# 14. Air Quality

## 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. 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 maximum projected hourly incremental traffic volumes generated by the Proposed Actions would exceed the 2021 City Environmental Quality *Review (CEQR) Technical Manual* carbon monoxide (CO) screening threshold of 170 peak-hour vehicle trips at a number of intersections in the study area, as well as the particulate matter (PM) emission screening threshold discussed in Chapter 17, Sections 210 and 311, of the *CEQR Technical Manual*. Therefore, a quantified assessment of emissions from traffic generated by the Proposed Actions was performed for CO and PM.

The Proposed Actions' RWCDS does not include any on-site parking on projected development sites or any new off-street public parking. Therefore, an air quality parking analysis was not required for this assessment.

It is anticipated that each of the projected and potential development sites would include fossil fuel-fired hot water systems, and most would include fossil fuel-fired heating systems. A heating and hot water systems stationary source analysis was conducted to evaluate potential future pollutant concentrations from these sources.

The With Action condition includes projected and potential development sites containing a mix of residential, medical office and commercial (retail and other office). Compared to the Without Action condition, the With Action condition removes warehousing activities and decreases other industrial use by nearly 50%. Therefore, potential impacts by light industrial facilities were evaluated from pollutant emissions from industrial uses that would remain because they are not located on projected development sites, or because they are expected to be co-located within

projected development sites with sensitive receptors. Impact of industrial uses on nearby sensitive receptors in other projected and potential development sites were analyzed.

Since there are no major or large air emission sources located within the 1000-foot radius of the project area, potential effects from large and major sources of emissions in the study area on the Proposed Actions were not warranted.

## Principal Conclusions

The Proposed Actions, as analyzed through – analysis sites, are not anticipated to result in significant, adverse impacts related to air quality. An E-Designation would be placed on several sites to ensure that stationary source impacts do not occur. The air quality analysis for the Proposed Actions considered the potential for both mobile and stationary source impacts.

## 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 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 NOx) are emitted from both mobile and stationary sources. Fine PM is also formed when emissions of NOx, sulfur oxides (SOx), 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 SO2 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 NOx 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, NOx, 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 result in an increase in vehicle trips higher than the *CEQR Technical Manual* screening threshold of 170 trips at certain intersections. Therefore, a mobile source analysis was conducted to evaluate future CO concentrations with and without the Proposed Actions.

### *Nitrogen Oxides, VOCS, and Ozone*

NOx 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 NOx 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 NOx 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 NOx) 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. (NOx emissions from fuel combustion consist of approximately 90 percent NO and 10 percent NO2 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. Since the traffic generated by the Proposed Actions would exceed the PM emission screening threshold discussed in Chapter 17, Sections 210 and 311 of the *CEQR Technical Manual*, a quantified assessment of emissions from traffic generated by the Proposed Actions was performed for PM.

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. Also, only natural gas would be used in heat and hot water sources. Therefore, mobile and stationary sources of $SO_2$ are not significant and analysis of $SO_2$ was not warranted.

### *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 light manufacturing-zoned areas, some of which would remain in the Proposed Actions, thus there would be a decrease in area for light manufacturing. Therefore, an analysis to examine the potential for impacts to the Proposed Actions from remaining industrial emissions was performed.

## Air Quality Regulations, Standards, and Benchmarks National and State Air Quality Standards

As required by the CAA, primary and secondary NAAQS have been established for six major air pollutants: CO, $NO_2$, ozone, respirable PM (both $PM_{2.5}$ and $PM_{10}$), $SO_2$, and lead. The primary standards represent levels that are requisite to protect the public health, allowing an adequate margin of safety. The secondary standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the environment. The primary standards are generally either the same as the secondary standards or more restrictive. The NAAQS are presented in **Table 14-1**.

***Table 14-1: National Ambient Air Quality Standards***

| 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[1] | NA | 150 | NA | 150 |
| **Fine Respirable Particulate Matter ($PM_{2.5}$)** | Annual Mean[4] | NA | 9 | NA | 15 |
| | 24-Hour Average[5] | NA | 35 | NA | 35 |
| **Sulfur Dioxide ($SO_2$)** | 1-Hour Average[6] | 0.075 | 196 | NA | NA |
| | Maximum 3-Hour Average[1] | NA | NA | 0.50 | 1,300 |

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

Source: 40 CFR Part 50: National Primary and Secondary Ambient Air Quality Standards.
Notes: ppm – parts per million (unit of measure for gases only)
$\mu g/m^3$ – 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 $\mu g/m^3$ 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] 3-year average of annual mean.
[5] Not to be exceeded by the annual 98th percentile when averaged over 3 years.
[6] 3-year average of the annual 99th percentile daily maximum 1-hour average concentration.

Effective December 2015, EPA lowered the 2008 ozone NAAQS from 0.075 ppm to 0.070. EPA issued final area designations for the revised standard on April 30, 2018. Effective May 8, 2024, the annual $PM_{2.5}$ NAAQS was lowered from 12 $\mu g/m^3$ to 9 $\mu g/m^3$.

Federal ambient air quality standards do not exist for noncriteria pollutants; however, as mentioned above, DEC has issued standards for three 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 redesignated 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 9 μg/$m^3$ effective May 2024. EPA designated the area as in attainment for the 12 μg/$m^3$ NAAQS effective April 15, 2015, and will re-assess the status for the 2024 standard.

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, 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 NYMA is not projected to meet the July 20, 2018 attainment deadline and DEC therefore requested that EPA reclassify the NYMA to "serious" nonattainment. EPA reclassified the NYMA from "moderate" to "serious" NAA effective September 23, 2019, which imposes a new attainment deadline of July 20, 2021 (based on 2018-2020 monitored data). NYSDEC'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. NYSDEC has requested EPA redesignate the area for the 2008 ozone NAAQS as severe on November 29, 2021. 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. This designation remains in effect.

EPA has established a 1-hour $SO_2$ standard, replacing the former 24-hour and annual standards, effective August 23, 2010. In December 2017, EPA designated the entire State of New York as in attainment for this standard, with the exception of Monroe County, which was designated "unclassifiable."

## 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 14-1**) 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

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

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. Project-related impacts less than these values are not considered to be significant.

### *$PM_{2.5}$ 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).

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, DEC has 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 from DAR-1 (February 2021) are provided in **Table 14-7** for the compounds affecting receptors located at projected and potential development sites. The compounds listed are those emitted by existing sources. There are no new proposed sources of air toxics within 400 feet of the Project Area.

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. None of the pollutants identified in **Table 14-7** are classified as carcinogenic according to DAR-1.

## Methodology for Predicting Pollutant Concentrations

### *Mobile Sources*

Vehicular traffic, whether on a road or in a parking garage, may affect air quality. Once operational, the Proposed Actions may result in significant adverse mobile source air quality impacts due to the increase or redistribution of traffic.

The Proposed Actions would be located in the Brooklyn, New York. Per the guidance of the *CEQR Technical Manual*, in this area of the City, actions that would result in the increment of 170 or more peak-hour vehicle trips at an intersection may cause significant adverse air quality impacts and require a detailed air quality analysis for CO. Also, as described above, the City has developed guidelines for determining potential project related $PM_{2.5}$ impacts. These guidelines are based on the number of project-induced heavy duty or its equivalent in vehicle trips. All mobile source analyses are performed for the 2034 future year.

#### *Vehicular Emissions*

Vehicular CO and PM engine emission factors were computed using the USEPA mobile source emissions model, Motor Vehicle Emission Simulator (MOVES4). Emissions are supplied for average projected free flow speeds provided by the traffic analysis. Applicable and up to date environmental and vehicular traffic data for MOVES are supplied by NYSDEC to accurately model

project conditions. Additional link-based data files requirements for MOVES are compiled by obtaining volume, speed, and traffic distribution data from the traffic analysis.

Appropriate credits are used to accurately reflect the inspection and maintenance program. County−specific hourly temperature and relative humidity data obtained from NYSDEC are used.[3]

Emissions of fugitive dust are estimated using the USEPA's latest Air Pollutant Emission Factor (AP-42) equation for paved roads. Emissions from fugitive dust are dependent upon vehicle weight and the surface silt loading in accordance with the latest NYCDEP guidelines regarding roadway silt loading factors and average fleet vehicle weight. Fugitive road dust is not included in the neighborhood scale $PM_{2.5}$ microscale analyses because NYCDEP considers it to have an insignificant contribution on that scale.

Traffic Data

Traffic data for the intersection analysis were derived from existing traffic counts, projected future growth in traffic, and other information developed as part of the traffic analysis for the Proposed Actions (see **Chapter 13, Transportation**). Traffic data for the future without the Proposed Project (the No-Action condition) and the future with the Proposed Project (the With-Action condition) were used in the respective air quality modeling condition. The weekday 7:45 a.m.– 8:45 a.m., 1:00 p.m.– 2:00 p.m. (midday) and 4:30 p.m.– 5:30 p.m. periods, and the 1:00 p.m.– 2:00 p.m. period on Saturday were analyzed.

The peak weekday morning, midday, evening as well as Saturday midday period traffic volumes were used as a baseline for determining off-peak volumes. Off-peak traffic volumes were determined by adjusting the peak period volumes by the 24-hour distributions of actual vehicle counts collected at appropriate locations.

Dispersion Model

The CO and PM concentrations due to vehicular emissions adjacent to the analysis sites were predicted using the American Meteorological Society/Environmental Protection Agency Regulated Model (AERMOD).[4] 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. Following USEPA guidelines, the analysis was performed using an area source representation of emission sources in order to simulate traffic-related air pollutant

[3] The inspection and maintenance programs require inspections of automobiles and light trucks to determine if pollutant emissions from each vehicle exhaust system are lower than emission standards. Vehicles failing the emissions test must undergo maintenance and pass a repeat test to be registered in New York State.

[4] USEPA. *User's Guide for the AMS/USEPA Regulatory Model (AERMOD)*. Office of Air Quality Planning and Standards. USEPA-454/B-19-027. Research Triangle Park, North Carolina. August 2019.

dispersion.[5] Hourly traffic volumes and associated emission factors were used to estimate hourly emission rates from each modeled roadway segment and predict traffic-related air pollutant concentrations at receptor locations.

Meteorology

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

The AERMOD model includes the modeling of hourly concentrations based on hourly traffic data and five years of monitored hourly meteorological data. The data consists of surface data collected at LaGuardia Airport and upper air data collected at Brookhaven, New York for the period 2017–2021. The meteorological data provide hour-by-hour wind speeds and directions, stability states, and temperature inversion elevation over the five-year period. These data are processed using the USEPA 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.

Analysis Year

The microscale analyses are performed for existing conditions and 2034, the year by which the Proposed Actions are likely to be completed. The future analysis is performed for both the No-Action condition and the With-Action condition.

Background Concentrations

To properly represent the total impact of the Proposed Actions in this analysis, it is necessary to consider representative background levels for each of the analyzed pollutants. The background level is the component of the total concentration not accounted for through the microscale modeling analysis. The background values used in the air quality analyses are provided in **Table 14-3.** Applicable background concentrations are added to the modeling results to obtain the total pollutant concentrations at each receptor site for the analysis year.

Analysis Sites

To determine locations at which microscale modeling analysis would be required to estimate CO and PM concentration levels at the most heavily congested intersections in the Affected Area, screening procedures described in the *CEQR Technical Manual* are utilized in order to select the worst-case analysis sites. These procedures include a determination as to whether future traffic volumes from the studied traffic intersections would exceed the *CEQR Technical Manual* CO screening threshold of 170 vehicles during peak traffic hours. For PM, the $PM_{2.5}$ screening

[5] USEPA. *Project-Level Conformity and Hot-Spot Analyses*, available at: https://www.epa.gov/state-and-local- ransportation/project-levelconformity-and-hot-spot-analyses#pmguidance

worksheet referenced in Section 201 of the *CEQR Technical Manual* was used 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. Traffic periods considered in the air quality analysis consist of the weekday AM, midday, PM, and Saturday midday peak hours. Future conditions for the study year 2034, with and without the Proposed Actions, are considered in the selection process.

Two intersections were selected for microscale analysis. These intersections were selected because they have the greatest number of project trip increments and truck-equivalent vehicles per the screening thresholds in the *CEQR Technical Manual* that would result in the highest potential CO and PM incremental concentrations.

1. Atlantic Avenue & Classon Avenue; and

2. Pacific Street & Grand Avenue.

## *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.

*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 development 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.

Each projected and potential development site (**Figure 14-1**) 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. 70 projected and potential sites were screening using CEQR procedures. A two-tiered screening approach was applied. First, sites were screened based on distance to edge of nearby receptors and square footage. For those sites that failed this screening, a stack setback distance was applied, and the sites were screened again. For those sites that failed this second screening, refined modeling was conducted.

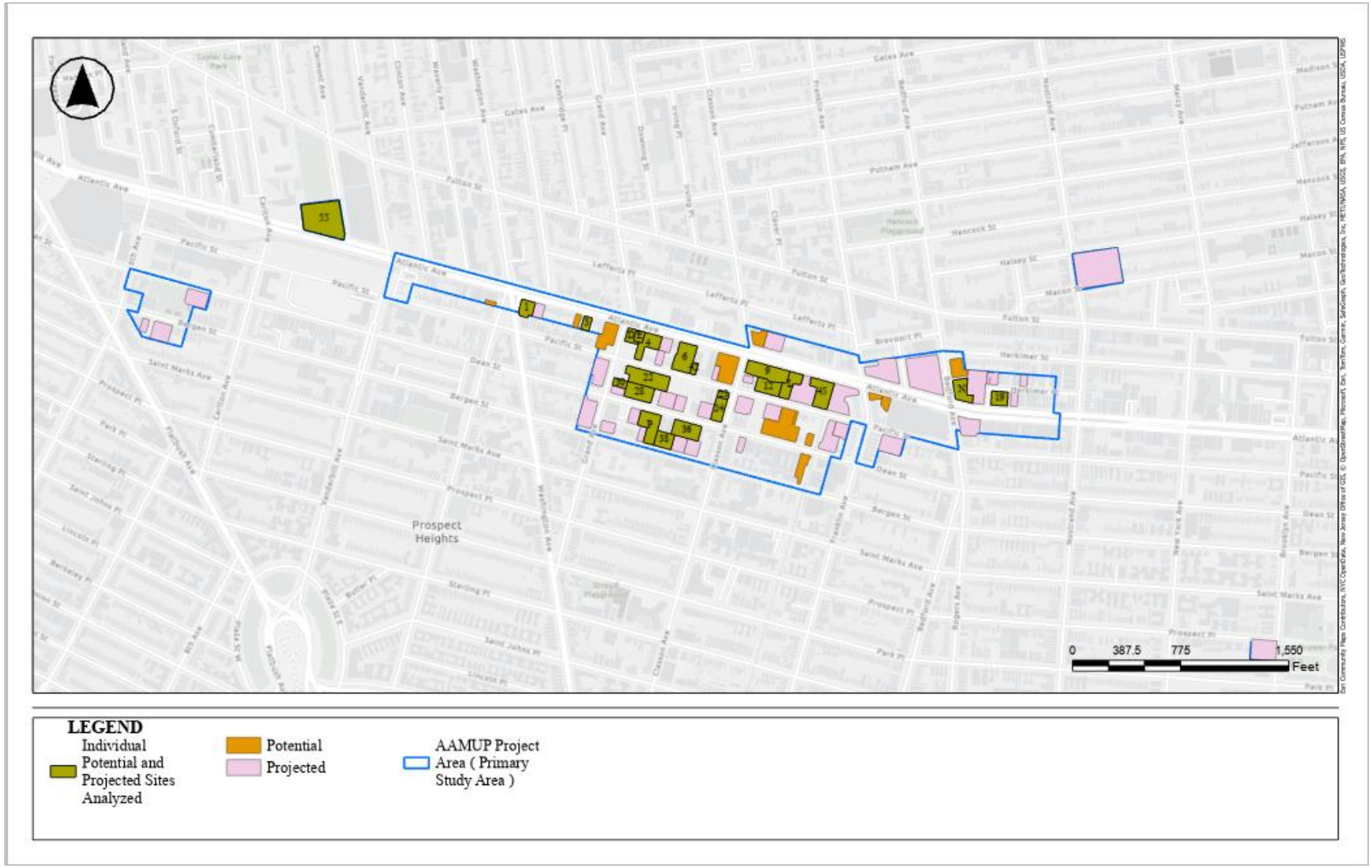
As a result of the two-tiered screening, 22 individual sites were analyzed in the refined modeling. The individual sites analyzed, and the corresponding locations, are in **Table 14-2** below.

***Table 14-2: Addresses of Individual Potential and Projected Development Sites Analyzed using AERMOD***

| Site | Development Sites |
|---|---|
| 1 | Projected development site at 571 Washington Avenue |
| 3 | Projected development site at 960 Atlantic Avenue |
| 4 | Projected development site at 998 Atlantic Avenue |
| 6 | Projected development site at 1026 Atlantic Avenue |
| 9 | Projected development site at 611 Classon Avenue |
| 12 | Projected development site at 1083 Pacific Avenue |
| 19 | Projected development site at 1167 Atlantic Avenue |
| 22 | Projected development site at 962 Pacific Street |
| 23 | Projected development site at 1030 Pacific Street |
| 24 | Projected development site at 618 Classon Avenue |
| 28 | Projected development site at Dean Street |
| 30 | Projected development site at 531 Grand Avenue |
| 36 | Projected development site at 904 Dean Street |
| 38 | Projected development site at 82 Bergen Street |
| 42 | Projected development site at 1025 Pacific Street |
| 45 | Projected development site at 1110 Atlantic Avenue |
| 55 | Projected development site at 510 Clermont Avenue |

| | |
|---|---|
| D | Potential development site at Grand Avenue |
| E | Potential development site at 992 Atlantic Avenue |
| L | Potential development site at 1089 Pacific Street |
| N | Potential development site at 1283 Bedford Avenue |
| P | Potential development site at 876 Dean Street |

**Figure 14-1**
**Individual Potential and Projected Sites Analyzed**



It was assumed that 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 natural gas. For development sites lower than 7 stories, the use of electrical heating system was assumed in accordance with City Local Law 154 of 2021. For sources that did not pass the screening analyses using the *CEQR Technical Manual* procedures, a refined modeling analysis was performed. For natural gas, the primary pollutants of concern are $NO_2$ and $PM_{2.5}$.

Refined Dispersion Analysis

The 22 individual 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, 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.

The refined dispersion modeling analysis was performed for $PM_{2.5}$ and $NO_2$. The analysis was performed using calculated emission rates for natural gas combustion as described below.

Emission Estimates and Stack Parameters

Fuel consumption was estimated based on building square footage and natural gas intensity factors, as outlined in the Air Quality Appendix of *CEQR Technical Manual*.

Emission factors from EPA's Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources were used to calculate emission rates for the projected and potential development sites' heat and hot water systems. The appendix includes tables that can be used to estimate emissions based on the development size, type of fuel used and type of construction.

One-hour average $NO_2$ concentration increments associated with the projected and potential development sites' hot water systems were estimated using AERMOD model's ARM2 module to analyze chemical transformation within the plume. For the $NO_2$ annual standard, the analysis assumed 100% conversion of $NO_x$ to $NO_2$ to identify worst-case annual concentrations.

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 during the most recent three-year period (2020–2022) were used for annual average $NO_2$, 1-hour $NO_2$, as well as and annual and 24-hour $PM_{2.5}$ background concentrations.

***Table 14-3: Maximum Background Pollutant Concentrations***

| Pollutant | Location | Averaging Period | Concentrations | | |
|---|---|---|---|---|---|
| | | | 2020[4] | 2021[4] | 2022 |
| $PM_{2.5}$ ($\mu g/m^3$) | PS 274 - 800 Bushwick Ave, Brooklyn NY [1, 2] | Annual | 5.5 | 7.6 | 8.1 |
| | | 24-hour | 15.4 | 20.4 | 17.9 |
| $NO_2$ (ppb) | Queens College[1, 3] | Annual | 12.46 | 13.02 | 13.66 |
| | | 1-hour | 52.4 | 49.0 | 53.2 |

Source: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2020–2022 and EPA Air Data website (Monitor Values Report | US EPA).

[1] Annual value is based on annual mean concentration for each year.

[2] The 24-hour value is based on the 98th percentile of 24-hour average concentration for each year.

[3] The 1-hour value is based on a three-year average (2020–2022) of the 98th percentile of daily maximum 1-hour average concentrations.

[4] Concentrations may have been affected by lower vehicle related emissions due to COVID-19. NYSDEC has not formally requested exceptional event designation for the data.

$PM_{2.5}$ annual average impacts are assessed on an incremental basis and compared with the $PM_{2.5}$ *de minimis* criteria, without considering the annual background. The $PM_{2.5}$ 24-hour average background concentration of 17.9 $\mu g/m^3$ (based on the 2020 to 2022 average of 98th percentile concentrations measured at the PS 274 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*. The *de minimis* value for 24-hour $PM_{2.5}$ was calculated to be 8.6 $\mu g/m^3$.

Meteorological Data

The meteorological data set consisted of five consecutive years of meteorological data: hourly surface data collected at the JFK Airport National Weather Service Station (2017–2021), and concurrent twice-daily 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 were spaced at approximately 3-meter (10-foot) intervals vertically to represent individual floors of a building, while horizontally, receptor spacing was 8 meters (approximately 26 feet).

Cumulative Impacts from Heat and Hot Water Systems

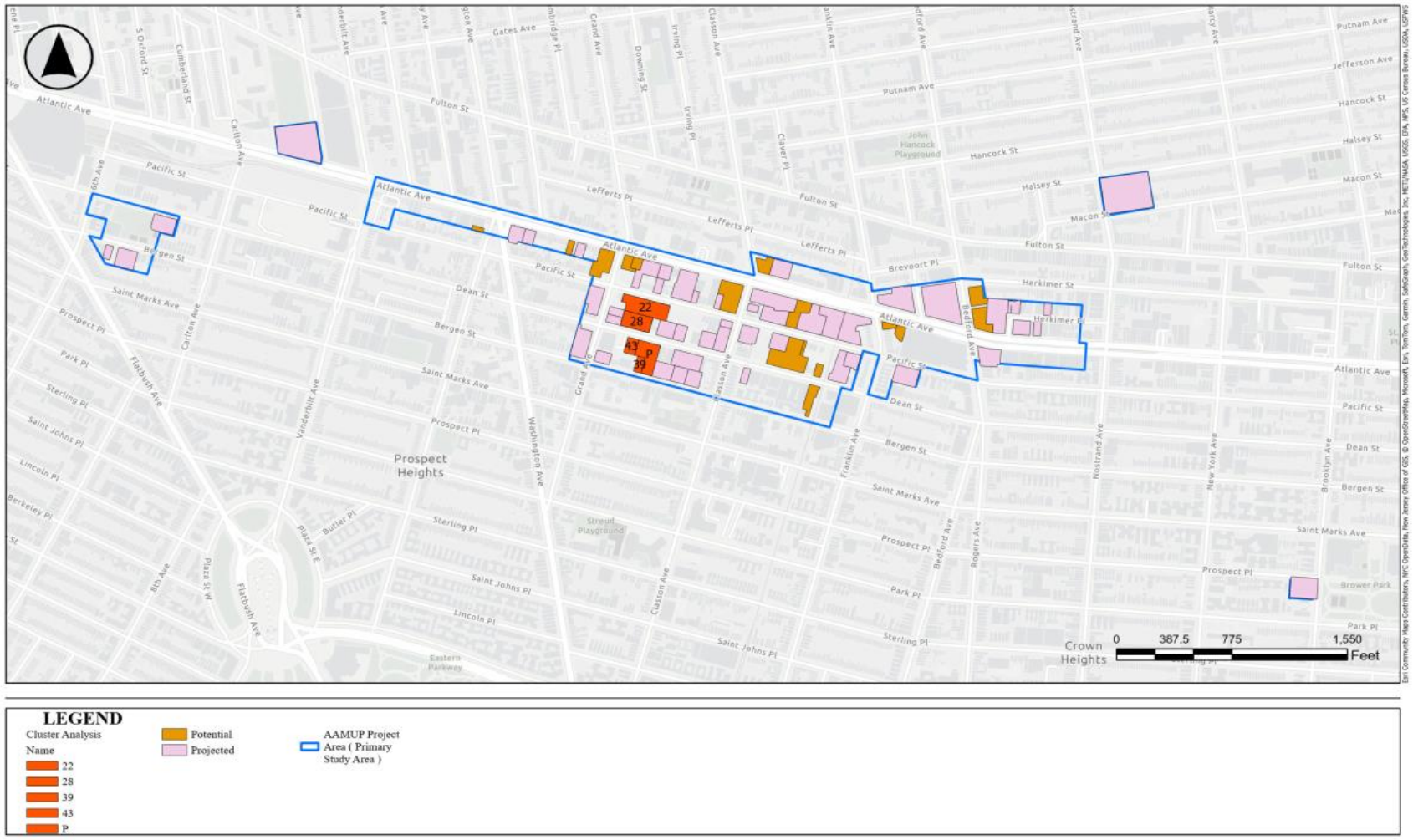
In addition to the individual source analysis, groups or "clusters" of heat and hot water sources with similar stack heights were modeled to address the cumulative impacts of multiple sources. The rezoning area and RWCDS were reviewed to determine areas where clusters with high density of development sites with similar building heights would be located, which could result in cumulative impacts on nearby buildings of a similar or greater height.

Two clusters were selected for analysis based on the greatest height delta, proximity to nearby buildings of greater height, and square footage. The development sites associated with the cluster and their location are presented in **Table 14-4** and **Figure 14-2**.

***Table 14-4: Sites included in Clusters***

| Site | Development Sites |
|---|---|
| Cluster 1 | Projected and potential development sites 39, 43, and P |
| Cluster 2 | Projected development sites 22 and 28 |

**Figure 14-2**
**Cluster Sites Analyzed**



The analysis was performed using the EPA-approved AERMOD model (Version 22112, EPA, 2022). The cluster analysis used the same meteorological data in AERMOD as described earlier.

To estimate the maximum expected pollutant concentration at a given receptor, the calculated impact was added to the background value that accounts for existing pollutant concentrations from other sources (see **Table 14-3**).

*Industrial Sources*

Analysis of Potential Impacts from Existing Uses

Actions that would result in the development of new, significant industrial sources or new uses that may be adversely affected by airborne emissions from existing or planned industrial sources require an assessment of both criteria and non-criteria pollutant emissions. The proposed actions would not introduce new industrial sources but could introduce new sensitive receptors within 400 feet of the existing industrial uses. Therefore, an industrial source screening assessment was performed for the projected and potential sites based on 2021 CEQR Technical Manual guidance. Pollutants emitted from exhaust systems of existing permitted industrial facilities were examined to identify potential adverse impacts on the projected and potential sites. Land use maps were reviewed to identify potential sources of emissions from manufacturing/industrial operations. A preliminary survey was conducted using the New York City Department of Environmental Protection's (NYCDEP's) Clean Air Tracking System to determine if there are any NYCDEP-issued permits for potential sources of air toxics concerns. A request was made to NYCDEP's Bureau of Environmental Compliance to obtain the most current information regarding the release of air pollutants from the existing manufacturing or industrial sources that were identified to have industrial permits within the 400-foot setback of the study area boundary. A comprehensive search was also performed to identify New York State Department of Environmental Conservation (DEC) Title V, 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. Lists of permits and registrations identified are included in Table 1 of **Appendix F**.

Forty-two DEP issued permits and five DEC registrations were identified in the study area. To determine the operating status of permitted industries, a field survey was conducted on February 6, 2024. Based on a further review of these permits, eight of DEP permits are included in the analysis and the rest of the DEP and all DEC permits and registrations were eliminated from further analysis because they were located on projected sites (and thus the source would not exist in the future) or they were emergency generators, boilers, and sources confirmed to no longer exist in the study area. The analysis assumes the potential site containing an existing industrial source (Alcon Body Repair) is not developed, in which case the industrial source is operating in the With Action condition in the same manner as currently permitted; as such, its effects on other projected and potential development sites were analyzed. As informed by NYCDCP, two light industrial facilities – Alchemy Paint Works and Bjork Carle Woodworking, each with two permits, located on a projected site (Site ID: 49, GMDC C6-3A, Block 1126, Lot 29) would continue its operations after the redevelopment. Therefore, these facilities are included in the analysis.

Projected development site 49 may include uses with sleeping accommodations in the same building with manufacturing uses beyond what is permitted under provisions of ZR 123. In order to avoid potential air quality impacts from manufacturing uses in the same building, specific zoning text (ZR 146-11) would require a restrictive declaration to be executed and recorded that would require the owners to provide any building design or other requirements which are acceptable to Department of Environmental Protection (DEP) and consistent with the underlying zoning to protect occupants of the building and surrounding properties from air contaminants, odors, vibrations or noise. No building permits for Site 49 shall be issued without DEP's approval and no certificate of occupancy for Site 49 shall be issued until submission of a DEP approved professionally certified report of the as-built conditions.

Projected development sites 12, 28, and 45 may also have some forms of industrial uses in addition to non-industrial uses in the same buildings. Due to the provisions of ZR123, the industrial uses on these sites are not anticipated to require DEP industrial facility permits, therefore, air quality impact by air toxics is not warranted for these sites.

After the elimination of industrial sources through the process described above, eight permits remained for further analysis, including the sources on one projected and one potential development site. **Table 14-5** provides the details of the industrial source analyzed for the study. Along with the facility on a projected site, one additional facility was identified to have two air permits. These additional permits were also considered in the analysis.

***Table 14-5: Industrial Sources within 400 Feet of a Projected or Potential Development Site***

| Name of Business | Address | Type of Business | DEP Air Permit ID | In Operation | Included in Analysis |
|---|---|---|---|---|---|
| Alchemy Paint Works, LLC | 1102 Atlantic Avenue | Artistic Products Paint Works | PB021715 | Yes | Yes |
| Alchemy Paint Works, LLC | 1102 Atlantic Avenue | Artistic Products Paint Works | PB014015 | Yes | Yes |
| Bjork Carle Woodworking* | 1093 Pacific Street | Wood Working | PW000320 | Yes | Yes |
| Bjork Carle Woodworking* | 1093 Pacific Street | Wood Working | PB021815 | Yes | Yes |
| Alcon Body Repair^ | 1154 Atlantic Avenue | Autobody spray booth | PW008618 | Yes | Yes |

| | | | | | |
|---|---|---|---|---|---|
| Bragley Shipping & Carrying | 924 Bergen Street | Industrial Spray booth | PA042194 | Yes | Yes |
| Bragley Shipping & Carrying | 924 Bergen Street | Industrial/Woodworking | PA042294 | Yes | Yes |
| Pranayama Art Inc | 831 Dean Street | Artistic Woodworking | PB477603 | Yes | Yes |

*: Industrial source on Projected site
^: Industrial Source on Potential Site

All pollutants listed in the permits were analyzed and, in addition, $PM_{2.5}$ and $PM_{10}$ fractions from total particulate concentrations, as listed in the permits, were derived based on the generic PM fractions for specific operations[6]. Solids from spray booth emissions were considered as particulate matter and total solvent (VOC) emissions were broken down into different types of pollutants as provided in the permits. For Permit # PA042194, VOCs were not broken down; therefore, generic Safety Data Sheet (SDS) for spray material mentioned in the permit was used to speciate VOCs to individual pollutants. Reasonable worst case emission rates for each pollutant from the industrial sources were estimated. **Table 14-6** shows the summary of estimated emission rates from the facility operations. Detailed emission rate calculations are included in Table 2 and Table 3 of **Appendix F**.

[6] https://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/particulate-matter-(pm)-2.5-significance-thresholds-and-calculation-methodology/final_pm2_5methodology.pdf?sfvrsn=2

***Table 14-6: Estimated Emission Rates for Industrial Sources***

| Facility | Description of Process | DEP Permit ID | Pollutant Name | CAS Number | Hourly Average Emissions (g/s) | Annual Average Emissions (g/s) |
|---|---|---|---|---|---|---|
| **Alchemy Paint Works** | **Artistic Products Paint Works** | **PB021715** | HDI Homopolymer | 28182-81-2 | 1.53E-04 | 1.26E-04 |
| | | | Butyl Acetate | 123-86-4 | 7.66E-05 | 6.30E-05 |
| | | | Etyle 3-ethoxypropionate | 763-69-9 | 5.77E-05 | 4.75E-05 |
| | | | Butoxyethyl Acetate | 112-07-2 | 3.67E-05 | 3.02E-05 |
| | | | Ethylbenzene | 100-41-4 | 9.45E-06 | 7.77E-06 |
| | | | Xylene | 1330-20-7 | 1.94E-05 | 1.60E-05 |
| **Alchemy Paint Works** | **Artistic Products Paint Works** | **PB014015** | n-butylacetate | 123-86-4 | 3.65E-04 | 3.00E-04 |
| | | | Kaolin | 1332-58-7 | 5.30E-05 | 4.36E-05 |
| | | | Titanium Dioxide | 13463-67-7 | 2.62E-04 | 2.16E-04 |
| | | | Barium Sulphate | 7727-43-7 | 5.30E-05 | 4.36E-05 |
| | | | Talc | 14807-96-6 | 2.68E-05 | 2.20E-05 |
| | | | Xylene | 1330-20-7 | 6.46E-05 | 5.31E-05 |
| | | | 1,2,4-trimethylbenzene | 95-63-6 | 5.41E-05 | 4.44E-05 |
| | | | solvent naphtha, light aromatic | 64742-95-6 | 6.61E-05 | 5.44E-05 |
| | | | Crystalline Silica | 14808-60-7 | 1.31E-05 | 1.08E-05 |
| | | | Acetone | 67-64-1 | 1.31E-05 | 1.08E-05 |
| | | | 1-Methxy-2-Propyl Acetate | 108-65-6 | 1.31E-05 | 1.08E-05 |
| | | | Ethyl 3-Ethoxypropionate | 763-69-9 | 1.80E-04 | 1.48E-04 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Methyl Amyl Ketone | 110-43-0 | 1.31E-05 | 1.08E-05 |
| | | | Methyl Acetate | 79-20-9 | 1.31E-05 | 1.08E-05 |
| | | | Ethylbenzene | 100-41-4 | 2.73E-05 | 2.24E-05 |
| | | | Triphosphoric Acid | 13939-25-8 | 1.31E-05 | 1.08E-05 |
| | | | Silica, Amorphous | 7631-86-9 | 1.31E-05 | 1.08E-05 |
| | | | Butyl Acetate | 123-86-4 | 5.67E-05 | 4.66E-05 |
| | | | Mineral Spirits | 64742-49-0 | 1.89E-05 | 1.55E-05 |
| | | | 1,3,5-trimethylbenzene | 108-67-8 | 5.25E-06 | 4.31E-06 |
| | | | Aliphatic Polyisocyanate | 28182-81-2 | 1.53E-04 | 1.26E-04 |
| | | | Butylglycol Acetate | 123-07-2 | 5.20E-05 | 4.27E-05 |
| | | | VM&P Naphtha | 64742-89-8 | 5.85E-05 | 4.81E-05 |
| | | | 1-Methxy-2-Propyl Acetate | 108-65-6 | 4.18E-05 | 3.44E-05 |
| | | | solvent naphtha, light aromatic | 64742-95-6 | 1.34E-05 | 1.10E-05 |
| | | | Ethy Glycol Butyl Ether | 111-76-22 | 1.81E-04 | 1.49E-04 |
| | | | Sec-Butyl Alcohol | 78-92-2 | 6.04E-05 | 4.96E-05 |
| | | | Copper Phthalocynine blue | 147-14-8 | 4.53E-05 | 3.72E-05 |
| | | | Iron oxide | 1309-37-1 | 7.55E-05 | 6.20E-05 |
| | | | Copper Phthalocyanine | 1328-53-6 | 4.53E-05 | 3.72E-05 |
| | | | Aluminum Oxide | 1344-28-1 | 6.04E-05 | 4.96E-05 |
| | | | Silicon Dioxide | 7631-86-9 | 1.51E-05 | 1.24E-05 |
| | | | Graphite | 7782-42-5 | 6.04E-05 | 4.96E-05 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Hydrophobic Amorphous Silica | 68611-44-9 | 1.51E-05 | 1.24E-05 |
| | | | Solvent naphtha, Medium Aliphatic | 64742-88-7 | 1.51E-05 | 1.24E-05 |
| | | | Petroleum Naphtha, Heavy | 94742-48-9 | 1.51E-05 | 1.24E-05 |
| | | | Iron Oxide Pigment | 51274-00-1 | 7.55E-05 | 6.20E-05 |
| | | | Aluminum Hydroxide | 21645-51-2 | 1.51E-05 | 1.24E-05 |
| | | | Copper Phthalocyanine | 15680-42-9 | 3.02E-05 | 2.48E-05 |
| | | | C.I. Pigment Green | 14302-13-7 | 4.53E-05 | 3.72E-05 |
| | | | Bismuth Vanadium Oxide | 14059-33-7 | 1.36E-04 | 1.12E-04 |
| | | | Chromium III Compound | 15096-41-0 | 1.51E-05 | 1.24E-05 |
| | | | Copper Phthalocyanine | 68987-63-3 | 1.51E-05 | 1.24E-05 |
| | | | Mica | 12001-26-2 | 6.04E-05 | 4.96E-05 |
| | | | Barium Sulfate | 7727-43-7 | 1.51E-05 | 1.24E-05 |
| | | | Aluminum | 7429-90-5 | 1.06E-04 | 8.68E-05 |
| | | | Carbon Black | 1333-86-4 | 4.53E-05 | 3.72E-05 |
| **Alcon body Repair** | **Autobody spray booth** | **PW008618** | Particulates/pigments* | NY075-02-5 | 6.30E-05 | 1.44E-04 |
| | | | Xylene | 01330-20-7 | 5.25E-03 | 1.15E-02 |
| | | | Ethylbenzene | 00100-41-4 | 6.30E-04 | 1.38E-03 |
| | | | Butanone | 00078-93-3 | 3.25E-04 | 7.48E-04 |
| | | | Toluene | 00108-88-3 | 7.87E-05 | 1.73E-04 |
| | **Wood Working** | **PW000320** | Particulates ($PM_{2.5}$) | NY075-02-5 | 7.43E-05 | 4.48E-05 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Bjork Carle Woodworking** | | | Particulates ($PM_{10}$) | NY075-00-5 | 1.05E-04 | 6.33E-05 |
| **Bjork Carle Woodworking** | **Wood Working** | **PW021815** | N-Butyl acetate | 123-86-4 | 2.16E-04 | 8.90E-04 |
| | | | Titanium Dioxide | 13463-67-7 | 2.49E-04 | 1.02E-03 |
| | | | Formaldehyde | 50-00-0 | 4.97E-07 | 2.04E-06 |
| | | | Xylene | 1330-20-7 | 1.12E-04 | 4.59E-04 |
| | | | 1-Butanol | 71-36-3 | 3.46E-05 | 1.42E-04 |
| | | | Ethanol | 64-17-5 | 1.47E-04 | 6.06E-04 |
| | | | Ethylbenzene | 100-41-4 | 9.95E-06 | 4.09E-05 |
| | | | Amorphous Silica | 7631-86-9 | 1.49E-05 | 6.13E-05 |
| | | | Talc | 14807-96-6 | 5.07E-05 | 2.08E-04 |
| | | | Ethylbenzene | 100-41-4 | 1.25E-05 | 5.15E-05 |
| | | | 2-Propanol | 67-63-0 | 4.83E-05 | 1.99E-04 |
| | | | Ethyl Acetate | 141-78-6 | 1.79E-05 | 7.36E-05 |
| | | | Toluene | 108-88-3 | 1.26E-04 | 5.19E-04 |
| | | | 4-Methylbenzenesulfonic acid | 104-15-4 | 3.66E-05 | 1.50E-04 |
| | | | Sulfuric Acid | 7664-93-9 | 6.65E-06 | 2.73E-05 |
| | | | 1-(2-Butoxymethylethoxy)-Propone | 29911-28-2 | 1.15E-05 | 4.72E-05 |
| | | | Butoxy propanol | 5131-66-8 | 2.87E-05 | 1.18E-04 |
| | | | Barium Sulfate | 7727-43-7 | 1.44E-04 | 5.90E-04 |
| | | **PA042194** | Particulates* | NY075-02-5 | 6.77E-03 | 2.32E-06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Bragley & Shipping Carrying** | **Woodworking Spray Booth** | | Total VOC | NY998-00-0 | 8.19E+00 | 1.17E-04 |
| | | | Isobutyl Acetate | 74-98-6 | 3.61E+00 | 5.15E-05 |
| | | | Ethyl Acetate | 141-78-6 | 2.26E+00 | 3.22E-05 |
| | | | Propane | 74-98-6 | 2.26E+00 | 3.22E-05 |
| | | | Acetone | 67-64-1 | 2.26E+00 | 3.22E-05 |
| | | | n-butane | 106-97-8 | 9.02E-01 | 1.29E-05 |
| | | | Toluene | 108-88-3 | 9.02E-01 | 1.29E-05 |
| | | | Butanol | 71-36-3 | 9.02E-01 | 1.29E-05 |
| | | | Cellulose nitrate, ester | 9004-70-0 | 9.02E-01 | 1.29E-05 |
| | | | Butyl cellosolve | 111-79-2 | 2.26E-01 | 3.22E-06 |
| | | | Isopropanol | 67-63-0 | 2.26E-01 | 3.22E-06 |
| | | | n-butyl acetate | 123-86-4 | 9.02E-02 | 1.29E-06 |
| **Bragley & Shipping Carrying** | **Cyclone, Wood working** | **PA042294** | Particulates ($PM_{2.5}$) | NY075-02-5 | 4.68E-03 | 1.28E-05 |
| | | | Particulates ($PM_{10}$) | NY075-00-5 | 6.61E-03 | 1.81E-05 |
| **Pranayama Art Inc.** | **Artistic Woodwork** | **PB477603** | Particulates ($PM_{2.5}$) | NY075-02-5 | 4.68E-03 | 1.62E-05 |
| | | | Particulate ($PM_{10}$) | NY075-00-5 | 6.61E-03 | 1.81E-05 |

*$PM_{10}$ from spray booth operations

Table 17-3 of the 2021 *CEQR Technical Manual* was used to convert the corresponding initial pollutant emissions from the source to dispersed pollutant concentrations. The resulting concentrations were compared to the NYSDEC DAR-1 Short-term Guideline Concentration (SGC) and Annual Guideline Concentration (AGC) thresholds. **Table 14-7** shows the analysis results for the pollutants; all the pollutants are below the applicable guideline concentrations except for one (HDI Homopolymer) that exceeded the SGC threshold. This pollutant is generated from the industrial spray booth that would continue to operate on a projected site (Site ID# 49). Therefore, a refined air quality analysis for one pollutant was performed.

***Table 14-7: Screening of Pollutants from Industrial Sources***

| Facility | Pollutant Name | CAS No | Setback Distance to Site (ft) | Maximum 1-hr Concentration ($\mu g/m^3$) ^ | Maximum Annual Concentration ($\mu g/m^3$) | SGC/NA AQS Criteria ($\mu g/m^3$) | AGC/NA AQS Criteria ($\mu g/m^3$) |
|---|---|---|---|---|---|---|---|
| **Alchemy Paint Works** | HDI Homopolymer | 28182-81-2 | 30 | 1.91E+01 | 6.62E-01 | 4.5 | 0.4 |
| | N-Butylacteare | 123-86-4 | | 9.57E+00 | 3.31E-01 | 71300 | 565 |
| | Etyle3-ethoxypropionate | 763-69-9 | | 7.21E+00 | 2.49E-01 | 140 | 64 |
| | Butylglycol Acetate | 112-07-2 | | 4.59E+00 | 1.59E-01 | N/A | 310 |
| | Ethylbenzene | 100-41-4 | | 1.18E+00 | 4.08E-02 | N/A | 1000 |
| | Xylene | 1330-20-7 | | 2.43E+00 | 8.38E-02 | 22000 | 100 |
| **Alchemy Paint Works** | n-butylacetate | 123-86-4 | 30 | 4.56E+01 | 1.58E+00 | 71300 | 565 |
| | Kaolin | 1332-58-7 | | 6.62E+00 | 2.29E-01 | N/A | 4.8 |
| | Titanium Dioxide | 13463-67-7 | | 3.28E+01 | 1.13E+00 | N/A | 24 |
| | Barium Sulphate | 7727-43-7 | | 6.62E+00 | 2.29E-01 | N/A | 12 |
| | Talc | 14807-96-6 | | 3.34E+00 | 1.16E-01 | N/A | 4.8 |
| | Xylene | 1330-20-7 | | 8.06E+00 | 2.79E-01 | 22000 | 100 |
| | 1,2,4-trimethylbenzene | 95-63-6 | | 6.75E+00 | 2.33E-01 | N/A | 60 |
| | solvent naphtha, light aromatic | 64742-95-6 | | 8.26E+00 | 2.85E-01 | N/A | 100 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Crystalline Silica | 14808-60-7 | | 1.64E+00 | 5.66E-02 | N/A | 2 |
| | Acetone | 67-64-1 | | 1.64E+00 | 5.66E-02 | 180000 | 30000 |
| | 1-Methxy-2-Propyl Acetate | 108-65-6 | | 1.64E+00 | 5.66E-02 | 36850 | 2000 |
| | Ethyl 3-Ethoxypropionate | 763-69-9 | | 2.25E+01 | 7.77E-01 | 140 | 64 |
| | Methyl Amyl Ketone | 110-43-0 | | 1.64E+00 | 5.66E-02 | N/A | 550 |
| | Methyl Acetate | 79-20-9 | | 1.64E+00 | 5.66E-02 | 76000 | 1400 |
| | Ethylbenzene | 100-41-4 | | 3.41E+00 | 1.18E-01 | N/A | 1000 |
| | Triphosphoric Acid | 13939-25-8 | | 1.64E+00 | 5.66E-02 | N/A | N/A |
| | Silica, Amorphous | 7631-86-9 | | 1.64E+00 | 5.66E-02 | N/A | N/A |
| | Butyl Acetate | 123-86-4 | | 7.08E+00 | 2.45E-01 | 71300 | 565 |
| | Mineral Spirits | 64742-49-0 | | 2.36E+00 | 8.16E-02 | N/A | N/A |
| | 1,3,5-trimethylbenzene | 108-67-8 | | 6.55E-01 | 2.27E-02 | N/A | 60 |
| | Aliphatic Polyisocyanate | 28182-81-2 | | 1.91E+01 | 6.62E-01 | 4.5 | 0.4 |
| | Butylglycol Acetate | 123-07-2 | | 6.49E+00 | 2.24E-01 | N/A | N/A |
| | VM&P Naphtha | 64742-89-8 | | 7.31E+00 | 2.53E-01 | N/A | 100 |
| | 1-Methxy-2-Propyl Acetate | 108-65-6 | | 5.22E+00 | 1.80E-01 | 36850 | 2000 |
| | solvent naphtha, light aromatic | 64742-95-6 | | 1.67E+00 | 5.77E-02 | N/A | 100 |
| | Ethy Glycol Butyl Ether | 111-76-22 | | 2.26E+01 | 7.82E-01 | N/A | N/A |
| | Sec-Butyl Alcohol | 78-92-2 | | 7.54E+00 | 2.61E-01 | N/A | 710 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Copper Phthalocynine blue | 147-14-8 | | 5.65E+00 | 1.95E-01 | N/A | N/A |
| | Iron oxide | 1309-37-1 | | 9.42E+00 | 3.26E-01 | N/A | 12 |
| | Copper Phthalocyanine | 1328-53-6 | | 5.65E+00 | 1.95E-01 | N/A | N/A |
| | Aluminum Oxide | 1344-28-1 | | 7.54E+00 | 2.61E-01 | N/A | 2.4 |
| | Silicon Dioxide | 7631-86-9 | | 1.88E+00 | 6.51E-02 | N/A | N/A |
| | Graphite | 7782-42-5 | | 7.54E+00 | 2.61E-01 | N/A | 4.8 |
| | Hydrophobic Amorphous Silica | 68611-44-9 | | 1.88E+00 | 6.51E-02 | N/A | N/A |
| | Solvent naphtha, Medium Aliphatic | 64742-88-7 | | 1.88E+00 | 6.51E-02 | N/A | 3200 |
| | Petroleum Naphtha, Heavy | 94742-48-9 | | 1.88E+00 | 6.51E-02 | N/A | N/A |
| | Iron Oxide Pigment | 51274-00-1 | | 9.42E+00 | 3.26E-01 | N/A | N/A |
| | Aluminum Hydroxide | 21645-51-2 | | 1.88E+00 | 6.51E-02 | N/A | N/A |
| | Copper Phthalocyanine | 15680-42-9 | | 3.77E+00 | 1.30E-01 | N/A | N/A |
| | C.I. Pigment Green | 14302-13-7 | | 5.65E+00 | 1.95E-01 | N/A | N/A |
| | Bismuth Vanadium Oxide | 14059-33-7 | | 1.70E+01 | 5.86E-01 | N/A | N/A |
| | Chromium III Compound | 15096-41-0 | | 1.88E+00 | 6.51E-02 | N/A | N/A |
| | Copper Phthalocyanine | 68987-63-3 | | 1.88E+00 | 6.51E-02 | N/A | N/A |
| | Mica | 12001-26-2 | | 7.54E+00 | 2.61E-01 | N/A | 7.1 |
| | Barium Sulfate | 7727-43-7 | | 1.88E+00 | 6.51E-02 | N/A | 12 |
| | Aluminum | 7429-90-5 | | 1.32E+01 | 4.56E-01 | N/A | 2.4 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Carbon Black | 1333-86-4 | | 5.65E+00 | 1.95E-01 | N/A | 7 |
| | Particulates (PM2.5) | NY075-02-5 | | 1.79E+01 | 2.14E-03 | 35 | 12 |
| | Particulate (PM10) | NY075-00-5 | | 2.43E+01 | 3.02E-03 | 150 | N/A |
| **Alcon body Repair** | Particulates/pigments* | NY075-02-5 | 30 | 31.9 | 0.8 | 150" | N/A" |
| | Xylene | 01330-20-7 | | 655.4 | 60.4 | 22000 | 100 |
| | Ethylbenzene | 00100-41-4 | | 78.7 | 7.3 | N/A | 1000 |
| | Butanone | 00078-93-3 | | 40.6 | 3.9 | 13000 | 5000 |
| | Toluene | 00108-88-3 | | 9.8 | 0.9 | 37000 | 5000 |
| **Bjork Carle Woodworking** | Particulates (PM2.5) | NY075-02-5 | 30 | 27.2 | 0.2 | 35" | 12 |
| | Particulate (PM10) | NY075-00-5 | | 37.1 | 0.3 | 150" | N/A |
| **Bjork Carle Woodworking** | N-Butyl acetate | 123-86-4 | 30 | 27.0 | 4.7 | 71300 | 565 |
| | Titanium Dioxide | 13463-67-7 | | 31.1 | 5.4 | N/A | 24 |
| | Formaldehyde | 50-00-0 | | 0.1 | 0.0 | 30 | 0.06 |
| | Xylene | 1330-20-7 | | 13.9 | 2.4 | 22000 | 100 |
| | 1-Butanol | 71-36-3 | | 4.3 | 0.7 | N/A | 1500 |
| | Ethanol | 64-17-5 | | 18.4 | 3.2 | N/A | 45000 |
| | Ethylbenzene | 100-41-4 | | 1.2 | 0.2 | N/A | 1000 |
| | Amorphous Silica | 7631-86-9 | | 1.9 | 0.3 | N/A | N/A |
| | Talc | 14807-96-6 | | 6.3 | 1.1 | N/A | 4.8 |
| | Ethylbenzene | 100-41-4 | | 1.6 | 0.3 | N/A | 1000 |
| | 2-Propanol | 67-63-0 | | 6.0 | 1.0 | 98000 | 7000 |
| | Ethyl Acetate | 141-78-6 | | 2.2 | 0.4 | N/A | 3400 |
| | Toluene | 108-88-3 | | 15.8 | 2.7 | 37000 | 5000 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 4-Methylbenzenesulfonic acid | 104-15-4 | | 4.6 | 0.8 | N/A | N/A |
| | Sulfuric Acid | 7664-93-9 | | 0.8 | 0.1 | 120 | 1 |
| | 1-(2-Butoxymethylethoxy)-Propone | 29911-28-2 | | 1.4 | 0.2 | N/A | N/A |
| | Butoxy propanol | 5131-66-8 | | 3.6 | 0.6 | N/A | N/A |
| | Barium Sulfate | 7727-43-7 | | 17.9 | 3.1 | N/A | 12 |
| **Bragley Shipping & Carrying** | Particulates* | NY075-02-5 | 210 | 37.03 | 0.00 | 150 | N/A |
| | Total VOC | NY998-00-0 | | 41256.60 | 0.03 | - | - |
| | Isobutyl Acetate | 74-98-6 | | 18180.87 | 0.01 | 71300 | 565 |
| | Ethyl Acetate | 141-78-6 | | 11363.05 | 0.01 | - | 3400 |
| | Propane | 74-98-6 | | 11363.05 | 0.01 | - | - |
| | Acetone | 67-64-1 | | 11363.05 | 0.01 | 180000 | 30000 |
| | n-butane | 106-97-8 | | 4545.22 | 0.00 | - | - |
| | Toluene | 108-88-3 | | 4545.22 | 0.00 | 37000 | 5000 |
| | Butanol | 71-36-3 | | 4545.22 | 0.00 | - | 1500 |
| | Cellulose nitrate, ester | 9004-70-0 | | 4545.22 | 0.00 | - | - |
| | Butyl cellosolve | 111-79-2 | | 1136.30 | 0.00 | - | - |
| | Isopropanol | 67-63-0 | | 1136.30 | 0.00 | 98000 | 7000 |
| | n-butyl acetate | 123-86-4 | | 454.52 | 0.00 | 71300 | 565 |
| **Bragley Shipping & Carrying** | Particulates ($PM_{2.5}$) | NY075-02-5 | 210 | 26.91 | 0.00 | 35 | 12 |
| | Particulate ($PM_{10}$) | NY075-00-5 | | 57.33 | 0.00 | 150 | N/A |
| **Pranayama Art Inc** | Particulates ($PM_{2.5}$) | NY075-02-5 | 30 | 2.32E-02 | 2.14E-03 | 35 | 12 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Particulate ($PM_{10}$) | NY075-00-5 | | 3.28E-01 | 3.02E-03 | 150 | N/A |

*PM10 from spray booth operations. N/A denotes pollutant does not have DAR-1 threshold concentration.

^ 2022 24-hour background PM10 concentration of 24 µg/m3 and background PM2.5 concentration of 17.9 µg/m3 were added to the estimated source concentrations and compared against NAAQS criteria.

### *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 DEC Title V and State Facility Permit websites, the New York City Department of Buildings website, and DEP permit data.

No facilities with a State Facility, Title V, or PSD Permit within the 1,000-foot study area around the Project Area were identified. Therefore, no analysis of the potential impacts of large or major sources of emissions on the projected and potential development sites was required.

## The Future without the Proposed Actions (No-Action Condition)

### *Mobile Sources*

CO concentrations in the 2034 No-Action condition were determined using the methodology previously described. **Table 14-8** shows future maximum predicted 8-hour CO concentration, including the background concentration, at the analysis intersections in the No-Action condition. The values shown are the highest predicted concentrations for the receptor locations for any of the time periods analyzed.

***Table 14-8: Maximum Predicted 1-Hour and 8-Hour Average CO No-Action Concentrations***

| Analysis Site | Location | 1-Hour Concentration (PPM) | 8-Hour Concentration (PPM) |
|---|---|---|---|
| 1 | Atlantic Avenue & Classon Avenue | 2.7 | 2.3 |
| 2 | Pacific Street & Grand Avenue | 2.1 | 1.9 |

Notes:
1-hour standard (NAAQS) is 35 ppm, 8-hour standard (NAAQS) is nine ppm.
Concentration includes 8-hours background concentration 1.7 ppm, and 1-hour background concentration 1.9 ppm.
Source: CSA Group, 2024.

PM2.5 concentrations for the No-Action condition are not presented since impacts are assessed on an incremental basis.

### *Stationary Sources*

In the No-Action condition, current uses on the projected and potential 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 could cumulatively be greater than the emissions from heat and hot water systems under the No Action condition.

## The Future without the Proposed Actions (With-Action Condition)

### *Mobile Sources*

CO concentrations for the 2034 With-Action condition were predicted using the methodology previously described. **Table 14-9** shows the future maximum predicted 1-hour and 8-hour average CO concentrations at the study intersection. The values shown are the highest predicted concentrations. The Proposed Actions would not result in any violations of the 1-hour or 8-hour CO standard. In addition, the incremental increases in 8-hour average CO concentrations are small, and consequently would not result in a violation of the *CEQR Technical Manual de minimis* CO criteria. Therefore, mobile source CO emissions from the Proposed Actions would not result in a significant adverse air quality impact.

***Table 14-9: Maximum Predicted 1-Hour and 8-Hour Average CO With-Action Concentrations***

| Analysis Site | Location | 1-Hour Concentration (PPM) | 8-Hour Concentration (PPM) | 8hr increment (ppm) | de minimis |
|---|---|---|---|---|---|
| 1 | Atlantic Avenue & Classon Avenue | 3.8 | 3.03 | 0.73 | 3.3 |
| 2 | Pacific Street & Grand Avenue | 2.3 | 1.98 | 0.8 | 3.5 |

Notes:

1-hour standard (NAAQS) is 35 ppm, 8-hour standard (NAAQS) is nine ppm.

Concentration includes 8-hours background concentration 1.7 ppm, and 1-hour background concentration 1.9 ppm. Persistence factor of 0.7

Source: CSA Group, 2024.

Using the methodology previously described, maximum predicted 24-hour $PM_{2.5}$ concentration increments were calculated so that they could be compared with the *de minimis* criteria. Based on this analysis, the maximum predicted localized 24-hour average $PM_{2.5}$ concentrations are presented in **Table 14-10**.

***Table 14-10: 2034 Maximum Predicted 24-Hour Average $PM_{2.5}$ Incremental and Total Concentrations (µg/m3)***

| Analysis Site | Location | No Action | With Action | Increment | De minimus |
|---|---|---|---|---|---|
| 1 | Atlantic Avenue & Classon Avenue | 10.1 | 13.8 | 3.7 | 8.6 |
| 2 | Pacific Street & Grand Avenue | 8.5 | 8.8 | 0.8 | 8.6 |

Source: CSA Group, 2024.
Notes: $PM_{2.5}$ *de minimis* criterion—24-hour average, not to exceed more than half the difference between the background concentration (19.1 µg/$m^3$) and the 24-hourstandard of 35 µg/$m_3$

The maximum annual $PM_{2.5}$ concentration increments and total annual $PM_{2.5}$ concentrations including the background at the intersections were calculated to be compared with the NAAQS and *de minimis* criteria. Analysis results are presented in **Table 14-11**.

As shown in the tables, both $PM_{2.5}$ 24-hour and neighborhood-scale annual incremental concentrations are below the 24-hour and annual *de minimis* criterion threshold; therefore, the results demonstrate that mobile source $PM_{2.5}$ emissions from the Proposed Actions would not result in a significant adverse air quality impact

***Table 14-11: 2034 Maximum Predicted Annual Average PM2.5 Incremental and Total Concentrations***

| Analysis Site | Location | No Action | With Action | Increment | De minimis |
|---|---|---|---|---|---|
| 1 | Atlantic Avenue & Classon Avenue | 0.5 | 0.53 | 0.03 | 0.1 |
| 2 | Pacific Street & Grand Avenue | 0.2 | 0.202 | 0.002 | 0.1 |

Source: CSA Group, 2024.
Note: $PM_{2.5}$ *de minimis* criterion—annual (neighborhood scale), 0.1 µg/$m_3$.

## *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. Additional sites were screened out by applying a setback to the screening distance (these sites subsequently require an E-Designation).

A total of 17 projected and 5 potential development sites failed the refined screening analysis using Figure 17-2 from the *CEQR Technical Manual*. Each of these development sites required a refined modeling analysis, using AERMOD, for the use of natural gas.

Refined Dispersion Analysis

As indicated above, 22 projected and potential development sites required a refined modeling analysis to determine the potential for air quality impacts.

**Table 14-12** presents a summary of the analysis results and proposed restrictions, with additional details provided in **Table 14-13** (projected development sites) and **Table 14-14** (potential development sites).

***Table 14-12: Heating and Hot Water System Analysis Summary***

| Analysis | Projected Development Sites | | Potential Development Sites | |
|---|---|---|---|---|
| | Pass | Fail | Pass | Fail |
| Natural Gas Screening | 20 | 34 | 6 | 10 |
| Natural Gas and Stack Setback Requirement | 17 | 17 | 5 | 5 |
| Natural Gas Refined Analysis | 0 | 17 | 0 | 5 |
| Natural Gas Stack Location Restriction Requirement | 0 | 17 | 0 | 5 |
| Natural Gas Stack Location Restriction and Low NOx 30 ppm Requirement | 16 | 1 | 5 | 0 |
| Natural Gas Stack Location Restriction and Low NOx 15 ppm Requirement | 1 | 0 | 0 | 0 |

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-810) would be assigned as part of the Proposed Actions for 44 projected and potential development sites (including 34 projected and 10 potential development sites). These designations specify the various restrictions, such as the use of low $NO_x$ burners or the distance that the vent stack on the building roof must be from its lot line(s).

***Table 14-13***
***Heating and Hot Water System Analysis – Results for Projected Development Sites***

| Site | Building Height | Maximum Natural Gas Modeled Concentration (µg/m$^3$) | | | | | Requires (E) Designation (Yes/No) |
|---|---|---|---|---|---|---|---|
| | | $PM_{2.5}$ 24-Hour | $PM_{2.5}$ Annual | $NO_2$ 1-Hour[1] | $NO_2$ Annual[1] | $PM_{2.5}$ 24-Hour/ $PM_{2.5}$ Annual/ $NO_2$ 1-Hour Standard/ $NO_2$ Annual | |
| 1 | 175 | 4.2 | 0.16 | 146 | 26.2 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to at least 62 feet from east lot line |
| 2 | 185 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 3 | 155 | 3.5 | 0.09 | 139 | 26.0 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to at least 46 feet from west lot line |
| 4 | 119 | 8.5 | 0.21 | 159 | 26.2 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to at least 65 feet from east lot line |
| 5 | 165 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 6 | 155 | 5.9 | 0.13 | 171 | 26.3 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to at least 22 feet from west lot line |
| 7 | 95 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 22 feet from nearest receptor |
| 8 | 55 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 164 feet from nearest receptor |
| 9 | 180 | 7.1 | 0.22 | 152 | 26.5 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to any area at least 75 feet from east lot line |
| 10 | 185 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 165 feet from nearest receptor |
| 11 | 115 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 24 feet from nearest receptor |
| 12 | 100 | 6.2 | 0.21 | 182 | 26.7 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to any area at least 60 feet from the north lot line |

***Table 14-13***
***Heating and Hot Water System Analysis – Results for Projected Development Sites***

| Site | Building Height | Maximum Natural Gas Modeled Concentration (µg/m³) | | | | | Requires (E) Designation (Yes/No) |
|---|---|---|---|---|---|---|---|
| | | $PM_{2.5}$ 24-Hour | $PM_{2.5}$ Annual | $NO_2$ 1-Hour[1] | $NO_2$ Annual[1] | $PM_{2.5}$ 24-Hour/ $PM_{2.5}$ Annual/ $NO_2$ 1-Hour Standard/ $NO_2$ Annual | |
| 13 | 185 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 14 | 185 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 15 | 180 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 240 feet from nearest receptor |
| 16 | 175 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 17 | 75 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 45 feet from nearest receptor |
| 19 | 165 | 4.7 | 0.08 | 171 | 26.2 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to the area between at least 20 feet from the east lot line and 12 feet from the west lot line |
| 20 | 180 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 21 | 95 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 20 feet from nearest receptor |
| 22 | 125 | 5.3 | 0.18 | 165 | 26.6 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to the area at least 26 feet from the north lot line |
| 23 | 75 | 2.8 | 0.04 | 131 | 26.1 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to the area at least 35 feet from the south lot line |
| 24 | 95 | 7.0 | 0.19 | 180 | 26.3 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict location to the area at least 13 feet from the south lot line |
| 25 | 120 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 26 | 110 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 55 feet from nearest receptor |
| 27 | 110 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 65 feet from nearest receptor |

***Table 14-13***
***Heating and Hot Water System Analysis – Results for Projected Development Sites***

| Site | Building Height | Maximum Natural Gas Modeled Concentration (µg/m³) | | | | | Requires (E) Designation (Yes/No) |
|---|---|---|---|---|---|---|---|
| | | $PM_{2.5}$ 24-Hour | $PM_{2.5}$ Annual | $NO_2$ 1-Hour[1] | $NO_2$ Annual[1] | $PM_{2.5}$ 24-Hour/ $PM_{2.5}$ Annual/ $NO_2$ 1-Hour Standard/ $NO_2$ Annual | |
| 28 | 120 | 2.4 | 0.48 | 118 | 26.0 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to the area at least 25 feet from the north lot line |
| 29 | 95 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 50 feet from nearest receptor |
| 30 | 60 | 5.5 | 0.21 | 139 | 26.6 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to the area between at least 50 feet from the east lot line and 27 feet from the south lot line |
| 31 | 85 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 32 | 110 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 10 feet from nearest receptor |
| 33 | 110 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 34 | 105 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 35 | 65 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 36 | 110 | 8.2 | 0.22 | 168 | 27.2 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to the area at least 70 feet from the south lot line |
| 37 | 120 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 60 feet from nearest receptor |
| 41 | 120 | 7.7 | 0.20 | 171 | 26.7 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to the area between at least 50 feet from the north lot line, 44 feet from the west lot line, and 48 feet from the east lot line |
| 38 | 95 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 48 feet from nearest receptor |

***Table 14-13***
***Heating and Hot Water System Analysis – Results for Projected Development Sites***

| Site | Building Height | Maximum Natural Gas Modeled Concentration (µg/m$^3$) | | | | | Requires (E) Designation (Yes/No) |
|---|---|---|---|---|---|---|---|
| | | $PM_{2.5}$ 24-Hour | $PM_{2.5}$ Annual | $NO_2$ 1-Hour[1] | $NO_2$ Annual[1] | $PM_{2.5}$ 24-Hour/ $PM_{2.5}$ Annual/ $NO_2$ 1-Hour Standard/ $NO_2$ Annual | |
| 39 | 110 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 40 | 95 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 60 feet from nearest receptor |
| 42 | 95 | 2.5 | 0.04 | 133 | 25.9 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to the area at least 11 feet from the west lot line |
| 43 | 110 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 55 feet from nearest receptor |
| 44 | 71 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 48 feet from nearest receptor |
| 45 | 175 | 8.2 | 0.19 | 148 | 26.1 | 8.6/0.3/188/100 | Yes - 15 ppm Low NOx burner and restrict stack location to the area between at least 13 feet from the east lot line and 73 feet from the west lot line |
| 46 | 115 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 47 | 110 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 48 | 115 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 49 | 195 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 50 | 165 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 33 feet from nearest receptor |
| 51 | 45 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 52 | 105 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 53 | 105 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 54 | 135 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| 55 | 240 | 6.2 | 0.14 | 187 | 26.2 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to at least 40 feet from the west lot line |

[1]Results include background concentrations of 100 and 25.7 for $NO_2$ hourly and annual, respectively.

***Table 14-14***
***Heating and Hot Water System Analysis – Results for Potential Development Sites***

| Site | Building Height | Maximum Natural Gas Modeled Concentration (µg/m³) | | | | | Requires (E) Designation (Yes/No) |
|---|---|---|---|---|---|---|---|
| | | $PM_{2.5}$ 24-Hour | $PM_{2.5}$ Annual | $NO_2$ 1-Hour[1] | $NO_2$ Annual[1] | $PM_{2.5}$ 24-Hour/ $PM_{2.5}$ Annual/ $NO_2$ 1-Hour Standard/ $NO_2$ Annual | |
| A | 65 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| B | 165 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| C | 91 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 125 feet from nearest receptor |
| D | 185 | 1.7 | 0.08 | 107 | 26.0 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to the area at least 14 feet from the east lot line |
| E | 185 | 5.8 | 0.25 | 132 | 26.6 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to at least 32 feet from the west lot line |
| F | 158 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 27 feet from nearest receptor |
| G | 165 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 85 feet from nearest receptor |
| H | 65 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| I | 85 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| J | 90 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| K | 85 | Pass | Pass | Pass | Pass | 8.6/0.3/188/100 | No |
| L | 175 | 7.1 | 0.15 | 187 | 26.2 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to northwest corner of the lot or to the area between 12 feet from the west lot line and 71 feet from the south lot line |
| M | 95 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 75 feet from nearest receptor |
| N | 135 | 8.7 | 0.24 | 168 | 26.7 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to northwest corner of the lot |
| O | 120 | Pass with E | Pass with E | Pass with E | Pass with E | 8.6/0.3/188/100 | Yes - stack setback of 105 feet from nearest receptor |
| P | 110 | 6.0 | 0.25 | 125 | 26.5 | 8.6/0.3/188/100 | Yes - 30 ppm Low NOx burner and restrict stack location to the area between at least 86 feet from the west lot line and 153 feet from the south lot line |

[1] Results include background concentrations of 100 and 25.7 for $NO_2$ hourly and annual, respectively.

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. Two clusters were identified for refined dispersion analysis using AERMOD. The analysis was performed using the general assumptions and procedures outlined earlier for individual development sites. As shown in **Table 14-15**, the results for both clusters are below the applicable standards.

***Table 14-15: Heating and Hot Water System Analysis – Results for Cluster Analysis***

| Cluster | Cluster Height | Maximum Natural Gas Modeled Concentration (µg/m$^3$) | | | | | Requires (E) Designation (Yes/No) |
|---|---|---|---|---|---|---|---|
| | | $PM_{2.5}$ 24-Hour | $PM_{2.5}$ Annual | $NO_2$ 1-Hour[1] | $NO_2$ Annual[1] | $PM_{2.5}$ 24-Hour/ $PM_{2.5}$ Annual/ $NO_2$ 1-Hour Standard/ $NO_2$ Annual | |
| 1 | 115 | 2.9 | 0.12 | 121 | 26.3 | 8.6/0.3/188/100 | Yes - reference to Table 14-14 |
| 2 | 120, 125 | 5.6 | 0.20 | 165 | 26.6 | 8.6/0.3/188/100 | Yes – reference to Table 14-14 |

[1] Results include background concentrations of 100 and 25.7 for $NO_2$ hourly and annual, respectively.

*Industrial Sources*

Based on the industrial source screening results, one pollutant from an industrial spray booth, intended to continue operations on the mixed-use Projected site (Site #49) after development, exceeded the Short-term Guideline Concentrations (SGC) threshold criteria. Therefore, a refined air quality analysis was completed to further assess the emissions from the spray booth using AERMOD dispersion modeling and the same meteorological data inputs as used for the detailed HVAC analysis. Annual emission rates and stack parameters were adapted from the existing Permit; however, the stack height for modeling was assumed as 198 feet above ground, which is three feet above the proposed height of the projected site #49. Air quality impacts were assessed on projected site #49 (as self-contamination) and on the adjoining mixed-use projected site #45 (MTA Cable Shop, 1110 Atlantic Ave). These are the closest buildings to the stack. If the refined air impacts are predicted to be below the SGC threshold for the closest buildings, then the concentrations at farther buildings/receptors would be much lower.

Site #49 and Site #45 are 195 feet and 185 feet, respectively, above ground level. Therefore, multiple receptors were placed along the facades of the Site #49 and Site #45 at heights of 5 feet and up to 195/185 feet, with a vertical separation of 10 feet between the receptors. This is to correspond the receptors with each floor of the buildings. The analysis was performed with and without building downwash and with the highest result reported. AERMOD results, as predicted worst-case impacts, on Site #49 and Site #45 were compared with the SGC recommended in NYSDCE's DAR-1 SGC/AGC Tables[7]. **Table 14-16** presents the industrial source analysis results and shows that the SGC guideline concentration would not be exceeded at Site #49 and Site #45

[7] NYSDEC Division of Air Resources, February 2021

at any floor height. Therefore, the Proposed Actions would not have a significant adverse air quality impact due to exposure of receptors to the existing industrial source.

***Table 14-16: Industrial Source Detailed Analysis Results***

| Pollutant | CAS # | Projected Site | Maximum 1-hr Avg Concentration (µg/m$^3$) | Avg Annual Concentration (µg/m$^3$) | SGC (µg/m$^3$) | AGC (µg/m$^3$) |
|---|---|---|---|---|---|---|
| HDI Homopolymer | 28182-81-2 | Site #49 | 3.9 | 0.01 | 4.5 | 0.4 |
| | | Site #45 | | | | |