PARK AVENUE BROOKLYN REZONING
Chapter 9: Air Quality

A. INTRODUCTION

This chapter assesses the potential for the RWCDS associated with the Proposed Actions to result in significant adverse air quality impacts. Air quality impacts result from emissions generated by stationary sources at a development site (direct impacts) or from off-site emissions associated with a project (indirect impacts). Examples of direct impacts include emissions from on-site fuel combustion for heating and hot water systems, while indirect impacts include emissions from on-road vehicle trips generated by reasonable worst-case development scenario (RWCDS) associated with 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 is not projected to exceed the 2025 *City Environmental Quality Review (CEQR) Technical Manual* carbon monoxide (CO) screening threshold of 170 peak-hour vehicle trips at any intersections in the study area. However, the maximum number of project-generated vehicles is predicted to exceed 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 PM.

A stationary source analysis was conducted to evaluate potential future pollutant concentrations from the heating and hot water systems associated with certain Projected and Potential Development Sites. In addition, Projected Development Sites 2, 6, and 8 would consist of schools. Therefore, this chapter also describes the expected use of potentially hazardous materials and the procedures and systems that would be employed in the proposed school to ensure the safety of staff, students and the surrounding community in the event of a chemical spill in one of the proposed science laboratories.

The Project Area is located within manufacturing zoned districts; therefore, potential effects of stationary source emissions from existing nearby industrial facilities on the ~~Proposed Project~~total RWCDS for the Proposed Actions were assessed. In addition, potential effects from large and major sources of emissions in the study area on the Proposed Actions were evaluated.

B. PRINCIPAL CONCLUSIONS

The air quality analysis addressed emissions from mobile sources, heating and hot water systems, school laboratory exhaust systems, industrial sources and large or major sources, and determined that the Proposed Actions would not result in significant adverse impacts related to air quality.

The mobile source analyses determined that concentrations of $PM_{2.5}$ due to project-generated traffic at intersections would not result in any violations of National Ambient Air Quality Standards (NAAQS), and furthermore, concentrations were predicted to be below CEQR *de minimis* criteria.

The stationary source analyses determined that the Projected and Potential Development Sites would not result in potential significant adverse air quality impacts from fossil fuel-fired heat and hot water systems. An (E) Designation (E-898) would be mapped in connection with the Proposed Actions to ensure that the development sites would not result in any significant adverse air quality impacts from fossil fuel-fired heat and hot water systems emissions. For sites that were assumed to utilize electric heating and hot water systems, an (E) Designation would be mapped to prohibit the use of fossil fuel-fired heat and hot water systems.

An analysis of the potential school laboratory exhaust systems for Projected Development Sites 2, 6 and 8 determined there would be no significant impacts in the proposed building or on the surrounding community in the event of a chemical spill in a laboratory. An (E) Designation (E-898) would be mapped in connection with the Proposed Actions to ensure that these development sites would not result in any significant adverse air quality impacts from potential laboratory fume hood emissions.

The analysis of industrial sources determined that maximum modeled concentrations did not exceed the associated limits; therefore, there would be no significant impacts on the Projected and Potential Development Sites from existing sources of industrial emissions.

No large or major sources of emissions were identified. Therefore, no analysis is required.

C. 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 NO_x) are emitted from both mobile and stationary sources. Fine PM is also formed when emissions of NO_x, sulfur oxides (SO_x), ammonia, organic compounds, and other gases react or condense in the atmosphere. Emissions of sulfur dioxide (SO_2) are associated mainly with stationary sources, and some sources utilizing non-road diesel such as large international marine engines. On-road diesel vehicles currently contribute very little to SO_2 emissions since the sulfur content of on-road diesel fuel, which is federally regulated, is extremely low. Ozone is formed in the atmosphere by complex photochemical processes that include NO_x and VOCs. Ambient concentrations of CO, PM, NO_2, SO_2, ozone, and lead are regulated by the U.S. Environmental Protection Agency (EPA) under the Clean Air Act (CAA), and are referred to as criteria pollutants; emissions of VOCs, NO_x, and other precursors to criteria pollutants are also regulated by EPA.

Carbon Monoxide (CO)

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. However, since the traffic generated by the ~~Proposed Project~~total RWCDS for the Proposed Actions would not exceed the CO emission screening threshold of 170 vehicle trips ~~in~~ per intersection referenced in

the *CEQR Technical Manual*, a quantified assessment of CO emissions from traffic generated by the total RWCDS for the Proposed Actions~~Proposed Project~~ was not required.

Nitrogen Oxides (NO_x), Volatile Organic Compounds (VOC) and Ozone (O_3)

NO_x are of principal concern because of their role, together with VOCs, as precursors in the formation of ozone. Ozone is formed through a series of reactions that take place in the atmosphere in the presence of sunlight. Because the reactions are slow, and occur as the pollutants are carried 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 would result. An analysis of project-related emissions of these pollutants from mobile sources is therefore not warranted.

In addition to being a precursor to the formation of ozone, NO_2 (one component of NO_x) is also a regulated pollutant. Since NO_2 is mostly formed from the transformation of NO in the atmosphere, it has mostly been of concern further downwind from large stationary sources, and not a local concern from mobile sources. (NO_x emissions from fuel combustion consist of approximately 90 percent NO and 10 percent NO_2 at the source.) With the promulgation of the 2010 1-hour average standard for NO_2, local sources such as vehicular emissions may be of greater concern. However, any increase in NO_2 associated with the Proposed Actions would be relatively small due to the very small increases in the number of vehicles. This increase would not be expected to significantly affect levels of NO_2 experienced near roadways. Furthermore, the monitored NO_2 concentrations at both near-road and rooftop monitoring sites (including monitored NO_2 concentrations at near road locations are well below the 1-hour NO_2 NAAQS of 188 $\mu g/m^3$. Therefore, it is unlikely that the incremental congestion from the Proposed Actions at local intersection locations would result in an exceedance of the NO_2 NAAQS.

An assessment of NO_2 emissions from potential heat and hot water systems at certain Projected and Potential Development Sites was conducted, following the *CEQR Technical Manual* guidance.

Lead (Pb)

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 and 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, or $PM_{2.5}$, and particles with an aerodynamic diameter of less than or equal to 10 micrometers, or (PM_{10}, which includes $PM_{2.5}$). $PM_{2.5}$ has the ability to reach the lower regions of the respiratory tract, delivering with it other compounds adsorbed to the surfaces of the particles, and is also extremely persistent in the atmosphere. $PM_{2.5}$ is mainly derived from combustion material that has volatilized and then condensed to form primary PM (often soon after the release from an exhaust) 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 $PM_{2.5}$ 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 this pollutant.

An assessment of $PM_{2.5}$ emissions from potential heat and hot water systems at certain Projected and Potential Development Sites was conducted, following the *CEQR Technical Manual* guidance.

Sulfur Dioxide (SO_2)

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 vehicles, no significant quantities are emitted from vehicular sources. Vehicular sources of SO_2 are not significant and therefore analysis of SO_2 from mobile and/or non-road sources was not warranted.

It is assumed for analysis purposes that natural gas could be burned in the heating and hot water systems associated with certain Projected and Potential Development Sites. The sulfur content of natural gas is negligible; therefore, no analysis was undertaken to estimate the future levels of SO_2 with the Proposed Actions.

Air Toxics

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

Federal ambient air quality standards do not exist for noncriteria pollutants; however, the New York State Department of Environmental Conservation (DEC) has issued standards for certain noncriteria compounds, including beryllium, gaseous fluorides, and hydrogen sulfide. DEC has also developed guideline concentrations for numerous noncriteria pollutants. The DEC guidance document DAR-1[1] contains a compilation of annual and short-term (1-hour) guideline concentrations for these compounds.

The DEC guidance thresholds represent ambient levels that are considered safe for public exposure. EPA has also developed guidelines for assessing exposure to noncriteria pollutants. These exposure guidelines are used in health risk assessments to determine the potential effects to the public.

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

D. AIR QUALITY REGULATIONS, STANDARDS, AND CRITERIA

National Ambient 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 9-1**.

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 the 1-hour and 8-hour CO NAAQS.

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

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

April 18, 2014, and is now under a maintenance plan. DEC recently submitted a limited maintenance plan to EPA for the period 2024 to 2034, which is currently under review.

As described above, EPA has revised the $PM_{2.5}$ standard. DEC submitted a recommendation as in attainment of the 9 $\mu g/m^3$ NAAQS. $PM_{2.5}$ attainment designations under the new standard are expected to be effective by May 2026.

TABLE 9-1
National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary		Secondary	
	ppm	$\mu g/m^3$	ppm	$\mu g/m^3$
Carbon Monoxide (CO)				
8-Hour Average	9 (1)	10,000	None	
1-Hour Average	35 (1)	40,000		
Lead				
Rolling 3-Month Average	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 (7)	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
Annual Average (4)	NA	NA	0.010	26

~~Footnotes~~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 per 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-hr average concentration.
7. Not to be exceed more than once a year on average over 3 years.

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

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, with subsequent reclassifications to "moderate" and "serious" nonattainment since compliance with the NAAQS was not achieved by the required attainment dates. On November 29, 2021, DEC presented a demonstration that the New York Metro Area (NYMA) was not projected to meet the July 20, 2021 attainment deadline and therefore requested

that EPA reclassify the NYMA to "severe" nonattainment. EPA reclassified the NYMA from "serious" to "severe" NAA, effective November 7, 2022, which imposed a new attainment deadline of July 20, 2027 (based on 2018–2020 monitored data). On June 4, 2018, EPA designated the same area as a moderate NAA for the revised 2015 ozone standard. On June 4, 2024, DEC requested the reclassification of the NYMA from "moderate" to "serious" nonattainment" for the 2015 ozone NAAQS. 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.

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

Significant Adverse Impact Criteria

The State Environmental Quality Review Act (SEQRA) regulations and 2025 *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 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 9-1**) 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 NAA, *de minimis* criteria have been defined by DEP for CO and $PM_{2.5}$. Actions predicted to increase the concentrations of these pollutants above the de *minimis* criteria 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 mobile sources of proposed projects or actions, as set forth in the 2025 *CEQR Technical Manual*. These criteria set the minimum change in CO concentration that defines a significant adverse impact. A significant increase 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 concentrations 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 the baseline (i.e. ~~No~~ No-Action) concentration and the 8-hour standard, when the ~~No~~ No-Action concentrations are below 8 ppm.

[2] 2025 *CEQR Technical Manual* Chapter 1, Section 222, December 2020 and SEQR Regulation 6 NYCRR 617.7

$PM_{2.5}$ De Minimis Criteria

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

- Predicted increase of more than half the difference between the 24-hour background concentration and the 24-hour standard;
- Annual average $PM_{2.5}$ concentration increments that 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 for mobile sources, 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, which 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 are considered to have a potential significant adverse impact.

E. METHODOLOGY FOR PREDICTING POLLUTANT CONCENTRATIONS

Mobile Sources

Intersection Screening

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

For the CO screening, the total incremental increase in the number of project-generated trips at each intersection was compared with the *CEQR Technical Manual* of 170 vehicles. For the PM screening, the procedure outlined in the 2025 *CEQR Technical Manual* is based on determining whether the projected number of vehicles trips at an intersection exceeds thresholds based on heavy-duty diesel vehicle (HDDV) equivalents. The thresholds are as follows:

- 12 or more HDDV for paved roads with average daily traffic fewer than 5,000 vehicles;
- 19 or more HDDV for collector roads;
- 23 or more HDDV for principal and minor arterials; or
- 23 or more HDDV for expressways and limited access roads.

The screening worksheet referenced in Section 201 of the *CEQR Technical Manual* was utilized to calculate the number of heavy-duty truck equivalents at each intersection. The worksheet uses vehicle classification information based on the traffic data collected for the project and assigns these classifications to vehicle categories using a table referenced in the *CEQR Technical*

Manual[3]. Roadway classifications were determined by corridor at each intersection, based on NYCDOT functional class criteria and ~~With~~ With-Action traffic volumes. For the PM screening, all trucks that would be generated by the Proposed Actions were classified using the HDDV8B vehicle category, although the actual truck types associated with the Proposed Actions would consist of a mix of delivery and trailer trucks. All other vehicles were classified as LDGT1, which is considered most representative of the automobile category among the vehicle types listed in the worksheet.

Based on a review of the study area roadway configuration, and the Level 2 traffic screening presented in the Draft Transportation Planning Factors and Travel Demand Forecast Memorandum, it was determined that projected vehicle trips generated by the Proposed Actions will not exceed the CO threshold of 170 vehicles in a peak hour at intersections in the study area. Therefore, a CO mobile source analysis is not required.

For $PM_{2.5}$, the projected traffic volumes at a number of intersections were determined to exceed the corresponding heavy-duty truck equivalents for one or more traffic peak periods. Therefore, an intersection analysis for $PM_{2.5}$ was performed, as discussed below.

Intersection Analysis

The prediction of vehicle-generated emissions and their dispersion in an urban environment incorporates meteorological phenomena, traffic conditions, and physical configuration. Air pollutant dispersion models mathematically simulate how traffic, meteorology, and physical configuration combine to affect pollutant concentrations. The mathematical expressions and formulations contained in the various models attempt to describe an extremely complex physical phenomenon as closely as possible. However, because all models contain simplifications and approximations of actual conditions and interactions, and since it is necessary to predict the reasonable worst-case condition, most dispersion analyses predict conservatively high concentrations of pollutants, particularly under adverse meteorological conditions.

The mobile source analyses for the Proposed Actions employ models approved by EPA that have been widely used for evaluating air quality impacts of projects in New York City, other parts of New York State, and throughout the country. The modeling approach includes a series of conservative assumptions relating to meteorology, traffic, and background concentration levels resulting in a conservatively high estimate of expected pollutant concentrations that could ensue from the Proposed Actions.

VEHICLE EMISSIONS

Engine Emissions

Vehicular cruise and idle $PM_{2.5}$ emission factors utilized in the dispersion modeling were computed using EPA's mobile source emissions model, Motor Vehicle Emission Simulator (MOVES5).[4] This emissions model is capable of calculating engine emission factors for various vehicle types, based on the fuel type (gasoline, diesel, or natural gas), meteorological conditions, vehicle speeds, vehicle age, roadway types, number of starts per day, engine soak time, and various other factors that influence emissions, such as inspection maintenance programs. The inputs and use of MOVES incorporate the most current guidance available from DEC.

[3] MOBILE6 Input Data Format Reference Tables, August 14, 2003.

[4] EPA, Motor Vehicle Emission Simulator (MOVES): User Guide for MOVES2014a. EPA420B15095. November 2015. Overview of EPA's Motor Vehicle Emission Simulator (MOVES5). November 2024, EPA-420-R-24-011.

Project specific vehicle classification data obtained through field studies were mapped to the 13 vehicle categories defined in the MOVES model based on New York State vehicle registration data in accordance with the current guidance in the *CEQR Technical Manual*. County-specific hourly temperature and relative humidity data obtained from DEC were used.

Road Dust

To account for the suspension of fugitive road dust in air from vehicular traffic in the local microscale analysis, $PM_{2.5}$ emission rates included fugitive road dust. However, fugitive road dust was not included in the neighborhood scale $PM_{2.5}$ microscale analyses, since the New York City Department of Environmental Protection (DEP) considers it to have an insignificant contribution on that scale. Road dust emission factors were calculated according to the latest procedure delineated by EPA[5] and the *CEQR Technical Manual*.

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 8, "Transportation"**). Traffic data for the Future without the Proposed Actions (the ~~No~~ No-Action condition) and the ~~With~~ With-Action condition were employed in the respective air quality modeling scenarios. The peak morning, midday, and evening period traffic volumes were used as a baseline for determining off-peak volumes for weekdays, and the peak Saturday period was used for weekend days. Off-peak traffic volumes in the ~~No~~ No-Action condition, and off-peak increments from the Proposed Actions were determined by adjusting the peak period volumes by the 24-hour distributions of actual vehicle counts collected at appropriate locations. For annual impacts, average weekday and weekend 24-hour distributions were used to more accurately simulate traffic patterns over longer periods.

Dispersion Modeling

Potential impacts from the Proposed Actions' mobile sources were predicted using the American Meteorological Society/EPA Regulated Model (AERMOD) Version 24142.[6] 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. AERMOD is a recommended model for transportation air quality analyses, and EPA mandated its use for transportation conformity purposes after a three-year transition period.[7]

The analysis was performed using an EPA line source representation of emission sources in order to simulate traffic-related air pollutant dispersion.[8] In addition, the weighted average release height and initial vertical source parameters were calculated for each modeled roadway.

For the $PM_{2.5}$ analysis, 24-hour traffic volumes were estimated using peak hour volumes as a baseline to determine volumes throughout the day. Off-peak traffic volumes were determined by

[5] EPA. Compilations of Air Pollutant Emission Factors AP-42. Fifth Edition, Volume I: Stationary Point and Area Sources, Ch. 13.2.1. NC. http://www.epa.gov/ttn/chief/ap42. January 2011.

[6] EPA. User's Guide for the AMS/EPA Regulatory Model (AERMOD). Office of Air Quality Planning and Standards. EPA-454/B-24-007, November 2024.

[7] EPA. Revisions to the Guideline on Air Quality Models: Final rule.89 FR 95043.

[8] EPA. Project-Level Conformity and Hot-Spot Analyses, available at: https://www.epa.gov/state-and-local-transportation/project-level-conformity-and-hot-spot-analyses#pmguidance.

adjusting the peak period volumes by the 24-hour distributions from available data at appropriate 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 the LaGuardia Airport National Weather Service Station (NWS) and upper air data collected at Brookhaven, New York for the period 2015–2019.[9] 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 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 are available were classified using categories defined in digital United States Geological Survey (USGS) maps. The meteorological dataset processed with the AERMET Version 19191 processor, provided by the DEC, was used for the analysis.[10]

All hours were modeled, and the highest resulting concentration for each averaging period were presented, based on the form of the standard or criterion.

Analysis Year

The microscale analyses were performed for 2031, the year by which development facilitated by the Proposed Actions are likely to be completed. The future analysis was performed for both without the Proposed Actions (the ~~No~~ No-Action condition) and with the Proposed Actions (the ~~With~~ With-Action condition).

Background Concentrations

Background concentrations are those pollutant concentrations originating from distant sources that are not directly included in the modeling analysis, which directly accounts for vehicular emissions on the streets within 1,000 feet and in the line of sight of an analysis site. Background concentrations must be added to modeling results to obtain total pollutant concentrations at an analysis site.

The background concentrations used in the mobile source analysis are based on concentrations recorded at a monitoring station representative of the county or from the nearest available monitoring station and in the statistical form of the National Ambient Air Quality Standards (NAAQS), as provided in the *CEQR Technical Manual*. The background concentrations are presented in **Table 9-2**.

[9] DEC has stated that upper air measurements for 2022 are missing a significant number of days, consequently 2022 meteorological data is not being considered.

[10] DEC staff previously communicated in an email to AKRF that the met data provided by DEC and processed with earlier versions is acceptable for use with later AERMOD versions. DEC does not have immediate plans to update the met data using AERMET Version 24142.

TABLE 9-2
Maximum Background Pollutant Concentrations for Mobile Source Analysis

Pollutant	Average Period	Location	Concentration	NAAQS
$PM_{2.5}$	24-hour	JHS 126	17.8 µg/m^3	35 µg/m^3 (1)
	Annual	JHS 126	7.7 µg/m^3	9 µg/m^3

~~**Notes:**~~**Note:**
(1) $PM_{2.5}$ 24-hour-average concentration represents the average of the 98th percentile day from three recent years of data.
Source: *New York State Air Quality Report Ambient Air Monitoring System, DEC, 2017-2019.*

$PM_{2.5}$ concentrations were based on three recent years of monitored data (2017–2019)[11] consistent with the statistical format of the NAAQS. To develop background levels for each pollutant, concentrations measured at the most representative ambient monitoring station operated by DEC over a three-year period were used consistent with DEC guidance. 2020 and 2021 data were not used because of uncertainties in the representativeness of background concentrations for these years due to effects of COVID-19, consistent with DEP guidance.

Analysis Site

One intersection exceeded the PM emission screening threshold discussed in Chapter 17, Sections 210 and 311, of the *CEQR Technical Manual*, at Park Avenue and Walworth Street. Therefore, a quantified assessment of emissions from traffic generated by the Proposed Actions was performed for PM at this location.

Receptor Placement

Multiple receptors (i.e., precise locations at which concentrations are evaluated) were modeled at the selected site. Receptors were placed along the approach and departure links and roadway segments at regularly spaced intervals. Ground-level receptors were placed at sidewalk or roadside locations near intersection with continuous public access, at a pedestrian height of 1.8 meters. Based on the DEP guidance for neighborhood-scale corridor $PM_{2.5}$ modeling, receptors in that analysis were placed at a distance of 15 meters, from the nearest moving lane at the analysis location.

Stationary Sources

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

Heat and Hot Water Systems

In 2021, the New York City Council passed a bill, Local Law 154 (LL154), that effectively bans the installation of most new natural gas and other fossil fuel-fired systems in buildings in New York City. In addition, the design of the proposed buildings must meet the applicable provisions of the New York City Energy Conservation Code and demonstrate consistency with the City's carbon intensity limits established pursuant to Local Law 97 of 2019. For Projected Development Site 2, 6 and 8, heating and hot water systems would be required to be electric-powered to meet the provisions of LL154. While it is anticipated that most of the other proposed buildings would also utilize electric heating and/or hot water systems, at this time, design information is not available. Therefore, for the purpose of evaluating potential air quality impacts associated with

[11] The 2020 and 2021 background data were not used because of uncertainties in the representativeness of background concentrations for these years due to effects of COVID-19, based on available guidance from DEP.

the reasonable worst-case development scenario, it was conservatively assumed that each of the other Projected Development Sites and the Potential Development Sites would utilize natural gas-fired heating and/or hot water systems.

The analysis of fossil fuel-fired heating and hot water systems of the RWCDS Projected Developments followed the procedures outlined in the 2025 *CEQR Technical Manual* to determine the potential for impacts on existing and ~~No~~ No-Action developments as well as "project-on-project" impacts.

The analysis was performed 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. AERMOD is EPA's preferred regulatory stationary source model.

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.

For the refined analysis, the exhaust stacks for the heat and hot water systems were assumed to be located at the edge of the development massing closest to the receptor, at an initial distance of 10 feet or greater from the nearest receptor. This included a minimum distance of 10 feet from the edge of the roof of the building where the stack was assumed to be located.

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. If a source could not meet the NAAQS or $PM_{2.5}$ *de minimis* criteria using the initial heating and hot water system stack assumptions, further restrictive measures were considered, including setting the stack back, use of low NO_x burners, increasing stack height, or a combination of these measures.

EMISSION ESTIMATES AND STACK PARAMETERS

Fuel consumption was estimated based on the procedure outlined in the *CEQR Technical Manual*. Using information in the Air Quality Appendix of the *CEQR Technical Manual*, an estimate of the emissions from the development's heating and hot water systems was made. The appendix includes tables which were used to estimate emissions based on the development size, type of fuel used and type of construction. A natural gas fuel consumption factor of 47.8 ft^3/ft^2-year and 36.1 ft^3/ft^2-year was used for residential and commercial developments, respectively. Mixed-use developments used the residential fuel consumption factors since they are more conservative. Short-term factors were determined by estimating peak hourly fuel consumption estimates for

heating and cooling systems assuming that the calculated annual fuel consumption occurs over a 100-day heating season.

Emission factors from the natural gas combustion section of EPA's AP-42 were used to calculate emission rates for the Projected Development Sites' heat and hot water systems.

To calculate exhaust velocity, the fuel consumption of the RWCDS Projected Developments was multiplied by EPA's fuel factor for natural gas,[12] providing the exhaust flow rate at standard temperature; the flow rate was then corrected for the exhaust temperature, and exhaust velocity was calculated based on the stack diameter. Assumptions for stack diameter and exhaust temperature for the proposed systems were obtained from a survey of boiler exhaust data provided by New York City Department of Environmental Protection (DEP),[13] and were used to calculate the exhaust velocity.

The emission rates and exhaust stack parameters used in the modeling analyses are presented in **Table 9-3.**

TABLE 9-3
Exhaust Stack Parameters and Emission Rates – Projected Heating and Hot Water Systems

Stack Parameter	Projected Development Site 1	Projected Development Site 3	Projected Development Site 4	Projected Development Site 5	Projected Development Site 7	Projected Development Site 9	Projected Development Site 10	Projected Development Site 11	Projected Development Site 12
Building Floor Area (gross square feet)	76,627	72,244	66,778	101,949	30,293	87,956	40,978	21,638	47,095
Building Height (feet)	125	125	125	125	125	125	125	95	125
Stack Height Above Building (feet)	3	3	3	3	10	3	3	3	10
Stack Height (feet)	128	128	128	128	135	128	128	98	1358
Stack Diameter (feet) (1)	2	2	2	2	2	2	2	2	2
Exhaust Velocity (feet/second)(1)	2.254	2.125	1.964	2.999	0.891	2.587	1.205	0.636	1.385
Exhaust Temperature (degrees Fahrenheit)(1)	307.8	307.8	307.8	307.8	307.8	307.8	307.8	307.8	307.8
Emission Rate (grams/second)									
NO_2 (1-hour average)	0.01925	0.00673	0.00622	0.02561	0. 00761	0.00819	0.00381	0.00543	0. 01183
NO_2 (Annual average)	0.00527	0.00184	0.00170	0.00702	0.00208	0.00224	0.00105	0.00149	0.00324
$PM_{2.5}$ (24-hour average)	0.00146	0.00138	0.00127	0.00195	0.00058	0.00168	0.00078	0.00041	0.00090
$PM_{2.5}$ (Annual average)	0.00040	0.00038	0.00035	0.00053	0.00016	0.00046	0.00021	0.00011	0.00025

Note:
(1) Stack parameter assumptions were obtained from a survey of boiler exhaust data provided by DEP.

One-hour average NO_2 concentration increments associated with the Projected and Potential Development Sites' hot water systems were estimated using AERMOD model's Plume Volume

[12] EPA. *Standards of Performance for New Stationary Sources.* 40 CFR Chapter I Subchapter C Part 60. Appendix A-7, Table 19-2. 2013.

[13] DEP. *Boiler Database*. August 11, 2017.

Molar Ratio Method (PVMRM) module to analyze chemical transformation within the model. The PVMRM module incorporates hourly background ozone concentrations to estimate NO_x transformation within the source plume. The model applied ozone concentrations measured in 2015–2019 at the DEC Queens College monitoring station, which is the nearest ozone monitoring station to the ~~project site~~Project Area.[14] An initial NO_2 to NO_x ratio of 10 percent at the source exhaust stack was assumed, which is considered representative for boilers.

The methodology used to determine the compliance of total one-hour NO_2 concentrations from the proposed sources with the one-hour NO_2 NAAQS was based on adding the monitored background to modeled concentrations, as follows: hourly modeled concentrations from proposed sources were first added to the seasonal hourly background monitored concentrations; then the highest combined daily one-hour NO_2 concentration was determined at each receptor location and the 98th percentile daily one-hour maximum concentration for each modeled year was calculated within the AERMOD model; finally, the 98th percentile concentrations were averaged over the latest five years. This methodology is referenced in EPA modeling guidance[15] and is recognized by the City.

Annual NO_2 concentrations from heating and hot water sources were estimated using the Tier 1 method, which conservatively assumes a full conversion of NO_2 to NO_x.[16]

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 9-4**). To develop background levels, concentrations measured at the most representative DEC ambient monitoring station a recent three-year period (2017–2019) were used for annual and 1-hour average NO_2 background concentrations. The 2020 and 2021 background data were not used because of uncertainties in the representativeness of background concentrations for these years due to effects of COVID-19, based on available guidance from DEP.

TABLE 9-4
Maximum Background Pollutant Concentrations

Pollutant	Average Period	Location	Concentration (µg/m^3)	NAAQS (µg/m^3)
NO_2	1-hour	Queens College 2	103.8	188
	Annual	Queens College 2	28.7	100
$PM_{2.5}$	24-hour	JHS 126	17.8	35

Source: New York State Air Quality Report Ambient Air Monitoring System, DEC, 2017–2019.

$PM_{2.5}$ annual average impacts are assessed on an incremental basis and compared with the $PM_{2.5}$ *de minimis* criteria, without considering the annual background. Therefore, the annual $PM_{2.5}$ background is not presented in the table. The $PM_{2.5}$ 24-hour average background concentration

[14] 2020 and 2021 background data were not used because of uncertainties in the representativeness of background concentrations for these years due to effects of COVID-19, consistent with DEP guidance. 2022 and later background data were not used since it needs to be paired with concurrent meteorological data, which NYSDEC has stated is missing a significant number of days of upper air measurements. Consequently, this data is not available for use in modeling analyses.

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

[16] Appendix W to Part 51, *Guideline on Air Quality Models*, Section 4.2.3.4.

of 17.8 µg/m^3 (based on the 2017 to 2019 average of 98th percentile concentrations measured at the JHS 126 monitoring station) was used to establish the *de minimis* value for the 24-hour increment, consistent with the guidance provided in the *CEQR Technical Manual*.

METEOROLOGICAL DATA

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

RECEPTOR PLACEMENT

Discrete receptors (i.e., locations at which concentrations are calculated) were modeled along the existing and proposed building façades to represent potentially sensitive locations such as operable windows and intake vents. Receptors were placed at elevated locations on all façades and at multiple elevations on buildings, to identify maximum pollutant concentrations. Generally, receptors were spaced at a three-meter (approximately 10 feet) interval vertically to represent individual floors of a building, while horizontally, receptor spacing was a minimum of three meters and a maximum of 10 meters (approximately 33 feet).

Chemical Spill Analysis

INTRODUCTION

Emissions from potential fume hood exhaust systems associated with the proposed schools', were analyzed. Impacts were evaluated to assess potential impacts in the event of an accidental chemical spill in a laboratory using information, procedures, and methodologies contained in the *CEQR Technical Manual*. Maximum concentrations were compared to the short-term exposure levels (STELs) or to the ceiling levels recommended by the U.S. Occupational Safety and Health Administration (OSHA) for the chemicals examined. Since design information was not available, it was assumed that the types and quantities of materials that are to be used in the proposed schools are those typically used in school science laboratories at New York City Department of Education schools.

Emissions from the proposed school buildings' fume hood exhaust system were evaluated, in the event of an accidental chemical spill in one of the laboratories. Impacts were evaluated using information, procedures, and methodologies described in the *CEQR Technical Manual*. Maximum concentrations were compared to the short-term exposure levels (STELs) or to the ceiling levels recommended by the U.S. Occupational Safety and Health Administration (OSHA) for each chemical examined.

The following section details the expected usage of potentially hazardous chemicals, as well as the ventilation system that would be employed at the public high schools to ensure the safety of the students and staff and the surrounding community in the event of an accidental laboratory chemical spill in the science laboratories. Two quantitative analyses employing mathematical modeling were prepared to determine potential impacts at (1) operable windows and air intakes in nearby buildings and at nearby places of public access; and (2) the school itself due to recirculation into air intake systems, windows, and open air terraces.

LABORATORY FUME HOOD EXHAUSTS

All laboratories in which hazardous chemicals are used would be equipped with fume hoods. Fume hoods are workstation enclosures that are maintained under negative pressure and continuously vented to the outside when work is taking place. Their function is to protect teachers, staff, and students from potentially harmful fumes. By providing an exhaust from laboratory rooms, they also prevent any fumes released within the laboratory from escaping into other areas of the building, or through windows to the outside.

Since design information is not yet available on the fume hood exhaust system, a set of conservative assumptions was used. The worst-case analysis assumed the fume hood exhausts would be combined and vented to the building roof through a single stack. Multiple locations of the fume hood exhaust were tested in order to determine the worst-case location. The minimum fume hood exhaust stack height was determined to be 15 feet above the building roof. An exhaust fan sufficient to maintain a minimum exit velocity of 1,500 feet per minute through a 12-inch stack discharge was also assumed.

CHEMICALS FOR ANALYSIS

An inventory of the types and quantities of typical chemicals that are likely to be used based on environmental assessments conducted for proposed public schools was used for the analysis. From the chemical inventory, 14 chemicals were selected for further examination, based on their toxicity and potential for air quality impacts. Common buffers, salts, enzymes, nucleotides, peptides, and other bio-chemicals were not considered in the analysis since they are not typically categorized as air pollutants. Nonvolatile chemicals (i.e., with a vapor pressure of less than 10 mm Hg) were excluded as well since they would largely not be released in a spill.

The hazardous chemicals selected are presented in **Table 9-5**. The vapor pressure shown for each chemical is a measure of its volatility (tendency to evaporate) or to form vapors, which is a critical parameter in determining potential airborne impacts from chemical spills. Exposure standards are safety- and health-based standards indicative of the chemical's toxicity—substances with higher toxicity have lower exposure standards. These include OSHA's permissible exposure limit (PEL), National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit (REL) and/or OSHA's STEL, ceiling, and immediately dangerous to life or health (IDLH) values. For all chemicals, the lowest value was chosen as the threshold to determine potential impacts.

TABLE 9-5
Expected Hazardous Materials in the Proposed School Laboratories

Chemical [CAS #]	Vapor Pressure mm Hg	PEL PPM	STEL PPM	REL PPM	IDLH PPM	Ceiling PPM
Acetone [67-64-1]	180	1,000	–	250	2,500	--
Allyl Alcohol [107-18-6]	17	2	4	2	20	--
Benzene [71-43-2]	75	1	1	--	500	–
Cyclohexene [110-83-8]	67	300	–	300	2,000	--
Ether [60-29-7]	442	400	500	--	1,900	–
Ethyl Acetate [141-78-6]	73	400	–	400	2,000	–
Ethyl Alcohol [64-17-5]	44	1,000	–	1,000	3,300	--
Isopropyl Alcohol [67-63-0]	33	400	500	400	2,000	--
Methyl Alcohol [67-56-1]	96	200	250	200	6,000	--
Nitric Acid [7697-37-2]	48	2	4	2	25	--
n-Butyl Acetate [123-86-4]	10	150	200	150	1,700	--
Petroleum distillates (Naphtha) [80002-05-9]	40	500	1,800 mg/m³	350 mg/m³	1,100	-
t-Butyl Alcohol [76-65-0]	42	100	150	100	1,600	-
Toluene [108-88-3]	21	100	150	100	500	300

Source: NIOSH Pocket Guide to Chemical Hazards. https://www.cdc.gov/niosh/npg/default.html
Notes:
PEL: Permissible Exposure Limit, Time Weighted Average (TWA) for up to an 8-hour workday during a 40-hour workweek; set by OSHA
STEL: Short-Term Exposure Limit, a 15-minute TWA exposure that should not be exceeded at any time during a workday.
IDLH: Immediately Dangerous to Life or Health.
REL: Recommended Exposure Limit, TWA for up to a 10-hour workday during a 40-hour workweek; set by NIOSH.
Ceiling: Level set by NIOSH or OSHA not to be exceeded in any working exposure
PPM: parts per million.
Where a hyphen (-) appears, there is no recommended corresponding guideline value.

ESTIMATES OF WORST-CASE EMISSION RATES

The dispersion of hazardous chemicals from a chemical spill within one of the proposed school laboratories was analyzed to assess the potential for exposure of the general public, and of students and staff within the school to hazardous vapors in the event of an accident. Evaporation rates for volatile hazardous chemicals expected to be used in the proposed laboratory were estimated using the model developed by the Shell Development Company.[17] The Shell model, which was developed specifically to assess air quality impacts from chemical spills, calculates evaporation rates based on physical properties of the compound, temperature, and rate of air flow over the spill surface. Room temperature conditions of 20°C and an air-flow rate of 0.5 meters per second were assumed for calculating evaporation rates.

Based on the relative STELs and the vapor pressures of the chemicals listed in **Table 9-5**, the most potentially hazardous chemicals are shown in **Table 9-6**. Besides the relative toxicities, other factors such as molecular weight, container size, and frequency of use were also considered. Chemicals with high vapor pressures evaporate most rapidly. The chemicals selected also have the lowest STEL. Since the chemicals selected for detailed analysis are most likely to have a relatively higher emission rate and the lowest exposure standards, if the analysis of these chemicals results in no significant adverse air quality impacts, it would indicate that the other chemicals listed in **Table 9-5** would also not present any significant potential impacts.

[17] Fleischer, M.T. An Evaporation/Air Dispersion Model for Chemical Spills on Land. Shell Development Company. December 1980.

TABLE 9-6
Chemicals Selected for Worst-Case Spill Analysis

Site	Chemical	Quantity (liters)	Evaporation Rate (gram/meter^2/sec)	Emission Rate* (gram/sec)
Projected Development Sites 2, 6 and 8	Allyl Alcohol	0.08	0.07	0.08
	Benzene	0.42	0.36	0.41
	Nitric Acid	0.18	0.27	0.30
	Acetone	1.04	0.82	0.91
	Ether	3.41	2.43	2.7
	Methyl Alcohol	0.35	0.27	0.31

Note: * Average emission rate.

The analysis conservatively assumes that a chemical spill in a fume hood would extend to an area of 12 square feet (sf) (approximately 1.11 square meters). The emission rates were determined using the evaporation rates and assuming this maximum spill area. For modeling purposes, the emission rates shown in **Table 9-6** are assumed to continue for a 15-minute time period after which the spill would be contained. The vapor from the spill would be drawn into the fume hood exhaust system and released into the atmosphere via the roof exhaust fans. The high volume of air drawn through this system provides a high degree of dilution for hazardous fumes before they are released above the roof. The exhaust height of the fan would be at an elevation of three feet above the building roof.

DISPERSION MODELING—RECIRCULATION IN THE LABORATORY BUILDING INTAKES

The potential for recirculation of the fume hood emissions back into the proposed laboratory building air intakes was assessed using the Wilson method.[18] This empirical procedure, which has been verified by both wind-tunnel and full-scale testing, is a refinement of the 1981 *ASHRAE Handbook* procedure, and takes into account such factors as plume momentum, stack-tip downwash, and cavity recirculation effects. The procedure determines the worst-case, absolute minimum dilution between exhaust vent and air intake. Three separate effects determine the eventual dilution: internal system dilution, obtained by combining exhaust streams (i.e., mixing in plenum chambers of multiple exhaust streams, and introducing fresh air supplied from roof intakes); wind dilution, dependent on the distance from vent to intake and the exit velocity; and dilution from the stack, caused by stack height and plume rise from vertical exhaust velocity. The critical wind speed for worst-case dilution is dependent on the exit velocity, the distance from vent to intake, and the cross-sectional area of the exhaust stack.

DISPERSION MODELING—DISPERSION IN THE SURROUNDING AREA

Maximum concentrations at elevated receptors downwind of the fume exhausts were estimated using the EPA AERMOD dispersion model.

Concentrations were evaluated at nearby buildings and publicly accessible areas. This included locations along the façades and roof of the buildings, operable windows, intake vents, and otherwise accessible locations. Multiple elevations were analyzed at spaced intervals on the buildings.

The power law relationship was used to convert the calculated 1-hour average maximum concentrations to short-term 15-minute averages. The 15-minute average concentrations were then compared to the STELs or to the ceiling levels for the chemicals examined.

[18] D.J. Wilson. A Design Procedure for Estimating Air Intake Contamination from Nearby Exhaust Vents, ASHRAE TRAS 89, Part 2A, pp. 136-152, 1983.

Industrial Sources

Pollutants emitted from existing sources were examined to identify potential adverse impacts on future residents of the proposed buildings. Businesses with potential manufacturing or process emission sources within 400 feet of the Project Area were surveyed for inclusion in the air quality impact analyses, as recommended in the *CEQR Technical Manual*. Existing land uses were reviewed to identify potential sources of emissions from manufacturing/industrial operations. A search of federal, state, and city permit data within the study area was conducted using the DEP Clean Air Tracking System (CATS) database[19] and the DEC Info Locator.[20]

A field survey was conducted on August 20, 2025, to determine the operating status of permitted sources and identify any potential industrial sites not included in the original permit request or the permit databases. The field survey determined that American Almond Products, with DEP permits PA004099, PA003999 and PA035374 which expired in 2017, is no longer operational and the business has closed. Additionally, one permitted source, Control Electro Polishing, with active DEP permits PA031197, PA166773 and PA166873 for metal processing, is located at 109 Walworth Street (Block 1736, Lot 50) and is currently operational.

Control Electro Polishing operates soap, metal cleaning and electropolishing tanks. Permit PA031197 lists three pollutants – hydrogen chloride (CAS 07647-01-0), nitric acid (CAS 07697-37-2), and sodium hydroxide (CAS 01310-73-2). Permit PA166773 list two pollutants – phosphorus acid/acid mist nec (CAS NY103-00-0) and sulphuric acid (CAS 07664-93-9). Permit PA166873 lists one pollutant – alkaline mist/basic mist nec (CAS NY104-00-0). Neither CAS NY103-00-0 nor CAS NY104-00-0 is listed in the DAR-1 database or have equivalents. Because phosphorus acid/acid mist nec (CAS NY103-00-0) is an acid, it was modeled as nitric acid from Permit PA031197. Nitric acid was chosen instead of hydrogen chloride because it has a more conservative DEC short-term guideline concentration (SGC) and annual guideline concentration (AGC) threshold compared to hydrogen chloride. Likewise, because alkaline mist/basic mist nec (CAS NY104-00-0) is a base, it was modeled as sodium hydroxide from Permit PA031197. The emission rates listed in these permits for acid mist nec and alkaline mist were combined with nitric acid and sodium hydroxide emission rates, respectively. The pollutants and emission rates for Control Electro Polishing are presented in **Table 9-7**.

[19] DEP. Clean Air Tracking System database. https://a826-web01.nyc.gov/DEP.BoilerInformationExt.

[20] DEC. https://gisservices.dec.ny.gov/gis/dil/

TABLE 9-7
Modeled Emission Rates of Existing Industrial Source DEP Permitted Sources

Facility	Description of Process	DEP Permit ID	Pollutant Name	CAS No.:	Hourly Emissions (lb/hr)	Annual Emissions (lb/yr)
Control Electro Polishing	Metal Cleaning	PA031197	Hydrogen Chloride	07647-01-0	0.001	1.6
			Nitric Acid	07697-37-2	0.001	1.6
			Sodium Hydroxide	01310-73-2	0.001	1.6
		PA166773	Phosphorus Acid/Acid Mist Nec(1)	NY103-00-0	0.11	80
			Sulphuric Acid	07664-93-9	0.03	45
		PA166873	Alkaline Mist/Basic Mist Nec(2)	NY104-00-0	0.125	200

Notes:
(1) Since no SGC or AGC is assigned to this pollutant, it was modeled with nitric acid from Permit PA031197 for evaluation purposes.
(2) Since no SGC or AGC is assigned to this pollutant, it was modeled with sodium hydroxide from Permit PA031197 for evaluation purposes.

REFINED DISPERSION ANALYSIS

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

To assess the effects of multiple sources emitting the same pollutants, cumulative source impacts were determined. Predicted worst-case impacts on the Projected and Potential Development Sites were compared with the SGCs and AGCs recommended in DEC's DAR-1 AGC/SGC Tables. These guidelines present the airborne concentrations that are applied as a screening threshold to determine if the future residents of the Projected and Potential Development Sites could be significantly impacted by nearby sources of air pollution.

Discrete receptors (i.e., locations at which concentrations were calculated) were placed on the potentially affected Projected and Potential Development Sites. The receptor network consisted of receptors located at spaced intervals along the sides of the development site from the ground floor to the roof.

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

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 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.

F. EXISTING CONDITIONS

Background Concentrations

The representative criteria pollutant concentrations measured in recent years at DEC air quality monitoring stations nearest to the Project Area are presented in **Table 9-8**. The values presented are consistent with the form of the NAAQS. As shown in the table, the recently monitored levels did not exceed the NAAQS. The data was obtained from DEC for the most recent three-year period (2022-2024).[21]

TABLE 9-8
Representative Monitored Ambient Air Quality Data

Pollutant	Location	Units	Averaging Period	Concentration	NAAQS
CO	Queens College	ppm	1-hour	1.7	35
	Queens College		8-hour	1.3	9
SO_2	Queens College	µg/m^3	1-hour	12.0	196
PM_{10}	Queens College	µg/m^3	24-hour	47	150
$PM_{2.5}$	JHS 126	µg/m^3	Annual	7.8	9
			24-hour	18.5	35
NO_2	Queens College	µg/m^3	Annual	25.7	100
	Queens College		1-hour	79.7	188
Lead	IS 52	µg/m^3	3-month	0.0049	0.15
Ozone	Queens College	ppm	8-hour	0.071	0.070

Source: New York State Air Quality Report Ambient Air Monitoring System, DEC, 2022-2024.
Notes:
(1) The CO concentrations represent the three-year average (2022-2024) of the second-highest value.
(2) The PM_{10} concentrations are the three-year average (2022-2024) of the 4th highest daily maximum 8-hour average concentrations.
(3) $PM_{2.5}$ annual concentrations are the average of 2022–2024 annual concentrations, and the 24-hour concentration is the average of the annual 98th percentile concentrations in the same period.
(4) The SO_2 1-hour and NO2 1-hour concentrations are the average of the 99th percentile and 98th percentile, respectively.
(5) The ozone concentration is based on the 3-year average (2022–2024) of the 4th highest daily maximum 8-hour average concentrations.

G. THE FUTURE WITHOUT THE PROPOSED ACTIONS (NO-ACTION CONDITION)

Mobile Sources

$PM_{2.5}$ concentrations for the ~~No~~ No-Action condition are not presented, since impacts are assessed on an incremental basis.

Stationary Sources

In the ~~No~~ No-Action condition, two sites within the Project Area are assumed to be redeveloped on an as-of-right basis pursuant to existing zoning (Projected Development Sites 2 and 12). All other sites within the Project Area are expected to remain the same as under existing conditions. The Proposed Actions would result in more development, and therefore, the emissions from heat and hot water systems associated with the Proposed Actions would potentially be cumulatively ~~be~~ greater than the emissions from heat and hot water systems under the ~~No~~ No-Action condition,

[21] Data obtained from https://dec.ny.gov/sites/default/files/2025-08/2024airqualreport.pdf

although the increase would be affected due to the requirements to reduce fossil fuel usage established under Local Law 97 and Local Law 154.

H. THE FUTURE WITH THE PROPOSED ACTIONS (WITH-ACTION CONDITION)

Mobile Sources

Intersection Analysis

Using the methodology previously described, maximum predicted 24-hour and annual average $PM_{2.5}$ concentrations were calculated so that they could be compared with the NAAQS and the *de minimis* criteria, respectively. Based on this analysis, the maximum predicted localized 24-hour average and neighborhood-scale annual average incremental $PM_{2.5}$ concentrations are presented in **Tables 9-9 and 9-10**, respectively. **Tables 9-9 and 9-10** also present the maximum predicted concentrations in the ~~No~~ No-Action and ~~With~~ With-Action condition. The values shown are the highest predicted concentrations for the modeled receptor locations and include background concentrations.

TABLE 9-9
Maximum Predicted 24-Hour Average $PM_{2.5}$ ~~With~~ With-Action and Incremental Concentrations (µg/m^3)

Analysis Site	Location	No-Action	With-Action	Increment	De Minimis Criterion
1	Park Avenue & Walworth Street	-	-	0.7	8.6[(1)]
		19.8[(2)]	20.2[(2)]	-	35[(3)]

Notes:
[(1)] $PM_{2.5}$ de minimis criterion—24-hour average, not to exceed more than half the difference between the background concentration (17.8 µg/m^3) and the 24-hour standard of 35 µg/m^3.
[(2)] The 24-hour $PM_{2.5}$ concentration presented represents the maximum of the total 98th percentile. Concentrations presented include a background concentration of 17.8 µg/m^3.
[(3)] NAAQS.

TABLE 9-10
Maximum Predicted Annual Average $PM_{2.5}$ ~~With~~ With-Action and Incremental Concentrations (µg/m^3)

Analysis Site	Location	No-Action	With-Action	Increment	De Minimis Criterion
1	Park Avenue & Walworth Street	-	-	0.02	0.1[(1)]
		7.79 [(2)]	7.81[(2)]	-	9[(3)]

Notes:
[(1)] $PM_{2.5}$ de minimis criterion—annual (neighborhood scale), 0.1 µg/m^3.
[(2)] Concentrations presented include a background concentration of 7.7 µg/m^3.
[(3)] NAAQS.

The results show that the 24-hour and annual $PM_{2.5}$ increments are predicted to be below the *de minimis* criteria and total concentrations are below the NAAQS at the analysis site. Therefore, no significant adverse air quality impacts are predicted from mobile sources of emissions due to the Proposed Actions.

Stationary Sources

Heat and Hot Water Systems

As described previously, a refined dispersion modeling analysis of potential fossil fuel-fired heating and hot water systems was prepared. **Tables 9-11 and 9-12** present the maximum predicted concentrations from the potential natural gas-fired heating and/or hot water systems associated with the Proposed Actions on the Project Area and off-site locations, respectively.

TABLE 9-11
Maximum Modeled Pollutant Concentrations on the Project Area from the Potential Heating and Hot Water Systems (µg/m^3)

Pollutant	Averaging Period	Maximum Modeled Concentration	Background	Total Concentration	Criterion
NO_2	1-hour	186(1)	N/A	186	188(2)
	Annual	1.93	28.7	30.6	100
$PM_{2.5}$	24-hour	8.2	N/A	8.2	8.6 (3)
	Annual	0.28	N/A	0.28	0.3(4)

Notes: N/A – Not Applicable
(1) The 1-hour NO_2 concentration presented represents the maximum of the total 98th percentile 1-hour NO_2 concentration predicted at any receptor using seasonal-hourly background concentrations.
(2) NAAQS.
(3) $PM_{2.5}$ *de minimis* criteria—24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 µg/m^3.
(4) $PM_{2.5}$ *de minimis* criteria—annual (discrete receptor).

TABLE 9-12
Maximum Modeled Pollutant Concentrations on Off-Site Locations from the Potential Heating and Hot Water Systems (µg/m^3)

Pollutant	Averaging Period	Maximum Modeled Concentration	Background	Total Concentration	Criterion
NO_2	1-hour	106(1)	N/A	106	188(2)
	Annual	0.35	28.7	29.1	100
$PM_{2.5}$	24-hour	0.78	N/A	0.78	8.6 (3)
	Annual	0.04	N/A	0.04	0.3(4)

Notes: N/A – Not Applicable
(1) The 1-hour NO_2 concentration presented represents the maximum of the total 98th percentile 1-hour NO_2 concentration predicted at any receptor using seasonal-hourly background concentrations.
(2) NAAQS.
(3) $PM_{2.5}$ *de minimis* criteria—24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 µg/m^3.
(4) $PM_{2.5}$ *de minimis* criteria—annual (discrete receptor).

To ensure that there is no potential for significant adverse impacts of $PM_{2.5}$ or NO_2 from the Projected and Potential Development Sites' heating and hot water system emissions, certain restrictions would be required through an Air Quality (E) Designation (E-898) that would be placed on certain Projected Development Sites; no restrictions would be required on the other development sites. These restrictions were assumed in the analysis results presented in **Tables 9-11 and 9-12** and would avoid the potential for significant air quality impacts from stationary sources based on the conservative assumptions used in the analysis.

Chemical Spill Analysis

RECIRCULATION IN LABORATORY BUILDING INTAKES

The recirculation analysis indicates that the minimum potential dilution factor between the fan exhausts and the nearest sensitive receptor is 371, 469 and 333 for Projected Development Sites

2, 6, and 8, respectively (i.e., pollutant concentrations at the nearest intake to the exhaust fan would be 371, 469 and 333 times less than the concentration at the fan exhaust for Projected Development Sites 2, 6, and 8), respectively. The results of the recirculation analysis are presented in **Table 9-13**.

TABLE 9-13
Fume Hood Recirculation Analysis Maximum Predicted Concentrations (ppm)

Chemical	STEL/OSHA Ceiling	Projected Development 2 15-Minute Average	Projected Development 6 15-Minute Average	Projected Development 8 15-Minute Average
Allyl Alcohol	2	0.01	0.01	0.01
Benzene	1	0.62	0.49	0.69
Nitric Acid	2	0.04	0.03	0.05
Acetone	250	0.14	0.11	0.15
Ether	400	0.32	0.25	0.35
Methyl Alcohol	200	0.08	0.07	0.09

Note: * 15-Minute Average emission rate.

The results indicate that a spill in a fume hood as described above would produce a maximum concentration at the nearest intake location below the corresponding STELs or ceiling values set by OSHA and/or NIOSH for each of the chemicals analyzed. Consequently, it can be concluded that no significant impact would be expected due to recirculation of fume hood emissions back into the proposed school buildings' air intakes in the event of a chemical spill.

DISPERSION IN SURROUNDING AREA

The results of the analysis of potential emissions from the fume hood exhaust systems in the surrounding area are shown in **Table 9-14**. As shown in the table, the maximum predicted concentrations for acetone, ether and methyl alcohol at elevated receptors downwind of the fume hood exhausts were determined to be below the STEL/OSHA levels. However, for allyl alcohol, benzene and nitric acid, the maximum predicted concentrations are predicted to exceed the STEL thresholds. To ensure that there would be no significant adverse impacts from the exhaust system of the <u>total RWCDS for the Proposed Actions</u>~~Proposed Project~~ or the surrounding community, certain restrictions would be required through an Air Quality (E) Designation (E-898).

TABLE 9-14
Maximum Predicted Concentrations (ppm)

Chemical	STEL/OSHA Ceiling	Projected Development 2 15-Minute Average	Projected Development 6 15-Minute Average	Projected Development 8 15-Minute Average
Allyl Alcohol	2	0.5	> 2	> 2
Benzene	1	> 1	>1	> 1
Nitric Acid	2	1.8	>2	>2
Acetone	250	5.9	39	70.8
Ether	400	13.8	90.4	164
Methyl Alcohol	200	3.6	23.6	42.9

Note: * 15-Minute Average emission rate.

Industrial Source Analysis

ANALYSIS OF POTENTIAL IMPACTS FROM EXISTING USES

As discussed above, a study was conducted to analyze industrial uses within 400 feet of the Projected and Potential Development Sites. DEP-BEC and DEC permit databases were used to identify existing sources of emissions. One permitted facility, Control Electro Polishing, with three active permits was analyzed. The information from these permits (emission rates, stack parameters, etc.) was input to the AERMOD dispersion model.

Using the modeling approach outlined above, concentrations were determined at the development sites. The maximum modeled concentrations did not exceed the associated limits. Therefore, no potential for significant adverse air quality impacts on the total RWCDS for the Proposed Actions~~Proposed Project~~ from the existing industrial sources is predicted. **Table 9-15** presents the maximum predicted pollutant concentrations at the Projected and Potential Development Sites using the AERMOD refined dispersion model. The table also lists the SGC and AGC for each air toxic pollutant.

TABLE 9-15
Maximum Modeled Impacts on Projected and Potential Sites from Industrial Sources

Pollutant	CAS Number	AERMOD Model Short-Term Impact (µg/m^3)	SGC (µg/m^3)	AERMOD Model Annual Impact (µg/m^3)	AGC (µg/m^3)
Hydrogen Chloride	07647-01-0	0.608	2,100	0.003	20
Nitric Acid(1)	07697-37-2	51	86	0.123	12.3
Sodium Hydroxide(2)	01310-73-2	49	200	--	--
Phosphorus Acid/Acid Mist Nec	NY103-00-0	--	--	--	--
Sulphuric Acid	07664-93-9	13	120	0.068	1
Alkaline Mist/Basic Mist Nec	NY104-00-0	--	--	--	--

Source: DEC, DAR-1 AGC/SGC Tables, February 2021.
Notes:
(1) Includes phosphorus acid mist modeled as nitric acid.
(2) Includes alkaline mist modeled as sodium hydroxide.

I. PROPOSED AIR QUALITY E-DESIGNATIONS

Heating and Hot Water Systems

To ensure that there is no potential for significant adverse impacts of $PM_{2.5}$ or NO_2 from the Proposed Actions' heating and hot water system emissions, certain restrictions would be required through an Air Quality (E) Designation (E-898) that would be placed on the Projected and Potential Development Sites. These restrictions were assumed in the analysis results presented in **Tables 9-11 and 9-12** and would avoid the potential for significant air quality impacts from stationary sources based on the conservative assumptions used in the analysis.

The restrictions would be as follows:

Projected Development Site 1 (Block 1715, Lot 3)

Any new residential, community facility and/or commercial development on Block 1715, Lot 3 must utilize only natural gas for fossil fuel-fired heating and hot water equipment and ensure that

the heating and ensure that the hot water exhaust stack(s) is at least 128 feet above grade, to avoid potential significant adverse air quality impacts.

Projected Development Site 2 (Block 1716, Lot 3)

Any new community facility and/or commercial development must use electric heat and hot water systems with no venting or stacks to avoid any potential significant adverse air quality impacts. Projected Development Site 3 (Block 1716, Lot 61)

Any new residential and/or commercial development must exclusively use natural gas as the type of fuel for heating and hot water systems, and be fitted with low NO_x (30 ppm) burners firing only natural gas for heating and hot water systems, and ensure that the heating and hot water system stack(s) is located at least 128 feet above grade and at least 70 feet away from the lot line facing Walworth Street to avoid any potential significant adverse air quality impacts.

Projected Development Site 4 (Block 1717, Lot 60)

Any new residential and/or commercial development must exclusively use natural gas as the type of fuel for heating and hot water systems, and be fitted with low NO_x (30 ppm) burners firing only natural gas for heating and hot water systems, and ensure that the heating and hot water system stack(s) is located at least 128 feet above grade and at least 43 feet away from the lot line facing Walworth Street to avoid any potential significant adverse air quality impacts.

Projected Development Site 5 (Block 1736, Lot 1)

Any new residential and/or commercial development must exclusively use natural gas as the type of fuel for heating and hot water systems, and ensure that the heating and hot water system stack(s) is located at least 128 feet above grade to avoid any potential significant adverse air quality impacts.

Projected Development Site 6 (Block 1736, Lots 10, 18, 61, 62, 63)

Any new community facility and/or commercial development must use electric heat and hot water systems with no venting or stacks to avoid any potential significant adverse air quality impacts.

Projected Development Site 7 (Block 1716, Lots 59, 60)

Any new residential and/or commercial development must exclusively use natural gas as the type of fuel for heating and hot water systems, and ensure that the heating and hot water system stack(s) is located at least 135 feet above grade and at least 22 feet and 43.5 feet away from the lot line facing Spencer Street and Park Avenue, respectively, to avoid any potential significant adverse air quality impacts.

Projected Development Site 8 (Block 1735, Lots 13, 14)

Any new community facility and/or commercial development must use electric heat and hot water systems with no venting or stacks to avoid any potential significant adverse air quality impacts.

Projected Development Site 9 (Block 1735, Lots 5, 11, 12)

Any new residential and/or commercial development must exclusively use natural gas as the type of fuel for heating and hot water systems, and be fitted with low NO_x (30 ppm) burners firing only natural gas for heating and hot water systems, and ensure that the heating and hot water system stack(s) is located at least 128 feet above grade, and ensure that the heating and hot water

system stack(s) is located at least 31 feet away from the lot line facing Spencer Street to avoid any potential significant adverse air quality impacts.

Projected Development Site 10 (Block 1735, Lot 3)

Any new residential and/or commercial development must exclusively use natural gas as the type of fuel for heating and hot water systems, and be fitted with low NO_x (30 ppm) burners firing only natural gas for heating and hot water systems, and ensure that the heating and hot water system stack(s) is located at least 128 feet above grade, and ensure that the heating and hot water system stack(s) is located at least 25 feet away from the lot line facing Walworth Street to avoid any potential significant adverse air quality impacts.

Projected Development Site 11 (Block 1735, Lots 61~~,~~ and 62)

Any new residential and/or commercial development must exclusively use natural gas as the type of fuel for heating and hot water systems, and ensure that the heating and hot water system stack(s) is located at least 98 feet above grade to avoid any potential significant adverse air quality impacts.

Projected Development Site 12 (Block 1717, Lot 2)

Any new residential and/or commercial development must exclusively use natural gas as the type of fuel for heating and hot water systems, and ensure that the heating and hot water system stack(s) is located at least 135 feet above grade and at least 31 and 34.5 feet away from the lot line facing Warsoff Place and Park Avenue, respectively, to avoid any potential significant adverse air quality impacts.

Potential Development Site A (Block 1736, Lot 68)

Any new residential and/or community facility must use electric heat and hot water systems with no venting or stacks to avoid any potential significant adverse air quality impacts.

Potential Development Site B (Block 1735, Lot 59)

Any new residential and/or community facility must use electric heat and hot water systems with no venting or stacks to avoid any potential significant adverse air quality impacts.

Chemical Fume Hood Exhaust Systems

To ensure that there is no potential for significant adverse impacts from the chemical fume hood exhaust systems, restrictions would be required through Air Quality (E) Designations that would be placed on certain Projected Development Sites. These restrictions would avoid the potential for significant air quality impacts from stationary sources based on the conservative assumptions used in the analysis.

Projected Development Site 2 (Block 1716, Lot 3)

Any new school development on Block 1716, Lot 3 must not use benzene in any chemical fume hood exhaust system, and must ensure that the stack(s) for the chemical fume hood exhaust is located at least 75 feet above grade and at least 20 feet from any accessible rooftop space, to avoid any potential significant adverse air quality impacts.

Projected Development Site 6 (Block 1736, Lots 10, 18, 61, 62, and 63)

Any new school development on Block 1736, Lots 10, 11, 13, 18, 61, 62, and 63 must not use benzene, allyl alcohol or nitric acid in any chemical fume hood exhaust system, and must ensure that the stack(s) for the chemical fume hood exhaust is located at least 75 feet above grade and at least 20 feet from any accessible rooftop space, to avoid any potential significant adverse air quality impacts.

Projected Development Site 8 (Block 1735, Lots 13 and 14)

Any new school development on Block 1735, Lots 13 and 14 must not use benzene, allyl alcohol or nitric acid in any chemical fume hood exhaust system, and must ensure that the stack(s) for the chemical fume hood exhaust is located at least 75 feet above grade and at least 20 feet from any accessible rooftop space, to avoid any potential significant adverse air quality impacts.