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 are not expected to significantly alter traffic conditions. The maximum hourly incremental traffic from the Proposed Actions would not exceed the 2020 *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 (PM) 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.

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 Proposed Actions would not result in any significant adverse air quality impacts on the surrounding community, and new development expected under the Proposed Actions would not be adversely affected by existing sources of air emissions in the Project Area.

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-619) would be mapped in connection with the Proposed Actions to ensure that future developments would not result in any significant adverse air quality impacts from fossil fuel-fired heat and hot water systems emissions.

The analysis of existing manufacturing uses in the surrounding study area determined that emissions of air toxic compounds would not result in any potential significant adverse air quality impacts on the Proposed Project. An analysis of the cumulative health risk impacts of existing 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 applicable health risk criteria. 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.

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. 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 not result in any significant increases in vehicle traffic. Therefore, an analysis of potential impacts from CO was not warranted.

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 emissions of these pollutants from mobile sources related to the Proposed Actions 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 Actions. 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 VOCs; salt particles resulting from the evaporation of sea spray; wind-borne pollen, fungi, molds, algae, yeasts, rusts, bacteria, and material from live and decaying plant and animal life; particles eroded from beaches, soil, and rock; and particles emitted from volcanic and geothermal eruptions and 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.

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 an 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 (DEC) has issued standards for certain noncriteria compounds, including beryllium, gaseous fluorides, and hydrogen sulfide. DEC has also developed guideline concentrations for numerous noncriteria pollutants. The DEC guidance document DAR-1[1] contains a compilation of annual and short-term (1-hour) guideline concentrations for these compounds. The DEC guidance thresholds represent ambient levels that are considered safe for public exposure. 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 and State Air Quality Standards (NAAQS) have been established for six major air pollutants: CO, NO_2, ozone, respirable PM (both

[1] DEC. DAR-1 (Air Guide-1) AGC/SGC Tables, February 2021.

$PM_{2.5}$ 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**.

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

Pollutant	Primary		Secondary	
	ppm	μg/m³	ppm	μg/m³
Carbon Monoxide (CO)				
8-Hour Average	9 (1)	10,000	None	
1-Hour Average	35 (1)	40,000		
Lead				
Rolling 3-Month Average	NA	0.15	NA	0.15
Nitrogen Dioxide (NO_2)				
1-Hour Average (2)	0.100	188	None	
Annual Average	0.053	100	0.053	100
Ozone (O_3)				
8-Hour Average (3)	0.070	140	0.070	140
Respirable Particulate Matter (PM_{10})				
24-Hour Average (4)	NA	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Annual Mean (5)	NA	12	NA	15
24-Hour Average (6)	NA	35	NA	35
Sulfur Dioxide (SO_2) (8)				
1-Hour Average (7)	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/m³—micrograms per cubic meter (unit of measure for gases and particles, including lead)
NA—not applicable
All annual periods refer to calendar year.
Standards are defined in ppm. Approximately equivalent concentrations in μg/m³ are presented.
1. Not to be exceeded more than once a year.
2. 3-year average of the annual 98th percentile daily maximum 1-hr average concentration.
3. 3-year average of the annual fourth-highest daily maximum 8-hr average concentration.
4. Not to be exceeded more than once a year on average over 3 years.
5. 3-year average of annual mean.
6. Not to be exceeded by the annual 98th percentile when averaged over 3 years.
7. 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.

The NAAQS for 3-hour SO_2 has also been adopted as the ambient air quality standard for New York State, but is 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, and 24-hour and annual SO_2 which correspond to federal standards that have since been revoked or replaced, and for the noncriteria pollutants fluoride and hydrogen sulfide.

Effective December 2015, EPA lowered the 2008 ozone NAAQS from 0.075 parts per million (ppm) to 0.070. EPA issued final area designations for the revised standard on April 30, 2018.

Federal ambient air quality standards do not exist for noncriteria pollutants; however, as mentioned above, DEC has issued standards for two noncriteria compounds. DEC has also developed a guidance document DAR-1 (February 2021), which contains a compilation of annual and short term (1-hour) guideline concentrations for numerous other noncriteria compounds. The DEC 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 had been designated as a moderate NAA for PM_{10}. EPA clarified on July 29, 2015 that the designation only applied to the revoked annual standard.

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 re-designated as in attainment for that standard effective April 18, 2014, and is now under a maintenance plan. 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 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 (New York 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, but certain requirements remain in areas that were either nonattainment or maintenance areas for the 1997 ozone standard ("anti-backsliding"). 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. On July 19, 2017, DEC announced that the New York metropolitan area is not projected to meet the July 20, 2018 attainment deadline and DEC therefore requested that EPA reclassify the New York metropolitan area to "serious" nonattainment. EPA reclassified the New York metropolitan area from "moderate" to "serious" NAA effective September 23, 2019, which imposed a new attainment deadline of July 20, 2021 (based on 2018–2020 monitored data). DEC's proposed draft revisions to the SIP (June 2021) state that based on monitoring data, New York State has not demonstrated compliance with the 2008 ozone NAAQS. On April 30, 2018, EPA designated the same area as a moderate NAA for the revised 2015 ozone standard. EPA is currently reviewing revisions to New York's SIP plan.

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.

EPA has established a 1-hour SO_2 standard, replacing the former 24-hour and annual standards, effective August 23, 2010. EPA has designated the entire State of New York as in attainment for this standard, with the exception of Monroe County which was designated "unclassifiable" and a portion of St. Lawrence County as "nonattainment."

DETERMINING THE SIGNIFICANCE OF AIR QUALITY IMPACTS

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 8.0 and 9.0 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

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

[2] New York City. *CEQR Technical Manual*. Chapter 1, Section 222. November 2020; and SEQR Regulations. 6 NYCRR § 617.7

- 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).

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 DEC have issued guidelines that establish acceptable ambient levels for these pollutants based on human exposure.

The DEC 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 DEC Air Guideline Concentrations

Pollutant	CAS Number	SGC ($\mu g/m^3$)	AGC ($\mu g/m^3$)
Ethylene Glycol	00107-21-1	1,000	400
Methanol	00067-56-1	33,000	4,000
Methyl Isobutyl Ketone	00108-10-1	31,000	3,000
Misc. VOC[1]	NY990-00-0	98,000	7,000
Xylene	02330-21-7	22,000	100

Notes:
SGC = short-term guideline concentrations
AGC = annual guideline concentrations
[1] Since VOCs are not assigned an SGC or AGC, the guideline concentrations for isopropyl alcohol were used for evaluation purposes.
Sources: DEC, DAR-1 AGC/SGC Tables, February 2021.

In order to evaluate impacts of non-carcinogenic toxic air emissions, DAR-1 includes a methodology called the “hazard index” to characterize the cumulative risk from potential air toxic emissions. The hazard index is based on predicted annual concentrations and annual exposure limits. If the combined ratios of pollutant concentration divided by its respective annual exposure threshold for each of the toxic pollutants is found to be less than 2, no significant adverse air quality impacts are predicted to occur due to these pollutant releases.

In addition, DEC characterizes risks of non-criteria carcinogenic pollutants. According to DAR-1, an overall incremental cancer risk from a proposed action of less than one-in-one million is considered to be insignificant. The potential cancer risk associated with each carcinogenic pollutant, as well as the total cancer risk 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. Alternatively, if refined air dispersion modeling is used to estimate the maximum concentrations of pollutants, a threshold of 10-in-one-million excess cancer risk for non-criteria carcinogenic compounds can be used.

D. METHODOLOGY FOR PREDICTING POLLUTANT CONCENTRATIONS

MOBILE SOURCES

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 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 truck types associated with the Proposed Actions would consist of a mix of delivery and trailer trucks. All other vehicles were classified as LDGT1. Roadway classifications were determined at each intersection, based on New York City Department of Transportation (DOT) Functional Classification Maps[3] and With Action traffic volumes.

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

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

described in the *CEQR Technical Manual* was used for the analysis, and considered impacts on existing buildings 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 (project-on-existing) or proposed development (project-on-project) 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*). Also, for development sites that are assumed to contain multiple buildings served by a single heating and hot water system, the screening analysis was initially performed on the building with the shortest height, to be conservative. 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, NO_2, and PM, while for natural gas, the primary pollutants of concern are NO_2 and PM.

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 nearby elevated receptor locations. Therefore, since the AERMOD analysis was performed to evaluate potential project-on-project and project-on-existing air quality impacts, 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 height would then be increased five-foot (or similar) increments until the source met the respective criteria. If necessary, further restrictive measures were considered, including use of low NO_x burners, increasing the minimum stack setback distance, or a combination of these measures.

Emission Estimates and Stack Parameters

Fuel consumption for each projected and potential development site was estimated based on procedures outlined in the *CEQR Technical Manual* as discussed above.

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 guidance[4].

One-hour average NO_2 concentration 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 DEC IS 52 monitoring station, which is the nearest ozone monitoring station to the rezoning area that has complete five years of hourly data available (2015–2019). 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 with the one-hour NO_2 NAAQS was based on adding the monitored background to modeled concentrations from the proposed sources, 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 referenced in EPA modeling guidance[5] and is recognized by the City.

[4] https://www3.epa.gov/scram001/guidance/clarification/NO2_Clarification_Memo-20140930.pdf

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

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 DEC ambient monitoring station over the latest available three-year period (2017–2019) were used for annual NO_2, SO_2 and PM_{10} background concentrations.

Table 15-3
Maximum Background Pollutant Concentrations

Pollutant	Average Period	Location	Concentration (µg/m³)	NAAQS (µg/m³)
NO_2	1-hour	IS 52	110.6	188
	Annual	IS 52	32.8	100
SO_2	1-hour	IS 52	14.6	196
$PM_{2.5}$	24-hour	Division Street	19.7	35
PM_{10}	24-hour	Division Street	39.3	150
Source: New York State Air Quality Report Ambient Air Monitoring System, DEC, 2017–2019.				

$PM_{2.5}$ 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 19.7 µg/m³ (based on the 2017 to 2019 average of 98th percentile concentrations measured at the Division Street 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*.

Meteorological Data

The meteorological data set consisted of five consecutive years of meteorological data: surface data collected at the LaGuardia Airport National Weather Service Station (2015–2019), and concurrent upper air data collected at Brookhaven, New York. The meteorological data provide hour-by-hour wind speeds and directions, stability states, and temperature inversion elevation over the five-year period. These data were processed using the EPA AERMET program to develop data in a format which can be readily processed by the AERMOD model. The land uses around the site where meteorological surface data were available were classified using categories defined in digital United States Geological Survey (USGS) maps to determine surface parameters used by the AERMET program.

Receptor Placement

Discrete receptors (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 would be spaced at a three-meter (approximately 10 feet) interval vertically to represent individual floors of a building, while horizontally, receptor spacing would be five meters.

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 Project Area boundaries and RWCDS were reviewed to determine areas where clusters of sites with a high density of development and with similar building heights would be located, as these clusters could result in cumulative impacts on nearby buildings of a similar or greater height. A total of two 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 Site 28 and Potential Development Sites A and GG
2	Projected Development Sites 24, 25, 26, and 27

The cluster analysis was performed using the EPA AERMOD model 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 and 45.2 ft^3/ft^2-year and 0.21 gal/ft^2-year were used for natural gas and fuel oil, respectively, for commercial 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) in 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 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 analysis.

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

A field survey was conducted on February 3, 2021, to determine the operating status of permitted industries and identify any potential industrial sites not included in the original permit request or

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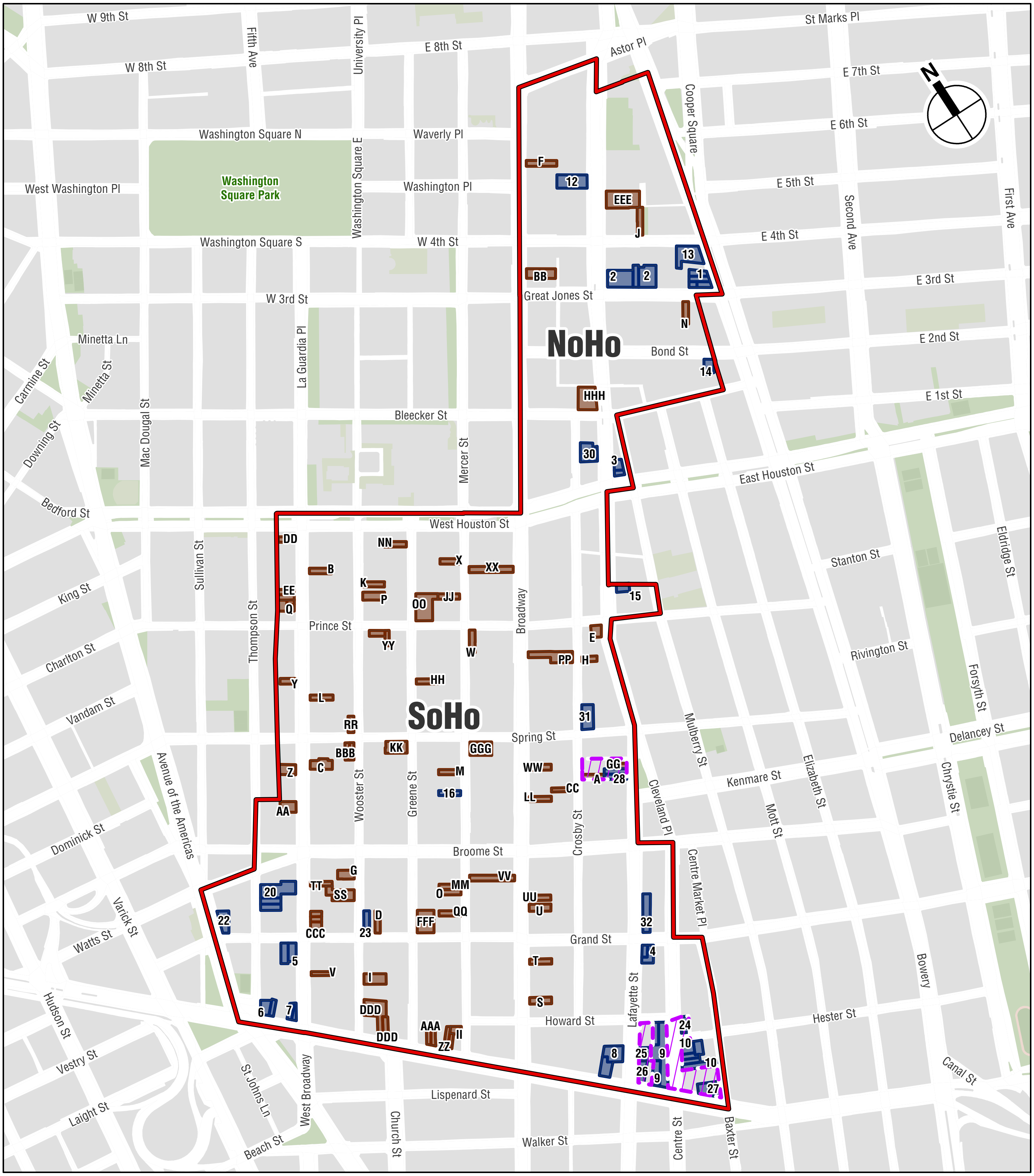

Data source: NYC Department of City Planning

0 500 FEET

Project Area / Rezoning Area

1 *Projected Development Site*

A *Potential Development Site*

Potential Cluster

Air Quality Cluster Analysis
Potential Cluster Locations

SOHO/NOHO NEIGHBORHOOD PLAN

Figure 15-1

the permit databases. Overall, one permitted source was identified and determined to be currently in operation. Information for this facility is presented in **Table 15-5.**

Table 15-5
Industrial Sources within 400 Feet of a Projected or Potential Development Site

Name of Business	Address	Type of Business	DEP Air Permit ID
Shield Press	9 Lispenard Street	Paper and Printing Processing	PB023003

Refined Dispersion Analysis

After compiling the information on facilities with manufacturing or process operations in the study area, maximum potential pollutant concentrations from the emission sources were determined using the EPA AERMOD refined dispersion model. The AERMOD model was run using the same model assumptions and options as described earlier for the refined modeling of heating and hot water systems.

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 DEC'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.

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 permit identified in **Table 15-5** were input into the AERMOD dispersion model. The pollutants and emission rates for the permitted facility are presented in **Table 15-6**.

Table 15-6
Modeled Emission Rates of Existing Industrial Sources

Facility	Description of Process	DEP Permit ID	CAS No.	Pollutant Name	Hourly Emissions (lb/hr)[1]	Annual Emissions (lb/yr)
Shield Press	Printing	PB023003	00107-21-1	Ethylene Glycol	0.00007	0.15
			00067-56-1	Methanol	0.00027	0.57
			00108-10-1	Methyl Isobutyl Ketone	0.00007	0.14
			NY990-00-0	Misc. VOC	0.32	682
			01330-30-7	Xylene	0.00073	1.52

Health Risk Assessment

Potential cumulative impacts were evaluated based on the Hazard Index Approach for non-carcinogenic compounds as described in the DEC DAR-1 guidance document. Hazard quotients are calculated by dividing the maximum modeled concentration of each pollutant by its respective AGC. The quotients are then summed together to calculate a multi-contaminant hazard index for each sensitive receptor. The maximum hazard index indicates the worst-case scenario for potential impacts from non-carcinogenic pollutants. For non-carcinogenic compounds, DEC's DAR-1 considers a cumulative hazard index of less than 2.0 to be acceptable. There were no carcinogenic compounds associated with the identified facility; therefore, no analysis of these compounds was required.

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 within 1,000 feet of 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 the DEC Title V and State Facility Permit websites.

Two sources have been identified: (1) the boiler plant at the Manhattan Criminal Court, which is within 1,000 feet of Projected Development Sites 9, 10, 25, 26, and 27; and (2) the New York University (NYU) Central Plant, which is within 1,000 feet of Projected Development Sites 2 and 12, and Potential Development Sites F, J, BB, EEE, and HHH. Therefore, an analysis of these sources was performed to assess their potential effects on the development sites.

The AERMOD dispersion model was used in the analysis, with the same meteorological data and background concentrations used for the heating and hot water system analysis. In addition, as described in the methodology for the analysis of stationary sources, total 1-hour NO_2 concentrations were determined using the EPA Tier 3 approach. For this analysis, modeling was performed with downwash in addition to without downwash, since the emission sources are taller in height than the projected and potential development sites, and worst-case impacts would therefore potentially occur under building downwash conditions.

For the Manhattan Criminal Courts Building available data from DEC and New York City Department of Citywide Administrative Services, including the existing permit and periodic emissions summaries and reports, were used. The facility emissions were calculated based on the actual fuel usage data for the Manhattan Criminal Courts Building from 2015 to 2017, and applying EPA’s Compilations of Air Pollutant Emission Factors (AP-42)[6] emission factors for boilers. The 12-month period with the highest fuel usage was used for the air quality analysis with monthly variable emission factors used. **Table 15-7** presents the highest monthly emission rates and the stack parameters used in the AERMOD analysis.

For the NYU Central Plant, emissions data were obtained from *181 Mercer Street and New Equipment at the NYU Central Plant* Technical Memorandum for CEQR No. 11DCP121M and applying EPA’s Compilations of Air Pollutant Emission Factors (AP-42)[7] for the PM and SO_2 emissions for the boilers and the turbines. Stack test data was used for the NO_x emission factors for the boilers and the turbines. **Table 15-8** presents the emission rates and stack parameters used in the AERMOD analysis for the analyzed facility.

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[6] 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.

[7] 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 15-7
Stack Parameters and Emission Rates from Manhattan Criminal Court

Parameter	Value
Stack Height (ft)(1)	341
Stack Diameter (ft)(2)	7.4
Exhaust Flow Rate (acfm) (3,4)	12,853
Exhaust Temperature (°F)(5)	400
Fuel Type	Natural Gas
NO_x Short Term Emission Rate (g/s)	0.999
NO_x Annual Emission Rate (g/s)	0.999
$PM_{2.5}$ Short Term Emission Rate (g/s)	0.034
$PM_{2.5}$ Annual Emission Rate (g/s)	0.034
PM_{10} Short Term Emission Rate (g/s)	0.034
SO_2 Short Term Emission Rate (g/s)	0.0077

Notes:
[1] The stack height is based on the DEC State Facility Permit.
[2] The stack diameter is based on fuel consumption rates provided by the facility.
[3] acfm = actual cubic feet per minute.
[4] The stack exhaust flow rate is based on personal communication with the facility.
[5] The stack exhaust temperature is based on personal communication with the facility.

Table 15-8
Stack Parameters and Emission Rates from the NYU Cogeneration Plant

Parameter	Combustion Turbine/Boiler Stack (Winter months)	Combustion Turbine/Boiler Stack (Spring, Fall, and Summer Months)	Engine Generator Stack (Winter, Spring Fall)	Engine Generator Stack (Summer)
Stack Height (ft)(1)	222	222	167	167
Stack Diameter (ft)(1)	9	9	3	3
Exhaust Flow Rate (m/s)(2)	20.2	18.9	29.2	29.2
Exhaust Temperature (°F)(2)	411	411	850	850
Fuel Type	Fuel Oil	Natural Gas	Natural Gas/Fuel Oil	Natural Gas/Fuel Oil
NO_x Short Term Emission Rate (g/s)	7.9	2.96	0.080	0.67
NO_x Annual Emission Rate (g/s)	4.16	4.16	0.080	0.11
PM_{10} Short Term Emission Rate (g/s)	0.55	0.31	0.031	0.031
$PM_{2.5}$ Short Term Emission Rate (g/s)	0.46	0.31	0.020	0.020
$PM_{2.5}$ Annual Emission Rate (g/s)	0.23	0.23	0.014	0.014
SO_2 Short Term Emission Rate (g/s)	0.23	0.069	0.0031	0.0031

Notes:
(1) Stack height and diameter are based on the DEC Title V Permit.
(2) Exhaust Flow Rate and Temperature from *181 Mercer Street and New Equipment at the NYU Central Plant* Technical Memorandum.

E. EXISTING CONDITIONS

The representative criteria pollutant concentrations measured in recent years at DEC air quality monitoring stations nearest to the Project Area are presented in **Table 15-9**. 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 15-9** 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 15-9
Representative Monitored Ambient Air Quality Data

Pollutant	Location	Units	Averaging Period	Concentration	NAAQS
CO	CCNY	ppm	1-hour	1.68	35
	CCNY		8-hour	1.1	9
SO_2	IS 52	µg/m³	1-hour	14.6	196
PM_{10}	Division Street	µg/m³	24-hour	39.3	150
$PM_{2.5}$	Division Street	µg/m³	Annual	9.0	12
			24-hour	19.7	35
NO_2	IS 52	µg/m³	Annual	31.7	100
	IS 52		1-hour	110.6	188
Lead	IS 52	µg/m³	3-month	0.0027	0.15
Ozone	IS 52	ppm	8-hour	0.071	0.075

Notes:
(1) The CO concentration for short-term average is the second-highest from the most recent year with available data.
(2) The PM_{10} concentration for the short-term average is the highest from the most recent year with available data.
(3) $PM_{2.5}$ annual concentrations are the average of 2017–2019 annual concentrations, and the 24-hour concentration is the average of the annual 98th percentile concentrations in the same period.
(4) The SO_2 1-hour and NO_2 1-hour concentrations are the average of the 99th percentile and 98th percentile, respectively, of the highest daily 1-hour maximum from 2017 to 2019.
(5) The lead concentration is based on the highest quarterly average concentration measured in 2019.
(6) The ozone concentration is based on the 3-year average (2017–2019) of the 4th highest daily maximum 8-hour average concentrations.
Source: New York State Air Quality Report Ambient Air Monitoring System, DEC, 2017–2019.

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

In the No Action condition, the identified 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. The Proposed Actions would likely result in more development; 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

As discussed in Chapter 14, “Transportation,” no intersection in proximity to the Project Area is expected experience a net incremental increase of 50 or more trips in any peak hour. Therefore, the total incremental increase in the number of project-generated trips at each intersection is below the *CEQR Technical Manual* of 170 vehicles. The maximum hourly traffic increment from the Proposed Actions would likewise not exceed the 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.

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 15 projected and 31 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, 12 projected and 26 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, 38 projected and potential development sites (12 projected and 26 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 only, and low NO_x burners are required to address NO_2 emissions, no significant adverse impacts are predicted at one projected development site.
- 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 three of the sites (one projected and two potential development sites).
- 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 11 of the sites (two projected and nine potential development sites).[8]
- If the fuel type is restricted to natural gas only, and the height of the exhaust stack is increased to address $PM_{2.5}$ and NO_2 emissions, no significant adverse impacts are predicted at four of the sites (three projected development and one potential development sites).
- If the fuel type is restricted to natural gas only, the height of the exhaust stack is increased 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 (one projected site).
- 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 to address $PM_{2.5}$ and NO_2 emissions, no significant adverse impacts are predicted at eight potential development sites.

[8] Alternatively, for Potential Development Site HH (Block 499, Lot 6), compliance can be achieved if the height of the heating and hot water system exhaust stack is increased and 20 ppm low NO_x burners are used.

- 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 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 nine of the sites (three projected and six potential development sites).[9,10,11]

Table 15-10 presents a summary of the analysis results and proposed restrictions, with additional detail provided in **Table 15-11** (projected development sites) **and Table 15-12** (potential development sites).

Table 15-10
Heating and Hot Water System Analysis Summary

Analysis	Projected Development Sites		Potential Development Sites	
	Pass	Fail	Pass	Fail
#2 Oil Screening	11	15	26	31
#2 Oil Refined Analysis	1	14	1	30
Total	**12**	**14**	**27**	**30**
Sites with Requirements	**Pass**	**Fail**	**Pass**	**Fail**
Natural Gas Screening	14	12	31	26
Natural Gas Refined Analysis	1	11	0	26
Natural Gas and Low NO_x Requirement	1	-	0	-
Natural Gas and Stack Setback Requirement	1	-	2	-
Natural Gas, Stack Setback, and Low NO_x Requirement	2	-	9	-
Natural Gas and Stack Height Requirement	3	-	1	-
Natural Gas, Stack Height, and Low NO_x Requirement	1	-	0	-
Natural Gas, Stack Setback, and Stack Height Requirement	0	-	8	-
Natural Gas, Stack Setback, Stack Height and Low NO_x Requirement	3	-	6	

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-619) would be mapped as part of the Proposed Actions for 46 projected and 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.

Cumulative Impacts from Heat and Hot Water Systems

A refined analysis was performed using the AERMOD model. The 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. The analysis was performed using the general assumptions and procedures outlined earlier for individual development sites. Two clusters were identified. Cluster 2 was not analyzed for No. 2 fuel oil since each of the development sites comprising this cluster were found to fail the air quality analysis using this fuel type. The maximum pollutant concentrations predicted by the AERMOD analysis are presented in **Table 15-13**.

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[9] Alternatively, for Potential Development Site U (Block 473, Lot 5), compliance can be achieved if the heating and hot water exhaust stack is setback and the height of the exhaust stack is increased.

[10] Alternatively, for Projected Development Site 22 (Block 476, Lot 1), compliance can be achieved if the heating and hot water exhaust stack is further setback and 30 ppm low NO_x burners are used.

[11] Alternatively, for Potential Development Site HHH (Block 529, Lot 69), compliance can be achieved if the heating and hot water system exhaust stack is further set back, the exhaust stack is increased, and 30ppm low NO_x burners are used.

For Cluster 2, Projected Development Sites 24, 25, and 27, fossil fuel-fired heating and hot water systems would be required to be fitted with low NO_x (30 ppm) burners firing only natural gas, and any new development on Projected Development Site 25 would require heating and hot water systems stack(s) to be located at least 173 feet above grade and at least 28 feet from the lot line facing Centre Street to avoid a potential significant adverse air quality impact. An (E) Designation (E-619) would be assigned as part of the Proposed Actions for each of these sites.

INDUSTRIAL SOURCES

Analysis of Potential Impacts from Existing Uses

As discussed above, a study was conducted to analyze industrial uses within 400 feet of the projected and potential development sites. DEP-BEC and EPA permit databases were used to identify existing sources of emissions. One facility was analyzed. The information from this permit (emission rates, stack parameters, etc.) was input to the AERMOD dispersion model.

Table 15-14 presents the maximum predicted pollutant concentrations at the projected and potential development sites using the AERMOD refined dispersion model. As shown in **Table 15-14**, the maximum predicted short-term concentration for each air toxic compound is less than the respective SGC. The maximum annual concentrations are predicted to be below the respective AGCs.

The modeling demonstrates that there would be no predicted significant adverse air quality impacts on these development sites from existing industrial sources in the area.

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 15-15 presents the results of the assessment of cumulative non-carcinogenic effects on the Proposed Actions. As shown in **Table 15-15**, the maximum hazard index at an individual receptor location is less than 2.0, the level currently considered by DEC to be significant. Therefore, based upon the cumulative air toxics analysis, the Proposed Actions would not result in a significant hazard.

ADDITIONAL SOURCES

Potential stationary source impacts on the Proposed Project from the existing large and major sources were determined using the AERMOD model. The maximum estimated annual concentrations of NO_2, short-term and annual concentrations of $PM_{2.5}$, and short-term concentrations of SO_2 from the modeling were added to the background concentrations to estimate total concentrations on the proposed project. Total 1-hour NO_2 concentrations were determined following the refined EPA "Tier 3" approach described earlier for the heating and hot water system analysis. The results of the AERMOD analyses are presented in **Table 15-16** and **Table 15-17** for the Manhattan Criminal Court and NYU Cogeneration Plant, respectively.

Table 15-11
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 1-hr	NO_2 1-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/SO_2 1-hour/ NO_2 1-hour Standard		$PM_{2.5}$ 24 hour	$PM_{2.5}$ Annual	NO_2 1-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/NO_2 1-hour Standard		
1	185	>7.7	>0.3	19.5	>188	7.7/0.3/196/188	Fail	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	Yes
2	185	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
3	115	>7.7	0.24	17.4	>188	7.7/0.3/196/188	Fail	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	Yes
4	165	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
5	220	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
6	175	2.4	0.09	15.2	137	7.7/0.3/196/188	Pass	1.1	0.04	122	7.7/0.3/188	Pass	Yes
7	145	>7.7	>0.3	21.4	>188	7.7/0.3/196/188	Fail	7.6	0.29	176	7.7/0.3/188	Pass	Yes
8	255	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
9	215	>7.7	>0.3	21.7	>188	7.7/0.3/196/188	Fail	7.6	0.13	157	7.7/0.3/188	Pass	Yes
10	235	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
12	205	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
13	235	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
14	105	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
15	105	>7.7	>0.3	36.9	>188	7.7/0.3/196/188	Fail	6.7	0.21	156	7.7/0.3/188	Pass	Yes
16	95	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
20	270	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
22	195	>7.7	>0.3	76.5	>188	7.7/0.3/196/188	Fail	4.3	0.11	174	7.7/0.3/188	Pass	Yes
23	75	>7.7	>0.3	18.0	>188	7.7/0.3/196/188	Fail	5.9	0.18	157	7.7/0.3/188	Pass	Yes
24	145	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
25	155	>7.7	>0.3	69.0	>188	7.7/0.3/196/188	Fail	2.3	0.05	174	7.7/0.3/188	Pass	Yes
26	145	>7.7	>0.3	63.2	>188	7.7/0.3/196/188	Fail	4.6	0.14	160	7.7/0.3/188	Pass	Yes
27	155	>7.7	>0.3	17.0	>188	7.7/0.3/196/188	Fail	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	Yes
28	95	>7.7	>0.3	89.8	>188	7.7/0.3/196/188	Fail	1.2	0.04	128	7.7/0.3/188	Pass	Yes
30 (CV)	104	>7.7	0.25	17.2	>188	7.7/0.3/196/188	Fail	5.0	0.15	180	7.7/0.3/188	Pass	Yes
31 (CV)	115	>7.7	>0.3	109	>188	7.7/0.3/196/188	Fail	7.5	0.24	175	7.7/0.3/188	Pass	Yes
32 (CV)	72	>7.7	>0.3	26.53	>188	7.7/0.3/196/188	Fail	1.5	0.06	131	7.7/0.3/188	Pass	Yes

Table 15-12
Heating and Hot Water System Analysis—Results for Potential Development Sites

		#2 Oil Modeled Concentration (μg/m³)						Natural Gas Modeled Concentration (μg/m³)					
Site	Building Height	$PM_{2.5}$ 24 hour	$PM_{2.5}$ Annual	SO_2 1-hr	NO_2 1-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/SO_2 1-hour/NO_2 1-hour Standard	Pass/ Fail	$PM_{2.5}$ 24 hour	$PM_{2.5}$ Annual	NO_2 1-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/NO_2 1-hour Standard	Pass/ Fail	Requires (E) Designation (Yes/No)
A	95	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
AA	95	>7.7	>0.3	21.3	>188	7.7/0.3/196/188	Fail	6.0	0.13	172	7.7/0.3/188	Pass	Yes
AAA	175	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	Yes
B	95	>7.7	>0.3	17.5	>188	7.7/0.3/196/188	Fail	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	Yes
BB	200	5.1	0.13	16.5	>188	7.7/0.3/196/188	Fail	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	Yes
BBB	75	>7.7	>0.3	50.4	>188	7.7/0.3/196/188	Fail	7.2	0.26	137	7.7/0.3/188	Pass	Yes
C	95	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
CC	160	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
CCC	85	>7.7	>0.3	88.9	>188	7.7/0.3/196/188	Fail	1.9	0.05	135	7.7/0.3/188	Pass	Yes
D	95	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
DD	100	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
DDD	165	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
E	85	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
EE	95	>7.7	>0.3	43.2	>188	7.7/0.3/196/188	Fail	2.2	0.07	168	7.7/0.3/188	Pass	Yes
EEE	195	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
F	150	>7.7	0.21	25.4	>188	7.7/0.3/196/188	Fail	1.3	0.04	135	7.7/0.3/188	Pass	Yes
FFF	135	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
G	95	>7.7	0.28	16.3	>188	7.7/0.3/196/188	Fail	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	Yes
GG	100	5.6	0.18	16.0	>188	7.7/0.3/196/188	Fail	2.8	0.09	172	7.7/0.3/188	Pass	Yes
GGG	194	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
H	100	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
HH	95	>7.7	>0.3	25.4	>188	7.7/0.3/196/188	Fail	7.5	0.28	159	7.7/0.3/188	Pass	Yes
HHH	155	>7.7	>0.3	34.2	>188	7.7/0.3/196/188	Fail	7.4	0.13	155	7.7/0.3/188	Pass	Yes
I	105	>7.7	0.21	16.7	>188	7.7/0.3/196/188	Fail	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	Yes
II	130	5.3	0.23	16.7	>188	7.7/0.3/196/188	Fail	2.0	0.09	149	7.7/0.3/188	Pass	Yes
J	145	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
JJ	95	>7.7	>0.3	41.1	>188	7.7/0.3/196/188	Fail	2.0	0.09	160	7.7/0.3/188	Pass	Yes
K	95	>7.7	>0.3	18.6	>188	7.7/0.3/196/188	Fail	5.2	0.16	142	7.7/0.3/188	Pass	Yes
KK	95	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
L	105	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
LL	160	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No

Table 15-12 (cont'd)
Heating and Hot Water System Analysis—Results for Potential Development Sites

Site	Building Height	#2 Oil Modeled Concentration (μg/m³)					Pass/ Fail	Natural Gas Modeled Concentration (μg/m³)				Pass/ Fail	Requires (E) Designation (Yes/No)
		$PM_{2.5}$ 24 hour	$PM_{2.5}$ Annual	SO_2 1-hr	NO_2 1-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/SO_2 1-hour/NO_2 1-hour Standard		$PM_{2.5}$ 24 hour	$PM_{2.5}$ Annual	NO_2 1-hr	$PM_{2.5}$ 24-hour/$PM_{2.5}$ Annual/NO_2 1-hour Standard		
M	95	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
MM	95	>7.7	>0.3	27.3	>188	7.7/0.3/196/188	Fail	1.5	0.04	171	7.7/0.3/188	Pass	Yes
N	95	>7.7	>0.3	19.3	>188	7.7/0.3/196/188	Fail	4.6	0.18	150	7.7/0.3/188	Pass	Yes
NN	95	>7.7	>0.3	18.7	>188	7.7/0.3/196/188	Fail	5.9	0.19	145	7.7/0.3/188	Pass	Yes
O	95	>7.7	>0.3	26.6	>188	7.7/0.3/196/188	Fail	6.0	0.19	177	7.7/0.3/188	Pass	Yes
OO	95	>7.7	>0.3	38.6	>188	7.7/0.3/196/188	Fail	7.6	0.12	161	7.7/0.3/188	Pass	Yes
P	95	>7.7	>0.3	21.1	>188	7.7/0.3/196/188	Fail	5.4	0.15	132	7.7/0.3/188	Pass	Yes
PP	200	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
Q	95	>7.7	>0.3	53.0	>188	7.7/0.3/196/188	Fail	2.1	0.06	172	7.7/0.3/188	Pass	Yes
QQ	95	>7.7	>0.3	17.7	>188	7.7/0.3/196/188	Fail	6.0	0.19	148	7.7/0.3/188	Pass	Yes
RR	75	>7.7	>0.3	21.2	>188	7.7/0.3/196/188	Fail	6.0	0.18	169	7.7/0.3/188	Pass	Yes
S	160	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
SS	105	>7.7	>0.3	17.4	>188	7.7/0.3/196/188	Fail	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	Yes
T	160	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
TT	95	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
U	160	>7.7	>0.3	29.4	>188	7.7/0.3/196/188	Fail	2.0	0.05	162	7.7/0.3/188	Pass	Yes
UU	160	>7.7	>0.3	28.4	>188	7.7/0.3/196/188	Fail	5.7	0.16	184	7.7/0.3/188	Pass	Yes
V	100	4.5	0.17	16.3	>188	7.7/0.3/196/188	Fail	1.4	0.05	137	7.7/0.3/188	Pass	Yes
VV	200	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
W	115	>7.7	>0.3	104.3	>188	7.7/0.3/196/188	Fail	7.5	0.22	150	7.7/0.3/188	Pass	Yes
WW	160	7.4	0.13	18.8	>188	7.7/0.3/196/188	Pass	1.9	0.05	146	7.7/0.3/188	Pass	Yes
X	105	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
XX	200	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
Y	100	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
YY	85	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
Z	95	Passes Screening	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/196/188	Pass	Passes Screening	Passes Screening	Passes Screening	7.7/0.3/188	Pass	No
ZZ	165	>7.7	0.33	18.4	>188	7.7/0.3/196/188	Fail	5.6	0.11	151	7.7/0.3/188	Pass	Yes

Table 15-13
Cumulative Heating and Hot Water System Analysis
Maximum Pollutant Concentrations – Screening Results (µg/m^3)

Pollutant	Averaging Period	Maximum Concentration		Background Concentration	Total Concentration		NAAQS / *De Minimis*
		Cluster 1	Cluster 2		Cluster 1	Cluster 2	
NO_2	1-Hour	150	166	NA	150	166	188
NO_2	Annual	0.96	0.73	32.8	33.8	33.5	100
SO_2	1-Hour	0.74	NA	14.6	15.3	NA	196
$PM_{2.5}$	24-Hour	4.0	5.4	NA	4.0	5.4	7.7
$PM_{2.5}$	Annual	0.13	0.20	NA	0.13	0.20	0.3
PM_{10}	24-Hour	4.0	5.4	39.3	43.3	44.7	150

Notes:
N/A—Not Applicable
The 1-hour NO_2 concentration presented represents the maximum of the total 98th percentile 1-hour NO_2 concentration predicted at any receptor using seasonal-hourly background concentrations.
For the one-hour SO_2 averaging period, the three-year average of the maximum 99th percentile concentration was taken from DEC's *New York State Ambient Air Quality Report for 2019*. http://www.dec.ny.gov/chemical/8536.html
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 19.7 µg/m^3, and 0.3 µg/m^3 for the annual period.

Table 15-14
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)
Ethylene Glycol	00107-21-1	0.0074	1,000	0.000080	400
Methanol	00-067-56-1	0.028	33,000	0.00032	4,000
Methyl Isobutyl Ketone	00108-10-1	0.0069	31,000	0.000080	3,000
Misc. VOC [(1)]	NY990-00-0	32.9	98,000	0.38	7,000
Xylene	01330-20-7	0.075	22,000	0.00085	100

Note: [(1)] Modeled as Isopropyl Alcohol.
Source: DEC, DAR-1 AGC/SGC Tables, February 2021.

Table 15-15
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				
Ethylene Glycol	00107-21-1	0.000080	400	0.00000020
Methanol	00-067-56-1	0.00032	4,000	0.000000080
Methyl Isobutyl Ketone	00108-10-1	0.000080	3,000	0.000000027
Misc. VOC [(1)]	NY990-00-0	0.39	7,000	0.000054
Xylene	01330-20-7	0.00085	100	0.0000085
			Total Hazard Index	0.000063
			Hazard Index Threshold Value	2.0

Note: [(1)] Modeled as Isopropyl Alcohol.
Source: DEC, DAR-1 AGC Table, February 2021.

Table 15-16
Maximum Modeled Pollutant Concentrations on the Proposed Project (μg/m³)—Manhattan Criminal Court

Pollutant	Averaging Period	Maximum Modeled Impact	Background	Total Concentration	NAAQS
NO_2	Annual[1]	0.46	32.3	32.8	100
	1-hour[2]	N/A	N/A	105	188
$PM_{2.5}$	24-hour	0.16	19.7	19.86	35
	Annual	0.022	9	9.02	12
SO_2	1-hour	0.14	14.8	14.9	196

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

Table 15-17
Maximum Modeled Pollutant Concentrations on the Proposed Project (μg/m³)—NYU Cogeneration Plant

Pollutant	Averaging Period	Maximum Modeled Impact	Background	Total Concentration	NAAQS
NO_2	Annual[1]	1.4	32.3	33.7	100
	1-hour[2]	N/A	N/A	133	188
$PM_{2.5}$	24-hour	1.3	19.7	21	35
	Annual	0.091	9	9.1	12
PM_{10}	24-hour	2.0	39.3	41.3	150
SO_2	1-hour	2.1	14.8	16.9	196

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

As shown in **Tables 15-16 and 15-17**, the predicted pollutant concentrations for all of the pollutant time averaging periods shown are below their respective standards. Therefore, no potential for significant adverse air quality impacts on the Proposed Project from the existing large and major sources is predicted.

(E) DESIGNATION REQUIREMENTS

At affected projected and potential development sites, the proposed (E) Designation (E-619) for heating and hot water systems 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 for heating and hot water systems 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. ✷