SECTION 6.4.4
AIR QUALITY

This section presents the assessment of potential effects of the Project on ambient air quality. The air quality analyses presented below were performed in accordance with the procedures found in the NYSDOT TEM, the USEPA guidance[1] on project-level analyses, and the FHWA's updated interim guidance on Mobile Source Air Toxic (MSAT) analysis. This section documents the assessment of traffic pattern changes at the three and four most congested intersections in the local street network for the Viaduct and Community Grid Alternatives, respectively, as well as the mesoscale (or regional) analysis that was conducted. Potential air quality effects associated with construction activities are described.

The study areas under each alternative for the air quality analyses include the network of roadways and intersections analyzed in the traffic analysis for each project alternative, as described in **Chapter 5, Transportation and Engineering Considerations**. Emission factors based on vehicle mix and speeds were obtained from the MOVES2014a emissions model and applied to traffic volumes projected in the countywide network from the traffic analysis for the mesoscale analysis. The vehicle mix was derived from project-specific vehicle mix that was projected as part of the traffic analysis and further classified into vehicle types compatible with MOVES2014a using regional data collected by NYSDOT.

For the analysis on a local level, a review of all the intersections in the Project Area (see **Figures 5-7 and 5-10**) analyzed in the traffic modeling provided initial screening and a basis for determining intersections that are anticipated to experience the most increase in traffic volumes and congestion and decrease in travel speeds. Analysis sites were selected based on the traffic conditions as well as proximity to sensitive receptors. USEPA MOVES2014a emissions model and the CAL3QHCR dispersion model were used to model concentrations at the analysis sites, as described in the following sections. Similarly, effects of construction activity on local traffic conditions were also analyzed using the same methodology.

On site construction activity was assessed on a local level using USEPA NONROAD emissions model and the AERMOD dispersion model to model concentrations at receptors near areas where demolition and other construction activities would occur. In order to assess the maximum potential combined impact, the maximum concentrations resulting from the traffic analysis of the construction traffic conditions and the on-site construction activities.

[1] USEPA. *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas.* EPA-420-B-15-084. November, 2015

6.4.4.1 AFFECTED ENVIRONMENT

NATIONAL AND STATE AIR QUALITY STANDARDS

As required by the Clean Air Act and its Amendments of 1990 (CAA), primary and secondary National Ambient Air Quality Standards (NAAQS) have been established for six major air pollutants: carbon monoxide (CO); nitrogen dioxide (NO_2); ozone; particulate matter less than 2.5 micrometers ($PM_{2.5}$) and less than 10 micrometers (PM_{10}); sulfur dioxide (SO_2); and lead. The primary standards represent levels that are requisite to protect the public health, allowing an adequate margin of safety. The secondary standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the environment. The primary standards are generally either the same as the secondary standards or more restrictive. The NAAQS are presented in **Table 6.4.4-1**. The NAAQS for CO, annual NO_2, and 3-hour SO_2 have also been adopted as the ambient air quality standards for New York State, but are defined on a running 12-month basis rather than for calendar years only. New York State also has standards for total suspended particles, settleable particles, non-methane hydrocarbons, 24-hour and annual SO_2, and ozone that correspond to Federal standards that have since been revoked or replaced, and for the noncriteria pollutants beryllium, fluoride, and hydrogen sulfide.

In addition to the criteria pollutants discussed above, toxic air pollutants, or MSATs, are pollutants known to cause or are suspected of causing cancer or other serious health ailments. The CAA Amendments of 1990 listed 188 air toxics and addressed the need to control toxic emissions from transportation sources. USEPA's 2007 MSAT rule identified a subset of compounds as having substantial contributions from mobile sources: benzene, 1,3-butadiene, formaldehyde, acrolein, naphthalene, polycyclic organic matter (POM), and diesel PM.

NAAQS ATTAINMENT STATUS AND STATE IMPLEMENTATION PLANS

The CAA, as amended in 1990, defines non-attainment areas (NAA) as geographic regions that have been designated as not meeting one or more of the NAAQS. When an area is designated as non-attainment by USEPA, the state is required to develop and implement a State Implementation Plan (SIP), which delineates how a state plans to achieve air quality that meets the NAAQS under the deadlines established by the CAA, followed by a plan for maintaining attainment status once the area is in attainment.

Onondaga County is currently in attainment for all standards of PM_{10}, $PM_{2.5}$, ozone, and lead. In 1993, USEPA re-designated the Syracuse area of Onondaga County as a maintenance area for CO. The 20-year CO air quality maintenance period for Onondaga County concluded on September 29, 2013. Thus, transportation/air quality conformity per §176(c) of the Clean Air Act and 40 CFR Part 93 Subpart A is not applicable to transportation projects in Onondaga County.

Table 6.4.4-1
National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary		Secondary	
	ppm	μg/m³	ppm	μg/m³
Carbon Monoxide (CO)				
8-Hour Average [1]	9	10,000	NA	
1-Hour Average [1]	35	40,000		
Lead				
Rolling 3-Month Average [2]	NA	0.15	NA	0.15
Nitrogen Dioxide (NO_2)				
1-Hour Average [3]	0.100	189	NA	
Annual Average	0.053	100	0.053	100
Ozone (O_3)				
8-Hour Average [4,5]	0.070	150	0.070	150
Respirable Particulate Matter (PM_{10})				
24-Hour Average [1]	NA	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Annual Mean[6]	NA	12	NA	15
24-Hour Average [7]	NA	35	NA	35
Sulfur Dioxide (SO_2) [8]				
1-Hour Average[9]	0.075	196	NA	NA
Maximum 3-Hour Average [1]	NA	NA	0.50	1,300

Notes:
ppm – parts per million (unit of measure for gases only)
μg/m³ – micrograms per cubic meter (unit of measure for gases and particles, including lead)
NA – not applicable
All annual periods refer to calendar year.
Standards are defined in ppm. Approximately equivalent concentrations in μg/m³ are presented.
(1) Not to be exceeded more than once a year.
(2) USEPA has lowered the NAAQS down from 1.5 μg/m³, effective January 12, 2009.
(3) 3-year average of the annual 98th percentile daily maximum 1-hr average concentration. Effective April 12, 2010.
(4) 3-year average of the annual fourth highest daily maximum 8-hr average concentration.
(5) USEPA has lowered the NAAQS down from 0.075 ppm, effective December 2015.
(6) 3-year average of annual mean. USEPA has lowered the primary standard from 15 μg/m³, effective March 2013.
(7) Not to be exceeded by the annual 98th percentile when averaged over 3 years.
(8) USEPA revoked the 24-hour and annual primary standards, replacing them with a 1-hour average standard. Effective August 23, 2010.
(9) 3-year average of the annual 99th percentile daily maximum 1-hr average concentration.
Source: 40 CFR Part 50: National Primary and Secondary Ambient Air Quality Standards.

Onondaga County is currently in attainment of the annual-average NO_2 standard. USEPA has designated the entire state of New York as "unclassifiable/attainment" of the 1-hour

NO_2 standard effective February 29, 2012. Since additional monitoring is required for the 1-hour standard, areas will be reclassified once three years of monitoring data are available.

USEPA has established a 1-hour SO_2 standard, replacing the former 24-hour and annual standards, effective August 23, 2010. Based on the available monitoring data, all New York State counties currently meet the 1-hour standard. Draft attainment designations were published by USEPA in February 2013, indicating that USEPA is deferring action to designate areas in New York State and expects to proceed with designations once additional data are gathered.

Pollutant levels measured at area monitoring stations are used to characterize existing conditions. Concentrations of relevant regulated pollutants at monitoring stations closest to the Project Area are shown in **Table 6.4.4-2**. These values are the most recent data available at the time the analyses for the Project were undertaken, and are consistent with the background conditions used in the future conditions analyses (see below). As shown in the table, the monitored levels do not exceed the NAAQS.

Table 6.4.4-2
Representative Monitored Ambient Air Quality Data

Pollutant	Monitoring Station Name/Location	Units	Averaging Period	Concentration	NAAQS
CO	Rochester Near Road, Monroe	ppm	1-hour	1.2	35
			8-hour	0.8	9
SO_2	East Syracuse, Onondaga	ppb	1-hour (1)	4.9	75
			3-hour (2)	10.2	500
PM_{10}	Rochester 2, Monroe	μg/m^3	24-hour	32	150
$PM_{2.5}$	East Syracuse, Onondaga	μg/m^3	24-hour (3)	16.6	35
			Annual	6.6	12
NO_2	Buffalo, Erie	ppb	1-hour (4)	51.5	100
			Annual	11.1	53
Lead	Rochester 2, Monroe	μg/m^3	3-month	0.003	0.15
Ozone	East Syracuse, Onondaga	ppm	8-hour	0.06	0.07

Notes

(1) The 1-hour value is based on a three-year average (2013-2015) of the 99th percentile of daily maximum 1-hour average concentrations. USEPA replaced the 24-hr and the annual standards with the 1-hour standard.

(2) The 3-hour value is based on the maximum 3-hour average concentration in 2011-2012, the latest years of reported 3-hour concentrations.

(3) The 24-hour value is based on a three-year average (2013-2015) of the 98th percentile of 24-hour average concentrations.

(4) The 1-hour value is based on a three-year average (2013-2015) of the 98th percentile of daily maximum 1-hour average concentrations.

Source: NYSDEC, New York State Ambient Air Quality Report (2011-2015).

6.4.4.2 NO BUILD ALTERNATIVE

Under the No Build Alternative, the existing roadways would remain with only routine maintenance and minor repairs. No new roadways or associated supporting infrastructure would be constructed. Emissions would continue to be emitted from existing sources, including on-road emissions in the Project Area. Construction emissions associated with the Project would not occur, but emissions associated with maintenance of aging roadway facilities would continue. An assessment of the No Build Alternative was performed for comparison to the Viaduct and Community Grid Alternatives. The results of the assessment of the No Build Alternative as compared to the Viaduct Alternative and Community Grid Alternative are presented in **Tables 6.4.4-3 through 6.4.4-8** and **Tables 6.4.4-9 through 6.4.4-12**, respectively.

6.4.4.3 ENVIRONMENTAL CONSEQUENCES OF THE VIADUCT ALTERNATIVE

PERMANENT/OPERATIONAL EFFECTS

Mesoscale Analysis

A mesoscale emissions analysis for CO, VOC, NOx, and PM was conducted in accordance with TEM using the USEPA mobile source emissions model, MOVES2014a, and the results of the regional traffic modeling conducted for the Viaduct Alternative. The study area used in the regional traffic modeling, as described in **Chapter 5, Transportation and Engineering Considerations**, was also used as the study area for the mesoscale analysis. The mesoscale analysis was conducted for the year 2020 (estimated time of completion or ETC), year 2030 (ETC+10), and year 2050 (ETC+30). For detailed technical information on the analysis methodology, see **Appendix G**.

The projected vehicle miles traveled (VMT) and the mesoscale emissions associated with traffic conditions under the Viaduct Alternative are shown in **Table 6.4.4-3**. Compared with the No Build Alternative, in year 2020, the Viaduct Alternative would result in higher emissions of CO and lower emissions of all other modeled criteria pollutants. In years 2030 and 2050, the Viaduct Alternative would result in higher area-wide emissions of all modeled criteria pollutants as the projected improvements in emissions from engine technology become less pronounced in later years and offset less of the growth in traffic. However, these increases would be areawide and would not represent a substantial increase at any single specific location. Total emissions in 2050 would also be lower than emissions in earlier years due to continued turnover of the fleet to lower emissions vehicles.

The increase in regional emissions would not result in an increase of greater than 4.7 percent from transportation sources for the pollutants analyzed. The changes in emissions are driven by two opposing processes—improvements, or decrease, in fleet-wide average emissions per vehicle-mile over time as engine technology improves, and increase in traffic volumes from growth. In the 2030 analysis year, the emissions increases would be much larger in percentage than the increase in VMT since the improvements in emission rates generated are projected to decrease to a lesser extent than the extent of traffic growth, compared to other years, thus resulting in less pronounced offsetting of the traffic effects.

Table 6.4.4-3
Criteria Pollutant Emissions in the No Build and Viaduct Alternatives

Analysis Year	Alternative	Annual VMT	Tons per Year				
			CO	NO_x	VOC	PM_{10}	$PM_{2.5}$
2020 (ETC)	No Build	3,729,123,504	11,819.2	1,715.4	230.0	80.9	73.1
	Viaduct	3,730,998,258	11,820.1	1,712.2	228.8	80.8	73.0
	Difference	1,874,754 (0.1%)	0.9 (0.0%)	-3.2 (-0.2%)	-1.2 (-0.5%)	-0.1 (-0.1%)	-0.1 (-0.1%)
2030 (ETC+10)	No Build	3,834,111,985	5,760.5	759.6	113.9	33.3	30.1
	Viaduct	3,842,875,479	6,029.9	770.2	115.0	34.6	31.2
	Difference	8,763,493 (0.2%)	269.3 (4.7%)	10.6 (1.4%)	1.1 (1.0%)	1.3 (3.9%)	1.2 (3.8%)
2050 (ETC+30)	No Build	3,917,525,200	3,272.6	327.9	46.4	8.9	8.0
	Viaduct	4,075,649,970	3,411.5	339.6	48.5	9.3	8.3
	Difference	158,124,770 (4.0%)	138.9 (4.2%)	11.7 (3.6%)	2.1 (4.5%)	0.4 (4.1%)	0.3 (4.1%)

Microscale Analysis

Carbon Monoxide (CO) Microscale Analysis

A screening was conducted using TEM procedures to determine if a CO microscale analysis is warranted for the Viaduct Alternative. The screening analysis was based on the Level of Service (LOS), traffic volumes, and average travel speed for the AM and PM peak periods for all intersections analyzed in the traffic modeling for the Viaduct Alternative. For locations that are expected to operate at LOS D or worse and would experience an increase of traffic volume of more than 10 percent or a decrease of average travel speed of more than 20 percent, a volume threshold screening was conducted based on emission factors developed from using the MOVES2014a emissions model and comparing against the applicable criterion. Based on the screening, it was determined that a microscale air quality analysis for CO is not warranted. For detailed technical discussion on the screening, see **Appendix G**.

Particulate Matter (PM) Microscale Analysis

The Viaduct Alternative would not generate or divert substantial volumes of diesel vehicle traffic as compared with the No Build Alternative. Therefore, based on NYSDOT[2] and USEPA[3] guidance, a PM microscale analysis for the Viaduct Alternative is not required. However, to address concerns expressed from the public regarding PM air quality in the vicinity of I-81, a PM microscale analysis was performed using the USEPA emissions model

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[2] NYSDOT. *The Environmental Manual Chapter 1.1 Section 8*. December 2012.

[3] USEPA. *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas*. EPA-420-B-15-084. November 2015.

MOVES2014a and dispersion model CAL3QHCR in order to assess potential PM concentrations at sensitive receptors within the study area. Three sites within the study area (as described in **Chapter 5, Transportation and Engineering Considerations**) were selected for analysis based on projected traffic conditions, the introduction of new/modified roadways, and the proximity to sensitive receptors. A critical analysis year of 2020 was determined based on the emissions strength calculated from applying the emission factors generated from MOVES2014a with the corresponding average speed and vehicle mix to the volumes at selected sites.

At the analysis locations, PM concentrations would be below the NAAQS and would not result in an increase greater than 1.1 percent from the concentrations predicted under the No Build Alternative (see **Table 6.4.4-4**). Furthermore, due to improved speeds at Site 1 and the shift in roadway geometry at Site 3, concentrations at these sites are projected to decrease when compared with the No Build Alternative. For detailed technical discussion on the methodology and results of the analysis, see **Appendix G**.

Table 6.4.4-4
$PM_{2.5}$ and PM_{10} Maximum Concentrations at Analysis Sites (μg/m^3)

Analysis Site	Pollutant	Averaging Period	No Build Total Concentration	Viaduct Alternative Total Concentration	NAAQS
Site 1: Crouse Avenue and Burnet Avenue to Crouse Avenue and Erie Boulevard	PM_{10}	24-Hour	49.9	47.2	150
	$PM_{2.5}$	24-Hour	20.9	19.8	35
		Annual	8.2	7.8	12
Site 2: N. West Street and W. Genesee Street	PM_{10}	24-Hour	43.5	44.0	150
	$PM_{2.5}$	24-Hour	17.8	18.0	35
		Annual	7.1	7.1	12
Site 3: Almond Street and Harrison Street	PM_{10}	24-Hour	54.8	50.6	150
	$PM_{2.5}$	24-Hour	20.7	19.6	35
		Annual	7.9	7.7	12

Notes:
Total PM_{10} concentrations include a background concentration of 35.9 μg/m^3 based on 2013-2015 data at the Rochester 2 monitoring station; total $PM_{2.5}$ concentrations include a background concentration of 16.6 μg/m^3 and 6.6 μg/m^3 for 24-hour and annual $PM_{2.5}$, respectively, based on 2013-2015 data at the East Syracuse monitoring station.

As shown, the analysis sites, PM concentrations would be below the NAAQS, and would not be substantially different from concentrations projected under the No Build Alternative. Therefore, the Viaduct Alternative would not adversely affect PM concentrations in these areas.

MSAT Analysis

A quantitative analysis was conducted to determine the annual emissions of MSATs anticipated under the Viaduct Alternative using emission factors obtained from the MOVES2014a emissions model. Since the analysis was prepared prior to the publication of FHWA's updated interim guidance that was issued on October 18, 2016, it is based on

FHWA's December 2012 updated interim guidance on MSATs. The potential differences in MSAT emissions due to the changes in projected VMT between the No Build and Viaduct Alternatives were assessed on an area-wide, or mesoscale, level for 1,3-Butadiene, Benzene, Formaldehyde, Acrolein, Naphthalene, Polycyclic Organic Matter (POM), and Diesel PM (DPM). The analysis methodology is included in **Appendix G**.

The MSAT emissions associated with the No Build and Viaduct Alternatives are shown in **Table 6.4.4-5**. Compared with the No Build Alternative, in years 2020 and 2030, the Viaduct Alternative would result in higher emissions of naphthalene and lower emissions of all other MSAT pollutants modeled, due to each compound's sensitivity to changes in traffic volume, vehicle mix, and travel speed. In year 2050, the Viaduct Alternative would result in higher emissions of all MSAT pollutants modeled due to the higher VMT compared with the No Build Alternative.

Table 6.4.4-5
MSAT Emissions in the No Build and Viaduct Alternatives

Analysis Year	Alternative	Annual VMT	Tons per Year						
			1,3-Butadiene	Benzene	Formaldehyde	Acrolein	Naphthalene	POM	DPM(1)
2020 (ETC)	No Build	3,729,123,504	0.5450	6.352	10.46	0.6271	0.001723	0.543	38.80
	Viaduct	3,730,998,258	0.5411	6.325	10.38	0.6217	0.001728	0.539	38.50
	Difference	1,874,754 (0.1%)	-0.0039 (-0.7%)	-0.027 (-0.4%)	-0.084 (-0.8%)	-0.0054 (-0.9%)	0.0000047 (0.3%)	-0.0036 (-0.7%)	-0.30 (-0.8%)
2030 (ETC+10)	No Build	3,834,111,985	0.1594	2.975	6.25	0.4066	0.000885	0.282	16.50
	Viaduct	3,842,875,479	0.1588	2.973	6.21	0.4047	0.000888	0.281	16.43
	Difference	8,763,493 (0.2%)	-0.00058 (-0.4%)	-0.0024 (-0.1%)	-0.034 (-0.5%)	-0.0020 (-0.5%)	0.0000033 (0.4%)	-0.00073 (-0.3%)	-0.070 (-0.4%)
2050 (ETC+30)	No Build	3,917,525,200	0.007444	1.688	2.69	0.1169	0.000432	0.0566	3.793
	Viaduct	4,075,649,970	0.007715	1.763	2.80	0.1213	0.000450	0.0589	3.916
	Difference	158,124,770 (4.0%)	0.00026 (3.5%)	0.075 (4.4%)	0.10 (3.8%)	0.0043 (3.7%)	0.000018 (4.1%)	0.0023 (4.1%)	0.12 (3.2%)

Notes:
(1) The VMT applied to DPM include only VMT estimated for diesel vehicles.

Similar to the results of the mesoscale analysis, the increases in MSAT emissions would be areawide and would not be located at any one particular location. The increase to MSAT emissions would not results in an increase of greater than 4.6 percent for any of the MSATs analyzed. While the Viaduct Alternative may not reduce VMT as well as emissions overall, within the design aimed at achieving the various objectives of the Project, consideration would nonetheless be given to improving traffic flow and other aspects affecting regional emissions where practicable.

CONSTRUCTION EFFECTS

Emissions from on-site construction equipment, on-road construction-related vehicles, diverted traffic during construction, and dust-generating construction activities have the potential to affect air quality. The potential effects of these activities on air quality are discussed in this section.

Construction of the Viaduct Alternative is anticipated to take six years to complete. An analysis was conducted to assess the effects of on-site construction activities on the surrounding community. Based on the CO screening methodologies used for the operational traffic analysis, it was determined that a microscale air quality analysis for CO is not warranted. However, to address concerns expressed from the public regarding PM air quality in the vicinity of I-81 during construction, a microscale detour traffic analysis was conducted. Traffic would be disrupted during the construction period, but detours/diversions are not expected to last more than five years in any one location (see **Chapter 4, Construction Means and Methods**). Therefore, in accordance with the NYSDOT's TEM, a mesoscale emissions analysis for construction traffic detours/diversions is not required.

On-Site Construction Activity

In general, much of the heavy equipment used in construction is powered by diesel engines that have the potential to produce relatively high PM emissions. Fugitive dust generated by construction activities is also a source of PM. In addition, gasoline engines produce relatively high levels of CO. Since USEPA mandates the use of ultra-low sulfur diesel (ULSD) fuel for all highway and non-road diesel engines[4], SO_2 emitted from the Project's construction activities would be negligible. Therefore, the three primary air pollutants of concern for construction activities are PM_{10}, $PM_{2.5}$, and CO.

The Martin Luther King, Jr. East (MLK, Jr. East) area was selected for the on-site air quality analysis because of the proximity of construction activities to a number of sensitive receptor locations there, including the Dr. King Elementary School, the State University of New York College of Environmental Science and Forestry, the Tucker Missionary Baptist Church, and a number of residential buildings. This location therefore represents a reasonable worst-case scenario for the analysis. The dispersion analysis included modeling of the worst-case annual and short-term (i.e., 24-hour, 8-hour, and 1-hour) averaging periods. Other areas in the project corridor were not modeled, but are discussed qualitatively, based on the reasonable worst-case analysis results.

The following are the key factors and assumptions used for this analysis:

- **Engine Emissions:** The sizes, types, and number of units of construction equipment were estimated based on the construction activity schedule anticipated for the Project (see **Chapter 4, Construction Means and Methods**). Emission factors for CO, PM_{10}, and $PM_{2.5}$ from on-site construction engines were developed using the USEPA

[4] USEPA required a major reduction in the sulfur content of diesel fuel intended for use in locomotive, marine, and non-road engines and equipment, including construction equipment. As of 2015, the diesel fuel produced by all large refiners, small refiners, and importers must be ULSD fuel sulfur. Levels in non-road diesel fuel are limited to a maximum of 15 parts per million.

NONROAD2008 emission model (NONROAD)[5]. Emission rates from truck engines were developed using the MOVES2014a emission model.

- **On-site Fugitive Dust:** In addition to engine emissions, fugitive dust emissions from operations (e.g., excavation and transferring of excavated materials into dump trucks) were calculated based on USEPA procedures in AP-42 Table 13.2.3-1[6]. In accordance with NYSDOT specifications, it is expected that a dust control plan would be implemented during the construction of the Project. Measures that could be included in a dust control plan include requiring trucks that are hauling loose material to be equipped with tight-fitting tailgates and have their loads securely covered prior to leaving the project site and the use of water sprays for demolition, excavation, and transfer of soils to ensure that materials would be dampened as necessary to avoid the suspension of dust into the air. These measures would effectively reduce PM emissions from dust-generating construction activities.
- **Dispersion Modeling:** Potential effects from construction sources were evaluated using the USEPA/AMS AERMOD, a refined dispersion model. AERMOD is a state-of-the-art dispersion model, applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources (including point, area, and volume sources). AERMOD is a steady-state plume model that incorporates current concepts about flow and dispersion in complex terrain and includes updated treatments of the boundary layer theory, understanding of turbulence and dispersion, and handling of terrain interactions.
- **Source Simulation:** As discussed above, the MLK, Jr. East area was selected for the on-site air quality analysis because of the proximity of construction activities to a number of sensitive receptor locations. For short-term model scenarios (predicting concentration averages for periods of 24 hours or less), all stationary sources, such as cranes and pile hammers, which idle in a single location while unloading, were simulated as point sources. Point sources were conservatively modeled at a single location throughout the year in order to capture the maximum potential short-term concentrations. Other engines, such as excavators and loaders that would move around the site on any given day, were simulated as area sources. For periods of eight hours or less, it was assumed that all engines would be active simultaneously. All sources are anticipated to move around the site throughout the year and were therefore simulated as area sources in the annual analysis. Sources were assumed to be operating during a typical 8-hour construction workday (i.e., from 7 AM to 3 PM) in the dispersion model, consistent with the assumption presented in **Chapter 4, Construction Means and Methods**.

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5 https://www.epa.gov/moves/nonroad-model-nonroad-engines-equipment-and-vehicles - *"NONROAD2008 has been incorporated into MOVES2014 and MOVES2014a. USEPA recommends using MOVES2014a if you are having problems installing or using NONROAD2008 on newer operating systems."*

6 USEPA Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, Section 1.3, Table 1.3-1.

- **Meteorological Data:** The meteorological data set consisted of five consecutive years of latest available meteorological data: surface data collected at the nearest representative National Weather Service Station (Syracuse Hancock International Airport) from 2011 to 2015 and concurrent upper air data collected at Albany, NY, the nearest upper air monitoring station. The meteorological data provide hour-by-hour wind speeds and directions, stability states, and temperature inversion elevation over the five-year period. These data were processed using the USEPA AERMET program to develop data in a format that could be readily processed by the AERMOD model.
- **Background Concentrations:** To estimate the maximum expected total pollutant concentrations, the calculated concentrations from the construction emission sources were added to a background value that accounts for existing pollutant concentrations from other sources. The background levels are based on concentrations monitored at the nearest ambient air monitoring stations (see **Table 6.4.4-2**).
- **Receptor Locations:** Receptors were placed at locations that would be publicly accessible, at residential and other sensitive uses, such as schools, at both ground-level and elevated locations (e.g., windows of residences). In addition, a ground-level receptor grid extending one kilometer from the construction sources was established to enable extrapolation of concentrations throughout the study area at locations more distant from construction activities.
- **Analysis Year:** The highest emissions were predicted for 2018 when demolition, superstructure, and earthworks activities would overlap and that there would be an increasing percentage of in-use newer and cleaner vehicles and engines for construction in future years.

Maximum predicted concentrations (including background) from peak construction activities under the Viaduct Alternative are presented in **Table 6.4.4-6**. As shown, total maximum concentrations from the on-site sources are predicted to be lower than the corresponding NAAQS for $PM_{2.5}$, PM_{10}, and CO. The modeled results for the 2018 analysis year are based on construction activities at the reasonable worst-case location in the MLK, Jr. East area where sensitive receptor locations are near on-site construction activities. Lower concentration increments from construction would be expected at other locations in the study area since activities would generally be located farther away from sensitive receptor locations.

Table 6.4.4-6
Maximum Predicted Pollutant Concentrations from On-Site Construction Activity for the Viaduct Alternative

Pollutant	Averaging Period	Background[1]	Concentration Increment from On-Site Construction Activity	Total	NAAQS
$PM_{2.5}$	24-hour	16.6 μg/m^3	4.9 μg/m^3	21.5 μg/m^3	35 μg/m^3
	Annual Local	6.6 μg/m^3	0.3 μg/m^3	6.9 μg/m^3	12 μg/m^3
PM_{10}	24-hour	35.9 μg/m^3	5.2 μg/m^3	41.1 μg/m^3	150 μg/m^3
CO	1-hour	1.2 ppm	10.5 ppm	11.7 ppm	35 ppm
	8-hour	0.8 ppm	2.6 ppm	3.4 ppm	9 ppm

Notes:
[1]Background concentrations and the monitoring stations at which they were measured from are presented above in **Table 6.4.4-2**. These values are the most recent data available at the time the analyses for the Project were undertaken.

Construction-related Traffic Diversions

Potential air quality effects associated with the traffic diversions that are expected to occur during construction activities for the Viaduct Alternative were analyzed for PM_{10} and $PM_{2.5}$ at East MLK Jr Drive at Southbound I-81 on-ramp and East MLK Jr. Drive at Northbound I-81 off-ramp due the highest projected volume increase expected at this ramp location to bypass the closure of I-81 north of the ramps that would occur under the construction of the Viaduct Alternative. The proximity to sensitive receptors at this location was also considered. Traffic diversions were analyzed for Phase 3 (see **Chapter 4, Construction Means and Methods**), during the closure of I-81 between East MLK, Jr. Drive and Butternut Street.

Consistent with the operational mobile source analysis, a PM microscale analysis was performed using the USEPA emissions model MOVES2014a and dispersion model CAL3QHCR. A detailed discussion on methodology used for the analysis is included in **Appendix G**. The CAL3QHCR model is EPA's preferred model for mobile source hot spot analysis, and includes modeling considerations specific to mobile sources. While, calculations differ between it and the AERMOD model, maximum contributions are added together to develop a conservative worst case combined impact.

The maximum total PM_{10} and $PM_{2.5}$ concentrations from traffic diversions at this site are shown in **Table 6.4.4-7**. Concentrations would be below the NAAQS.

Table 6.4.4-7
Maximum $PM_{2.5}$ and $PM_{2.5}$ Concentrations from Traffic Diversions during Construction of the Viaduct Alternative ($\mu g/m^3$)

Analysis Site	Pollutant	Averaging Period	Concentration with Traffic Diversions	NAAQS
E. MLK Jr. Drive and new ramps at I-81	$PM_{2.5}$	24-Hour	17.8	35
		Annual	7.0	12
	PM_{10}	24-Hour	42.2	150

Notes:
Total PM_{10} concentration include a background concentration of 35.9 $\mu g/m^3$ based on 2013-2015 data at the Rochester 2 monitoring station; total $PM_{2.5}$ concentrations include a background concentration of 16.6 $\mu g/m^3$ and 6.6 $\mu g/m^3$ for 24-hour and annual $PM_{2.5}$, respectively, based on 2013-2015 data at the East Syracuse monitoring station.

Combined Effect

Since emissions from both on-site construction equipment and construction-related traffic diversions may contribute to concentrations concurrently at the same location, the combined effect was assessed where applicable. Maximum concentrations from the mobile source analysis and the on-site construction activity were conservatively added together regardless of receptor locations in order to estimate the maximum potential combined effect. While maximum concentrations were predicted using different dispersion models, the maximum concentrations predicted using the CAL3QHCR model would represent the maximum contribution from on road mobile sources that are anticipated at near-road receptors and added to all concentrations predicted by the AERMOD model along with background concentrations to determine the maximum potential combined concentrations.

As presented in **Table 6.4.4-8**, total maximum concentrations from the on-site sources and traffic diversions including background concentrations are projected to be lower than the corresponding NAAQS for $PM_{2.5}$ and PM_{10}. Therefore, construction under the Viaduct Alternative would not have the potential to result in significant air quality impacts, and no other analysis refinements are warranted.

Table 6.4.4-8
Maximum Combined Concentrations from On-Site Construction Activity and Traffic Diversions during Construction for the Viaduct Alternative ($\mu g/m^3$)

Pollutant	Averaging Period	Background	On-Site Construction Activity Contribution	Mobile Sources Contribution[1]	Total	NAAQS
$PM_{2.5}$	24-hour	16.6	4.9	1.2	22.7	35
	Annual Local	6.6	0.3	0.4	7.3	12
PM_{10}	24-hour	35.9	5.2	6.3	47.4	150

Notes:
[1] The values shown are concentrations presented in **Table 6.6.4-7** excluding the background concentrations.

INDIRECT EFFECTS

As part of the Viaduct Alternative, consumption of gasoline and diesel by mobile sources and electricity would result in indirect pollutant emissions—upstream emissions associated with producing fuels, power, or materials. Direct emissions resulting from the combustion of gasoline and diesel are accounted for in the microscale and mesoscale analyses above. No direct emissions are associated with electric consumption. Indirect emissions would not be emitted from any one particular location (e.g., oil rig, fuel refinery, power plant, etc.), would be spread across the entire fuel distribution or energy grid, and would be located far removed from the Project Area. Therefore, adverse indirect effects are not anticipated associated with upstream emissions.

The Viaduct Alternative would not induce substantial growth and, therefore, would not result in any further indirect effects.

CUMULATIVE EFFECTS

The traffic data that were used in the air quality analyses accounted for traffic diversions associated with the Viaduct Alternative as well as traffic associated with known reasonably foreseeable projects. Thus, the results of the air quality analyses reflect the traffic effects of the proposed action combined with that of reasonably foreseeable actions. No significant adverse cumulative effects related to air quality are anticipated as a result of the Project.

MITIGATION

The Viaduct Alternative would involve the reconstruction of all highway elements and would improve traffic operational conditions on I-81, I-481, and I-690 (see **Chapter 5, Transportation and Engineering Considerations**). New and replaced signals would be designed to minimize traffic impacts with coordination through the existing centrally controlled traffic signal communication system. For intersections that are projected to operate at saturated levels, traffic mitigation measures (i.e. lane widening) may be introduced in the future in order to improve the traffic operational conditions at these intersection. Measures taken to improve traffic conditions would also result in improvements to the projected air quality conditions. No significant permanent/operational air quality impacts were identified for the Viaduct Alternative. Therefore, no additional air quality mitigation measures are warranted.

To further reduce the effects of construction activities on air quality at nearby sensitive receptor locations, the use of emission controls, such as best available tailpipe technologies (i.e., diesel particulate filters), and the utilization of newer equipment that meets specific USEPA standards would be included in the construction specifications to the extent practicable.

6.4.4.4 ENVIRONMENTAL CONSEQUENCES OF THE COMMUNITY GRID ALTERNATIVE

PERMANENT/OPERATIONAL IMPACTS

Mesoscale Analysis

A mesoscale emissions analysis for CO, VOC, NOx, and PM was conducted in accordance with the TEM using the USEPA mobile source emissions model, MOVES2014a, and the results of the regional traffic modeling conducted for the Community Grid Alternative. The study area used in the regional traffic modeling, as described in **Chapter 5, Transportation and Engineering Considerations**, was also used as the study area for the mesoscale analysis. The mesoscale analysis was conducted for the year 2020 (ETC), year 2030 (ETC+10), and year 2050 (ETC+30). For detailed technical information on the analysis methodology, see **Appendix G**.

The mesoscale emissions associated with traffic conditions under the Community Grid Alternative are shown in **Table 6.4.4-9**. Compared with the No Build Alternative in year 2020, the Community Grid Alternative would result in higher emissions of VOCs and lower emissions of all other modeled criteria pollutants as a result of the steeper projected improvements in emissions, as projected in the emission rates of the USEPA MOVES2014a emissions model, offsetting the increase in VMT. In year 2030, the Community Grid Alternative would result in lower emissions of NOx and higher emissions of all other modeled criteria pollutants. In year 2050, due to the higher overall VMT compared with the No Build Alternative, the Community Grid Alternative would result in higher emissions of all modeled criteria pollutants. However, these increases would be areawide and include would not represent a substantial increase at any single specific location. Total emissions in 2050 would also be lower than emissions in earlier years due to continued turnover of fleet to lower emissions vehicles.

Table 6.4.4-9
Criteria Pollutant Emissions in the No Build and Community Grid Alternatives

Analysis Year	Alternative	Annual VMT	Tons per Year				
			CO	NO_x	VOC	PM_{10}	$PM_{2.5}$
2020 (ETC)	No Build	3,729,123,504	11,819.2	1,715.4	230.0	80.9	73.1
	Community Grid	3,723,299,253	11,809.1	1,712.0	238.1	80.6	72.8
	Difference	-5,824,251 (-0.2%)	-10.2 (-0.1%)	-3.5 (-0.2%)	8.1 (3.5%)	-0.3 (-0.4%)	-0.3 (-0.4%)
2030 (ETC+10)	No Build	3,834,111,985	5,760.5	759.6	113.9	33.3	30.1
	Community Grid	3,835,874,787	6,017.6	751.9	119.9	30.8	34.2
	Difference	1,762,802 (0.05%)	257.1 (4.5%)	-7.7 (-1.0%)	6.0 (5.2%)	0.9 (2.6%)	0.8 (2.5%)
2050 (ETC+30)	No Build	3,917,525,200	3,272.6	327.9	46.4	8.9	8.0
	Community Grid	4,067,945,999	3,704.5	349.9	51.2	9.9	8.9
	Difference	150,420,799 (3%)	431.8 (13.2%)	22.0 (6.7%)	4.8 (10.4%)	1.0 (11.2%)	0.9 (11.2%)

The increase in regional emissions would not result in an increase of greater than13.2 percent from transportation sources for the criteria pollutants analyzed. While the Community Grid Alternative may not reduce VMT as well as emissions overall, within the design aimed at achieving the various objectives of the Project, consideration would nonetheless be given to improving traffic flow and other aspects affecting regional emissions where practicable.

Microscale Analysis

Carbon Monoxide (CO) Microscale Analysis

A screening analysis was conducted using TEM procedures to determine if a CO microscale analysis is warranted for the Community Grid Alternative. The screening analysis was based on the LOS, traffic volumes, and average travel speed for the AM and PM peak periods for all intersections analyzed in the traffic modeling for the Community Grid Alternative. For locations that are expected to operate at LOS D or worse and would experience an increase of traffic volume of more than 10 percent or a decrease of average travel speed of more than 20 percent, a volume threshold screening was conducted based on emission factors developed from using the MOVES2014a emissions model and comparing against the applicable volume threshold criterion. Based on the screening, it was determined that a microscale air quality analysis for CO is not warranted. For detailed technical discussion on the screening, see **Appendix G**.

Particulate Matter (PM) Microscale Analysis

The Community Grid Alternative would not generate or divert substantial volumes of diesel vehicle traffic as compared with the No Build Alternative. Thus, based on NYSDOT[7] and USEPA[8] guidance, a microscale hot-spot analysis for the Community Grid Alternative is not required. However, to address concerns expressed from the public regarding PM air quality in the vicinity of I-81, a PM microscale analysis was performed in order to assess potential PM concentrations at sensitive receptors within the study area. The MOVES2014a emissions model and the CAL3QHCR dispersion model were used to estimate concentrations at receptor sites. A critical analysis year of 2020 was determined based on the emissions strength calculated from applying the emission factors generated from MOVES2014a with the corresponding average speed and vehicle mix to the volumes at selected sites. For further discussion on the methodology and results of the analysis, see **Appendix G**.

Four sites within the study area (as described in **Chapter 5, Transportation and Engineering Considerations**) were selected for analysis based on projected traffic conditions, the introduction of new/modified roadways, and the proximity to sensitive receptors. The selected analysis sites and their respective PM concentrations are shown in

[7] NYSDOT. *The Environmental Manual Chapter 1.1 Section 8*. December, 2012

[8] USEPA. *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas.* EPA-420-B-15-084. November, 2015

Table 6.4.4-10. At the analysis locations, PM concentrations would be below the NAAQS and would not result in an increase greater than 18 percent from the concentrations predicted under the No Build Alternative. Furthermore, due to the shift in roadway geometry as well as the removal of the I-81 viaduct, concentrations at Site 3 are projected to decrease when compared with the No Build Alternative. For detailed technical discussion on the methodology and results of the analysis, see **Appendix G**.

MSAT Analysis

A quantitative analysis was conducted to determine the annual emissions of MSATs anticipated under the Community Grid Alternative using emission factors obtained from the MOVES2014a emissions model. The analysis was conducted prior to the publication of FHWA's updated interim guidance that was issued on October 18, 2016. Therefore, the analysis was based on FHWA's December 2012 guidance on MSATs, the potential differences in MSAT emissions due to the changes in projected VMT were assessed on an area-wide, or mesoscale, level for 1,3-Butadien, Benzene, Formaldehyde, Acrolein, Naphthalene, POM, and DPM. The analysis methodology is included in **Appendix G**.

Table 6.4.4-10
$PM_{2.5}$ and $PM_{2.5}$ Maximum Concentrations at Analysis Sites (μg/m^3)

Analysis Site	Pollutant	Averaging Period	No build Total Concentration	Community Grid Alternative Total Concentration	NAAQS
Site 1: Crouse Avenue and Burnet Avenue to Crouse Avenue and Erie Boulevard	PM_{10}	24-Hour	49.9	58.7	150
	$PM_{2.5}$	24-Hour	20.9	23.6	35
		Annual	8.2	9.0	12
Site 2: N. West Street and W. Genesee Street	PM_{10}	24-Hour	43.5	46.5	150
	$PM_{2.5}$	24-Hour	17.8	18.8	35
		Annual	7.1	7.3	12
Site 3: Almond Street and Harrison Street	PM_{10}	24-Hour	54.8	42.0	150
	$PM_{2.5}$	24-Hour	20.7	17.5	35
		Annual	7.9	6.9	12
Site 4: State Street and Erie Boulevard	PM_{10}	24-Hour	48.1	47.8	150
	$PM_{2.5}$	24-Hour	19.2	19.2	35
		Annual	7.6	7.4	12

Notes:
Total PM_{10} concentrations include a background concentration of 35.9 μg/m^3 based on 2013-2015 data at the Rochester 2 monitoring station; total $PM_{2.5}$ concentrations include a background concentration of 16.6 μg/m^3 and 6.6 μg/m^3 for 24-hour and annual $PM_{2.5}$, respectively, based on 2013-2015 data at the East Syracuse monitoring station.

The MSAT emissions associated with the No Build and Community Grid Alternatives are shown in **Table 6.4.4-11**. Compared with the No Build Alternative, in year 2020, the Community Grid Alternative would result in higher emissions of 1,3-butadiene and benzene and lower emissions of all other MSAT pollutants modeled, due to each compound's sensitivity to changes in traffic volume, vehicle mix, and travel speed. In year 2030, the minor increase in VMT in the Community Grid Alternative along with projected reduced emission rates would result in lower emissions of all MSAT pollutants modeled. In year 2050, the Community Grid Alternative would result in higher emissions of all MSAT pollutants modeled due to the higher VMT compared with the No Build Alternative.

Table 6.4.4-11
MSAT Emissions in the No Build and Community Grid Alternatives

Analysis Year	Alternative	Annual VMT	Tons per Year						
			1,3-Butadiene	Benzene	Formaldehyde	Acrolein	Naphthalene	POM	DPM[1]
2020 (ETC)	No Build	3,729,123,504	0.5450	6.352	10.46	0.627	0.001723	0.543	38.80
	Community Grid	3,723,299,253	0.5462	6.364	10.43	0.626	0.001717	0.542	38.51
	Difference	-5,824,251 (-0.2%)	0.0013 (0.2%)	0.012 (0.2%)	-0.026 (-0.2%)	-0.0015 (-0.2%)	-0.0000068 (-0.4%)	-0.0011 (-0.2%)	-0.29 (-0.7%)
2030 (ETC+10)	No Build	3,834,111,985	0.1594	2.975	6.25	0.407	0.000885	0.282	16.50
	Community Grid	3,835,874,787	0.1581	2.968	6.05	0.397	0.000873	0.279	15.91
	Difference	1,762,802 (0.05%)	-0.0013 (-0.8%)	-0.0077 (-0.3%)	-0.19 (-3.1%)	-0.0098 (-2.4%)	-0.000011 (-1.3%)	-0.0029 (-1.0%)	-0.59 (-3.5%)
2050 (ETC+30)	No Build	3,917,525,200	0.007444	1.688	2.69	0.117	0.000432	0.0566	3.793
	Community Grid	4,067,945,999	0.007707	1.772	2.80	0.121	0.000448	0.0590	3.902
	Difference	150,420,799 (3%)	0.00027 (3.6%)	0.083 (4.9 %)	0.11 (4.0%)	0.0045 (3.9%)	0.000016 (3.8%)	0.0024 (4.2%)	0.11 (2.9%)

Notes:
(1) The VMT applied to DPM include only VMT estimated for diesel vehicles.

Similar to the results of the mesoscale analysis, the increases in MSAT emissions would be areawide and would not be located at any one particular area. The increase to MSAT emissions would not result in an increase of greater than 5.7 percent for any of the MSATs analyzed. The Community Grid Alternative may not reduce VMT as well as emissions overall, but consideration has been and will be given to improving traffic flow and other aspects affecting regional emissions where practicable.

CONSTRUCTION EFFECTS

Emissions from on-site construction equipment, on-road construction-related vehicles, diverted traffic during construction, and dust-generating construction activities have the potential to affect air quality. The potential effects of these activities under the Community Grid Alternative on air quality are discussed in this section.

Construction of the Community Grid Alternative is anticipated to take five years to complete. An analysis was conducted to assess the effects of on-site construction activities on the surrounding community. Based on the CO screening methodologies used for the operational traffic analysis, it was determined that a microscale air quality analysis for CO is not warranted. However, to address concerns expressed from the public regarding PM air quality in the vicinity of I-81 during construction, a microscale detour traffic impact analysis was conducted. Traffic would be disrupted during the construction period, but any detours/diversions are not expected to last more than five years in any one location (see **Chapter 4, Construction Means and Methods**). Therefore, in accordance with the NYSDOT's TEM, a mesoscale emissions analysis for construction detour/diversions traffic is not required.

On-Site Construction Activity

The methodology used for the on-site construction activity analysis of the Community Grid Alternative is the same as that used for the Viaduct Alternative. Maximum predicted concentrations (including background) from peak construction activities (Phase 2B) under the Community Grid Alternative for the 2018 analysis year are presented in **Table 6.4.4-12**.

Table 6.4.4-12
Maximum Predicted Pollutant Concentrations from On-Site Construction Activity for the Community Grid Alternative

Pollutant	Averaging Period	Background[1]	Concentration Increment from On-Site Construction Activity	Total	NAAQS
$PM_{2.5}$	24-hour	16.6 μg/m^3	4.1 μg/m^3	20.7 μg/m^3	35 μg/m^3
	Annual Local	6.6 μg/m^3	0.2 μg/m^3	6.8 μg/m^3	12 μg/m^3
PM_{10}	24-hour	35.9 μg/m^3	4.3 μg/m^3	40.2 μg/m^3	150 μg/m^3
CO	1-hour	1.2 ppm	10.5 ppm	11.7 ppm	35 ppm
	8-hour	0.8 ppm	2.6 ppm	3.4 ppm	9 ppm

Notes:
[1]Background concentrations and the monitoring stations at which they were measured from are presented above in **Table 6.4.4-2**. These values are the most recent data available at the time the analyses for the Project were undertaken.

As shown, total maximum concentrations from the on-site sources are predicted to be lower than the corresponding NAAQS for $PM_{2.5}$, PM_{10}, NO_2, and CO. The modeled results are based on construction activities at the reasonable worst-case location in the MLK, Jr. East area where sensitive receptor locations are near on-site construction activities. Lower concentration increments from construction would be expected in other areas since on-site construction activities would generally be farther away from sensitive receptor locations.

Construction-related Traffic Diversions

Potential air quality effects from the traffic diversions that are expected to occur during construction of the Community Grid Alternative were analyzed for PM_{10} and $PM_{2.5}$ at the intersection of Crouse Avenue and Burnet Avenue to Crouse Avenue and Erie Boulevard due the potential effects of the westbound I-690 shutdown on traffic conditions analyzed for Phase 2B (see **Chapter 4, Construction Means and Methods**). The proximity to sensitive receptors at this location was also considered.

Consistent with the operational mobile source analysis, a PM microscale analysis was performed using the USEPA emissions model MOVES2014a and dispersion model CAL3QHCR. A detailed discussion on methodology used for the analysis is included in **Appendix G**.

The total PM_{10} and $PM_{2.5}$ concentrations from traffic diversions at this site would be below the NAAQS, as shown in **Table 6.4.4-13**.

Table 6.4.4-13
$PM_{2.5}$ and PM_{10} Concentrations from Traffic Diversions during Construction for the Community Grid Alternative (μg/m^3)

Analysis Site	Pollutant	Averaging Period	Concentration with Traffic Diversions	NAAQS
Crouse Avenue and Burnet Avenue to Crouse Avenue and Erie Boulevard	$PM_{2.5}$	24-Hour	23.7	35
		Annual	9.0	12
	PM_{10}	24-Hour	59.0	150

Notes:
Total PM_{10} concentration include a background concentration of 35.9 μg/m^3 based on 2013-2015 data at the Rochester 2 monitoring station; total $PM_{2.5}$ concentrations include a background concentration of 16.6 μg/m^3 and 6.6 μg/m^3 for 24-hour and annual $PM_{2.5}$, respectively, based on 2013-2015 data at the East Syracuse monitoring station.

Combined Effect

Since emissions from both on-site construction equipment and construction-related traffic diversions may contribute to concentrations concurrently, the combined effect was assessed where applicable. Maximum concentrations from the mobile source analysis and the on-site construction activity were conservatively added together regardless of receptor locations in order to estimate the maximum potential combined effect. While maximum concentrations were predicted using different dispersion models, the maximum concentrations predicted using the CAL3QHCR model would represent the maximum contribution from on road mobile sources that are anticipated at near-road receptors and added to all concentrations predicted by the AERMOD model along with background concentrations to determine the maximum potential combined concentrations.

As presented in **Table 6.4.4-14**, total maximum concentrations from the on-site sources and traffic diversions are projected to be lower than the corresponding NAAQS for $PM_{2.5}$ and PM_{10}. Therefore, construction under the Community Grid Alternative would not have the potential to result in significant air quality impacts and no other analysis refinements are warranted.

Table 6.4.4-14
Maximum Combined Concentrations from On-Site Construction Activity and Traffic Diversions during Construction for the Community Grid Alternative (μg/m³)

Pollutant	Averaging Period	Background	On-Site Construction Activity Modeled Contribution	Mobile Sources Modeled Contribution[1]	Total	NAAQS
$PM_{2.5}$	24-hour	16.6	4.1	7.1	27.8	35
	Annual Local	6.6	0.2	2.4	9.2	12
PM_{10}	24-hour	35.9	4.3	23.1	63.3	150

Notes:
1 The values shown are concentrations presented in **Table 6.6.4-13** excluding the background concentrations.

INDIRECT EFFECTS

As part of the Community Grid Alternative, consumption of gasoline and diesel by mobile sources and electricity would result in indirect pollutant emissions—upstream emissions associated with producing fuels, power, or materials. Direct emissions resulting from the combustion of gasoline and diesel are accounted for in the microscale and mesoscale analyses above. No direct emissions are associated with electric consumption. Indirect emissions would not be emitted from any one particular location (e.g., oil rig, fuel refinery, power plant, etc.), would be spread across the entire fuel distribution or energy grid, and would be located far removed from the Project Area. Therefore, adverse indirect effects are not anticipated associated with upstream emissions.

The Community Grid Alternative would not induce substantial growth and, therefore, would not result in any further indirect effects.

CUMULATIVE EFFECTS

The traffic data that were used in the air quality analyses accounted for traffic diversions associated with the Community Grid Alternative as well as traffic associated with known reasonably foreseeable projects. The results of the air quality analyses reflect the traffic effects of the proposed action combined with that of reasonably foreseeable actions. No significant adverse cumulative effects related to air quality are anticipated as a result of the Project.

MITIGATION

The Community Grid Alternative would remove the existing I-81 viaduct between the New York, Susquehanna and Western Railway bridge (at Renwick Street) and the I-81/I-690 interchange and replace it with a street-level urban arterial roadway. As a result, traffic would be diverted onto former I-481 both north and south of I-690, as well as onto local roadways. In order to accommodate the traffic diversions, it would be necessary to install new traffic signals or replace existing signals. (see **Chapter 5, Transportation and Engineering Considerations**). New and replaced signals would be designed to minimize traffic impacts with coordination through the existing centrally controlled traffic signal communication system. For intersections that are projected to operate at saturated levels, traffic mitigation measures (i.e., lane widening) may be introduced in the future in order to improve the traffic operational conditions at these intersections. Measures taken to improve traffic conditions would also result in improvements to the projected air quality conditions. No significant permanent/operational air quality impacts were identified for the Community Grid Alternative. Therefore, no additional air quality mitigation measures are warranted.

To further reduce the effects of construction activities on air quality at nearby sensitive receptor locations, the use of emission controls, such as best available tailpipe technologies (i.e., diesel particulate filters), and the utilization of newer equipment that meets specific USEPA standards would be included in the construction specifications to the extent practicable.