A. INTRODUCTION

The proposed Police Academy would provide facilities for civilians, recruits, and active police officers, including academic and indoor/outdoor physical training facilities, classrooms, an indoor pistol training facility, a tactical village, an outdoor track, a police museum, a visiting police/lecturer housing facility, and an above-grade parking facility. As such, the Proposed Action, which would result in the proposed Academy, is expected to be complete and operational by 2014. The proposed Academy would allow sensitive land uses (such as the museum and dormitory) in an area where existing zoning permits only commercial, manufacturing and industrial activity.

Air quality, which is a general term used to describe pollutant levels in the atmosphere, would be affected by these changes. Emissions generated by proposed facilities at the Academy would affect air quality levels within the campus as well as the existing sensitive land uses. In addition, toxic air emissions generated by existing industrial sources may affect the proposed sensitive land uses.

The air quality impacts that are addressed in this analysis of the Proposed Action are:

1. Impacts associated with mobile (vehicular related) sources including project-generated vehicles and emissions from the proposed approximately 1,800-space parking facility;
2. Impacts from emissions of the proposed central heating plant (i.e., a cogeneration unit and supplemental boilers) on existing and proposed sensitive land uses;
3. Impacts from "major" existing emission sources (i.e., heating, ventilation, and air conditioning [HVAC] systems with 20 or more million Btu/hr heat input) on the proposed sensitive land uses; and
4. Impacts of the air toxic emissions generated by nearby existing industrial sources on proposed sensitive land uses.

Air quality analyses were conducted, following the procedures outlined in the New York City Environmental Quality Review (*CEQR) Technical Manual*, to determine whether the Proposed Action would result in violations of ambient air quality standards or health-related guideline values. The methodologies and procedures utilized in these analyses are described below.

B. POLLUTANTS OF CONCERN

Criteria Pollutants

The following air pollutants, known as criteria pollutants, have been identified by the U.S. Environmental Protection Agency (EPA) as being of concern nationwide: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone, particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and lead. National Ambient Air Quality Standards (NAAQS) are concentrations set for each of the criteria pollutants specified by the United States Environmental Protection Agency (USEPA) that have been developed to protect human health and welfare. New York has adopted the NAAQS as state ambient air quality standards. These standards, together with their health-related averaging periods, are presented in Table 13-1.

Table 13-1: Applicable National and State Ambient Air Quality Standards

Pollutant	Averaging Period	National and NY State Standards	
		Primary	Secondary
Ozone	8 Hour	0.075 ppm (147 µg/m^3)	Same as Primary Standard
Carbon Monoxide	8 Hour	9 ppm (10 mg/m^3)	Same as Primary Standard
	1 Hour	35 ppm (40 mg/m^3)	Same as Primary Standard
Nitrogen Dioxide	Annual Average	0.053 ppm (100 µg/m^3)	Same as Primary Standard
Sulfur Dioxide	Annual Average	80 µg/m^3 (0.03 ppm)	-
	24 Hour	365 µg/m^3 (0.14 ppm)	-
	3 Hour	-	1300 µg/m^3 (0.5 ppm)
Suspended Particulate Matter (PM_{10})	24 Hour	150 µg/m^3	Same as Primary Standard
Suspended Fine Particulate Matter ($PM_{2.5}$)	24 Hour	35 µg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	15.0 µg/m^3	Same as Primary Standard
Lead	Calendar Quarter	0.15 µg/m^3	Same as Primary Standard

Notes: *ppm: parts per million*
µg/m^3: micrograms per cubic meter
Source: *US Environmental Protection Agency, "National Primary and Secondary Ambient Air Quality Standards." (49 CFR 50). New York State Department of Environmental Conservation.*

In addition to federal standards, incremental impact criteria have been established by New York State Department of Environmental Conservation (NYSDEC) and New York City Department of Environmental Protection (NYCDEP) to measure the impact significance of estimated incremental increases of concentrations. Applicable "significant threshold values" (STVs) are:

1. **NYSDEC.** Significant $PM_{2.5}$ thresholds:
   - Predicted impacts of 5 µg/m3 averaged over a 24-hour (daily) period at discrete locations of public access, either at ground or at elevated levels; and
   - Predicted maximum annual impacts at discrete locations of 0.3 µg/m3.
2. **NYCDEP.** Significant CO increments:
   - An increase of 0.5 ppm or more for the 8-hour period, when baseline concentrations are above 8.0 ppm; or
   - An increase of one-half the difference between the baseline and the standard concentration (9 ppm) for the 8-hour period, when baseline concentrations are below 8 ppm.
3. **NYCDEP.** Significant $PM_{2.5}$ thresholds:
   - Predicted impacts between 2 and 5 µg/m3 averaged over a 24-hour (daily) period at discrete locations of public access, either at ground or at elevated levels; and
   - Predicted annual impacts at discrete locations (from stationary sources only) of 0.3 µg/m3.

Project-related impacts less than these threshold values are considered not significant. Quantitative analyses were conducted to determine whether the potential impacts of the project would exceed these thresholds.

The following air pollutants were considered for this analysis:

- CO and $PM_{2.5}$ for localized impacts of project-generated mobile source emissions; and
- SO_2, PM_{10}, and NO_2 for impacts of project-related HVAC emissions.

Air Toxic Pollutants

In addition to criteria pollutants, small quantities of a wide range of the non-criteria air pollutants, known as toxic air pollutants, which are emitted from nearby industrial and commercial facilities, are also of concern. These pollutants can be grouped into two categories: carcinogenic air pollutants, and non-carcinogenic air pollutants. These include hundreds of pollutants, ranging from high to low toxicity. No federal standards have been promulgated for toxic air pollutants. However, the USEPA and the NYSDEC have issued guidelines that establish acceptable ambient levels for these pollutants based on human exposure criteria.

In order to evaluate short-term and annual impacts of carcinogenic and non-carcinogenic toxic air pollutants, the NYSDEC has established short-term guideline concentrations (SGCs) and annual guideline concentrations (AGCs) for exposure limits. These are maximum allowable 1-hour and annual guideline concentrations, respectively, that are considered acceptable concentrations below which there should be no adverse effects on the health of the general public. Based on SGCs and AGCs, USEPA also developed methodologies that can be used to estimate the potential impacts of air toxic pollutants from multiple emission sources. The "Hazard Index Approach" can be used to estimate the potential impacts of non-carcinogenic pollutants. If the combined ratio of estimated pollutant concentrations divided by the respective SGCs or AGCs value for each of the toxic pollutants is found to be less than 1, no significant air quality impacts are predicted to occur. Estimated overall incremental cancer risk should be compared with one-to-one million threshold established by USEPA to determine if significant air quality impacts are predicted.

C. MOBILE SOURCE ANALYSIS

Localized increases in pollutant levels may result from increased vehicular traffic volumes and changed traffic patterns in the study area as a consequence of the Proposed Action. According to the *CEQR Technical Manual* screening threshold criteria for this area of the City, if more project-generated vehicles pass through a signalized intersection in any given peak period than the following screening thresholds, there is a potential for mobile air quality impacts and a detailed analysis is required.:

- For CO -- 100 vehicles
- For $PM_{2.5}$ -- 12 or more heavy duty diesel vehicles (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 trip generation conducted for the proposed Academy development indicates that the number of project-generated vehicles would be above *CEQR* screening threshold values during peak periods at the affected intersections. Therefore, a detailed microscale modeling analysis was conducted that estimated CO and $PM_{2.5}$ levels near the intersections in the study area that are anticipated to be affected by the Proposed Action. The project's first year of operation (2014) was considered, and pollutant levels were estimated for Existing conditions and for future 2014 conditions with and without the Proposed Action.

Analysis Sites

In order to select these analysis sites, traffic volumes, the traffic levels of service, and travel speeds at the major signalized intersections were evaluated with and without the Proposed Action. Analysis of the site selection was based on a screening analysis that was conducted using the *CEQR Technical Manual* screening threshold criteria to determine where the air quality levels would most greatly be affected by the Proposed Action. The screening analysis used total traffic volumes at intersections, changes associated with speeds, and project-generated trips from the traffic analysis to make the final determination on the analysis sites for all pollutants of concern in the microscale intersection analysis.

Two intersections were selected for analysis – the intersection of 30th Avenue and College Point Boulevard (Site 1), and the intersection of Ulmer Street and the Whitestone Expressway (Site 2). Site 1 was selected because it is the intersection that will see the greatest number of project-induced trips; Site 2 was selected because it is the intersection with the greatest number of total (i.e., future No Build plus project induced) vehicles.

Receptors

The locations at which pollutant concentrations are estimated are known as "receptors." Following guidelines established by the EPA, receptors were located where the maximum concentration is likely to occur and where the general public is likely to have access. For this analysis, receptors were distributed along sidewalks near the intersections selected for analysis.

Traffic Data

Traffic data for the air quality analysis were derived from traffic counts and other information developed as part of the traffic study analysis, using CEQR guidelines. Weekday AM and PM peak periods were considered. These are the periods when the maximum changes in pollutant concentrations are expected based on overall traffic volumes and anticipated changes in traffic patterns.

The 2000 Highway Capacity Manual and HCS+ software (HCS Version 5.3) were used to develop the traffic data necessary for the air quality analysis. The vehicle classification was determined through field data collection. Existing vehicle speeds were obtained from field measurements for the area, and adjusted to estimate future free flow speeds.

Vehicle Classification Data

Vehicle classification data required to determine composite emission factors were based on traffic survey data for the following categories: light-duty gasoline vehicles (LDGVs), sport utility vehicles (SUVs), medallion taxis, light-duty trucks, heavy-duty trucks, and buses. Light-duty gasoline trucks were divided into four groups (LDGT1 LDGT2, LDGT3 and LDGT4) based on local registration data. Based upon current CEQR guidelines, SUVs were classified as light-duty gasoline trucks with 75 percent of emissions considered as LDGT1 and LDGT2, with the remaining 25 percent as LDGT3 and LDGT4. The split between LDGT1 and 2 and LDGT3 and 4 and heavy-duty gasoline vehicles (HDGVs) and HDDVs was based on NYSDEC's 2007 registration data in MOBILE 6 for each appropriate analysis year. All buses were analyzed using urban transit bus emission factors.

Vehicular Emissions

CO and $PM_{2.5}$ emission factors were estimated using EPA's MOBILE 6.2.03 (EPA420-R-03-010), the most current updated version of the mobile emission factor algorithm model. This version includes the effects of the new vehicle standards, vehicle turnover, and emission factors for particulate matter. The latest NYSDEC modeling inputs and assumptions were applied.

Dispersion Analysis

Mobile source dispersion models are the basic analytical tools used to estimate pollutant concentrations from the emissions generated by motor vehicles as expected under given conditions of traffic, roadway geometry, and meteorology. CAL3QHC Version 2 is a line-source dispersion model that predicts pollutant concentrations near congested intersections and heavily traveled roadways. CAL3QHC input variables include free flow and calculated idle emission factors, roadway geometries, traffic volumes, site characteristics, background pollutant concentrations, signal timing, and meteorological conditions. CAL3QHC predicts inert pollutant concentrations, averaged over a one-hour period near roadways. This model was used to predict concentrations at the intersections.

CAL3QHC predicts peak one-hour pollutant concentrations using assumed meteorology and peak-period traffic conditions. Different emission rates occur when vehicles are stopped (idling), accelerating, decelerating, and moving at different average speeds. CAL3QHC simplifies these different emission rates into the following two components:

1. Emissions when vehicles are stopped (idling) during the red phase of a signalized intersection.
2. Emissions when vehicles are in motion during the green phase of a signalized intersection.

The analyses followed the EPA's Intersection Modeling Guidelines (EPA-454/R-92-005) for CO modeling methodology and receptor placement. All major roadway segments (links) within approximately 1,000 feet from each analysis site (i.e., congested intersection) were considered.

Results

A summary of the results of the mobile source air quality modeling analysis for the 2014 Future with the Proposed Action is provided in Table 13-2, Table 13-3 and Table 13-4. The values shown are the maximum CO concentrations estimated near each analysis site and the worst-case $PM_{2.5}$ incremental concentrations (with and without the Proposed Action).

TABLE 13-2: 2008 EXISTING MAXIMUM 8-HOUR CO LEVELS

Site #	Analysis Site	CO Analysis	
		8-hour CO Level (ppm) (AM)	8-hour CO Level (ppm) (PM)
1	30th Ave & College Point Blvd	2.6	2.7
2	Ulmer St. & Whitestone Expressway	4.2	4.1

Notes:
NAAQS:
CO = 9 ppm
All values are the maximum estimated concentrations under all time periods considered and include an 8-hour background concentration of 2.3 ppm.

Concentrations were estimated for the following time periods:
AM - AM peak period (6-7 AM)
PM - PM peak period (3-4 PM)

TABLE 13-3: 2014 FUTURE WITH AND WITHOUT THE PROPOSED ACTION MAXIMUM 8-HOUR CO LEVELS

Site #	Analysis Site	CO Analysis			
		8-hour CO Level (ppm) (W/out PA)	8-hour CO Level (ppm) (With PA)	8-hour CO Increment (ppm)	Peak Time Period
1	30th Ave & College Point Blvd	2.5	2.8	0.3	AM
2	Ulmer St. & Whitestone Expressway	4.4	4.5	0.1	AM

Notes:
NAAQS:
CO = 9 ppm
All values are the maximum estimated concentrations under all time periods considered and include an 8-hour background concentration of 2.3 ppm.

Concentrations were estimated for the following time periods:
AM - AM peak period (6-7 AM)
PM - PM peak period (3-4 PM)

TABLE 13-4: MAXIMUM $PM_{2.5}$ INCREMENTAL IMPACTS

Site #	Analysis Site	24-Hour Results	Annual Results
		24-hour Increment (µg/m3)	Neighborhood Increment (µg/m3)
1	30th Ave & College Point Blvd	0.84	0.079

Notes:
Significant Threshold Values:
(NYSDEC) 24-hour = 5 ug/m3
(NYCDEP) 24-hour = 2 to 5 ug/m3
Annual at Discrete Receptor= 0.3 ug/m3
Neighborhood Average = 0.1 ug/m3

Time periods for which concentrations were estimated:
AM - AM peak period (6-7 AM)
PM - PM peak period (3-4 PM)

The results of this analysis are summarized as follows:

1. CO levels would not exceed the 8-hour standard. The highest estimated concentration (4.5 ppm) would occur at the intersection of Ulmer Street and Whitestone Expressway under the PM peak period.
2. The DEP CO *de minimis* criteria would not be exceeded at any of the analysis sites, indicating that the Proposed Action would not have the potential to cause CO impacts that are considered to be significant.
3. The Proposed Action would not cause increases above the 24-hour $PM_{2.5}$ STV or the annual $PM_{2.5}$ STV and would not result in any significant adverse impacts at any of the analysis sites based on both NYSDEC and NYCDEP criteria.
    - The highest estimated 24-hour incremental neighborhood concentration (0.84 µg/m^3) would occur at the intersection of 30th Avenue and College Point Boulevard.

- The highest estimated annual incremental neighborhood concentration (0.079 µg/m^3) would occur at the intersection of 30th Avenue and College Point Boulevard.

The result of this analysis is that the mobile source impacts of the Proposed Action would not significantly impact local air quality levels.

Analysis of Parking Facility

An analysis was conducted to determine if the proposed parking facility would affect CO levels at adjacent receptors. The analysis was based on the methodology recommended in the 2001 *CEQR Technical Manual*. Emissions from vehicles traveling into and out of the facility, idling emissions from vehicle start up as well as adjacent roadway sources were considered in the evaluation. Results indicate that emissions generated from the proposed parking facility would not result in a significant adverse impact to CO levels at adjacent receptors.

In addition, the impacts of these emissions would occur within the proposed campus and not on public streets. The impacts of these emissions, therefore, would not add to the maximum estimated mobile source intersection impacts.

D. STATIONARY SOURCE ANALYSIS

Heating System Emissions

A central utility plant (CUP) is proposed to provide for the heating, electrical, and hot water needs of the entire campus. Separate boilers in the individual buildings are not anticipated. The CUP will include a 1,400 kW co-generation unit with gas-fired turbines and five supplemental dual-fuel boilers (4 operational and 1 standby boilers), each at 1,250 BPH input. The co-generation unit would provide a portion of electric needs of the campus, with the remainder coming from emergency generators, the power grid and other on-site (non-polluting) renewable sources. The electricity generated by the unit would be solely for campus needs, and would not be sold to the power grid.

Gases from both the co-generation unit and the boilers would be exhausted into the atmosphere via one common stack that would be approximately 140 ft tall (approximately 35 feet higher than the roof of CUP building).

Emissions from CUP have the potential to affect both proposed and nearby existing sensitive land uses. Analyses were therefore conducted, using the EPA AERMOD dispersion model and EPA/CEQR recommended dispersion options, to determine whether these impacts would be significant.

The following analyses were conducted:

1. An analysis to estimate the potential impacts of CUP emissions on the Police Academy's sensitive land uses;
2. An analysis to estimate the potential impacts of the CUP emissions on surrounding existing land uses; and
3. An analysis to estimate the potential impacts of existing "major" sources (i.e., those with 20 or more MMBtu/hr heat input) on the proposed sensitive land uses.

Analyses were conducted as follows:

- The pollutants considered for the analyses are SO_2, NO_2, PM_{10}, and $PM_{2.5}$.

- Analyses were conducted with and without building downwash using latest five consecutive years of meteorological data from LaGuardia Airport (2002-2006). While pollutant concentrations were estimated at all receptor sites, only the highest concentrations are reported.
- Estimated short-term and annual pollutant concentrations were added to appropriate background levels, and maximum total pollutant concentrations were compared with NAAQS to determine whether there would be the a potential violation of these standards.

"Major" Existing Emission Source

Following *CEQR Technical Manual* guidelines, a survey of land uses and building heights was conducted to determine whether there are any existing "major" sources of combustion emissions (i.e., emissions with heat inputs 20 million Btu per hour or greater) located within 400 feet of the project site.

The survey identified one "major" combustion emission source (College Point Asphalt Plant located west of the project area, at 120-01 31st Street). This facility has a State Facility Permit (# 2-6302-00083/00005), which was issued on 1/08/02, for an estimated heat input rating of 125 million Btu/hr. A detailed dispersion analysis was conducted to estimate the potential impacts of this plant on project sensitive land uses.

The survey also identified another potential source of emissions – a cement distribution terminal located at the border of 1,000 feet south of the proposed Academy site. However, this facility was not considered for analysis as a "major" source because it has no State Facility permit or Title V permit and is not listed in the EPA Envirofacts database.

An additional examination was also conducted to determine if there is any "large" combustion emission source (e.g., power plant, co-generation facility, etc.) located within 1,000 feet of the proposed Academy site. The result of this survey is that no such sources are located within 1,000 feet of the project site and therefore no further analysis is required.

Dispersion Analyses

Dispersion Model

The EPA AERMOD model was used for all stationary source dispersion analyses. AERMOD is a steady-state plume model applicable in rural and urban areas, in flat and complex terrain, for surface and elevated releases, and for multiple emission sources (including point, area, and volume sources). It can be used to calculate pollutant concentrations from one or more points (e.g., exhaust stacks) based on hourly meteorological data, and has the capability of calculating pollutant concentrations in a cavity region and at locations where the plume from the exhaust stack is affected by the aerodynamic wakes and eddies (downwash) produced by nearby structures.

Regulatory default options of the AERMOD model were used. Following CEQR guidelines, analyses were conducted assuming stack tip downwash, urban dispersion and surface roughness length, with and without building downwash, and the elimination of calms. The AERMOD downwash algorithm was utilized to estimate the potential affects of the multiple building structures on the plume dispersion.

Pollutant Emission Rates and Stack Parameters

CUP Operations

While the dual-fuel boilers could use either natural gas or fuel oil #2, it was conservatively assumed, for the purpose of this analysis, that the higher emitting fuel oil #2 would be used. The heat input of the boilers and co-generation unit were converted to an energy basis by multiplying by 33,446 Btu/hr per boiler horsepower. Emission factors for pollutants were obtained from EPA's "Compilation of Air Pollutant Emission Factors" (AP-42, 2000) for stationary gas-fired combustion turbines and fuel oil-fired boilers, based on heat input rating.

The following assumptions were made to estimate pollutants emission rates from CUP operations:

- Four boilers would be operating for the whole year (with one unit on standby);
- All emissions from boilers would be uncontrolled;
- The sulfur content of the fuel oil # 2 would be 0.2 percent;
- Emissions of NOx from turbines would be controlled with water-steam injection;
- Emissions of SO_2, PM_{10}, and $PM_{2.5}$ from turbines would be uncontrolled; and
- The CUP boilers would operate at 100 percent load 2,400 hours per year.

Emission rates for the co-generation unit and each boiler were summed up to estimate total emission rates for all units combined. Because pollutants would be released from a single stack, emissions of each pollutant were modeled using a generic emission rate of 1 grams per second, and the estimated normalized pollutant concentrations were converted to the 3-hour, 24-hour, and annual concentrations (corresponding to the respective NAAQS averaging time periods) using actual pollutant emissions rates.

The following stack parameters were used in the analysis:

- Stack height = 140 feet
- Stack diameter = 7 feet 6 inches
- Stack temperature = 420 ^{o} Fahrenheit
- Exit velocity = 1,700 feet/minute

Asphalt Plant Operations

The nearby asphalt plant manufactures hot mix asphalt paving materials, including liquid asphalt cement. Emission factors were obtained from EPA's AP-42 for a bath mix plant with a fuel oil-fired dryer. These factors (in tons per ton of material produced) were converted to emission rates using the plant's projected output of 500,000 tons of asphalt per year.

The following stack parameters were obtained from the State permit:

- Stack height = 25 feet
- Release shaft cross-sectional area of 72 by 42 inches (based on this, an equivalent stack diameter was estimated to be 4 feet 11 inches)
- Stack temperature = 423 ^{o} Fahrenheit
- Stack exit velocity = 2,000 feet/minute (approximated based on heat input)

Emissions from this facility were modeled assuming that they would be released from a single stack of equivalent diameter using generic emission rate of 1 gram per second. The estimated normalized pollutant concentrations were converted to the 3-hr, 24-hr, and annual concentrations, corresponding to the respective pollutants NAAQS averaging time periods, using actual pollutant emissions rates, as described above.

Meteorological Data

Analyses were conducted using five consecutive years of meteorological data (2002-2006). Surface data were obtained from La Guardia Airport and upper air data were obtained from Brookhaven station, New York. These meteorological data provide hour-by-hour wind speeds and directions, stability states, and temperature inversion elevations over the 5-year period. Data were developed using the EPA AERMET processor. The land use around the proposed Academy site was classified using defined categories to determine surface parameters used by the AERMET program.

Receptor Locations

In order to estimate the potential impacts of the CUP emissions, and for conservative purposes of this

analysis, it was assumed that operable windows of each project building and each nearby existing residential building would be a sensitive receptor. To estimate maximum pollutant concentrations, receptors were placed on each potentially affected project building and each nearby existing building at regular intervals around all facades. These receptors were located at top-roof levels of each building that is shorter than the height of the nearby stack and at the stack height of each building is taller than the stack height. Receptors were placed at these locations because the highest impacts would occur along stack plume centerlines, and receptors located further from these centerlines would be impacted less than receptors considered. A total of 678 receptor locations were considered in the analysis.

On-Site Receptors

The following sensitive receptor sites associated with the proposed buildings were considered for the analysis of the CPU emissions:

- Site 1: Firearms/Driver Training (EVOC) area (Block 4321, Lot 48; Block 4324, Lot 1; Block 4325, Lot 1; and Block 4326, Lot 1), with a 92-foot tall building.
- Site 2: Academic/Student Support/Library area (Block 4329, Lot 7, and Block 4301, Lot 1), with a 140-foot tall building.
- Site 3: Tactical Village area (Block 4327, Lot 1; Block 4328, Lot 1; Block 4358, Lot 1; and Block 4359, Lot 1), with a 79-foot tall building.
- Site 4: Tactical Gym/Field House area (Block 4327, Lot 1; Block 4328, Lot 1), with a 140-foot tall building.
- Site 5: Central Service area (Block 4326, Lot 1), with a 93-foot tall building.
- Site 6: Dining, Lodging, Assembly, and Banquet (Block 4329, Lot 1, Block 4301, Lot 1), with a 90-foot tall building, and
- Site 7: Museum (Block 4301, Lot 1), with a 54-foot tall building.

For the analysis of the asphalt plant emissions, receptors were placed on each proposed building at the height corresponding to the height of the asphalt plant stack.

Off-Site Receptors

A survey of existing land uses within 400 feet of the project area was conducted using the New York City Open Accessible Space Information System Cooperative (OASIS) database to identify sensitive land uses and determine the size and location of existing buildings. The survey identified commercial and industrial establishments, 1 and 2 family homes, multi-family homes, and mixed-use residential buildings.

Residential buildings located on Block 4292, Lot 11-12; Block 4294, Lot 26; and Block 4295, Lot 26 were selected as nearby receptor sites for the analysis of the CPU emission impacts on existing land uses.

Background Values

Background concentrations (i.e., pollutant levels from other sources in the study area) for the pollutants of concern were obtained from monitoring data collected by the NYSDEC in 2006 for Queens, the latest year of compiled data. These values were added to estimated project impacts, and the resulting total concentrations were compared with appropriate NAAQS.

Results

Impacts of CUP Emissions on Proposed Buildings

The result of the analysis of CUP emission impacts on proposed buildings, which are summarized in Table 13-5, is that the maximum total estimated 24-hour and annual SO_2 concentrations, 24-hour PM_{10} concentrations, and annual NO_2 concentrations are all expected to be below the applicable NAAQS. In addition, the maximum $PM_{2.5}$ impacts are less than the STVs. Emission estimates are also provided.

While analyses were conducted with and without the consideration of downwash effects on plume dispersion (i.e., affects caused by wind flow obstructions around buildings), these maximum values were all estimated as a result of direct plume impacts (i.e., without plume downwash).

The result of this analysis, therefore, is that no exceedances of the NAAQS for all applicable pollutants are predicted as a result of the CUP emission impacts on proposed- buildings.

Impacts of the CUP Emissions on Existing Land Uses

The potential impacts of CUP emission impacts on existing land uses are also summarized in Table 13-5. The result of this analysis is that maximum estimated pollutant concentrations are all below the applicable NAAQS. In addition, the maximum $PM_{2.5}$ impacts of CUP emissions are less than the applicable NYSDEC/NYCDEP STVs – with an estimated maximum 24-hour impact of 0.45 ug/m^3 (compared to the STV of 2 to 5 ug/m^3) and an estimated maximum annual impact of 0.1 ug/m^3 (compared to the STV of 0.3 ug/m^3).

As such, the CUP emissions are not predicted to significantly impact existing nearby land uses.

Table 13-5: Maximum Estimated Impacts of CUP Emissions (ug/m^3)

Pollutants	Averaging Time	Actual Pollutant Emission Rates	Maximum Estimated Impact	Background Concentration	Maximum Total Estimated Conc.	NAAQS (STV)
Impacts on Project-induced Buildings						
NO_2	Annual	1.017	9.4	53	62	100
SO_2	3-hr	3.441	323.0	202	525	1300
	24-hour	3.441	249.1	84	333	365
	Annual	0.943	8.8	18	27	80
PM_{10}	24-hour	0.329	23.8	90	114	150
Impacts on Existing Land Uses						
NO_2	Annual	1.017	0.2	53	53	100
SO_2	3-hr	3.441	10.1	202	212	1300
	24-hour	3.441	5.2	84	89	365
	Annual	0.943	0.2	18	18	80
PM_{10}	24-hour	0.329	0.5	90	91	150

Impacts of the Asphalt Plant Emissions on Proposed Buildings

The potential impacts of Asphalt Plant combustion emissions on proposed buildings are summarized in Table 13-6. The maximum impact was found (with downwash effects) at the Firearms / Driver Training (EVOC) area (near Block 4321, Lot 49), at a distance of approximately 500 feet from asphalt plant. The total maximum estimated pollutant concentrations at any of the receptor sites are below the applicable NAAQS standards. As such, the asphalt plant emissions are not predicted to significantly impact the proposed project buildings.

Table 13-6: Maximum Estimated Impacts of Asphalt Plant Emissions, (ug/m^3)

Pollutants	Averaging Time	Maximum Estimated Normalized Conc.	Actual Pollutant Emission Rates	Maximum Estimated Actual Conc.	Bkgd Conc.	Maximum Total Estimated Conc.	National Air Quality Standards
Impacts of Asphalt Plant Emissions							
NO2	Annual	4.45E+00	0.949	4	53	57	100
SO2	3-hr	4.27E+01	2.150	92	202	294	1300
	24-hour	2.23E+01	2.150	48	84	132	365
	Annual	4.45E+00	0.696	3	18	21	80
PM10	24-hour	2.23E+01	0.484	11	90	101	150

E. INDUSTRIAL SOURCE IMPACT ANALYSIS

Introduction

The proposed Action would allow development of sensitive land uses within existing manufacturing and industrial zones. As such, emissions of toxic pollutants from the operation of existing industrial emission sources might affect proposed sensitive land uses.

An analysis was therefore conducted to determine whether the impacts of these emissions would be significant. Data necessary to perform this analysis, which include facility type, source identification and location, pollutant emission rates, and exhaust stack parameters, were obtained from regulatory agencies (e.g., from existing air permits). All existing industrial facilities located within 400 feet of the Academy site that are permitted to exhaust toxic pollutants were considered in this analysis.

Air Toxics Analysis

An air toxics analysis process was conducted as follows:

- An analysis area within 400 feet around the area to be developed was identified using Geographic Information System (GIS) shape files;

- Air permits for all industrial facilities within this analysis area on NYSDEC, NYCDEP Clean Air Tracking System, and EPA Environfacts databases were acquired and reviewed;
- Dispersion analyses were conducted to determine the potential of the toxic emissions released from the permitted emission sources to adversely affect the new Academy, as follows:
- The dispersion modeling analysis was conducted using NYSDEC's DAR-1 software and database to determine whether the existing currently operating permitted facilities within the air toxics study area would have the potential to adversely affect the sensitive receptors at the development sites. Each toxic pollutant concentrations were determined and compared to short-term or annual health-related guideline values (i.e., SGCs or AGCs). Total non-carcinogenic pollutants hazard indexes was summed up and compared to the EPA's Hazard Index Threshold. Impacts of carcinogenic pollutants were estimated using unit risk factors.

Data Sources

Information regarding emissions of toxic air pollutants from existing industrial sources was obtained from New York State and New York City databases as follows:

- The boundaries of the Police Academy site were used to identify the extent of the study area for determining air quality impacts associated with the Proposed Action. All permitted industrial toxic air pollutant emission sources located within a 400-foot radius of the Academy site were included in this analysis.
- The New York City OASIS data base, which is an interactive mapping and data analysis application, was used to identify existing industrial uses located within the analysis area;
- A search was performed to identify NYSDEC Title V permits and permits listed in the EPA Envirofacts database.
- Air permits for active (currently permitted) industrial facilities within the analysis area that are included in the NYCDEP Clean Air Tracking System database were acquired and reviewed to obtain pollutant emission rates and stack parameters. The data on these permits, which include source locations, stack parameters, pollutant emission rates, etc., are considered to be the most current and served as the primary basis of data for this analysis. This information was compiled into DAR-1 software format for use in the following analyses.

Assessment Methodology

Toxic air pollutants can be grouped into two categories: carcinogenic air pollutants, and non-carcinogenic air pollutants. These include hundreds of pollutants, ranging from high to low toxicity. While no federal standards have been promulgated for toxic air pollutants, EPA and NYSDEC have issued guidelines that establish acceptable ambient levels for these pollutants based on human exposure criteria.

In order to evaluate short-term and annual impacts of non-carcinogenic toxic air pollutants, the NYSDEC has established short-term guideline concentrations (SGCs) and annual guideline concentrations (AGCs) for exposure limits. These are maximum allowable 1-hour and annual guideline concentrations, respectively, that are considered acceptable concentrations below which there should be no adverse effects on the health of the general public.

Dispersion Analyses

Dispersion analyses were conducted to determine the potential of the toxic emissions released from the permitted emission sources to adversely affect the new Police Academy uses. NYCDEC DAR-1 database and modeling software (modified version of the SCREEN model and enhanced version of USEPA's ISCLT2 model) was employed to estimate maximum cumulative short-term (1-hour) and annual impacts for each air toxic pollutant and determine whether facilities have the potential to exceed short-term or annual guidelines values (i.e., SGCs or AGCs). If the results of the screening-level analysis exceed any of

the guideline values, a more refined and less conservative analysis was followed.

Emission sources for the dispersion analysis were located using GIS software and the Universal Transverse Mercator coordinate system with appropriate projection information (Datum NAD83, UTM Zone 18).

The dispersion analysis was performed by modeling the emissions of all identified toxic air pollutants from the existing industrial facilities in one modeling run. The estimated ambient concentrations of each air toxic pollutant were then compared with the guideline concentrations established by the NYSDEC and EPA and contained in the DAR-1 database.

Industrial Source Emissions

Nine (9) industrial facilities with NYCDEP permits were identified within a 400-foot radius of the Police Academy site. Of these, permits for two facilities were cancelled (Permit PA100988 for Flushing Central Service, and Permit PA060783 for North American Specialties). Permits for the following three facilities contain no information on pollutant emission rates and stack parameters and these facilities, therefore, were not included in the analysis:

- F & R Enterprises (Permit PA042671);
- Express Auto Corp (Permit PB042107); and
- Crystal Windows & Doors System (Permits PB012302, PB014906, and PB027706).

Analyses were conducted for the following four active permitted facilities, which have eight permitted emission sources:

- College Point Bus facility (Permits PA008098 and PA008198);
- F & R Enterprises Cofire facility (Permit PA020771);
- S &S NPropeller Co, Inc (Permits PA007893 and PA007993); and
- N.A.S Interplex Inc. (Permits PA 065382, PA065398, and PA065183)

The permits for these four existing facilities identify eight active emission sources – seven (7) sources of non-carcinogenic pollutants and one (1) source of carcinogenic pollutants. According to these permits, five (5) toxic non-carcinogenic air pollutants and one carcinogen (trichloroethylene) are released from these emission sources.

Results of the Cancer Risk and Hazard Index Evaluation

Non-Carcinogens

Table 13-7, entitled "Analysis of the Non-Carcinogenic Toxic Pollutants," lists the identified facilities that emit non-carcinogenic pollutants together with the type and location of each facility and its permit number, emission point(s), contaminant name, and CAS registry number. Also provided are the respective pollutant guidelines values, estimated pollutant concentrations (short-term and long-term), and hazard indexes.

As shown on the Table 13-7, a screening-level analysis with DAR-1 SCREEN model identified the potential exceedances of short-term guideline concentration (SGC) for particulate matter and annual guideline concentrations (AGC) for trichloroethylene. The maximum estimated concentrations of other non-carcinogenic toxic contaminants were below the NYSDEC short-term guideline concentrations (SGCs).

The maximum estimated short-term 1-hour concentrations of particulate matter from each of the two emission sources of the College Point Bus facility were 932 ug/m^3 and 380.9 from the sources X9NI0001 and X9NI0002, respectively, which are above the SGC of 380 ug/m^3. The maximum estimated annual concentration of trichloroethylene from the source X2GU0003 of the N.A.S. Interplex facility was 0.905 ug/m^3, which is above the AGC of 0.5 ug/m^3.

As these values exceed the guideline concentrations, more detailed, less conservative analyses were conducted using the EPA SCREEN model. The resulting concentrations from the College Point Bus facility were 21 and 8 ug/m^3 (from X9NI0001 and X9NI0002 sources, respectively), which are below the SGC of 380 ug/m^3. Similarly, a refined analysis was conducted for the N.A.S. Interplex facility using the DAR-1 ISCLT2 model. The resulting maximum trichloethylene concentration was estimated to be 0.0187 ug/m^3 that is below AGC of 0.5 ug/m^3.

The total hazard index caused by the non-carcinogenic pollutants emitted from all of the sources combined is estimated to be 0.610×10^{-2}. This value is below the level (1.0) that is considered by EPA to be significant. Therefore, the analysis has demonstrated that the cumulative health risk posed by non-carcinogenic pollutants emitted from existing emission sources would not cause significant air quality impacts that exceed threshold levels established by the EPA.

Carcinogens

Table 13-8, entitled "Analysis of the Carcinogenic Toxic Pollutants," lists the identified facilities that emit carcinogenic pollutants together with the type and location of each facility and its permit number, emission point(s), contaminant name, and CAS registry number. Also provided are the estimated annual concentration and incremental cancer risks. As shown on this table, the maximum estimated incremental cancer risk caused by trichloroethylene is estimated to be 3.75×10^{-2} per million. This value is below the level of one per million that is considered by EPA to be significant.

Summary of Results

The result of this analysis is that no exceedance of either the NYSDEC SGC or AGC acceptable limits or EPA's incremental risk threshold limit is predicted.

Facility Name	Facility Address	Type of Business	NYCDEP Permit No.	Emission Point	CAS Registry No.	Compound	Permitted Emission Rates		Est. Short-Term Conc.	NYSDEC SGC	Est. Short-Term Conc.	Est. Annual Av. Conc.	NYSDEC AGC
							lb/hr	lb/year	ug/m^3	ug/m^3	% of SGC	ug/m^3	ug/m^3
N.A.S. INTERPLEX	120-12 28 Avenue, Queens	Grinding of Metal Parts	PA065382	X2GU0002	NY075-00-0	PM10	0.002	2.4	2.1159	380	0.5568	0.264E-04	50
N.A.S. INTERPLEX	120-12 28 Avenue, Queens	Metal Stamping	PA065183	X2GU0004	08012-95-1	Mineral Oil (Mist)	0.025	5.0	26.449	380	6.9603	0.500E-02	12
F & R Enterprises Cofire, Inc	120-30 28 Avenue, Queens	Asphalt Batching Plant	PA020771	X6GW0001	NY075-00-0	PM10	0.043	1.35	0.386	380	0.1016	0.215E-06	50
College Point Bus Facility	120-30 28 Avenue, Queens	Asphalt Batching Plant	PA008098	X9NI0001	NY075-00-0	PM10	0.881	1412	932.0731	380	245.2824	0.219+00	50
College Point Bus Facility	120-30 28 Avenue, Queens	Spray Booth	PA008198	X9NI0002	NY075-00-0	PM10	0.360	517.7	380.8698	380	100.2289	0.785E-01	50
S & S Npropeller Co, Inc	26-15 123 Street, Queens	Grinding of Metal Parts	PA007893	X5000002	NY075-00-0	PM10	0.267	300.0	53.651	380	14.1187	0.681E-02	50
S & S Npropeller Co, Inc	26-15 123 Street, Queens	Spray Booth	PA007993	X5000001	NY075-00-0	PM10	0.015	3.120	15.869	380	4.1762	0.781E-04	50
					00108-88-3	Toluene	0.4	640	49.7248	37,000	0.1344	2.51E-03	400
					00067-63-0	Isopropyl Alcohol	0.10	2.080	10.5797	98,000	0.0108	0.534E-03	7,000
					00067- 64-1	Acetone	0.015	3.120	15.8695	180,000	0.0088	0.800E-03	28,000

Table 13-8: Analysis of the Carcinogenic Toxic Pollutants

Facility Name	NYCDEP Permit No.	Emission Point	CAS Registry No.	Compound	Permitted Emission Rates		NYSDEC AGC	Estimated Annual Conc.
					lb/hr	lb/year	ug/m^3	ug/m^3
N.A.S. Interplex Inc.	PA065398	X2GU0003	00079-01-6	Trichloetylene	0.045	18	0.5	1.87E-02

F. SUMMARY OF RESULTS

The result of these analyses is the Proposed Action would not result in a violation of any applicable air quality standard or cause an exceedance of the significant threshold value. As such, the potential air quality impacts of the Proposed Action are not considered to be significant.