FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE CROTON WATER TREATMENT PLANT FOR THE MOSHOLU SITE

6.11. AIR QUALITY

6.11.1. Introduction

This air quality section assesses the anticipated air quality impacts associated with the proposed Croton Water Treatment Plant project (Croton project) at the Mosholu Site. The potential impacts from mobile and stationary from construction and operation of the water treatment plant are presented. Mobile sources included vehicular traffic on public streets and roads. Stationary sources included the plant's boiler system used to supply heat and hot water and the emergency electric-generation system. The stationary sources of construction activities included exhaust from construction equipment and vehicles. Fugitive particulate (dust) sources included land clearing and excavation activities, and on-site vehicle travel associated with construction activities. The methodology, as well as the pollutants of concern, the applicable air quality standards, and the potential impact criteria are presented in the Section 4.11, Data Collection and Impact Methodologies, Air Quality.

The methodology and results of the air dispersion modeling performed for the mobile and stationary sources are presented. Dispersion modeling was utilized to assess the effects of: (1) emissions from mobile sources; (2) emissions from stationary operational sources; and (3) emissions from construction sources. Mobile source dispersion modeling analyses were conducted for Future Without the Project and Potential Project Impact scenarios. Project mobile source increments were determined by subtracting the Future Without the Project scenario from the Potential Project impact scenarios (i.e., Build – No Build = Project Increments). The peak project impact year from either construction or operations was used to be conservative.

The criteria air pollutants of concern include carbon monoxide, particulate matter less than 10 micron in aerodynamic diameter, sulfur dioxide, and nitrogen dioxide. Impacts of toxic air contaminants from stationary combustion sources were also considered. Project impacts were compared to the applicable standards or guidelines to evaluate whether such predicted impacts would be considered potentially significant.

In addition to these analyses for the criteria pollutants and toxic air contaminants, an air quality analysis were performed to evaluate the potential impacts of particulate matter less than 2.5 micron in aerodynamic diameter ($PM_{2.5}$). A micro-scale analysis was conducted for 24-hour $PM_{2.5}$ impacts. A neighborhood analysis was conducted for annual $PM_{2.5}$-impacts.

6.11.2. Baseline Conditions

6.11.2.1. Existing Conditions

The New York State Department of Environmental Conservation (NYSDEC) monitors ambient air quality at a number of locations throughout New York State, including in Westchester County and the New York City Boroughs. Each of the NYSDEC air monitoring stations monitors one or several regulated air pollutants. The most recent year of available data from these monitoring stations is for calendar year 2002. Monitoring data from the air monitoring stations closest to water treatment plant site were used to characterize background air quality levels of criteria air pollutants.

Figure 6.11-1 shows the locations of the ambient air quality monitoring stations. Mount Vernon, 2.5 miles to the east-northeast, is the nearest Total Suspended Particulates (TSP) ambient air monitoring station to the water treatment plant site. Ambient air TSP data for the water treatment plant site were obtained from Mount Vernon. TSP is no longer federally regulated; TSP monitoring was discontinued after 1998.

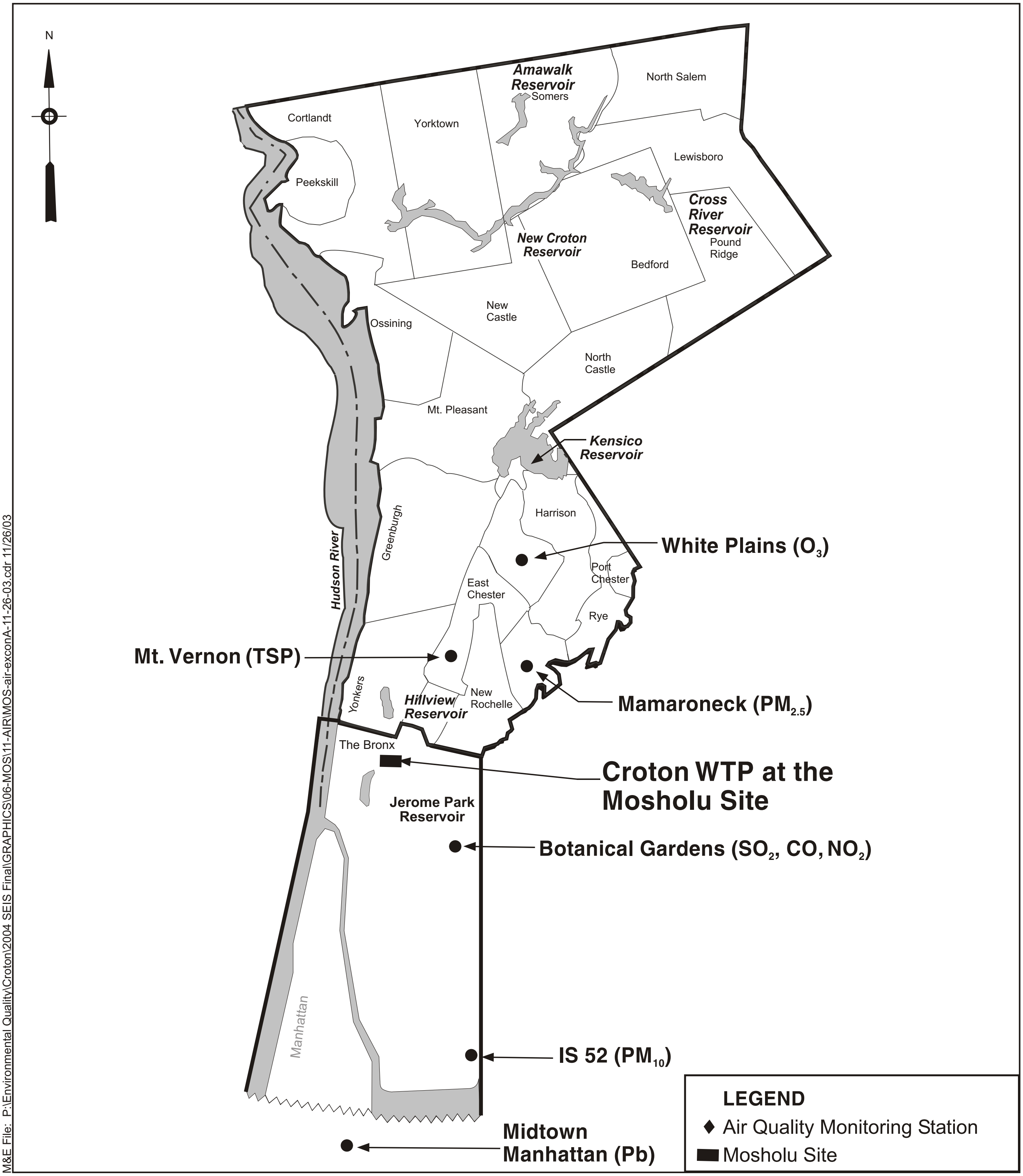
IS 52, located 5 miles south of the water treatment plant site, is the nearest PM_{10} ambient air monitoring station. PM_{10} data for the water treatment plant site were obtained from the IS 52 station, located at 681 Kelly Street, Bronx, NY, were used as the background value for PM_{10}.

The Botanical Gardens ambient air monitoring station in the Bronx, the closest monitoring station to the water treatment plant site (1.5 miles south), conducts sulfur dioxide (SO_2), CO (carbon monoxide), ozone, nitrogen dioxide (NO_2) and particulate matter smaller than 2.5 microns ($PM_{2.5}$) monitoring.

The latest monitoring data for lead are obtained from the Midtown Manhattan ambient air monitoring station (10.5 miles to the south-southwest of the water treatment plant site). This monitoring station measured ambient air concentrations of airborne lead until 1998. Since lead is no longer used as an additive in gasoline, the lead concentrations in ambient air have dropped to negligible. This has greatly reduced the need for ambient air monitoring for lead.

Tables 6.11-1 summarizes the location of the monitoring stations, list of criteria pollutants, and year 2002 ambient air quality monitoring data representative of air quality in the vicinity of the water treatment plant site. A comparison of the monitored ambient levels in this table with the corresponding standards reveals that, with the exception of ozone, none of the Federal and State standards were exceeded. As discussed in Section 4.11, Data Collection and Impact Methodologies, Air Quality, the water treatment plant site lies within a "severe" non-attainment area for ozone (O_3). The site alternative is located in an attainment area or unclassified area with respect to the other criteria pollutants.

Background Data for Criteria Pollutants. The monitored background levels of the principal pollutants of concern for construction, mobile and stationary source air quality modeling analysis are SO_2, NO_2, CO and PM_{10}. Background air quality data is based on the most recent five years of available NYSDEC monitoring data, 1998 through 2002. The highest annual averages measured over the latest available 5-year period were used to determine the annual average background levels for CO and NO_2. For SO_2, only three years of monitoring data were available for background. Three years was used for PM_{10} and $PM_{2.5}$ background. For averaging times shorter than one year (e.g., 1-hour, 3-hour, 8-hour and 24-hour periods), the background values for three pollutants (i.e., CO, SO_2 and PM_{10}) are values collected for at least three years. Table 6.11-2 summarizes the background values for the water treatment plant site.



Not To Scale

Mosholu Site NYSDEC Ambient Air Monitoring Stations

Croton Water Treatment Plant

Figure 6.11-1

TABLE 6.11-1. AIR QUALITY MONITORING DATA FOR YEAR 2002[1]

Pollutant	Monitoring Station	Averaging Period[2]	Ambient Standard	Measured Conc.	
				Highest	2nd Highest
Sulfur Dioxide, μg/m^3 (ppm)	Botanical Gardens 200th Street & SE Blvd. Bronx	Annual	80 (0.03)	23 (0.009)	- -
		24 hour	365 (0.14)	112 (0.043)	97 (0.037)
		3 hour	1,300 (0.50)	154 (0.059)	146 (0.056)
Carbon Monoxide, μg/m^3 (ppm)	Botanical Gardens, 200th Street & SE Blvd., Bronx	8 hour	10,000 (9.0)	3,315 (2.9)	2,400 (2.1)
		1 hour	40,000 (35)	4,915 (4.3)	4,229 (3.7)
Ozone[3], μg/m^3 (ppm)	Botanical Gardens, 200th Street & SE Blvd., Bronx	1 hour	235 (0.12)	259 (0.132)	247 (0.126)
Nitrogen Dioxide, μg/m^3 (ppm)	Botanical Gardens, 200th Street & SE Blvd., Bronx	Annual	100 (0.053)	53 (0.028)	- -
Lead[4] μg/ m^3	Midtown, Madison Avenue (47th – 48th Streets), Manhattan	3 month	1.5	0.13	0.12
Total Suspended Particulates[5] μg/m^3	Mt. Vernon 260 South Sixth Ave. Mt. Vernon, NY	Annual	75	33	- -
		24-hour	250	78	76
Inhalable Particulates, PM_{10} μg/m^3	I.S. 52 681 Kelly Street Bronx	Annual	50	21	- -
		24 hour	150	91[6]	45
Respirable Particulates, $PM_{2.5}$ μg/m^3	Botanical Gardens 200th Street & SE Blvd. Bronx	Annual	15	13.5	- -
		24-hour	65	34.9	34.0

Notes:

1. Source: New York State Department of Environmental Conservation. 2002. Annual New York State Air Quality Report, Ambient Air Monitoring System. New York, NY.
2. Generally the ambient standards for averaging periods of 24 hours or less may not be exceeded more than once per year. Therefore, measured second highest concentrations are included for these averaging times.
3. The 1-hour ozone standard is not to be exceeded more than an average of one day per year based on the last three years. The 8-hour ozone standard was not adopted until July 1997.
4. Monitoring for lead was discontinued after 1998.
5. The 24-hour NYS standard is 250 μg/m^3. TSP is no longer a federally regulated pollutant. TSP data is for 1998; monitoring was discontinued after 12/31/1998.
6. The highest value of 91μg/m^3 exceeds the second highest value by more than 100 percent and is not considered statistically representative. It is shown as reported, but it is not used in this analyses.

Abbreviations:

ppm = parts per million
μg/m^3 =micrograms per cubic meter
1 ppm nitrogen dioxide = 1,880 μg/m^3
1 ppm sulfur dioxide = 2,610 μg/m^3

TABLE 6.11-2. SUMMARY OF THE SELECTED AMBIENT AIR MONITORING DATA FOR BACKGROUND POLLUTANT CONCENTRATION

Pollutant	Monitoring Station	1998	1999	2000	2001	2002
SO_2 3-hour	Botanical Garden	--	--	162 µg/m^3 (0.062 ppm)	**183** µg/m^3 (**0.070** ppm)	146 µg/m^3 (0.056 ppm)
24 hours		--	--	99 µg/m^3 (0.038 ppm)	**120** µg/m^3 (**0.046** ppm)	97 µg/m^3 (0.037 ppm)
Annual		--	--	*23 µg/m^3 (0.009 ppm)	**26** µg/m^3 (**0.010** ppm)	23 µg/m^3 (0.009 ppm)
NO_2 Annual	Botanical Garden	56 µg/m^3 (0.030 ppm)	54 µg/m^3 (0.029 ppm)	54 µg/m^3 (0.029 ppm)	**58** µg/m^3 (**0.031** ppm)	53 µg/m^3 (0.028 ppm)
CO 1-hour	Botanical Garden	5372 µg/m^3 (4.7 ppm)	6515 µg/m^3 (5.7 ppm)	**6858** µg/m^3 (**6.0** ppm)	5601 µg/m^3 (4.9 ppm)	4,229 µg/m^3 (3.7 ppm)
8- hours		3658 µg/m^3 (3.2 ppm)	**4572** µg/m^3 (**4.0** ppm)	4001 µg/m^3 (3.5 ppm)	3,086 µg/m^3 (2.7 ppm)	2,400 µg/m^3 (2.1 ppm)
PM_{10} 24 hours	IS 52	--	22.0 µg/m^3	45.0 µg/m^3	42.0 µg/m^3	**45.0** µg/m^3
Annual		--	16.0 µg/m^3	21.0 µg/m^3	21.0 µg/m^3	**21.0** µg/m^3

Note:
--denotes air sampling did not occur or monitoring data is not available.
Bold denotes highest value (maximum 2nd high for 1-hr, 3-hr, 8-hr, and 24-hr data) in last 5 years.
* denotes data captured is less than 75%.
Source: State of New York Department of Environmental Conservation, Air Quality Reports for Calendar Years 1998 to 2002.

6.11.2.1.1. Mobile Sources

Air quality impacts from motor vehicles can have localized or microscale effects on ambient air quality for CO and $PM_{10.}$ For $PM_{2.5}$ short-term (24-hours) impacts, a microscale analysis was conducted, and for annual (long-term) impacts, a neighborhood analysis was deemed more representative. Therefore, a quantified analysis of the potential CO, PM_{10} and $PM_{2.5}$ impacts from the sources most likely to affect the communities (on-street vehicular traffic) was performed.

Traffic monitoring was conducted in 2003 to obtain information on traffic volume, delay time and vehicle classification. Data gathered from the traffic monitoring was processed using the Highway Capacity Manual methodology and HCS2000 software (Section 4.9, Data Collection and Impact Methodologies and Section 5.9, Traffic and Transportation Analysis). The intersections with the worst level of service (LOS), the highest traffic volumes and the highest number of induced traffic were considered in selecting the worst intersection for detailed dispersion modeling analysis (Figure 6.11-2 their locations are shown in Figure 6.4-2 and listed in Table 6.11-3).

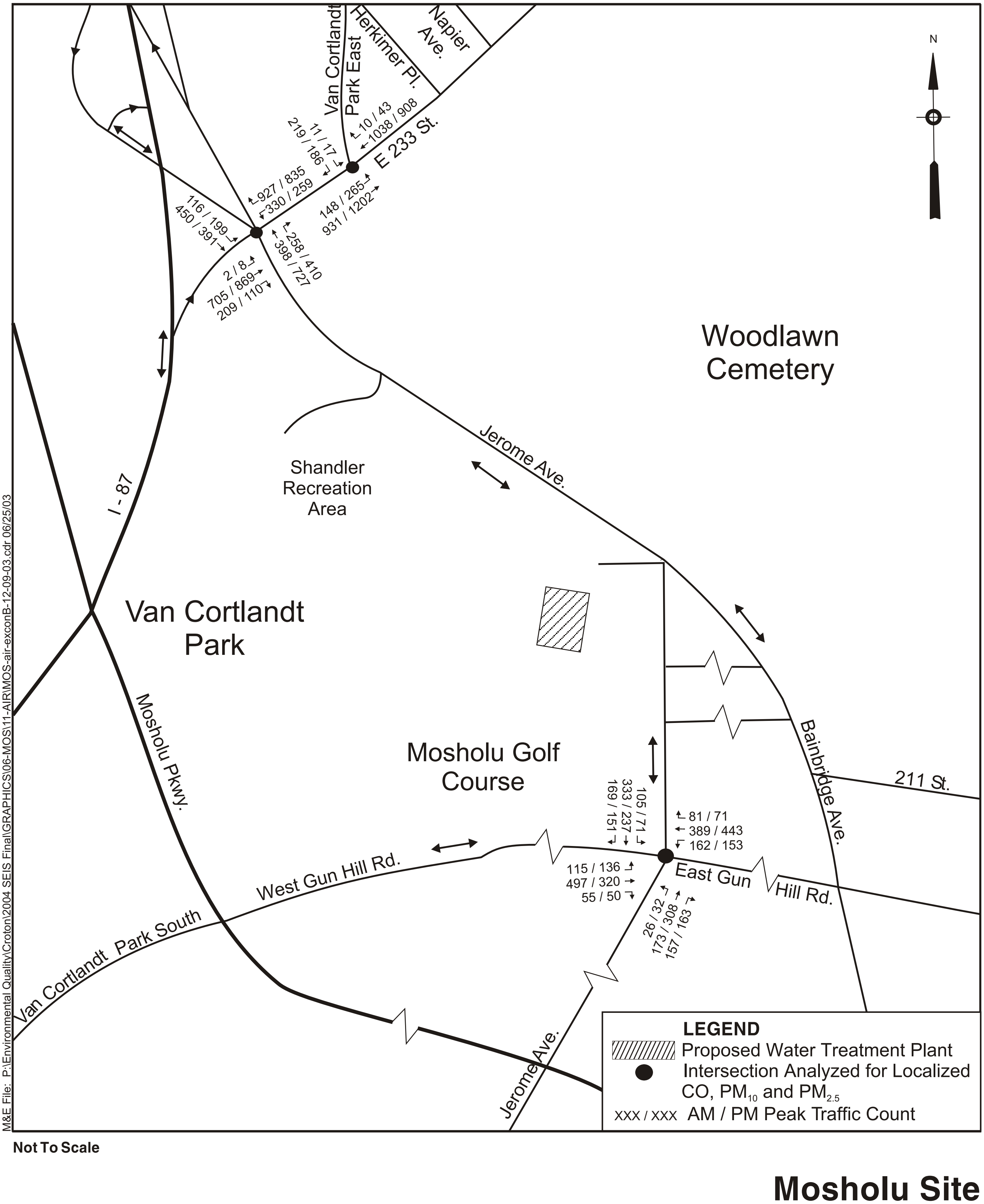
A mobile source analysis of the worst intersection (No. 118, Jerome Ave/East 233rd and I-187)[*] was conducted for CO, PM_{10} and $PM_{2.5}$ for the Potential Project Impact and Future Without the Project (Build / No Build) scenarios. All of the estimated construction generated trucks would access the site through this intersection. Impacts were modeled at this location based on the predicted traffic volumes and patterns forecast for the year 2010 construction scenario. If the worst intersection complies with the standard and *de minimis* values, it was assumed other intersections would also comply with the impact criteria.

[*] The intersection of Van Cortlandt Park East and East 233rd Street was analyzed as part of the Jerome Ave/E 233rd intersection.

TABLE 6.11-3. INTERSECTIONS CONSIDERED FOR THE MOSHOLU SITE

Intersection Number	Top Ranking	Intersection Name	AM Peak Hour			PM Peak Hour			Project-related Construction Traffic	
			Volume	Delay	LOS	Volume	Delay	LOS	Cars	Trucks
			vph	seconds	Total	vph	seconds	Total	trips	trips
118	1	Jerome Avenue & 233rd Street	3395	33.8	C	3797	36.1	D	208	20
117[a]	2	Van Cortlandt Park East & 233rd Street	2357	16.5	B	2621	26.4	C	208	20
122	3	Gun Hill Road & Jerome Avenue	2262	39.4	D	2135	26.0	C	93	3

Note: [a] This intersection was analyzed as part of the Jerome Avenue and 233rd Street intersections.



Not To Scale

Mosholu Site Intersections Considered for Air Quality Mobile Source Analysis

Croton Water Treatment Plant

Figure 6.11-2

6.11.2.1.2. Stationary Sources.

Currently there is no development at the project site.

6.11.2.2. Future Without the Project

The Future Without the Project mobile source analysis was conducted for the anticipated peak construction traffic year, 2010. In 2010 construction-related traffic would be anticipated to be at the maximum, and would be greater than for operation of the project or any other construction year. Therefore, Future Without Project mobile source impacts are analyzed for year 2010. Due to the anticipated number of heavy trucks, the construction year 2006 was also analyzed. For stationary sources the construction impacts were analyzed for 2010, whereas operational stationary sources were analyzed for 2011, the planned first year of operation.

6.11.2.2.1. Mobile Sources

In the Future Without the Project, a mobile source air quality analysis was conducted for two construction years: 2010—the anticipated peak year of construction-related vehicular activities, and 2006—the peak year of construction-related heavy truck activities. The methodology for the localized pollutant analysis at intersections is discussed in Section 4.11, "Air Quality Methodology." Localized pollutant impacts from the vehicles queuing at the intersections were analyzed for the 1-hour and 8-hour CO concentrations, and 24-hour and annual PM_{10} concentrations.

The analysis for each pollutant involved a two-step process. First, the pollutant emission rate was determined, then the dispersion model was run using the calculated emission rate. MOBILE6.2 emission factors and projected traffic volumes for years 2006 and 2010 were used as inputs to the CAL3QHC and CAL3QHCR dispersion model along with the local vehicle fleet classifications from the 2003 traffic study. Future CO, PM_{10} and $PM_{2.5}$ pollutant levels without the project were estimated for the worst intersection.

Carbon Monoxide. To determine motor-vehicle-generated CO concentrations adjacent to the streets near the proposed Croton project, the CAL3QHC model was applied. Maximum 1- and 8-hour CO concentrations were determined using EPA's CAL3QHC model version 2 (*User's Guide to CAL3QHC, A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections*, Office of Air Quality, Planning Standards, EPA, Research Triangle Park, North Carolina). CO impacts from traffic were predicted using a two step methodology. First, emission factors were calculated using data from the traffic study using the USEPA MOBILE6.2 emissions model. A dispersion model then used these emission factors to calculate downwind CO impacts.

The CAL3QHC model predicted 1-hour CO impacts from traffic. To ensure that the maximum impacts were captured, impacts were calculated for a range of meteorological conditions and wind directions. Following USEPA guidelines (Guideline for Modeling Carbon Monoxide from Roadway Intersections, EPA-454/R-92-005, 1992) the persistence factor of 0.7 was used to convert the results from 1-hour averaging time periods to 8-hour averaging time periods, consistent with the standard.

The results of CAL3QHC dispersion modeling were added to the predicted background concentrations, and then compared to the 1-hour and 8-hour ambient air quality standard for CO. Table 6.11-4 and 6.11-5 show the results of CO modeling for 2006 and 2010. As indicated in the tables, the maximum predicted concentrations are below the applicable air quality standard.

Particulate Matter (PM_{10}). PM_{10} impacts from traffic were determined using the 2-model methodology similar to that used for CO. Emission factors were calculated using data from the traffic study and the MOBILE6.2 emissions model. CAL3QHCR was then used to calculate downwind PM_{10} impacts.

MOBILE6.2 emission factors, projected 24-hour traffic volumes and five years of hourly meteorological data were used as inputs to the CAL3QHCR dispersion model to estimate impacts to the nearby intersection. Background PM_{10} concentrations from the nearest air quality monitoring station, which is IS 52, were added to the predicted impacts. Tables 6.11-6 and 6.11-7 present the PM_{10} results for 2006 and 2010. The 24-hour PM_{10} standard is 150 µg/m^3 and the annual standard is 50 µg/m^3. No exceedences of the 24-hour or annual PM_{10} standards were predicted.

TABLE 6.11-4. PREDICTED CARBON MONOXIDE 1-HOUR AND 8-HOUR CONCENTRATIONS IN THE FUTURE WITHOUT THE PROJECT PEAK YEAR 2010 (PPM)

Intersection	Ambient AQ Background		Model Result		Total Predicted Conc.		Standard
			AM	PM	AM	PM	
Peak Traffic Year 2010							
Jerome Avenue & 233rd Street	1-hour	5.9	3.0	3.1	8.9	9.0	35
	8-hour	2.0	2.1	2.2	4.1	4.2	9

TABLE 6.11-5. PREDICTED CARBON MONOXIDE 1-HOUR AND 8-HOUR CONCENTRATIONS IN THE FUTURE WITHOUT THE PROJECT PEAK YEAR 2006 (PPM)

Intersection	Ambient AQ Background		Model Result		Total Predicted Conc.		Standard
			AM	PM	AM	PM	
Peak Traffic Year 2010							
Jerome Avenue & 233rd Street	1-hour	5.9	3.5	3.8	9.4	9.2	35
	8-hour	2.0	2.5	2.7	4.5	4.7	9

TABLE 6.11-6. PREDICTED PM_{10} 24-HOUR AND ANNUAL CONCENTRATIONS IN THE FUTURE WITHOUT THE PROJECT PEAK YEAR 2010 ($\mu g/m^3$)

Intersection	Averaging Time	Ambient AQ Background[1]	Model Result	Total Predicted Conc.	Standard
Peak Traffic Year 2010					
Jerome Avenue & 233rd Street	24-Hour	45	38	83	150
	Annual	21	14	35	50

Note: [1] Ambient AQ Background + Model Result = Total Predicted Concentration.

TABLE 6.11-7. PREDICTED PM_{10} 24-HOUR AND ANNUAL CONCENTRATIONS IN THE FUTURE WITHOUT THE PROJECT PEAK YEAR 2006 ($\mu g/m^3$)

Intersection	Averaging Time	Ambient AQ Background[1]	Model Result	Total Predicted Conc.	Standard
Peak Traffic Year 2010					
Jerome Avenue & 233rd Street	24-Hour	45	39.63	84.63	150
	Annual	21	14.54	35.54	50

Note: [1] Ambient AQ Background + Model Result = Total Predicted Concentration.

Fine Particulate Matter Analysis. Although USEPA currently does not offer specific guidance for modeling $PM_{2.5}$ impacts from mobile sources, the methodology described below was developed based on existing EPA approved methods for other mobile source modeling that are discussed in the *CEQR Technical Manual*, EPA documents describing the general approach to $PM_{2.5}$ regulation, EPA $PM_{2.5}$ monitoring station location guidance* and the interim guidance developed by NYCDEP and NYSDEC. The general approach is to predict the highest concentrations anticipated that would represent a neighborhood scale exposure level.

Vehicular $PM_{2.5}$ emission factors for the 2006 and 2010 were derived using the MOBILE6.2 emissions model. For the microscale analysis sources of particulate included running exhaust, brake and tire wear, and road dust. Only running exhaust was included for the neighborhood analysis.

The CAL3QHCR model was used to predict $PM_{2.5}$ concentrations at receptor locations. Maximum daily and annual average concentrations were calculated by the model using five years of hourly meteorological data. Receptors for the annual, neighborhood scale model were

* *Guidance for Network Design and Optimum Site Exposure for $PM_{2.5}$ and PM_{10}*; EPA-454/R-99-022

located at a distance of 15 meters (49 feet) from the roadway. The microscale analysis for 24-hour averaging periods were run with the same receptors used in the CO models.

To determine the predicted $PM_{2.5}$ increment from project mobile sources, the net differences in the predicted $PM_{2.5}$ results were obtained by subtracting the model results of the Future Without the Project scenarios from the results of the Proposed Construction Impacts scenarios. Tables 6.11-8 and 6.11-9 presents the modeled concentrations of $PM_{2.5}$ for the Future Without the Project construction scenario year 2006 and 2010.

TABLE 6.11-8. PREDICTED $PM_{2.5}$ 24-HOUR AND ANNUAL CONCENTRATIONS IN THE FUTURE WITHTOUT THE PROJECT PEAK YEAR 2006 ($\mu g/m^3$)

Intersection	Averaging Time	Model Result
Site Preparation Year 2006		
Jerome Avenue & 233rd Street	24-Hour	5.91
	Annual	0.43

TABLE 6.11-9. PREDICTED $PM_{2.5}$ 24-HOUR AND ANNUAL CONCENTRATIONS IN THE FUTURE WITHTOUT THE PROJECT PEAK YEAR 2010 ($\mu g/m^3$)

Intersection	Averaging Time	Model Result
Peak Traffic Year 2010		
Jerome Avenue & 233rd Street	24-Hour	5.47
	Annual	0.29

6.11.2.2.2. Stationary Sources

In Future Without the Project years 2010 and 2011, the concentrations of stationary source-related pollutants PM_{10}, $PM_{2.5}$, SO_2, CO and NO_2, were anticipated to remain at the same levels as determined for the existing conditions. No new air quality impacts are anticipated in the project vicinity under the Future Without the Project scenario.

In Future Without the Project for years 2010 and 2011, the ambient 24-hour and annual concentrations of $PM_{2.5}$ were assumed to remain at the same levels as existing conditions. Newly promulgated diesel exhaust regulations are anticipated to reduce future ambient concentrations of fine particulate, including $PM_{2.5}$, but the effects are not quantified.

6.11.3. Potential Impacts

6.11.3.1. Potential Project Impacts

The air quality study of the proposed plant evaluated the potential project impacts from mobile and stationary sources of emissions. Mobile sources included vehicular traffic on the street system and within the on-site parking facilities. Stationary sources included the plant's boiler system and the emergency electric-generation system.

6.11.3.1.1. Mobile Sources

The anticipated year of operation of the project is 2011. However, no significant mobile source impacts are anticipated from operation of the plant, as induced traffic volumes (25 auto trips and 4 truck trips) are lower than the mobile source screening thresholds. Thus a detailed analysis of mobile source impacts was not conducted for project operation.

6.11.3.1.2. Stationary Sources

Operations at the water treatment plant site, during the year 2011, would emit regulated air pollutants. This section identifies the operations that have the potential to emit regulated air pollutants, and examines each potential stationary emission source. Stationary sources with the potential to emit regulated air pollutants include natural gas-fired boilers and emergency diesel generators. Small quantities of various chemical compounds may occasionally be exhausted from the laboratory hood. Table 6.11-10 summarizes the emission sources at the proposed plant.

TABLE 6.11-10. WATER TREATMENT PLANT EMISSION SOURCES

Source	Boilers	Emergency Generators
Fuel	Natural Gas	Diesel
Number of Units	3	2
Operating Units	2	0[a]
Rating	23.4 MMBtu/hr	2,220 hp
Stack Height	50 feet	50 feet
Stack Diameter	42 inches	12 inches
Flow Rate	32,500 acfm	10,500 acfm
Temperature	500 °F	870 °F

Notes:
a. Only, one emergency generator would operate in an emergency. Under normal operating conditions, the generators will be exercised once per week.

The stationary source analysis evaluated the impacts of $PM_{2.5}$, PM_{10}, SO_2, CO and NO_2 emitted by the project's combustion sources: the heating and hot water boiler system, and the emergency generators. Combustion by-products may include some regulated hazardous air pollutants (HAP) and toxic air contaminants (TAC). HAPs are regulated by USEPA Title III of the Clean Air Act Amendments of 1990. TACs are regulated by NYSDEC and include HAPs.

The emission of nitrogen compounds from combustion units are usually expressed as total nitrogen oxides or NO_x. For the project area, the ambient air ratio of NO^2 to NO_x is 0.59. This ratio was used to determine NO2 impacts from emission rates of NO_x (i.e., NO_2 is 59% of total NO_x).

As part of the stationary source analysis, the potential impact of regulated substances emitted in small concentrations from the laboratory hoods was evaluated. The potential for odors from the treatment process and residuals handling was also addressed.

Boiler System. The boiler system for the proposed project would provide heat and hot water. The system would consist of three packaged natural gas-fired firetube boilers, each rated at approximately 23.4 million British Thermal Units per hour (MMBtu/hr) fuel input. Two boilers were assumed operating at full capacity for up to 8,312 total hours per year, with no boilers operating during the warmer summer months, and with two boilers operating at the same time only during the coldest months. The standby boiler would operate only one hour per month for exercise. Emission factors were obtained from manufacturer's data. Boiler emissions are shown in Table 6.11-11.

TABLE 6.11-11. 23.4 MMBTU/HR BOILER EMISSIONS[1]

Pollutant	Emission Factor	Emission				
		1-Hour	24-Hour	Annual	Annual	
	lb/MMBtu	pounds	pounds	hours	pounds	tons
SO_2	1.00E-03	4.7E-02	1.12	8312	195	9.74E-02
NO_2[2]	3.50E-02	1.64	39.37	8312	6820	3.41
CO[3]	4.00E-02	1.87	45.00	8312	7790	3.90
PM[4]	1.00E-02	4.7E-01	11.25	8312	1950	0.97
VOC	1.60E-02	7.5E-01	18.00	8312	3120	1.56

Notes:
1. Emission Factors are from Cleaver Brooks Firetube Boiler, Model CB-LE, Table A3-10, CB-LE Boilers Natural Gas Emissions, 30 ppm NOx, dry basis and corrected to 3% excess oxygen.
2. Conversion of NOx to NO_2 is 59 percent (Newtown Creek FSEIS, 2001).
3. The CO emission factor increases to 0.11 lb/MMBtu if boiler is operated below 50% load. Boilers will operate between 50% and 100% load. 100% load was modeled.
4. All PM is assumed to be $PM_{2.5}$.

Natural gas combustion may also result in emissions of relatively small amounts of TACs. Emissions factors for TACs have been developed for various combustion sources, and are compiled in the USEPA document "Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume 1: Stationary Point and Area Sources." Tables 1.4-3 and 1.4-4, "Emission Factors from Speciated Organic Compounds from Natural Gas Combustion" and "Emission Factors for Metals from Natural Gas Combustion," respectively, provide emission factors used to estimate TACs from the Mosholu water treatment plant boilers. Annual emissions are based on all three boilers operating a total of 8,312 hours in a year. TAC emissions, based on AP-42 emission factors, are shown in Table 6.11-12.

TABLE 6.11-12. BOILER TAC EMISSIONS

Pollutant	Emission Factor	1-Hour	Annual	
	lb/MMScf	pounds	pounds	tons
Benzene	2.10E-03	4.82E-05	4.00E-01	2.00E-04
Toluene	3.40E-03	7.80E-05	6.48E-01	3.24E-04
Formaldehyde	7.50E-02	1.72E-03	1.43E+01	7.15E-03
Naphthalene	6.10E-04	1.40E-05	1.16E-01	5.82E-05
Acenaphthylene	1.80E-06	4.13E-08	3.43E-04	1.72E-07
Acenaphthene	1.80E-06	4.13E-08	3.43E-04	1.72E-07
Phenanthrene	1.70E-05	3.90E-07	3.24E-03	1.62E-06
Anthracene	2.40E-06	5.51E-08	4.58E-04	2.29E-07
Fluoranthene	3.00E-06	6.88E-08	5.72E-04	2.86E-07
Pyrene	5.00E-06	1.15E-07	9.53E-04	4.77E-07
Benzo(a)anthracene	1.80E-06	4.13E-08	3.43E-04	1.72E-07
Chrysene	1.80E-06	4.13E-08	3.43E-04	1.72E-07
Benzo(b)fluoranthene	1.80E-06	4.13E-08	3.43E-04	1.72E-07
Benzo(k)fluoranthene	1.80E-06	4.13E-08	3.43E-04	1.72E-07
Benzo(a)pyrene	1.20E-06	2.75E-08	2.29E-04	1.14E-07
Indeno(1,2,3-cd)pyrene	1.80E-06	4.13E-08	3.43E-04	1.72E-07
Dibenz(a,h)anthracene	1.20E-06	2.75E-08	2.29E-04	1.14E-07
Benzo(g,h,i)perylene	1.20E-06	2.75E-08	2.29E-04	1.14E-07
2-Methylnaphthalene	2.40E-05	5.51E-07	4.58E-03	2.29E-06
3-Methylchloranthrene	1.80E-06	4.13E-08	3.43E-04	1.72E-07
7,12-Dimethylbenz(a)anthracene	1.60E-05	3.67E-07	3.05E-03	1.53E-06
Dichlorobenzene	1.20E-03	2.75E-05	2.29E-01	1.14E-04
Hexane	1.8	4.13E-02	3.43E+02	1.72E-01
Arsenic	2.00E-04	4.59E-06	3.81E-02	1.91E-05
Beryllium	1.20E-05	2.75E-07	2.29E-03	1.14E-06
Cadmium	1.10E-03	2.52E-05	2.10E-01	1.05E-04
Chromium	1.40E-03	3.21E-05	2.67E-01	1.33E-04
Cobalt	8.40E-05	1.93E-06	1.60E-02	8.01E-06
Manganese	3.80E-04	8.72E-06	7.25E-02	3.62E-05
Mercury	2.60E-04	5.96E-06	4.96E-02	2.48E-05
Nickel	2.10E-03	4.82E-05	4.00E-01	2.00E-04
Selenium	2.40E-05	5.51E-07	4.58E-03	2.29E-06
Lead	5.00E-04	1.15E-05	9.53E-02	4.77E-05
Butane	2.10E+00	4.82E-02	4.00E+02	2.00E-01
Pentane	2.60E+00	5.96E-02	4.96E+02	2.48E-01
Propane	1.60E+00	3.67E-02	3.05E+02	1.53E-01
Barium	4.40E-03	1.01E-04	8.39E-01	4.20E-04
Copper	8.50E-04	1.95E-05	1.62E-01	8.10E-05
Molybdenum	1.10E-03	2.52E-05	2.10E-01	1.05E-04
Vanadium	2.30E-03	5.28E-05	4.39E-01	2.19E-04

TABLE 6.11-12. BOILER TAC EMISSIONS

Pollutant	Emission Factor	1-Hour	Annual	
	lb/MMScf	pounds	pounds	tons
Zinc	2.90E-02	6.65E-04	5.53E+00	2.76E-03

Note:
1. Currently, USEPA is investigating acrolein sampling methods. Until such time that methods are developed and test data for acrolein for gas-fired boilers are available, acrolein emissions cannot be quantified.
2. Natural gas heating value is 1020 Btu/scf.

Emergency Generators. Two 1500 kilowatt (KW), or 2,220 horsepower (HP) diesel fuel-fired emergency generators would provide emergency power for the Mosholu water treatment plant. One would serve as the duty generator and the other would be back-up. The emergency generators would only operate in the event of a utility power failure, and for "exercising" to keep them in good working order. Each diesel generator would be exercised approximately one hour per week. Only one generator would be exercised at a time. During an emergency only one generator would be operated at a time. Fuel would be available on-site to provide emergency power from one generator for a maximum of only slightly longer than one day. Table 6.11-13 shows the estimated emissions from the generators, each operating for one hour per week, 52 weeks per year.

TABLE 6.11-13. EMERGENCY DIESEL GENERATOR EMISSIONS[1]

Pollutant	Emission Factor	Emission (per unit)			
		1-Hour	24-Hour	Annual[2]	
	gm/hp-hr	Pounds	pounds	pounds	tons
SO_2[3]	5.60E-01	2.74	5.48	285.04	0.14
NO_2[4]	11.5	56.28	112.57	5,853.44	2.93
CO	8.00E-01	3.92	7.83	407.20	0.20
PM_{10}[5]	0.384	1.88	3.76	195.5	0.10
VOC	2.40E-01	1.17	2.35	122.16	0.06

Notes:
1. Emissions based on 1500 DFMB Onan Generator Set, Exhaust Emissions Data Sheet.
2. Assumes generator is exercised 1 hour per week.
3. Based on 0.2 percent sulfur in fuel.
4. Assumes 59 percent conversion of NOx to NO2 (Newtown Creek FSEIS, 2001).
5. Assumes 90 percent of diesel exhaust particulate is $PM_{2.5}$ and 96 percent is PM_{10}. The remaining 4 % is PM greater than 10 micron (AP-42).

Diesel combustion may also result in emissions of relatively small amounts of TACs. Emissions factors for TACs from large diesel engines are compiled in AP-42, Tables 3.4-3 and 3.4-4, “Speciated Organic Compounds Emission Factors for Large Uncontrolled Stationary Diesel Engines” and “PAH Emission Factors for Large Uncontrolled Stationary Diesel Engines,” respectively. These two tabulations provide the emission factors used to estimate TACs from the emergency diesel generators. Annual emissions are based on each engine generator operating one hour per week, every week of the year. TAC emissions, based on AP-42 emission factors, are shown in Table 6.11-14.

TABLE 6.11-14. EMERGENCY DIESEL GENERATOR TAC EMISSIONS

Pollutant	Emission Factor	Emissions (per unit)		
		1-Hour	Annual	
	lb/MMBtu	pounds	pounds	tons
Benzene	7.76E-04	1.21E-02	1.25E+00	6.27E-04
Toluene	2.81E-04	4.37E-03	4.54E-01	2.27E-04
Xylenes	1.93E-04	3.00E-03	3.12E-01	1.56E-04
Propylene	2.79E-03	4.34E-02	4.51E+00	2.25E-03
Formaldehyde	7.89E-05	1.23E-03	1.28E-01	6.38E-05
Acetaldehyde	2.52E-05	3.92E-04	4.07E-02	2.04E-05
Naphthalene	1.30E-04	2.02E-03	2.10E-01	1.05E-04
Acenaphthylene	9.23E-06	1.43E-04	1.49E-02	7.46E-06
Acenaphthene	4.68E-06	7.27E-05	7.56E-03	3.78E-06
Phenanthrene	4.08E-05	6.34E-04	6.59E-02	3.30E-05
Anthracene	1.23E-06	1.91E-05	1.99E-03	9.94E-07
Fluoranthene	4.03E-06	6.26E-05	6.51E-03	3.26E-06
Pyrene	3.71E-06	5.77E-05	6.00E-03	3.00E-06
Benzo(a)anthracene	6.22E-07	9.67E-06	1.01E-03	5.03E-07
Chrysene	1.53E-06	2.38E-05	2.47E-03	1.24E-06
Benzo(b)fluoranthene	1.11E-06	1.72E-05	1.79E-03	8.97E-07
Benzo(k)fluoranthene	2.18E-07	3.39E-06	3.52E-04	1.76E-07
Benzo(a)pyrene	2.57E-07	3.99E-06	4.15E-04	2.08E-07
Indeno(1,2,3-cd)pyrene	4.14E-07	6.43E-06	6.69E-04	3.35E-07
Dibenz(a,h)anthracene	3.46E-07	5.38E-06	5.59E-04	2.80E-07
Benzo(g,h,i)perylene	5.56E-07	8.64E-06	8.99E-04	4.49E-07

Note:
1. Currently, USEPA is investigating acrolein sampling methods. Until such time that methods are developed and test data for acrolein for gas-fired boilers are available, acrolein emissions cannot be quantified.

Operating Emissions Summary. Criteria pollutants are emitted from the boilers and the generators at the proposed plant. Total facility emissions, shown in Table 6.11-15, are below the major source threshold.

Total emissions of each criteria pollutant would be less than the major source threshold for that pollutant. The proposed plant would not be classified as a major source for any criteria pollutant

Combustion sources also emit trace quantities of HAPs and TACs. A major source of Title III HAPs is one where 10 tons of any single regulated HAP or 25 tons of total HAPs are emitted in one year. The proposed plant is not a major source for HAPs. Table 6.11-16 summarizes potentially toxic emissions from combustion sources at the proposed plant.

TABLE 6.11-15. CRITERIA POLLUTANT EMISSIONS SUMMARY

Pollutant	Boilers tons/yr	Generators tons/yr	Total tons/yr	National & State Threshold tons/yr
Sulfur Dioxide	0.09	0.14	0.23	100
Oxides of Nitrogen	3.41	2.93	6.34	25
Carbon Monoxide	3.90	0.20	4.10	100
PM_{10}	0.97	0.10	1.07	100
VOC	1.56	0.06	1.62	25

TABLE 6.11-16. TOTAL TOXIC AIR CONTAMINANT EMISSIONS FROM COMBUSTION SOURCES AT THE MOSHOLU SITE

Pollutant	1-Hour	Annual	
	pounds	pounds	tons
Benzene (HAP)	1.22E-02	1.65E+00	8.27E-04
Toluene (HAP)	4.52E-03	1.10E+00	5.51E-04
Xylenes (HAP)	3.00E-03	3.12E-01	1.56E-04
Propylene	4.34E-02	4.51E+00	2.25E-03
Formaldehyde (HAP)	4.67E-03	1.44E+01	7.21E-03
Acetaldehyde (HAP)	3.92E-04	4.07E-02	2.04E-05
Naphthalene (HAP)	2.05E-03	3.26E-01	1.63E-04
Acenaphthylene (HAP)	1.44E-04	1.53E-02	7.63E-06
Acenaphthene (HAP)	7.28E-05	7.91E-03	3.95E-06
Phenanthrene (HAP)	6.35E-04	6.92E-02	3.46E-05
Anthracene (HAP)	1.92E-05	2.45E-03	1.22E-06
Fluoranthene (HAP)	6.28E-05	7.09E-03	3.54E-06
Pyrene (HAP)	5.79E-05	6.95E-03	3.47E-06
Benz(a)anthracene (HAP)	9.75E-06	1.35E-03	6.74E-07
Chrysene (HAP)	2.39E-05	2.82E-03	1.41E-06
Benzo(b)fluoranthene (HAP)	1.73E-05	2.14E-03	1.07E-06
Benzo(k)fluoranthene (HAP)	3.47E-06	6.96E-04	3.48E-07
Benzo(a)pyrene (HAP)	4.05E-06	6.44E-04	3.22E-07
Indeno(1,2,3-cd)pyrene	6.52E-06	1.01E-03	5.06E-07
Dibenz(a,h)anthracene (HAP)	5.43E-06	7.88E-04	3.94E-07
Benzo(g,h,i)perylene (HAP)	8.70E-06	1.13E-03	5.64E-07
2-Methylnaphthalene (HAP)	1.10E-06	4.58E-03	2.29E-06
3-Methylchloranthrene (HAP)	8.26E-08	3.43E-04	1.72E-07
7,12-Dimethylbenz(a)anthracene (HAP)	7.34E-07	3.05E-03	1.53E-06
Dichlorobenzene (HAP)	5.51E-05	2.29E-01	1.14E-04
Hexane (HAP)	8.26E-02	3.43E+02	1.72E-01
Arsenic (HAP)	9.18E-06	3.81E-02	1.91E-05
Beryllium (HAP)	5.51E-07	2.29E-03	1.14E-06
Cadmium (HAP)	5.05E-05	2.10E-01	1.05E-04

TABLE 6.11-16. TOTAL TOXIC AIR CONTAMINANT EMISSIONS FROM COMBUSTION SOURCES AT THE MOSHOLU SITE

Pollutant	1-Hour	Annual	
	pounds	pounds	tons
Chromium (HAP)	6.42E-05	2.67E-01	1.33E-04
Cobalt (HAP)	3.85E-06	1.60E-02	8.01E-06
Manganese (HAP)	1.74E-05	7.25E-02	3.62E-05
Mercury (HAP)	1.19E-05	4.96E-02	2.48E-05
Nickel (HAP)	9.64E-05	4.00E-01	2.00E-04
Selenium (HAP)	1.10E-06	4.58E-03	2.29E-06
Lead (HAP)	2.29E-05	9.53E-02	4.77E-05
Butane	9.64E-02	4.00E+02	2.00E-01
Pentane	1.19E-01	4.96E+02	2.48E-01
Propane	7.34E-02	3.05E+02	1.53E-01
Barium	2.02E-04	8.39E-01	4.20E-04
Copper	3.90E-05	1.62E-01	8.10E-05
Molybdenum	5.05E-05	2.10E-01	1.05E-04
Vanadium	1.06E-04	4.39E-01	2.19E-04
Zinc	1.33E-03	5.53E+00	2.76E-03
Total HAP			**1.81E-01**

Note:
1. Currently, USEPA is investigating acrolein sampling methods. Until such time that methods are developed and test data for acrolein for gas-fired boilers are available, acrolein emissions cannot be quantified.

Criteria Pollutant ISCST3 Modeling. The potential impacts of the boiler system and emergency generators emissions were analyzed using the USEPA's Industrial Source Complex Short Term, Version 3 dated 02035 (ISCST3) model (User's Guide, USEPA, 1995d). ISCST3 is a refined computerized dispersion model that calculates impacts at receptors from multiple point, area and volume sources. ISCST3 uses historical hourly meteorological data. Meteorological data from La Guardia Airport, with upper air data from Brookhaven, for years 1997 through 2001, were used.

ISCST3 was used to predict maximum pollutant concentrations at designated receptors. Three sets of receptors were generated for the analysis; fenceline, Cartesian grid and sensitive land uses. The fenceline receptors were placed at approximately 25 meter intervals along the property boundary. The Cartesian grid receptors extend out to approximately ½ km in all directions from the site.

Locations of sensitive receptors in the vicinity of the proposed project were also included. Sensitive receptors include the public areas in Mosholu Park, the transit platform above Jerome Park Avenue, the residential housing units across at Bainbridge Avenue and Jerome Avenue, along Jerome Avenue, and the northeast and southeast corners of Jerome Avenue and 213th Street. Additional elevated receptors for second floor apartments were incorporated into this modeling study. Figure 6.11-3 shows the proposed plant, the boiler exhaust location, the property line and the locations of sensitive receptors.

The stack height for boilers and generators are lower than USEPA Good Engineering Practice (GEP) guidelines. Therefore building downwash was considered. The USEPA Building Profile Input Program (BPIP) was used to calculate building cross-sections for wind directions at 10 degree intervals. The cross-sections were included in the ISCST3 model input file and the building downwash option was selected.

In accordance with procedures described in USEPA's "Guideline on Air Quality Models," the Auer procedure was used to determine Urban/Rural classification. Based on examination of USGS 7.5 minute quadrangle maps for an approximately 3 kilometer radius around the water treatment plant, Urban classification is appropriate for this site.

The background pollutant concentrations were obtained from the NYSDEC monitoring data. Background air quality data is based on the most recent five years of NYSDEC monitoring data, 1998 through 2002. Annual background values are from the year with the highest annual concentration. For averaging times shorter than one year, the background value is the highest second-high value for the five years. Where five contiguous years of recent monitoring data are not available, a minimum of three years were used. Table 6.11-2 summarizes the existing monitoring data for the water treatment plant site.

Each emergency generator is assumed to be exercised at full capacity for one hour per week. Both generators would not be exercised at the same time.

Dispersion modeling was conducted to compare concentrations of pollutants at off-site receptors with applicable ambient air quality standards. Table 6.11-17 compares the combined concentrations of each pollutant at the maximum off-site receptor with applicable standards.

TABLE 6.11-17. MODELING RESULTS FOR ALL MOSHOLU WATER TREATMENT PLANT CRITERIA POLLUTANT SOURCES

Pollutant	Averaging Time	All Sources	Background	Total	National[1] & State[2] Standards
		μg/m^3	μg/m^3	μg/m^3	μg/m^3
Sulfur Dioxide	3-hours	5.4	183	188.4	1300
Sulfur Dioxide	24-hours	0.22	120	120.2	365
Sulfur Dioxide	Annual	0.005	26	26.0	80
Nitrogen Dioxide	Annual	0.07	58	58.1	100
Carbon Monoxide	1-hour	46.2	6,858	6904	40,000
Carbon Monoxide	8-hours	4.32	4,572	4576	10,000
PM_{10}	24-hours	0.44	45	45.4	150
PM_{10}	Annual	0.02	21	21.0	50

Notes:
1. HOCFR 5.0
2. 6NYCRR Part 257- Air Quality Standards

Off-site concentrations from all facility sources are predicted to be in compliance with applicable ambient air quality standards. Impacts from all combustion emission sources at the water treatment plant site are not significant.

Toxic Air Contaminant Modeling. Dispersion modeling was conducted to determine concentrations of TACs at off-site receptors. The potential impact TAC emissions from combustion sources was analyzed using the USEPA's ISCST3 dispersion model. The model was to obtain 1-hour averaging time concentrations.

The same receptors used for criteria pollutant modeling were used. For the proposed plant, sensitive receptors include the public areas in Mosholu Park, the transit platform above Jerome Avenue, the residential housing units across at Bainbridge Avenue and Jerome Avenue, along Jerome Avenue, and the northeast and southeast corners of Jerome Avenue and 213th.

Maximum one-hour and annual concentrations of TACs were determined from dispersion modeling. The model was run with a normalized emission rate of 1.0 grams per second. The model was run for 5 years of hourly meteorological data. The results from the highest year were used for the boilers and generators. The maximum emission rate for each pollutant was multiplied by the model result to obtain the 1-hour impact.

One-hour concentrations were compared with Short-term Guideline Concentrations (SGC) and annual concentrations were compared with Annual Guideline Concentrations (AGC) from the NYSDEC Department of Air Resources (DAR) document "DAR-1, AGC/SGC Tables" dated July 12, 2000. Table 6.11-18 compares the combined concentrations of each pollutant at the maximum off-site receptor with applicable guideline concentrations.

TABLE 6.11-18. COMBINED CONCENTRATIONS OF TACS FROM BOILERS AND GENERATORS

Pollutant	1-hr Impact	SGC1	Annual Impact	AGC1
	µg/m^3	µg/m^3	µg/m^3	µg/m3
Benzene	7.14E-02	1300	8.02E-05	0.13
Toluene	2.63E-02	37000	4.51E-05	400
Xylenes	1.77E-02	4300	1.68E-05	700
Propylene	2.55E-01	NL	2.43E-04	3000
Formaldehyde	1.92E-02	30	4.63E-04	0.06
Acetaldehyde	2.31E-03	4500	2.19E-06	0.45
Acrolein[2]	--	0.19	--	0.02
Naphthalene	1.20E-02	7900	1.50E-05	3
Acenaphthylene	8.45E-04	NL	8.13E-07	0.02
Acenaphthene	4.29E-04	NL	4.18E-07	0.02
Phenanthrene	3.74E-03	NL	3.65E-06	0.02
Anthracene	1.13E-04	NL	1.22E-07	0.02
Fluoranthene	3.69E-04	NL	3.69E-07	0.02
Pyrene	3.40E-04	NL	3.53E-07	0.02

TABLE 6.11-18. COMBINED CONCENTRATIONS OF TACS FROM BOILERS AND GENERATORS

Pollutant	1-hr Impact	SGC1	Annual Impact	AGC1
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	µg/m3
Benzo(a)anthracene	5.72E-05	NL	6.50E-08	0.02
Chrysene	1.40E-04	NL	1.44E-07	0.02
Benzo(b)fluoranthene	1.02E-04	NL	1.07E-07	0.02
Benzo(k)fluoranthene	2.02E-05	NL	2.99E-08	0.02
Benzo(a)pyrene	2.37E-05	NL	2.96E-08	0.02
Indeno(1,2,3-cd)pyrene	3.82E-05	NL	4.69E-08	0.02
Dibenz(a,h)anthracene	3.19E-05	NL	3.74E-08	0.02
Benzo(g,h,i)perylene	5.11E-05	NL	5.56E-08	0.02
2-Methylnaphthalene	3.85E-06	NL	1.46E-07	0.02
3-Methylchloranthrene	2.89E-07	NL	1.09E-08	0.02
7,12-Dimethylbenz(a)anthracene	2.56E-06	NL	9.72E-08	0.02
Dichlorobenzene	1.92E-04	NL	7.29E-06	0.09
Hexane	2.89E-01	NL	1.09E-02	200
Arsenic	3.21E-05	NL	1.22E-06	0.00023
Beryllium	1.92E-06	1	7.29E-08	0.00042
Cadmium	1.76E-04	NL	6.69E-06	0.0005
Chromium	2.24E-04	NL	8.51E-06	1.2
Cobalt	1.35E-05	NL	5.11E-07	0.005
Manganese	6.09E-05	NL	2.31E-06	0.05
Mercury	4.17E-05	1.8	1.58E-06	0.3
Nickel	3.37E-04	6	1.28E-05	0.004
Selenium	3.85E-06	NL	1.46E-07	20
Lead	8.01E-05	NL	3.04E-06	0.75
Butane	3.37E-01	NL	1.28E-02	45000
Pentane	4.17E-01	NL	1.58E-02	4200
Propane	2.56E-01	NL	9.72E-03	110000
Barium	7.05E-04	NL	2.67E-05	1.2
Copper	1.36E-04	100	5.17E-06	0.02
Molybdenum	1.76E-04	NL	6.69E-06	12
Vanadium	3.69E-04	NL	1.40E-05	0.2
Zinc	4.65E-03	NL	1.76E-04	50

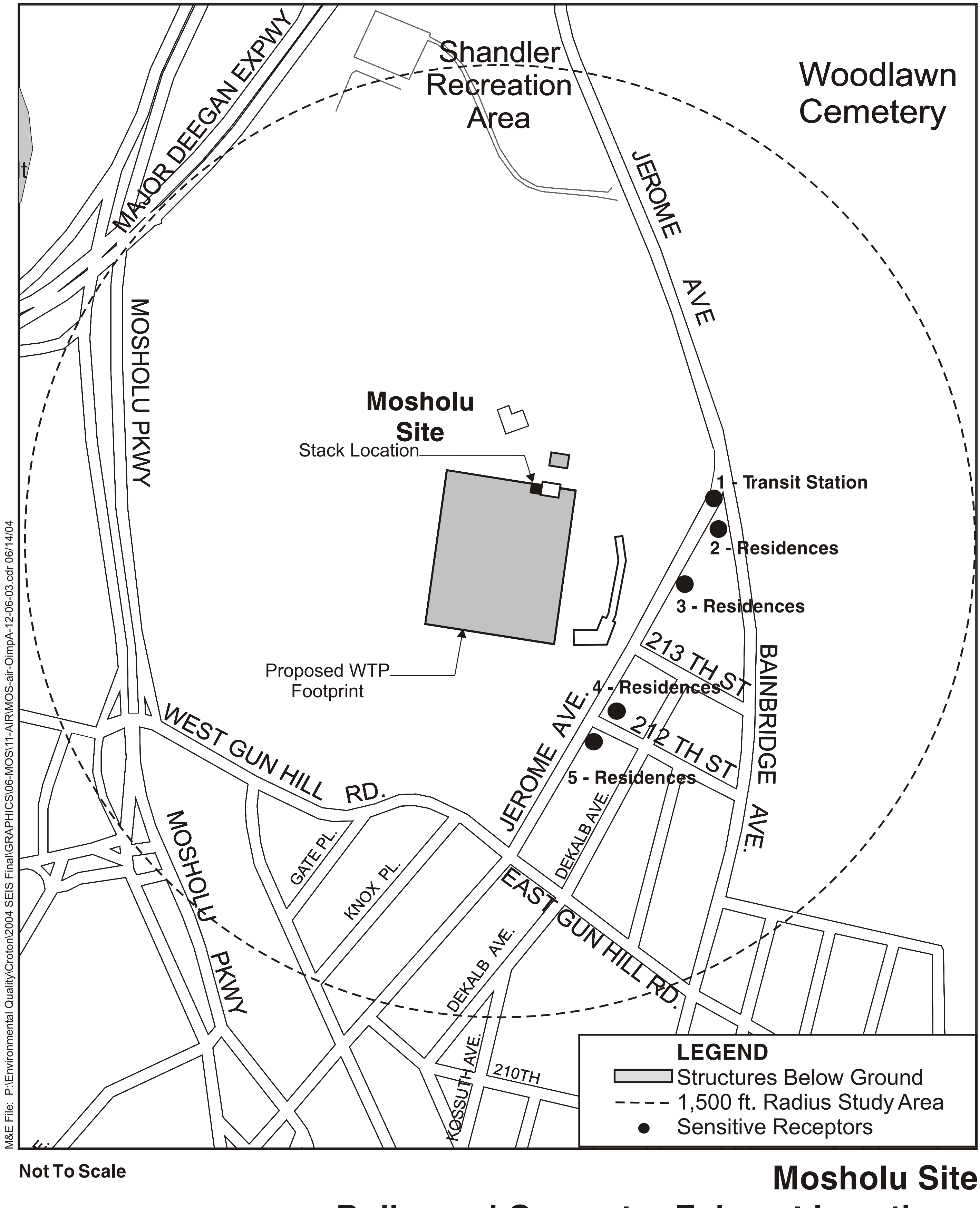
Notes:
1. NL represents "Not Listed."
2. Currently, USEPA is investigating acrolein sampling methods. Until such time that methods are developed and test data for acrolein for gas-fired boilers are available, acrolein concentrations cannot be quantified.

Maximum 1-hour and annual concentrations of TACs are lower than the corresponding SGCs and AGCs for each pollutant. TAC and HAP impacts from combustion sources at the Mosholu water treatment plant are predicted to be insignificant.

Laboratory Hoods. Limited water testing would be conducted in a small on-site laboratory. Volatile chemicals would be used under a laboratory hood exhausted through a stack located at the southwest corner of the arrival and receiving building. Normal laboratory operations are not anticipated to have a significant impact on ambient air quality. Accidental spills of any consequence would not be likely to occur due to the small quantities of chemicals to be used for testing.

Sulfuric acid would be used for alkalinity testing. Each test would require approximately 25 milliliters (ml) of relatively dilute (0.02 Normal) sulfuric acid. Tests would be performed under a laboratory hood that would be exhausted through a stack at 100 cfm. If the full amount of sulfuric acid were to spill and be allowed to evaporate (not be cleaned up), and the entire volume were to evaporate within one hour, the highest 1-hour off-site concentration, based on SCREEN3 model results would be 0.005 $\mu g/m^3$. The New York State Short-term Guideline Concentration (SGC) is 120 $\mu g/m^3$. Thus, impacts from an accidental release of sulfuric acid via the laboratory hood would be lower that the State SGC and, therefore, insignificant.

Odors. The potential for odors from the treatment process and the installation of odor control technologies and design are addressed in Section 6.1, Introduction and Proposed Project Description, Residual Facilities. No specific odor-producing substances have been identified at the proposed plant as there would be no residual handling facility. The residuals from the treatment process would be transferred off-site to be dewatered at Hunts Point Water Pollution Control Plant (WPCP).



Not To Scale

Mosholu Site
Boiler and Generator Exhaust Locations, and Sensitive Receptors

Figure 6.11-3

Fine Particulate Matter Analysis. Dispersion modeling was performed (for Year 2011) to assess the impacts of the particulate matter emitted from the proposed project sources on ambient $PM_{2.5}$ concentrations in the defined study areas. Since the interim guidance criteria for $PM_{2.5}$ are based on incremental changes for both localized and neighborhood scale assessments, the modeling was performed to estimate maximum predicted changes in $PM_{2.5}$ concentrations that could be compared to these criteria.

Boiler System. The boiler system for the proposed project would provide heat and hot water. The system would consist of three packaged natural gas-fired firetube boilers, each rated at approximately 23.4 million British Thermal Units per hour (MMBtu/hr) fuel input. Up to two boilers would be operational at any one time, with the other boiler as a standby unit. Emission factors were obtained from manufacturer's data. All particulate matter (PM) emissions from the boiler would be $PM_{2.5}$. Boiler dispersion modeling results for $PM_{2.5}$ are shown in Table 6.11-13.

Emergency Generators. Two 1500-kilowatt (KW), or 2,220-horsepower (HP) diesel fuel-fired emergency generators would provide emergency power for the proposed plant. One would serve as the duty generator and the other would be back-up. The emergency generators will only operate in the event of a utility power failure, and for "exercising" to keep them in good working order. Each diesel generator would be exercised approximately one hour per week. Only one generator would be exercised at a time. During an emergency only one generator would be operated at a time. Fuel would be available on-site to provide emergency power from one generator for a maximum of only slightly longer than one day. Table 6.11-19 shows the estimated $PM_{2.5}$ emissions from Mosholu generators, each operating for one hour per week, 52 weeks per year.

TABLE 6.11-19. EMERGENCY DIESEL GENERATOR EMISSIONS[1]

Pollutant	Emission Factor	Emission			
		1-Hour	24-Hour	Annual[2]	
	gm/hp-hr	pounds	pounds	pounds	tons
$PM_{2.5}$[3]	0.36	1.76	3.52	183	0.09

Notes:
1. Emissions based on 1500 DFMB Onan Generator Set, Exhaust Emissions Data Sheet.
2. Assumes generator is exercised 1 hour per week.
3. Assumes 90 percent of diesel exhaust particulate is $PM_{2.5}$ and 100 percent is PM_{10} (AP-42).

Summary. $PM_{2.5}$ would be emitted from the boilers and the generators at the proposed plant. Total facility emissions, shown in Table 6.11-20, are below the major source threshold.

TABLE 6.11-20. $PM_{2.5}$ POLLUTANT EMISSIONS SUMMARY

Pollutant	Boilers	Generators	Total
	tons/yr	tons/yr	tons/yr
$PM_{2.5}$	0.97	0.09	1.07

Dispersion modeling was conducted to compare concentrations of $PM_{2.5}$ at off-site receptors with applicable ambient air quality standards. Table 6.11-21 compares the combined concentrations of $PM_{2.5}$ at the maximum off-site receptor with applicable standards.

TABLE 6.11-21. MODELING RESULTS FOR ALL MOSHOLU WATER TREATMENT PLANT $PM_{2.5}$ POLLUTANT SOURCES

Pollutant	All Sources $\mu g/m^3$	Interim Guidance Criteria[1] $\mu g/m^3$
$PM_{2.5}$ 24-Hour	0.44	5.0
$PM_{2.5}$ Annual	0.016	0.3 / 0.1

Notes:
1. The interim maximum 24-hour *de minimis* increment concentration is 5 $\mu g/m^3$ and the annual microscale *de minimis* increment concentration is 0.3 $\mu g/m^3$. The interim neighborhood scale *de minimis* increment concentration is 0.1 $\mu g/m^3$.

A significant impact would occur if maximum project impacts exceeded the *de minimis* threshold of 5.0 $\mu g/m^3$ for 24-hours or 0.3 $\mu g/m^3$ microscale annual maximum threshold, or 0.1 $\mu g/m^3$ annual neighborhood scale threshold. The maximum project 24-hour and annual impacts are below the interim *de minimis* thresholds of 5.0 and 0.3 $\mu g/m^3$, respectively. A neighborhood analysis was conducted that showed the average $PM_{2.5}$ impacts from the project, at 0.026 $\mu g/m^3$, would be lower than 0.1 $\mu g/m^3$. In reviewing the results of modeling for the neighborhood analysis it was concluded that mobile source and project stationary source impacts do not overlap. $PM_{2.5}$ impacts from the operation of the proposed project are predicted to be insignificant.

6.11.3.2. Potential Construction Impacts

6.11.3.2.1. On-site Activities

Possible effects on local air quality during construction at the project sites include:

- Fugitive dust and other emissions from land-clearing operations and excavation,
- Air emissions from on-site construction equipment, and
- Mobile source emissions from construction workers' private vehicles and construction trucks.

The methodology described in Section 4.11, Data Collection and Impact Methodologies, Air Quality, was followed to predict the anticipated construction-related mobile source air quality impacts associated with the proposed Croton project.

The construction activities analysis for the peak construction year, 2010, the projected period of greatest quantities of construction equipment usage, evaluated the potential impact of construction emissions in terms of the criteria pollutants (CO, SO_2, NO_2 and PM_{10}) and fine particulate ($PM_{2.5}$) emissions. Fugitive dust emissions from construction operations can occur from excavation, hauling, dumping, grading, compacting, wind erosion, and traffic over unpaved and paved surfaces. Actual quantities of emissions depend on the extent and nature of the construction activities, the type of equipment employed, the physical characteristics of the underlying soil, the speed at which the construction vehicles are operated, and the type of fugitive dust control methods employed. Most of the fugitive dust generated by construction activities consists of relatively large-size particles that are anticipated to settle within short distance from the construction site and that would not significantly reception nearby.

Approximately 1,250,000 cubic yards (cy) of soil and rock will be removed during the construction of the Mosholu facility. It is estimated that 60 percent would be removed in 2006 (peak construction year) and the remaining 5 and 35 percent would be removed in 2005 and 2007 to 2010, respectively. In 2006, excavation and grading activities would be primarily for the Main Process building, the pump stations and the residuals/chemical buildings. The excavation for these facility areas would remove approximately 762,500 cy of materials.

According to the groundwater information for the Mosholu Site, it is estimated that there is about 7 to 8 feet of material above the groundwater table. With the consideration of the capillary rise of water, it is assumed that the deep soil above the groundwater line would be sufficiently moist to suppress dust emissions when it is excavated. The soil material from the surface to a depth of 4 feet may be dry and is assumed to be susceptible to creating fugitive dust emissions during excavation. In calculating the volume of excavated soil materials, the amount of dry soil material was determined by multiplying the size of the individual building footprint areas by a depth of 4 feet. A 5-foot construction easement was added to the perimeter of the individual water treatment plant building footprint area to account for the actual surface area of the construction activities. Table 6.11-22 presents the estimated amount of dry and wet soil material to be excavated from the Mosholu site.

TABLE 6.11-22. ESTIMATED AMOUNT OF EXCAVATED DRY AND WET SOIL (TONS)

Excavation Activities	Dry Soil	Wet Soil	Total
Site Preparation	65,813	65,812	131,625
Main Process Bldg	239,220	508,343	747,563
Connection to Shaft	0	536,625	536,625
RWPS	165,038	385,087	550,125
Tunnels	0	135,540	135,540
Access Shaft	449	8,529	8,978

Note: Conversion of 1,250,000cy = 2,110,455 tons

Overburden and debris removal. One grader and up to four backhoes or loaders will be used to remove overburden and debris. This activity would be anticipated to last about 18 months and involve the removal of approximately 762,500 yd^3 of material. Emissions of criteria pollutants and fine particulates were based on the number of equipment hours and the EPA's Non-road Engine and Vehicle Study and AP-42 emission factors.

Overburden and debris load-out to trucks. A maximum of 231-20 yd^3 truck trips per day were anticipated for hauling 762,500 yd^3 of overburden off-site. Emissions of criteria pollutants and fine particulates were based on the number of tons of overburden and AP-42 emission factors.

Rock Drilling. The Mosholu water treatment plant site is mostly filled with soil material. Rock drilling and blasting will not occur at this site. However, there will be drilling and blasting activities underground during the tunnel excavation from the water treatment plant site to Jerome Park Reservoir. All emissions from the drilling and blasting activities will be contained underground inside the tunnels.

Rock load-out to trucks. After the rock materials are drilled and blasted, the rock material will be lifted by cranes and dumped into the trucks to transport the rocks to the off-site rock crusher. This activity would be anticipated to last about six months and involve the removal of approximately 32,000 yd^3 of rock material.

Gravel stockpiling. Approximately 30,000 yd^3 of gravel would be stockpile on-site for backfill construction materials. Emissions of criteria pollutants and fine particulates were quantified based on the number of tons of materials removed stockpile via crane for backfill use. A maximum of 580 yd^3 will be stockpile on-site in a single day, which would require the use of a crane. Emission factors from AP-42 were applied.

Road dust. Each delivery haul truck and heavy vehicle will travel approximately 600 feet into the construction pit loaded and the same distance unloaded (roundtrip). In order to limit fugitive dust from truck travel, on-site roads would be paved, and would be maintained by hourly water flushing and sweeping. The truck route into the construction area would be paved. The AP-42 emission factor (in lb/VMT) is based on the silt loading and average vehicle weight. The silt content was assumed to be 6.9%, based on the EPA’s default value listed for a construction site. The computations of fugitive emissions were performed with loaded and unloaded weights of the delivery haul trucks. The speed will be limited to 5 mph for all on-site construction trucks. The average vehicle weight was based on the weight of delivery haul trucks (50 tons loaded/16 tons empty), rock trucks (60 tons loaded/16 tons empty), and "other" trucks (25 tons loaded/8 tons empty), assuming half of the travel distance would be with a full load and half would be with no load (empty). Water flushing and sweeping would provide a control efficiency of approximately 50%.

Construction Vehicles On-Site Parking. At the Mosholu Site, parking spaces will be available for construction workers. The speed and idle will be limited to 5 mph and 3 minutes for all vehicles, respectively. Also, public transportation would be used to transport workers to and from the jobsite and their homes.

On-site Construction Equipment. An analysis of the potential for air quality impacts from on-site construction equipment at the proposed Croton water treatment plant site was performed for the peak construction year of 2010. The analyses address combustion emissions from stationary on-site equipment, such as cranes, and fugitive dust emissions from mobile equipment, such as backhoes. A complete list of on-site equipment is provided below in Table 6.11-23.

TABLE 6.11-23. ON-SITE CONSTRUCTION EQUIPMENT FOR PEAK MONTH OF MAY 2010

Equipment Type	Quantity On-Site	Mobile or Stationary
Cranes	Four	Stationary
Backhoes	Three	Mobile
Loaders	One	Mobile
Welding Machines	Three	Stationary
Site Graders	One	Mobile
Air Compressors	Three	Stationary
Concrete Vibrators	Seven	Stationary
Concrete Floor Finishers	Six	Stationary
Trucks/Heavy Vehicles[1]	Five	Mobile

Notes:
1. Quantity on-site in any one hour for 8 hour work shift period.

Emission factors for NO_X, CO, PM_{10}, $PM_{2.5}$, and SO_2 from the combustion of fuel for on-site construction equipment (excluding delivery trucks/heavy vehicles) were developed using the Draft USEPA NONROAD Emissions Model Version 2.2d (May 2003). The model is based on source inventory data accumulated for specific categories of off road equipment. Data provided in the output files from the NONROAD model were used to derive (i.e., back-calculated from regional emission estimates) these emission factors for each type of equipment that is anticipated to be present on-site during construction activities. Emission rates of NO_2, PM and CO (SO_2 emissions were negligible) from combustion of fuel for on-site delivery trucks/heavy vehicles were developed using the MOBILE6.2 emissions model. Emission factors associated with fugitive dust emissions from mobile equipment were developed using equations presented in USEPA's AP-42 "A Compilation of Air Pollution Emission Factors."

ISCST3 Dispersion Modeling. A dispersion modeling analysis was performed to estimate concentrations of air pollutants associated with emissions produced by on-site construction activities at the proposed Croton project site. The modeling analysis was conducted using the ISCST3 dispersion model and was performed in accordance with USEPA and NYCDEP guidance regarding the use of dispersion models for regulatory purposes. The total predicted concentrations of criteria pollutants have been used to demonstrate compliance with applicable impact thresholds.

The background levels were obtained from the NYSDEC monitoring data. Background air quality data is based on the most recent five years of NYSDEC monitoring data, 1998 through 2002. Annual background values are from the year with the highest annual concentration. For averaging times shorter than one year, the background value is the highest second-high value for the five years. Where five contiguous years of recent monitoring data are not available, a minimum of three years were used. Table 6.11-2 summarizes the monitoring data for the Mosholu water treatment plant. Table 6.11-24 presents the results of ISCST3 dispersion modeling for the maximum construction activities.

TABLE 6.11-24. RESULTS OF DISPERSION ANALYSIS FOR CONSTRUCTION ACTIVITIES

Pollutant	Background $\mu g/m^3$	Concentration $\mu g/m^3$	Total[1] $\mu g/m^3$	Standard $\mu g/m^3$
SO_2 3-Hour[2]	183	0.79	184	1300
SO_2 24-Hour	120	0.18	120	365
SO_2 Annual	26	0.01	26	80
NO_2 Annual	58	9.7	68	100
CO 1-Hour[2]	6,858	934	7,792	40,000
CO 8-Hour[2]	4,572	289	4,861	10,000
PM_{10} 24-Hour	45	46.3	91	150
PM_{10} Annual	21	3.4	24	50

Notes:

1. Total is sum of concentration and background. NO_2 concentrations are based on a NO_2NO_X ratio of 0.59 or 59% NO_2.
2. Pollutant concentrations from the project sources would be low relative to the standard and have not been quantified.
3. Includes fenceline receptors

To determine project impacts, the results of construction impacts from modeling and background (predicted impacts added to background are shown in the column titled "Total" in Table 6.11-21) were compared to the applicable ambient standards (NAAQS). A significant impact would occur if a standard would be exceeded as a result of the project. Based on modeling results, no significant impacts are predicted from construction activities.

Fine Particulate Matter Construction Impact Analysis. For the $PM_{2.5}$ incremental impact analysis, the maximum impacts were calculated for nearby sensitive uses (with 24-hours of public access) for comparison with interim guidance criteria. The predicted maximum off-site concentrations from on-site construction sources are presented in Table 6.11-25.

TABLE 6.11-25. MOSHOLU FACILITY MAXIMUM PREDICTED OFFSITE CONCENTRATION-PM2.5

Modeled Pollutant	Averaging Period	Units	Maximum Predicted Concentration		Interim Guidance
			All Receptors[1]	Sensitive Receptors	
$PM_{2.5}$	24-Hours	$\mu g/m^3$	17.9	4.55	5
	Annual (Discrete)	$\mu g/m^3$	1.31	0.35	0.3
	Annual (Neighborhood)	$\mu g/m^3$	0.058	N/A	0.1

Note: [1] Includes fenceline receptors

With respect to $PM_{2.5}$ the NAAQS is not presented in Table 6.11-25. This is because NYCDEP is currently employing interim guidance criteria for evaluating the potential $PM_{2.5}$ impacts from NYCDEP projects under CEQR. The interim guidance criteria for determining the potential for significant adverse impacts from $PM_{2.5}$ are as follows:

- Predicted incremental impacts of $PM_{2.5}$ greater than 5 μg/m^3 averaged over a 24-hour (daily) period at a discrete location of public access, either at ground or elevated levels (microscale analysis); or
- Predicted incremental ground-level impacts of $PM_{2.5}$ greater than 0.1 μg/m^3 on an annual average neighborhood-scale basis (i.e., the computed annual concentration averaged over receptors placed over a one kilometer by one kilometer grid, centered around the location where the maximum impact is predicted).
- In addition, NYSDEC consider incremental impacts of $PM_{2.5}$ greater than 0.3 μg/m^3 from stationary sources at any discrete ground-level or elevated locations as having potential for significant impact.

The air modeling analysis calculates the highest predicted increase in the 24-hour $PM_{2.5}$ concentrations as 17.9 μg/m^3 at the fence line and 4.55 μg/m^3 at the nearest sensitive receptor, the adjacent golf course. While the highest incremental $PM_{2.5}$ concentration occurred at the fence line was higher than the interim guidance criteria for the localized 24-hour impacts (i.e., 5μg/m^3), the maximum predicted incremental 24-hour concentration at sensitive public locations would be significantly lower. In addition, the 24-hour $PM_{2.5}$ concentration from construction for the proposed project was based on the month (May 2010) when the maximum short-term emissions would be anticipated; therefore, the actual increase in $PM_{2.5}$ concentration is anticipated to be lower than the predicted values for the rest of the construction period.

The highest predicted annual increases were 1.31 μg/m^3 at the fence line and 0.35 μg/m^3 at the nearest sensitive receptor. While the highest annual concentration was slightly higher than the NYSDEC criteria of 0.3 μg/m^3 at the closest sensitive receptor, this only occurred at a limited area on the adjacent golf course. In addition, this concentration only occurs during the peak year (2010), and the annual concentration for the rest of the construction period will be lower than 0.3 ug/m3.

On a neighborhood scale basis, the predicted incremental impact of $PM_{2.5}$ would be 0.058 μg/m^3, which is below the NYCDEP interim guidance.

Based on the above, the impact from the construction of the project on $PM_{2.5}$ was not considered significant.

6.11.3.2.2. Mobile Sources

A mobile source air quality analysis of the potential construction activities was conducted for 2010, the year of maximum anticipated construction traffic for the Mosholu Site.

Site Preparation Phase. An additional analysis of mobile source construction impacts was performed for the analysis year of the year of maximum anticipated construction truck traffic, 2006. The methodology for the localized pollutant analysis at intersections is the same as discussed under the Methodology section. Localized pollutant impacts from the vehicles were analyzed for the 8-hour CO concentrations and for 24-hour and annual PM_{10} concentrations. The same set of receptor locations used in the analysis of the No Build scenario was used for the project impact scenario.

Based on the predicted construction-induced traffic for the peak year 2010, which are discussed in Section 6.9, Traffic and Transportation, traffic estimates include the additional vehicles during the weekday morning and afternoon peak periods. The construction related vehicle trips exceed the screening thresholds and therefore dispersion was performed for CO, PM_{10}, and $PM_{2.5}$.

Carbon Monoxide. CO Emission factors are projected to decrease in succeeding future years; whereas, traffic volumes would increase. The results of CAL3QHC dispersion modeling were added to the predicted background concentrations, and then compared to the 1-hour and 8-hour ambient air quality standard for CO. Tables 6.11-26 and 6.11-27 shows the results of CO modeling for years 2006 and 2010. As indicated in the tables, the maximum predicted concentrations are below the applicable air quality standard.

TABLE 6.11-26. PREDICTED CARBON MONOXIDE 8-HOUR CONCENTRATIONS DURING CONSTRUCTION PEAK YEAR 2006 (ppm)

Intersection	Average Time	Ambient AQ Background[1]	Model Result		Total Predicted Conc.		Standard
			AM	PM	AM	PM	
Peak Traffic Year 2010							
Jerome Avenue & 233rd Street	1-hour	5.9	3.6	4.0	9.4	9.9	35
	8-hour	2.0	2.5	2.7	4.5	4.8	9

Note: Total Predicted Concentration = Ambient AQ Background + Model Result.

TABLE 6.11-27. PREDICTED CARBON MONOXIDE 8-HOUR CONCENTRATIONS DURING CONSTRUCTION PEAK YEAR 2010 (PPM)

Intersection	Ambient AQ Background[1]		Model Result		Total Predicted Conc.		Standard
			AM	PM	AM	PM	
Peak Traffic Year 2010							
Jerome Avenue & 233rd Street	1-hour	5.9	3.0	3.4	8.9	9.3	35
	8-hour	2.0	2.1	2.4	4.1	4.4	9

Note: Total Predicted Concentration = Ambient AQ Background + Model Result.

In addition, the CEQR *de minimis* values were calculated for the 8-hour period. As indicated in the Tables 6.11-28 and 6.11-29, the CEQR *de minimis* values for the 8-hour period were not exceeded. Therefore, the proposed project would have no significant impacts for CO at the Mosholu Site.

TABLE 6.11-28. 8-HOUR CONCENTRATIONS AND CEQR *DE MINIMIS* VALUES PEAK YEAR 2006 (ppm)

Intersection	Averaging Period	Total No Build Conc.		Total Build Conc.[1]		Project Increment		*De minimis Criteria*	
		AM	PM	AM	PM	AM	PM	AM	PM
Peak Year 2006									
Jerome Avenue & 233rd Street	8-hour	4.5	4.7	4.5	4.8	0.0	0.1	2.3	2.2

Notes: Total Predicted Concentration = Ambient AQ Background + Model Result.
The increment between the no-build and the build concentrations are 0.1 ppm and 0.1 ppm for the AM and PM periods respectively. These values are below the *de minimis* criteria.

TABLE 6.11-29. 8-HOUR CONCENTRATIONS AND CEQR *DE MINIMIS* VALUES PEAK YEAR 2010 (ppm)

Intersection	Averaging Period	Total No Build Conc.		Total Build Conc.[1]		Project Increment		*De minimis Criteria*	
		AM	PM	AM	PM	AM	PM	AM	PM
Peak Year 2010									
Jerome Avenue & 233rd Street	8-hour	4.1	4.2	4.1	4.4	0.0	0.2	2.5	2.4

Notes: Total Predicted Concentration = Ambient AQ Background + Model Result.
The increment between the no-build and the build concentrations are 0.1 ppm and 0.1 ppm for the AM and PM periods respectively. These values are below the *de minimis* criteria.

PM_{10}. For the localized PM_{10} levels, MOBILE6.2 emission factors, projected traffic volumes, and five years of hourly meteorological data were used as inputs to the CAL3QHCR dispersion model to estimate future PM_{10} levels from traffic in the vicinity of the project. The background 24-hour and annual PM_{10} levels were added to the modeled 24-hour and annual concentrations, respectively. Tables 6.11-30 and 6.11-31 present the PM_{10} results for years 2006 and 2010.

TABLE 6.11-30. PREDICTED 24-HOUR AND ANNUAL PM_{10} CONCENTRATIONS DURING CONSTRUCTION PEAK YEAR 2006 ($\mu g/m^3$)

Intersection	Averaging Time	Ambient AQ Background[2]	Model Result	Total Predicted Conc.[1]	Standard
Peak Traffic Year 2010					
Jerome Avenue & 233rd Street	24-Hours	45	40	85	150
	Annual	21	15	36	50

Note: Ambient AQ Background + Model Result = Total Predicted Concentration.

TABLE 6.11-31. PREDICTED 24-HOUR AND ANNUAL PM_{10} CONCENTRATIONS DURING CONSTRUCTION PEAK YEAR 2010 ($\mu g/m^3$)

Intersection	Averaging Time	Ambient AQ Background[2]	Model Result	Total Predicted Conc.[1]	Standard
Peak Traffic Year 2010					
Jerome Avenue & 233rd Street	24-Hours	45	38.64	83.64	150
	Annual	21	14.11	35.11	50

Note: Total Predicted Concentration = Ambient AQ Background + Model Result.

CAL3QHR Model Results. The estimated PM_{10} concentrations at the selected intersection for years 2006 and 2010 are predicted to be below the ambient air quality standards.

Fine Particulate Matter Analysis. For the Future With the Project (Build) scenario, localized $PM_{2.5}$ levels, MOBILE6.2 emission factors, projected traffic volumes, and five years of hourly meteorological data were used as inputs to the CAL3QHCR dispersion model to estimate future $PM_{2.5}$ increments from construction traffic for the proposed project. Neighborhood receptors were added and were located 15 meters (49 feet) from the curb.

$PM_{2.5}$ impacts from project mobile sources were obtained by subtracting the model results of the Future Without the Project (No Build) scenario from the results of the Future With the Project (Build) scenario. The interim mobile source guidance criteria are *de minimis* values of 5.0 $\mu g/m^3$ for 24-hours and 0.1 $\mu g/m^3$ for annual neighborhood scale concentrations. Table 6.11-32 and 6.11-33 present the $PM_{2.5}$ results for year 2006 and 2010.

TABLE 6.11-32. PREDICTED 24-HOUR AND ANNUAL $PM_{2.5}$ CONCENTRATIONS DURING CONSTRUCTION PEAK YEAR 2006 ($\mu g/m^3$)

Intersection	Average Time	Build Result	No Build Result	Project Increment	Interim Criteria
Peak Traffic Year 2010					
Jerome Avenue & 233rd Street	24-hour	6.06	5.91	0.15	5.0
	Annual	0.45	0.43	0.02	0.1

TABLE 6.11-33. PREDICTED 24-HOUR AND ANNUAL $PM_{2.5}$ CONCENTRATIONS DURING CONSTRUCTION PEAK YEAR 2010 ($\mu g/m^3$)

Intersection	Average Time	Build Result	No Build Result	Project Increment	Interim Criteria
Peak Traffic Year 2010					
Jerome Avenue & 233rd Street	24-hour	5.55	5.47	0.08	5.0
	Annual	0.30	0.29	0.01	0.1

In, summary, the mobile source $PM_{2.5}$ analysis determined the maximum predicted incremental impacts and compared them with the interim guidance criteria. Predicted increments were determined by subtracting the Future Without the Project scenario results from the Future With the Project scenario.

The interim guidance criteria are 5.0 µg/m^3 for 24-hours microscale and 0.1 µg/m^3 for annual neighborhood scale concentrations. The maximum predicted 24-hour $PM_{2.5}$ incremental concentration of 0.08 µg/m^3, presented in Table 6.11-33, is below the interim guideline criteria concentration of 5.0 µg/m^3. The annual neighborhood $PM_{2.5}$ increment of 0.01 µg/m^3 is predicted to be below the neighborhood interim guideline criteria concentration of 0.1 µg/m^3. Therefore, no significant or adverse $PM_{2.5}$ impacts are predicted as a result of the construction related mobile sources.

6.11.3.2.3. Total Combined $PM_{2.5}$ Impacts

In order to address the issue of the combined air quality impacts of the construction activities with the offsite mobile sources it was conservatively assumed that maximum impacts for both on-site and off-site sources occurred simultaneously. Concentrations of $PM_{2.5}$ from the construction activities (that was calculated adjacent to the off-street location of concern) were then combined with the concentrations due to the offsite sources. The highest predicted 24 hour concentration from the total impacts was less than the interim guidance criteria of 5 µg/m^3 for offsite sensitive receptors.

6.11.4 Control of Construction Emissions

Construction activities will involve the excavation and transport of soil and rock. Activities will take place within a pit sheltered from the wind. Trucks leaving the site with soil or rocks will be covered, and all loose soil and dirt on the trucks will be washed prior to allowing the trucks to travel on public roads. Construction roads will be paved. Watering will further control dust emissions. No excavation activities will be permitted during periods of high winds.

During construction at the project site, all appropriate fugitive dust control—including watering of exposed areas and using dust covers for trucks—will be employed. These measures include satisfying Section 1402.2-9.11 of the New York City Air Pollution Code. To prevent fugitive dust from construction and demolition activities from becoming airborne, the following measures will be implemented:

- Use of water or chemicals to control dust in the demolition of existing buildings or structures, construction operations, and during the clearing and grading of land;
- Application of water or suitable chemicals to dirt paths, materials, stockpiles, and other surfaces that can generate airborne dust over extended periods, or plastic covering of stockpiled materials;
- Covering open-body trucks transporting materials likely to generate to airborne dust at all times when in motion; and

- Prompt removal of earth or other material from paved streets, where it has been deposited by trucking or earth-moving equipment, erosion by water, or other means.

Diesel construction equipment will be maintained in proper operating condition, including tuned up and supplied with the correct fuel. Mufflers, exhaust equipment and other operational components of construction equipment will be maintained in accordance with manufacturer's specifications.

Like construction equipment, trucks will be maintained in proper working condition in accordance with manufacturer's specifications. Trucks will be required to turn off their engines and not idle onsite for more than three minutes. In addition, the trucks would limit their speeds to a maximum of 5 mph while traveling within the construction site.