcel located within Projected Development Site 5 (Block 1751, Lot 34), the implementation of the restrictions would be required through the LDA between HPD and future developer with oversight provided through HPD.

[6] Alternatively, for Projected Development Site 13 (Block 1786, Lots 4 and 47), compliance can be achieved if the heating and hot water system stacks are set back from the building edge, and the height of the exhaust stack is increased.

[7] For the City-owned parcel located within projected site 4 (Block 1775, Lot 71), the implementation of the restrictions would be required through the Land Disposition Agreement between HPD and future developer with oversight provided through HPD.

[8] Alternatively, for Projected Development Site 20 (Block 1654, Lots 3, 4, and 45), compliance can be achieved if the heating and hot water system stacks are further set back from the building edge.

[9] For the City-owned parcel located within projected site 27 (Block 1785, Lot 1), the implementation of the restrictions would be required through the Land Disposition Agreement between HPD and future developer with oversight provided through HPD.

- If the fuel type is restricted to natural gas only, the height of the exhaust stack is increased where feasible to address $PM_{2.5}$ and NO_2 emissions, and low NO_x burners are required to address NO_2 emissions, no significant adverse impacts are predicted at two of the sites (one of the projected development sites and one of the potential sites).
- If the fuel type is restricted to natural gas only, heating and hot water system stacks are set back from the building edge, and the height of the exhaust stack is increased where feasible to address $PM_{2.5}$ and NO_2 emissions, and low NO_x burners are required to address NO_2 emissions, no significant adverse impacts are predicted at two of the projected development sites.[10]

Table 15-7 presents a summary of the analysis results and proposed restrictions, with additional detail provided in **Tables 15-8** (projected development sites) **and 15-9** (potential development sites).

Overall, to preclude the potential for significant adverse air quality impacts on other projected and potential development sites, or existing buildings, from the heat and hot water emissions, an (E) Designation (E-422) would be assigned as part of the Proposed Actions for 30 projected and potential development sites (including 21 projected and 9 potential development sites). These designations would specify the various restrictions, such as type of fuel to be used, the use of low NO_x burners, the distance that the vent stack on the building roof must be from its lot line(s), and/or the increase of the exhaust stack height.

Table 15-7
Heating and Hot Water System Analysis Summary

	Projected Development Sites		Potential Development Sites	
Analysis	**Pass**	**Fail**	**Pass**	**Fail**
#2 Oil Screening	47	21	25	9
#2 Oil Refined Analysis	0	21	0	9
Total	**47**	**21**	**25**	**9**
Sites with Requirements	**Pass**	**Fail**	**Pass**	**Fail**
Natural Gas Screening[1]	6	15	4	5
Natural Gas Refined Analysis	0	15	1	4
Natural Gas and Low NO_x Requirement	2	-	0	-
Natural Gas and Stack Setback Requirement[1]	7	-	0	-
Natural Gas, Stack Setback, and Low NO_x Requirement	2	-	1	-
Natural Gas and Stack Height Requirement[1]	1	-	2	-
Natural Gas, Stack Height, and Low NO_x Requirement	1	-	1	-
Natural Gas, Stack Setback, Stack Height and Low NO_x Requirement	2	-	0	-

Note:
[1] For the City-owned parcels located within Projected Development Sites 4, 5, and 27, the implementation of the restrictions would be required through the Land Disposition Agreement between HPD and the future developer with oversight provided through HPD.

For the City-owned parcels located within Projected Development Sites 4, 5 and 27, the implementation of the restrictions would be required through the Land Disposition Agreement between HPD and the future developer with oversight provided through HPD.

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[10] Alternatively, for Projected Development Site 43 (Block 1637, Lots 21, 22, 51, and 52), compliance can also be achieved if the height of the heating and hot water system exhaust stack is increased.

Table 15-8
Heating and Hot Water System Analysis—Results for Projected Development Sites

		#2 Oil Modeled Concentration(µg/m^3)					Natural Gas Modeled Concentration (µg/m^3)					
Site	Building Height	$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	SO_2 One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/SO_2 One-hour Standard	Pass/Fail	$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	NO_2 One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/NO_2 One-hour Standard	Pass/Fail	Requires (E) Designation (Yes/No)
1	75	>5.65	>0.3	42.39	5.65/0.3/196	Fail	4.0	0.26	183.4	5.65/0.3/188	Pass	Yes
2	200	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
3	155	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
4	215	>5.65	0.18	39.0	5.65/0.3/196	Fail	3.3	0.06	161.7	5.65/0.3/188	Pass	Yes
5	190	>5.65	>0.3	41.8	5.65/0.3/196	Fail	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	Yes
6	200	>5.65	>0.3	42.0	5.65/0.3/196	Fail	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	Yes
7	210	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
8	215	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
9	185	>5.65	>0.3	40.6	5.65/0.3/196	Fail	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	Yes
10	270	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
11	275	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
12	200	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
13	190	>5.65	0.3	40.3	5.65/0.3/196	Fail	5.1	0.1	153.8	5.65/0.3/188	Pass	Yes
14	200	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
15	190	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
16	220	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
17	300	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
18	290	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
19	260	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
20	210	>5.65	>0.3	43.8	5.65/0.3/196	Fail	5.2	0.13	142.2	5.65/0.3/188	Pass	Yes
21	180	>5.65	>0.3	41.3	5.65/0.3/196	Fail	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	Yes

Table 15-8 (cont'd)
Heating and Hot Water System Analysis—Results for Projected Development Sites

		#2 Oil Modeled Concentration($\mu g/m^3$)					Natural Gas Modeled Concentration ($\mu g/m^3$)					
Site	**Building Height**	**$PM_{2.5}$-24 hour**	**$PM_{2.5}$-Annual**	**SO_2 One-hr**	**$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/SO_2 One-hour Standard**	**Pass/ Fail**	**$PM_{2.5}$-24 hour**	**$PM_{2.5}$-Annual**	**NO_2 One-hr**	**$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/NO_2 One-hour Standard**	**Pass/ Fail**	**Requires (E) Designation (Yes/No)**
22	180	>5.65	>0.3	41.0	5.65/0.3/196	Fail	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	Yes
23	100	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
24	175	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
25	145	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
26	145	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
27	95	>5.65	>0.3	44.1	5.65/0.3/196	Fail	2.9	0.08	158.8	5.65/0.3/188	Pass	Yes
28	95	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
29	170	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
30	130	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
31	95	>5.65	>0.3	39.4	5.65/0.3/196	Fail	4.2	0.14	183.3	5.65/0.3/188	Pass	Yes
32	150	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
33	260	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
35	95	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
36	75	>5.65	>0.3	39.3	5.65/0.3/196	Fail	2.9	0.1	164.3	5.65/0.3/188	Pass	Yes
37	75	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
38	155	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
39	65	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
40	105	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
41	95	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
42	65	>5.65	>0.3	56.0	5.65/0.3/196	Fail	3.7	0.07	132.4	5.65/0.3/188	Pass	Yes

Table 15-8 (cont'd)
Heating and Hot Water System Analysis—Results for Projected Development Sites

Site	Building Height	#2 Oil Modeled Concentration($\mu g/m^3$)				Pass/ Fail	Natural Gas Modeled Concentration ($\mu g/m^3$)				Pass/ Fail	Requires (E) Designation (Yes/No)
		$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	SO_2 One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/SO_2 One-hour Standard		$PM_{2.5}$-24 hour	$PM_{2.5}$-Annual	NO_2 One-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/NO_2 One-hour Standard		
43	75	>5.65	>0.3	50.4	5.65/0.3/196	Fail	5.5	0.13	157.9	5.65/0.3/188	Pass	Yes
44	90	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
45	65	>5.65	>0.3	43.9	5.65/0.3/196	Fail	4.8	0.17	171.7	5.65/0.3/188	Pass	Yes
46	105	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
47	65	>5.65	>0.3	39.4	5.65/0.3/196	Fail	4.7	0.11	173.9	5.65/0.3/188	Pass	Yes
48	75	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
49	115	>5.65	>0.3	72.7	5.65/0.3/196	Fail	5.5	0.18	159.7	5.65/0.3/188	Pass	Yes
50	95	>5.65	>0.3	39.3	5.65/0.3/196	Fail	5.0	0.17	138	5.65/0.3/188	Pass	Yes
51	105	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
52	95	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
53	95	>5.65	>0.3	40.0	5.65/0.3/196	Fail	4.8	0.13	183.8	5.65/0.3/188	Pass	Yes
54	105	>5.65	>0.3	71.7	5.65/0.3/196	Fail	5.6	0.16	175.4	5.65/0.3/188	Pass	Yes
55	105	>5.65	0.29	39.4	5.65/0.3/196	Fail	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	Yes
56	185	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
57	115	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
58	95	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
59	115	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
60	95	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
61	95	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
62	125	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
63	255	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
64	95	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No

Table 15-8 (cont'd)

Heating and Hot Water System Analysis—Results for Projected Development Sites

		#2 Oil Modeled Concentration(μg/m^3)					Natural Gas Modeled Concentration (μg/m^3)					
Site	**Building Height**	**$PM_{2.5}$-24 hour**	**$PM_{2.5}$-Annual**	**SO_2 One-hr**	**$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/SO_2 One-hour Standard**	**Pass/ Fail**	**$PM_{2.5}$-24 hour**	**$PM_{2.5}$-Annual**	**NO_2 One-hr**	**$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/NO_2 One-hour Standard**	**Pass/ Fail**	**Requires (E) Designation (Yes/No)**
65	95	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
66	165	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
67	165	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
68	175	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
69	165	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No

Note: SO_2 one-hour and NO_2 one-hour concentrations presented include the respective background concentrations.

Table 15-9

Heating and Hot Water System Analysis—Results for Potential Development Sites

		#2 Oil Modeled Concentration(µg/m^3)					Natural Gas Modeled Concentration (µg/m^3)					
Site	**Building Height**	**PM$_{2.5}$-24 hour**	**PM$_{2.5}$-Annual**	**SO$_2$ One-hr**	**PM$_{2.5}$ 24-hour/PM$_{2.5}$ Annual/SO$_2$ One-hour Standard**	**Pass/ Fail**	**PM$_{2.5}$-24 hour**	**PM$_{2.5}$-Annual**	**NO$_2$ One-hr**	**PM$_{2.5}$ 24-hour/PM$_{2.5}$ Annual/NO$_2$ One-hour Standard**	**Pass/ Fail**	**Requires (E) Designation (Yes/No)**
A	115	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
B	170	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
C	280	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
D	155	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
E	160	>5.65	>0.3	40.3	5.65/0.3/196	Fail	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	Yes
F	225	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
G	230	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
H	210	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
I	170	>5.65	>0.3	>196	5.65/0.3/196	Fail	2.6	0.07	124	5.65/0.3/188	Pass	Yes
J	165	>5.65	>0.3	41.1	5.65/0.3/196	Fail	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	Yes
O	73	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Fail	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
P	190	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
Q	330	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
R	295	>5.65	>0.3	42.3	5.65/0.3/196	Fail	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	Yes
S	200	>5.65	0.12	39.4	5.65/0.3/196	Fail	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	Yes
T	240	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
U	170	>5.65	>0.3	109.8	5.65/0.3/196	Fail	3.7	0.15	182.5	5.65/0.3/188	Pass	Yes
V	205	>5.65	>0.3	112.7	5.65/0.3/196	Fail	3.4	0.12	125.6	5.65/0.3/188	Pass	Yes
X	135	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
Y	95	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
Z	95	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
AA	95	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
AB	65	>5.65	>0.3	38.6	5.65/0.3/196	Fail	4.5	0.11	176.9	5.65/0.3/188	Pass	Yes
AC	75	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
AD	105	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
AE	105	>5.65	>0.3	49.6	5.65/0.3/196	Fail	4.5	0.11	153.4	5.65/0.3/188	Pass	Yes
AH	155	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No
AI	210	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/196	Pass	Passes Screening	Passes Screening	Passes Screening	5.65/0.3/188	Pass	No

Cumulative Impacts from Heat and Hot Water Systems

An analysis was conducted to evaluate potential air quality impacts from groups or “clusters” of heat and hot water systems in close proximity with similar stack heights. Three clusters were identified.

Screening Analysis

The analysis was initially performed using the AERSCREEN model as described above. The maximum NO_2 annual, SO_2 one-hour, and three-hour and PM_{10} 24-hour concentrations predicted by the AERSCREEN analysis are presented in **Table 15-10**.

Table 15-10
Maximum Screening Pollutant Concentrations (µg/m^3)

Pollutant	Averaging Period	Maximum Concentration			Background	Total Concentration			NAAQS
		Cluster 1	Cluster 2	Cluster 3		Cluster 1	Cluster 2	Cluster 3	
NO_2	Annual	5.1	13.0	3.4	39.1	44.2	52.1	42.5	100
SO_2	1-Hour	2.0	5.1	1.3	36.9	38.9	42.0	38.2	196
	3-Hour	2.0	5.1	1.3	136.1	138.1	142.0	137.4	1,300
PM_{10}	24-Hour	18.3	47.0	12.2	39.0	57.3	86.0	51.2	150

Note:
For the one-hour SO_2 averaging period, the three-year average of the maximum 99th percentile concentration was taken from NYSDEC’s *New York State Ambient Air Quality Report for 2015*. http://www.dec.ny.gov/chemical/8536.html

Refined Dispersion Analysis

Based on the cumulative effects of the sources each of the clusters failed the screening analysis for both No. 2 fuel oil and natural gas for NO_2 one-hour, $PM_{2.5}$ 24-hour, and $PM_{2.5}$ annual. Therefore, a refined analysis was performed for these pollutants using the AERMOD model. The analysis was performed using the general assumptions and procedures outlined earlier for individual development sites. The maximum NO_2 1-hour, $PM_{2.5}$ 24-hour, and $PM_{2.5}$ annual concentrations predicted by the AERMOD model are presented in **Table 15-11**.

Table 15-11
Maximum Pollutant Concentrations (µg/m^3)

Pollutant	Averaging Period	Maximum Concentration			Background	Total Concentration			NAAQS / *De Minimis*
		Cluster 1	Cluster 2	Cluster 3		Cluster 1	Cluster 2	Cluster 3	
NO_2	1-Hour	N/A	N/A	N/A	N/A	158.9	179.5	174.3	188
$PM_{2.5}$	24-Hour	3.5	4.4	2.9	23.7	N/A	N/A	N/A	5.65
	Annual	0.12	0.13	0.08	N/A	N/A	N/A	N/A	0.3

Notes:
N/A—Not Applicable
The $PM_{2.5}$ *de minimis* criteria for the 24-Hour period is half the difference between the NAAQS of 35 µg/m^3 and the ambient monitored background of 23.7 µg/m^3, and 0.3 µg/m^3 for the annual period.

The results of the analysis determined that Clusters 1 and 2 would not result in significant adverse air quality impacts. For Cluster 3, Projected Development Sites 19, and 33, and Potential Development Site H would be required to utilize natural gas for the heating and hot water equipment, to avoid a potential significant adverse air quality impact. An (E) Designation (E-422) would be assigned as part of the Proposed Actions for each of these sites to restrict the fuel type.

INDUSTRIAL SOURCES

As discussed above, a study was conducted to analyze industrial uses within 400 feet of the projected and potential development sites, large sources, or major sources within 1,000 feet of a projected or potential development site. DEP-BEC and EPA permit databases were used to identify existing sources of emissions. A total of two facilities (consisting of three sources) were analyzed. The information from these permits (emission rates, stack parameters, etc.) was input to the AERMOD dispersion model.

Table 15-12 presents the maximum predicted pollutant concentrations at the projected and potential development sites using the AERMOD refined dispersion model. As shown in **Table 15-12**, for all projected and potential development sites, the refined modeling demonstrates that there would be no predicted significant adverse air quality impacts on these development sites from existing industrial sources in the area.

Table 15-12
Maximum Modeled Impacts on Projected and Potential Sites from Industrial Sources

Pollutant	CAS Number	AERMOD Model Short-Term Impact (µg/m^3)	SGC (µg/m^3)	AERMOD Model Annual Impact (µg/m^3)	AGC (µg/m^3)
Particulates(1)	NY075-02-5	28.40	35	9.10	12
Acetone	00067-64-1	3,481	180,000	7.74	30,000
Butyl Acetate	00123-86-4	990	95,000	1.81	17,000
Toluene	00108-88-3	2,001	37,000	3.65	5,000
Isopropyl Alcohol	00067-63-0	1,730	98,000	3.98	7,000
Misc. VOC	NY999-00-0	5,031	98,000	1.08	7,000
Xylene	01330-20-7	1,597	22,000	3.64	100

Note: (1) Conservatively assumes all particulate emissions would be PM2.5. Federal 24-hour and annual standard from Particulate ($PM_{2.5}$) used.
Source: NYSDEC, DAR-1 AGC/SGC Tables, August 2016.

Health Risk Assessment

Cumulative impacts were also determined for the combined effects of multiple air contaminants in accordance with the approach described in the “Methodology for Predicting Pollutant Concentrations” section of this chapter. Using the predicted concentrations of each pollutant, the maximum hazard index was calculated for each affected projected and potential development site associated with the Proposed Actions (none of the analyzed air toxic compounds were identified as potential carcinogens; therefore, the unit risk analysis was not performed). The hazard index approach was used to determine the effects of multiple non-carcinogenic compounds.

Table 15-13 presents the results of the assessment of cumulative non-carcinogenic effects on the Proposed Actions.

Table 15-13
Estimated Maximum Hazard Index

Pollutant	CAS Number	Estimated Pollutant Concentration (μg/m^3)	AGC (μg/m^3)	Concentration to AGC Pollutant Ratio
Non-Carcinogenic Compounds				
Particulates(1)	NY075-02-5	28.40	12	7.58E-01
Acetone	00067-64-1	3,481	30,000	2.25E-04
Butyl Acetate	00123-86-4	990	17,000	1.06E-04
Toluene	00108-88-3	2,001	5,000	7.29E-04
Isopropyl Alcohol	00067-63-0	1,730	7,000	5.69E-04
Misc. VOC	NY999-00-0	5,031	7,000	1.54E-04
Xylene	01330-20-7	1,597	100	3.64E-02
			Total Hazard Index	0.796
			Hazard Index Threshold Value	1.0

Notes: (1) Conservatively assumes all particulate emissions would be $PM_{2.5}$. Federal 24-hour and annual standard from Particulate ($PM_{2.5}$) used.

Source: NYSDEC, DAR-1 AGC/SGC Tables, August 2016.

ADDITIONAL SOURCES

Potential stationary source impacts on the projected and potential development sites from the existing large sources were determined using the AERMOD model. The maximum estimated concentrations of NO_2, SO_2, and PM_{10} from the modeling were added to the background concentrations to estimate total air quality concentrations on the Proposed Actions, while $PM_{2.5}$ concentrations were compared with the $PM_{2.5}$ *de minimis* criteria. The results of the AERMOD analysis are presented in **Tables 15-14a**, **15-14b, and 15-14c** for the Franklin Plaza Apartments, Taino Towers and 1199 Housing Corporation, respectively. **Table 15-14d** presents the results of the cumulative AERMOD analysis of the Franklin Plaza Apartments and the 1199 Housing Corporation on Projected Development Sites 65, 66, and 67.

Table 15-14a
Maximum Modeled Pollutant Concentrations on Projected and Potential Development Sites(μg/m^3)—Franklin Plaza Apartments

Pollutant	Averaging Period	Maximum Modeled Impact	Background	Total Concentration	NAAQS / *De Minimis*
NO_2	Annual[2]	1.1	39.1	40.2	100
	1-hour[1]	N/A	N/A	181.4	188
SO_2	3-Hour	0.96	136.1	137.1	1,300
	1-Hour	1.20	36.9	38.1	196
PM_{10}	24-hour	4.6	39	43.6	150
$PM_{2.5}$	24-hour	4.6	N/A	4.6	5.65[3]
	Annual	0.11	N/A	0.11	0.3[4]

Notes:

[1] Reported concentration is the maximum total 98th percentile concentration at any receptor using seasonal-hourly background concentrations.

[2] Annual NO_2 impacts were estimated using a NO_2 /NO_x ratio of 0.75.

[3] $PM_{2.5}$ *de minimis* criteria— 4-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 μg/m^3.

[4] $PM_{2.5}$ *de minimis* criteria—annual (discrete receptor), 0.3 μg/m^3.

Table 15-14b
Maximum Modeled Pollutant Concentrations on Projected and Potential Development Sites($\mu g/m^3$)—Taino Towers

Pollutant	Averaging Period	Maximum Modeled Impact	Background	Total Concentration	NAAQS / *De Minimis*
NO_2	Annual[2]	0.57	39.1	39.7	100
	1-hour[1]	N/A	N/A	120.1	188
SO_2	3-Hour	0.83	136.1	136.9	1,300
	1-Hour	0.81	36.9	37.7	196
PM_{10}	24-hour	4.2	39	43.2	150
$PM_{2.5}$	24-hour	3.76	N/A	3.76	5.65[3]
	Annual	0.06	N/A	0.06	0.3[4]

Notes:

[1] Reported concentration is the maximum total 98th percentile concentration at any receptor using seasonal-hourly background concentrations.

[2] Annual NO_2 impacts were estimated using a NO_2 /NO_x ratio of 0.75.

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

[4] $PM_{2.5}$ *de minimis* criteria—annual (discrete receptor), 0.3 $\mu g/m^3$.

Table 15-14c
Maximum Modeled Pollutant Concentrations on Projected and Potential Development Sites ($\mu g/m^3$)—1199 Housing Corporation

Pollutant	Averaging Period	Maximum Modeled Impact	Background	Total Concentration	NAAQS / *De Minimis*
NO_2	Annual[2]	0.54	39.1	39.6	100
	1-hour[1]	N/A	N/A	110.9	188
SO_2	3-Hour	0.62	136.1	136.7	1,300
	1-Hour	0.74	36.9	37.6	196
PM_{10}	24-hour	1.92	39	40.9	150
$PM_{2.5}$	24-hour	1.72	N/A	1.72	5.65[3]
	Annual	0.06	N/A	0.06	0.3[4]

Notes:

[1] Reported concentration is the maximum total 98th percentile concentration at any receptor using seasonal-hourly background concentrations.

[2] Annual NO_2 impacts were estimated using a NO_2 /NO_x ratio of 0.75.

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

[4] $PM_{2.5}$ *de minimis* criteria—annual (discrete receptor), 0.3 $\mu g/m^3$.

Table 15-14d
Maximum Modeled Pollutant Concentrations on Projected Development Sites 65, 66, and 67 (µg/m^3)—Franklin Plaza Apartments and 1199 Housing Corporation

Pollutant	Averaging Period	Maximum Modeled Impact	Background	Total Concentration	NAAQS / *De Minimis*
NO_2	Annual[2]	1.50	39.1	40.6	100
	1-hour[1]	N/A	N/A	181.4	188
SO_2	3-Hour	0.68	136.1	136.8	1,300
	1-Hour	0.74	36.9	37.6	196
PM_{10}	24-hour	4.63	39	43.6	150
$PM_{2.5}$	24-hour	4.63	N/A	4.63	5.65[3]
	Annual	0.16	N/A	0.16	0.3[4]

Notes:
[1] Reported concentration is the maximum total 98th percentile concentration at any receptor using seasonal-hourly background concentrations.
[2] Annual NO_2 impacts were estimated using a NO_2 /NO_x ratio of 0.75.
[3] $PM_{2.5}$ *de minimis* criteria—24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 µg/m^3.
[4] $PM_{2.5}$ *de minimis* criteria—annual (discrete receptor), 0.3 µg/m^3.

As shown in **Tables 15-14a, 15-14b, 15-14c, and 15-14d**, the predicted pollutant concentrations for all of the pollutant time averaging periods shown are below their respective standards. Therefore, no significant adverse air quality impacts on the proposed and potential development sites from existing sources are predicted.

PROPOSED (E) DESIGNATION REQUIREMENTS

At affected projected and potential development sites, the proposed (E) Designation (E-422) would specify the type of fuel to be used, whether low NO_x burners are required, the distance that the vent stack on the building roof must be from its lot line(s), and/or the minimum stack height. A summary of the proposed (E) Designations is presented in **Appendix F**.

For each of the projected and potential development sites with a proposed (E) Designation, the (E) Designation process, as set forth in Zoning Resolution Section 11-15 and Chapter 24 of Title 15 of the Rules of the City of New York, allows for the modification of the measures required under an (E) Designation in the event of new information or technology, additional facts or updated standards that are relevant at the time the site is ultimately developed. Since the air quality analysis is based on conservative assumptions due to the absence of information on the actual design of buildings that would be constructed, the actual design of buildings may result in modification of the (E) Designation measures under these procedures. When an (E) Designation is placed for more than one pollutant (e.g., for $PM_{2.5}$ and NO_2), any modifications must address the measures required with respect to each pollutant.

With the foregoing, the evaluation of $PM_{2.5}$, and thus the (E) Designations, would be able to take into account the fact that air quality in New York City is expected to improve. As discussed in the Section "NAAQS Attainment Status and Implementation Plan," EPA recently redesignated the New York City Metropolitan Area, which had been nonattainment with the 2006 24-hour $PM_{2.5}$ NAAQS since November 2009, as in attainment. Under the required maintenance plans, NYSDEC will continue to address the attainment of the 24-hour and annual NAAQS in the area, which will require further reductions in emissions of $PM_{2.5}$ and its precursors. In addition, New York City has prohibited the use of No. 6 and No. 4 oil in new boiler installations. The City is also phasing out their use at existing installations, which will result in direct reductions of $PM_{2.5}$ emissions, and reductions in SO_2 emissions, which is a $PM_{2.5}$ precursor (since chemical reactions in the atmosphere convert some SO_2 to $PM_{2.5}$). Although these measures do not address the emissions of $PM_{2.5}$ associated with Proposed Actions, taken together, they are anticipated to result in an improvement in air quality in the rezoning area, resulting in significant reductions from current levels of the ambient background $PM_{2.5}$ concentrations and, consequently, in the total $PM_{2.5}$ concentrations with the Proposed Actions.

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