

Table 5-1 Federal and New York State Ambient Air Quality Standards

Pollutant	Avg. Period	Federal Air Quality Standards				New York State Standards ¹	
		Primary Standard		Secondary Standard		Level	Statistic
		Level ³	Statistic ²	Level	Statistic		
Carbon Monoxide	8-hour	9 ppm	Maximum	None		9 ppm	Maximum
	1-hour	35 ppm	Maximum			35 ppm	Maximum
Lead ⁴	Rolling 3 month average (2008 standard)	0.15 µg/m ³	Maximum	Same as Primary		None	
Nitrogen Dioxide	Annual	0.053 ppm	Arithmetic Mean	Same as Primary		0.05 ppm	Arithmetic Mean
	1-hour	0.100 ppm ⁵	3 year avg	0.053 ppm	Arithmetic Mean	None	
Total Suspended Particulates (TSP) ⁶	12 consecutive months	None		None		75 µg/m ³	Geometric Mean
	24-hours	None		None		250 µg/m ³	Maximum
Particulate Matter (PM ₁₀) ⁷	24-hour	150 µg/m ³	Maximum	Same as Primary		None	
Particulate Matter (PM _{2.5})	Annual	12 µg/m ³	Arithmetic Mean	Same as Primary		None	
	24-hour	35 µg/m ³ ⁸	3 year avg	Same as Primary			
Ozone ⁹	8-hour (2008 std)	0.075 ppm	3 year avg	Same as Primary		None	
	8-hour (1997 std)	0.08 ppm	3 year avg	Same as Primary			
	1-hour	0.12 ppm	Not Applicable in NYS ¹⁰	Same as Primary		0.12 ppm	Maximum
Sulfur Dioxide	Annual	None		None		0.03 ppm	Arithmetic Mean
	24-hour					0.14 ppm	Maximum
	3-hour	None		0.5 ppm	Maximum	0.50 ppm	Maximum
	1-hour	75 ppb	3 year avg ¹¹	None		None	
Hydrocarbons (non-methane)	3-hour (6-9 am)	None		None		0.24 ppm	Maximum

Footnotes

Number	Description
1	New York State also has standards for beryllium, fluorides, hydrogen sulfide, and settleable particulates (dustfall). Ambient monitoring for these pollutants is not currently conducted.
2	All maximum values are concentrations not to be exceeded more than once per calendar year. (Federal 1 hour Ozone Standard not to be exceeded more than three days in three calendar years).
3	Gaseous concentrations for Federal standards are corrected to a reference temperature of 25°C and to a reference pressure of 760 millimeters of mercury.
4	Federal standard for lead not yet officially adopted by NYS. Based upon the November 22, 2011 EPA designation for areas of New York State, which became effective on 12/31/11, the 0.15 µg/m ³ standard will be effective throughout New York State on 1/1/2013 will replace the previous level of 1.5 µg/m ³ . The 1978 lead standard (1.5 µg/m ³ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard (12/31/12 throughout New York State).
5	The 0.100 ppm standard is effective 1/22/2010. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average within an area must not exceed 0.100 ppm.
6	New York State also has 30, 60, and 90-day standards as well as geometric mean standards of 45, 55, and 65 µg/m ³ in Part 257 of NYCRR. While these TSP standards have been superseded by the above PM10 standards, TSP measurements may still serve as surrogates to PM10 measurements in the determination of compliance status.
7	Federal standard for PM ₁₀ not yet officially adopted by NYS, but is currently being applied to determine compliance status.
8	Federal standard was changed from 65 to 35 µg/m ³ on December 17, 2006. Compliance with the Federal standard is determined by using the average of 98th percentile 24 hour value during the past three years, which can not exceed 35 µg/m ³ .
9	Former NYS Standard for ozone of 0.08 PPM was not officially revised via regulatory process to coincide with the Federal standard of 0.12 PPM which is currently being applied by NYS to determine compliance status. Compliance with the Federal 8 hour standards is determined by using the average of the 4th highest daily value during the past three years - which can not exceed 0.084 PPM or 0.075 PPM, effective May 27, 2008).
10	(a) EPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").
	(b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1.
11	Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

Table 5-2 NYSDEC Region 1 Ambient Air Background Concentrations ¹

Pollutant	Station	Averaging Period	Background Reading
Ozone	Babylon	8-hour	0.086 ppm
		1-hour	0.127 ppm
	Holtsville	8-hour	0.080 ppm
		1-hour	0.12 ppm
Nitrogen Dioxide	Holtsville	Annual	8.78 ppb ²
		1-hour	57.0 ppb ²
Sulfur Dioxide	Holtsville	Annual	1.03 ppb
		24-hour	6.1 ppb
PM_{2.5}	Babylon	Annual	8.4 ug/m ³
		24-hour	23 ug/m ³

Notes:

1. *New York State Ambient Air Quality Report for 2012*
2. Only 2010 data available.

Table 5-3 Potential Emissions from Construction Activity¹

Anticipated Length of Workday: 8 hours
 Workdays per week: 5 days 20 days/month
 Construction Activity Duration: 12 months
 Work Hours per Year: 1920 hours/year

Maximum Calculated Hourly Emissions Data

Equipment	SCC	Equipment ID	Equipment Rated HP	Age of equip.	NONROAD Emission Rates (tons/year), NR-009d, July 2010 ¹							
					THC	VOC ²	CO	NO _x	SO ₂	PM ₁₀	PM ₁₀ (ULSD) ³	PM _{2.5} (ULSD)
Excavator	2270002036	EX	200	10	0.14	0.15	0.49	2.35	0.005	0.13	0.10	0.09
Backhoe	2270002066	BH	150	10	0.26	0.27	0.73	2.16	0.005	0.18	0.15	0.15
FE Loader	2270002066	FE	150	10	0.26	0.27	0.73	2.16	0.005	0.18	0.15	0.15
Derrick Crane	2270002045	DC	250	10	0.17	0.18	0.40	3.10	0.005	0.13	0.09	0.08
Telescoping Crane	2270002045	TC	100	10	0.07	0.08	0.19	1.29	0.005	0.06	0.04	0.04
Concrete pump	2260006010	CP	50	10	0.06	0.06	0.26	0.65	0.005	0.05	0.04	0.04
Compressor	2270006015	Comp	50	10	0.06	0.06	0.26	0.65	0.005	0.05	0.04	0.04
Dewatering pump	2260006010	DP	25	10	---	---	---	---	0.005	---	---	---
Paver	2270002003	PAV	200	10	0.14	0.14	0.49	2.33	0.005	0.13	0.10	0.09
Rock drill (pneumatic)	2270002033	RD3_Jack	pneumatic	10	---	---	---	---	---	---	---	---
Rock Drill	2270002033	RD1_Crawl	200	10	0.13	0.14	0.32	2.46	0.005	0.11	0.07	0.07
Pile drilling rig	2270002033	PDR	200	10	---	---	---	---	0.005	---	---	---
Drill rig (hydraulic)	2270002033	DR	200	10	0.14	0.14	0.33	2.56	0.005	0.11	0.07	0.07
Raise Bore Machine (Electric)	2270002033	RBM	300	10	---	---	---	---	---	---	---	---
Compactor	2270002009	SC	25	10	0.00	0.00	0.00	0.00	0.005	0.00	0.00	0.00
Pavement Cutter	2270002039	PC	25	10	0.00	0.00	0.00	0.00	0.005	0.00	0.00	0.00
Total (tons/year)					1.41	1.49	4.21	19.73	0.07	1.13	0.84	0.81

1. Emission factors based on NONROAD2008a emissions model.

2. Conversion from THC to VOC using conversion factor (1.053) for diesel engine type. (EPA-420-R-10-015, NR-002d, Conversion Factors for Hydrocarbon Emission Components)

3. Emissions using ULSD (Ultra-low Sulfur Diesel fuel) assume 15 ppm sulfur concentration in fuel.

Calculated Nonroad Emission Factors Accounting for Equipment Deterioration

Equipment	SCC	Equipment ID	Equipment Rated HP	Age of equip.	Nonroad Emission Factors (g/hp-hr) with Deterioration Factor, NONROAD2008a							
					THC	CO	NO _x	SO ₂	PM ₁₀	PM ₁₀ (ULSD)	PM _{2.5} (ULSD)	
Excavator, 2 cu yd	2270002036	EX	200	10	0.33	1.16	5.55	---	0.31	0.23	0.22	
Backhoe, 1 cu yd	2270002066	BH	150	10	0.81	2.30	6.81	---	0.56	0.47	0.46	
FE Loader, 3 1/2 cu yds	2270002066	FE	150	10	0.81	2.30	6.81	---	0.56	0.47	0.46	
Derrick Crane, 100 ton	2270002045	DC	250	10	0.32	0.76	5.87	---	0.25	0.17	0.16	
Telescoping Crane	2270002045	TC	100	10	0.35	0.89	6.08	---	0.29	0.19	0.18	
Concrete pump, 30 cu yds/hr	2260006010	CP	50	10	0.54	2.46	6.17	---	0.48	0.38	0.37	
Compressor, 800 cfm at 100 psi	2270006015	Comp	50	10	0.54	2.46	6.17	---	0.48	0.38	0.37	
Dewatering pump	2260006010	DP	25	10	---	---	---	---	---	---	---	
Paver	2270002003	PAV	200	10	0.32	1.16	5.51	---	0.31	0.23	0.22	
Rock drill	2270002033	RD3_Jack	pneumatic	10	---	---	---	---	---	---	---	
Rock Drill	2270002033	RD1_Crawl	200	10	0.31	0.76	5.82	---	0.25	0.16	0.16	
Pile drilling rig	2270002033	PDR	200	10	---	---	---	---	---	---	---	
Drill rig (hydraulic)	2270002033	DR	200	10	0.32	0.77	6.05	---	0.25	0.17	0.16	
Raise Bore Machine (Electric)	2270002033	RBM	300	10	---	---	---	---	---	---	---	
Compactor	2270002009	SC	25	10	0.00	0.00	0.00	---	0.00	0.00	0.00	
Pavement Cutter	2270002039	PC	25	10	0.00	0.00	0.00	---	0.00	0.00	0.00	
Chain saw, gas		SG	5	10								
Saw, electric		SE	---	10								
Welder	2270006025	Weld	---	10								
Pneumatic Hammer		PH	pneumatic	10								
* Jack hammer		JH	pneumatic	10								

Equipment Specific NONROAD Emission Factors

Equipment	SCC	Equipment ID	Equipment Rated HP	Age of equip.	Nonroad Emission Factors (g/hp-hr), NONROAD ¹							
					THC	CO	NO _x	SO ₂ ⁴	PM ₁₀	PM ₁₀ (ULSD) ²	PM _{2.5} (ULSD) ^{2,3}	
Excavator, 2 cu yd	2270002036	EX	200	10	0.32	1.14	5.28	0.005	0.31	0.22	0.22	
Backhoe, 1 cu yd	2270002066	BH	150	10	0.78	2.23	6.24	0.005	0.55	0.46	0.45	
FE Loader, 3 1/2 cu yds	2270002066	FE	150	10	0.78	2.23	6.24	0.005	0.55	0.46	0.45	
Derrick Crane, 100 ton	2270002045	DC	250	10	0.31	0.75	5.58	0.005	0.25	0.16	0.16	
Telescoping Crane	2270002045	TC	100	10	0.34	0.87	5.65	0.005	0.28	0.18	0.18	
Concrete pump, 30 cu yds/hr	2260006010	CP	50	10	0.52	2.37	5.60	0.005	0.47	0.37	0.36	
Compressor, 800 cfm at 100 psi	2270006015	Comp	50	10	0.52	2.37	5.60	0.005	0.47	0.37	0.36	
Dewatering pump	2260006010	DP	25	10	0.28	1.53	4.73	0.005	0.34	0.24	0.24	
Paver	2270002003	PAV	200	10	0.32	1.14	5.28	0.005	0.31	0.22	0.22	
Rock drill	2270002033	RD3_Jack	<i>pneumatic</i>	10	---	---	---	---	---	---	---	
Rock Drill	2270002033	RD1_Crawl	200	10	0.31	0.75	5.58	0.005	0.25	0.16	0.16	
Pile drilling rig	2270002033	PDR	200	10	0.31	0.75	5.58	0.005	0.25	0.16	0.16	
Drill rig (hydraulic)	2270002033	DR	200	10	0.31	0.75	5.58	0.005	0.25	0.16	0.16	
Raise Bore Machine (Electric)	2270002033	RBM	300	10	---	---	---	---	---	---	---	
Compactor	2270002009	SC	25	10	0.28	1.53	4.73	0.005	0.34	0.24	0.24	
Pavement Cutter	2270002039	PC	25	10	0.29	2.34	4.48	0.005	0.42	0.32	0.31	
Chain saw, gas		SG	5	10								
Saw, electric		SE	---	10								
Welder	2270006025	Weld	---	10								
Pneumatic Hammer		PH	pneumatic	10								
* Jack hammer		JH	pneumatic	10								

Notes:

1. Emission factors for THC, NO_x, PM and CO are taken from the NonRoad Model. Emission factor model files are EXTHC.emf, EXNOX.emf, EXHPM.emf, and EXHCO.emf.
2. The PM₁₀ and PM_{2.5} emission factors (S_{PMadj}) were adjusted for a fuel sulfur content of 15 ppm based on Equation 5 of the EPA guidance document, Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression Ignition, EPA420-P-04-009, July 2010 (NR-009d)
3. The fraction of PM_{2.5} emissions from the total PM₁₀ emissions was determined using a 0.97 adjustment factor (NR009d, page 25).
4. Sulfur dioxide emission factor was calculated from Equation 7 (NR-009d) assuming 15 ppm sulfur content in fuel.

Table 5-4a Truck Traffic Emissions on Paved Roads

Anticipated Length of Workday: 7 hours/day
 Workdays per week: 5 days 20 days/month
 Construction Activity Duration: 12 months 240 Total days

Paved Roads								Estimate Emissions					Emission Estimates With Natural Mitigation					
Equipment	Equipment ID	Avg. Vehicles/ day	Max. Vehicles / hour	Feet/ vehicle	Activity Duration (hrs)	Miles per Trip	Trips per year	TSP (lb/hr)	PM ₁₀ (lb/hr)	PM ₁₀ (Tons)	PM _{2.5} (lb/hr)	PM _{2.5} (Tons)	Days with >= 0.01" precip., p (days) ²	TSP (lb/hr)	PM ₁₀ (lb/hr) ¹	PM ₁₀ (Tons)	PM _{2.5} (lb/hr) ¹	PM _{2.5} (Tons)
truck	CT1	20	2	5280	1680	60	20	7.535E+02	4.557E-02	3.828E-02	1.204E-02	1.012E-02	110	7.421E+02	4.489E-02	3.540E-02	1.186E-02	9.354E-03
Dump truck	DT1	25	2	5280	1680	80	25	7.535E+00	4.557E-02	3.828E-02	1.204E-02	1.012E-02	110	7.421E+00	4.489E-02	3.540E-02	1.186E-02	9.354E-03
Flatbed truck	FT1	10	2	5280	1680	60	10	2.015E+00	1.272E-02	1.068E-02	3.979E-03	3.343E-03	110	1.985E+00	1.252E-02	9.877E-03	3.919E-03	3.091E-03
Total:								7.630E+02	1.039E-01	8.724E-02	2.807E-02	2.358E-02		7.515E+02	1.023E-01	8.067E-02	2.764E-02	2.180E-02

Notes:

1. A 50% control efficiency for PM10 is applied to calculate the emission estimates due to speed restrictions of less than 5 mph.
2. Number of precipitation days with rainfall amounts measured >= 0.01 (NOAA National Climatic Data Center.)

Table 5-4b Paved Road Emission Factors

Equipment	SCC	Equipment ID	Pollutant	Base Emission factor, k ¹	Silt Loading, sL (g/m ²) ²	Average Weight of Vehicles, W (tons) ³	C (lb/VMT) ⁴	Particulate Emission Factor (lb/VMT)
Concrete truck	2270002042	CT1, CT2	TSP	0.011	0.60	30	0.00234	0.22
			PM ₁₀	0.0022	0.60	30	0.00119	0.05
			PM _{2.5}	0.00054	0.60	30	0.00115	0.012
Dump truck	2270002078	DT1, DT2	TSP	0.011	0.60	30	0.00234	0.22
			PM ₁₀	0.0022	0.60	30	0.00119	0.05
			PM _{2.5}	0.00054	0.60	30	0.00115	0.012
Flatbed truck	2270002078	FT1, FT2	TSP	0.011	0.60	8	0.00234	0.06
			PM ₁₀	0.0022	0.60	8	0.00119	0.01
			PM _{2.5}	0.00054	0.60	8	0.00115	0.004

Notes:

Source: Emissions from Paved Roads - Source: AP-42 Emission Factors, January 2011.

1. Base emission factor for particle size range and units of interest. Based on Table 13.2-1.1 in AP-42 (January 2011) Section 13.2.1 for PM-30, PM10, and PM2.5. For PM30, k=0.011, for PM10, k=0.0022 and for PM2.5 k=0.00054.
2. The silt loading is obtained from table 13.2.1-3 in AP-42 section 13.2.1, Paved Roads, (January 2011), Recommended Default Silt Loading Values for Public Paved Roads (ADT<500).
3. The average weight of concrete trucks and dump trucks, W, was assumed to be approximately 30 tons. The flatbed trucks assumed to have an average weight of 8 tons.
4. C factor from MOVES2010b emissions model.
5. The feet per vehicle was measured from Bay Park WWTP site plan and doubled.

Calculations:

Particulate Emission Factor (lb/VMT) = k(sL)^{0.91} * W^{1.02} (Equation 1)

Particulate Emissions (lbs/hr): Particulate Emission Factor (lb/VMT) x max. vehicles/hr x ft/vehicle x 1 mile/5280 ft x % Activity hrs per stage.

Table 5-5a Exhaust Emissions Associated with Material Transport ¹

Anticipated Length of Workday: 7 hours/day
 Workdays per week: 5 days 20 days/month
 Construction Activity Duration: 12 months 240 days

Material Transport

Equipment	Equipment ID	Round trip Miles ²	Trips per Day	VOC		NOx		SO ₂		CO		PM10		PM2.5	
				Emission Factor (g/VMT)	Emission (tons/year)	Emission Factor (g/VMT)	Emission (tons/year)	Emission Factor (g/VMT)	Emission (tons/year)	Emission Factor (g/VMT)	Emission (tons/year)	Emission Factor (g/VMT)	Emission (tons/year)	Emission Factor (g/VMT)	Emission (tons/year)
Concrete truck	CT1	60	20	2	0.0026	11.4	0.0151	0.00945	1.25E-05	17.4	0.0230	0.538	0.0007	0.52	0.0007
Dump truck	DT1	80	25	2	0.0044	11.4	0.0251	0.00945	2.08E-05	17.4	0.0384	0.538	0.0012	0.52	0.0011
Flatbed truck	FT1	60	10	2	0.0013	11.4	0.0075	0.00945	6.25E-06	17.4	0.0115	0.538	0.0004	0.52	0.0003
Total (tons/year)					0.0084		0.0478		3.96E-05		0.0729		0.0023		0.0022

- Notes:**
 1. Emission factors based on USEPA MOVES2010b model output.
 2. Travel distance based on distance to supply depots.

Table 5-5b Exhaust Emissions Associated with Commuting Construction Workers ¹

Vehicle Type ²	Days per Year	Round trip Miles ³	Trips per Day	VOC		NOx		SO ₂		CO		PM2.5	
				Emission Factor (g/VMT)	Emission (lb/year)	Emission Factor (g/VMT)	Emission (lb/year)	Emission Factor (g/VMT)	Emission (lb/year)	Emission Factor (g/VMT)	Emission (lb/year)	Emission Factor (g/VMT)	Emission (lb/year)
Workers Commuting (LDGV)	240	120	60	0.148	564	0.438	1669	0.0099	38	4.23	16114	0.0328	125
Workers Commuting (LDGG)	240	120	60	0.193	735	0.632	2408	0.0126	48	4.81	18324	0.0365	139
Total (lb/year)				0.341	1299.0	1.07	4076.2	0.0225	85.7	9.04	34438.1	0.0693	264.0
Total (tons/year)				0.65		2.04		0.04		17.22		0.13	

- Notes:**
 1. Emission factors based on USEPA MOVES2010b model output.
 2. Workers commuting are divided into half Light Duty Gasoline Vehicles (LDGV) and half Light Duty Gasoline Trucks (LDGT).
 3. Trips per day was based on 60 workers per day commuting to and from the Bay Park site.

Table 5-6 Comparison to De minimis Levels

Pollutant	Nonroad tons/year	Paved Road tons/year	Exhaust tons/year	Total tons/year	De minimis < tpy
NOx	19.73	NA	2.09	22	100
VOC	1.49	NA	0.66	2	50
CO	4.21	NA	17.29	21	100
PM_{2.5}	0.81	0.02	0.13	1	100
SO₂	0.07	NA	0.04	0.11	100

Note:

NA = Not applicable