Memorandum

To: Rhode Island Department of Transportation
Two Capitol Hill
Providence, RI 02903

Date: January 24, 2019

Project #: 72900.00

From: Peter J. Pavao, PE, PTOE
Director of Transportation Systems

Re: Reconstruction of the Pell Bridge Approaches
Environmental Assessment – Air Quality

1. Project Overview

The Claiborne Pell Newport Bridge (Pell Bridge) carries State Route 138 between Jamestown and Newport and is the only road connection between Jamestown and Aquidneck Island. The Proposed Action Alternative of the Pell Bridge Interchange Project (Project) would provide direct connection from the northern part of the City to the downtown area, reduce queued vehicle traffic onto the Pell Bridge, reduce traffic in downtown Newport, and provide a portion of the bicycle and pedestrian facilities envisioned in the Aquidneck Island Transportation Study. The Proposed Action (Project) would occur in the City of Newport and Town of Middletown, Rhode Island. In accordance with the National Environmental Policy Act (NEPA), an Environmental Assessment (EA) is being developed to evaluate the impacts of construction and operation of the re-designed interchange on environmental resources.

2. Study Area and Methodology

Study Area

Air quality is considered using two distinct study areas. The local study area considers pollutant concentrations at the microscale. The local air quality study area for the Project mirrors the intersection study area from the transportation analysis, as local air quality is most likely to change at intersections affected by the project. The regional study area for air quality encompasses the county in which the Project is located (Newport County) and is informed by the extents of the regional transportation study area. This regional study area is congruent with the geographical boundaries the EPA uses to designate the Attainment or Nonattainment of criteria pollutants.

Methodology

Existing Conditions

The air quality Existing Conditions are determined by reviewing publicly-available air quality monitoring data collected by state air agency (RIDEM). These documents help determine the pollutants of concern for the project, their attainment status and background concentrations used in microscale analyses.

Microscale Analysis

The Environmental Protection Agency (EPA) has set the National Ambient Air Quality Standards (NAAQS) for criteria pollutants to protect public health. The predominant source of pollution anticipated from the proposed project is emissions from the motor vehicle traffic travelling through the study area. Carbon Monoxide (CO) is directly emitted by motor vehicles. The Pell Bridge improvements are expected to include new intersections as part of the Project. Although the project is located in an attainment area for CO, the microscale analysis analyzed concentrations of CO and compared them to the NAAQs. Microscale analyses are conducted for worst-case scenarios, in order to show that all study area intersections will pass the NAAQS by demonstrating the acceptability of a few representative intersections.

Traffic Scenarios

The air quality study included a local (microscale) air quality analysis of CO to demonstrate compliance with the NAAQS by evaluating air quality impacts of the Build Condition. The air quality analysis considers the highest network volumes and delays and thus presents the worst-case scenario for analysis. The microscale analysis evaluated the evening peak hour, as volumes and delays across the study intersections were worse than the morning peak hour.

Intersection Assessment

The intersections that were modeled in the microscale analysis were selected based on level of service and intersection volumes as outlined in the EPA's *Guideline for Modeling Carbon Monoxide from Roadway Intersections* (the "EPA Guidance")[1]. The EPA Guidance requires that intersections be ranked by descending intersection volumes and improving level of service. Intersections that have the worst level of services and highest intersection volumes are chosen for analysis. These intersections provided the worst-case scenario pollutant concentrations. As a result of the screening assessment of the traffic data from the proposed project, four intersections were chosen for the analysis based on level of service (LOS) and volume during the evening peak hour. The intersections represent the worst LOS in the study area and/or the largest volume in the study area due to the proposed project. It is expected that if these worst-case scenario intersections pass, then all intersections in the study area will exhibit CO concentrations below the NAAQS. Based on the rankings, the following intersections were evaluated:

- Halsey Street at New Ramp Connector (High Volume)
- Admiral Kalbfus Road at Halsey Street (High Volume and Worst LOS)
- JT Connell Highway at New Ramp Connector and Dyer Gate Road (High Volume and Worst LOS)
- JT Connell Highway at Farewell Street and Van Zandt Avenue (Worst LOS)

Given the same LOS, the evening peak hour was chosen for the analysis because it has higher overall volume than the morning peak hour. Thus, the evening peak hour condition presents the greatest potential for impact.

Background Values

RIDEM maintains a network of air quality monitors to measure background concentrations of the criteria pollutants. Background concentrations are ambient pollution levels from all stationary, mobile, and area sources. The values presented in this report are from the *2017 Annual Monitoring Network Plan* submitted July 5, 2017.[2] The concentrations represent design values, determined using monitored data measured from 2014 to 2016.

1 "Guideline for Modeling Carbon Monoxide from Roadway Intersections", United States Environmental Protection Agency, Office of Air Quality Planning and Standards, EPA-454/R-92-005, November 1992.

2 "Rhode Island 2017 Annual Monitoring Network Plan" Rhode Island Department of Environmental Management. Office of Air Resources. July 5, 2017.

FHWA Categorical Hotspot Finding

The intersections were analyzed following the Federal Highway Administration's (FHWA's) carbon monoxide categorical hot-spot finding guidance. Under the final conformity rule amendments at 40 Code of Federal Regulation 93.123(a)(3)[3], urban projects that include one or more intersections under consideration for CO hot-spot analysis may rely upon the CO categorical hot-spot finding in place of doing a detailed analysis for the project-level conformity determination. As of 2008, EPA has allowed for the CO categorical hot-spot finding to replace detailed hot-spot analysis if appropriate modeling showed that a type of highway or transit project would not cause or contribute to a new or worsened local air quality violation of the CO NAAQS.

In order to qualify for the CO categorical hot-spot finding to replace a detailed analysis, modeling parameters must fall within acceptable ranges as defined by EPA and FHWA. These ranges are meant to ensure that the intersections of study in the project are sufficiently similar to the modeled intersection of the CO categorical hot-spot finding. Some examples of these modeling parameters are analysis year, angle of intersecting cross streets, maximum grade, approach speeds, volumes, etc. If the intersections of interest have modeling parameters within the acceptable range defined by FHWA, the project is considered sufficiently similar to the intersection modeled in the CO categorical hot-spot finding and no further analysis is warranted.

FHWA has released a web-based tool[4] to organize modeling parameters and check for conformity against the acceptable parameter ranges. The air quality analysis for intersections makes use of the web-based tool to confirm reliability on the CO categorical hot-spot finding. Traffic volumes, speeds, and LOS were obtained from the traffic analysis associated with the project. Topology and intersection configurations were obtained from geographical information systems and project plans. It was assumed that the heavy-duty truck percentage was five percent on all roadways and a persistence factor of 0.7 was used per EPA guidance[5].

CO hot-spot analysis is often done to replicate conditions during cold winter mornings, when vehicle cold-starts are frequent and CO emissions are higher. An average low temperature 17.7 °F, was used for the analysis to assess the worst-case scenario for CO emissions (i.e. winter conditions). This temperature was determined using the MOVES input files and corresponds to the temperature that would be used a detailed analysis were being conducted. All intersections were modeled for a 2040 opening year for Build Condition where applicable.

Mesoscale Assessment

A mesoscale assessment was undertaken to assess the effect the Project will have on regional air quality. Mesoscale assessments are conducted by gathering vehicle emission factors and combining them with traffic parameters that result from the transportation analysis.

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3 United States Environmental Protection Agency Laws and Regulations, US Code of Federal Regulations 40 Title 40: Protection of Environment. http://www2.epa.gov/laws-regulations/regulations#find.

4 U.S. Department of Transportation Federal Highway Administration, Air Quality Transportation Conformity website: http://www.fhwa.dot.gov/environment/air_quality/conformity/policy_and_guidance/cmcf/intersection_form.cfm

5 "Guideline for Modeling Carbon Monoxide from Roadway Intersections", US Environmental Protection Agency, Office of Air Quality Planning and Standards, Technical Support Division; Research Triangle Park, NC; EPA-454/R-92-006 (Revised); September 1995

The emissions factors for the study area were developed using the Motor Vehicle Emission Simulator (MOVES2014a)[6]. MOVES2014a is EPA's motor vehicle emissions model for state and local agencies to estimate VOCs, NOx, and other emissions from cars, trucks, buses, and motorcycles. All the vehicle emission factors used in the mesoscale analysis were obtained using EPA's MOVES2014a emissions model. MOVES2014a calculates emission factors from motor vehicles in mass per distance format (often grams per mile) for existing and future conditions and applies these factors to Vehicle Miles Travelled (VMT) data to obtain emissions inventories. The emissions calculated for this air quality assessment include Tier 3 emission standards, which is an EPA program that sets new vehicle emissions standards, including lowering the sulfur content of gasoline, heavy-duty engine, and vehicle greenhouse gas regulations (2014-2018), and the second phase of light-duty vehicle GHG regulations (2017-2025). It also includes Rhode Island-specific conditions, such as the state vehicle registration age distribution and the statewide Inspection and Maintenance (I/M) Program.[7] These stringent emissions regulation programs often result in smaller emissions inventories with the passage of time when comparing similar scenarios. The factors were derived using a seasonal average during the evening peak hour with a representative vehicle mix. Oxides of Nitrogen (NO_X), Volatile Organic Compounds (VOC), Particulate Matter (PM_{10} and $PM_{2.5}$) and Carbon Dioxide (CO_2) will be considered. The mesoscale assessment evaluated the following conditions: 2017 Existing Conditions, 2040 No-Build and 2040 Build conditions.

Additionally, the mesoscale analysis requires traffic data that results from the network operations analysis. The daily vehicle miles travelled (VMT), the vehicle hours travelled (VHT) and link speeds for the proposed Project were estimated through the traffic study assessment (VISSIM model). The corresponding emissions related to the Project's VHT is estimated by combining these traffic parameters with the MOVES emissions factors.

Mobile Source Air Toxics

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that EPA regulate 188 air toxics, also known as hazardous air pollutants.[8] EPA identified nine compounds with significant contributions from mobile sources among the national and regional-scale cancer risk drivers listed in the 2011 National Air Toxics Assessment (NATA).[9] They are 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. The 2007 EPA rule mentioned above requires controls to dramatically decrease the nine mobile source air toxics (MSAT) emissions through cleaner fuels and cleaner engines. Based on an FHWA analysis[10] using USEPA's MOVES2014a model, even if VMT increase by 45 percent from 2010 to 2050 as forecasted, a combined reduction of 91 percent in the total annual emissions of the priority MSAT is projected to occur over the same period.

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6 MOVES2014a (Motor Vehicle Emission Simulator), November 2016, US EPA, Office of Mobile Sources, Ann Arbor, MI.

7 The Stage II Vapor Recovery System is the process of collecting gasoline vapors form vehicles as they are refueled. This requires the use of a special gasoline nozzle at the fuel pump.

8 The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 9 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://www.epa.gov/iris/).

9 National Air Toxics Assessment, Environmental Protection Agency. Accessed at http://www.epa.gov/ttn/atw/nata1999/.

10 U.S. Department of Transportation, Federal Highway Administration. October 18, 2016. Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents. Accessed from https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/.

The MSAT study area for the Project consists of the transportation network the Project would affect. MSAT analyses are intended to capture net changes in emissions within an affected environment. The affected environment for MSAT analysis is generally different from the affected environment defined in NEPA documentation for other environmental resources. This is because analyzing MSATs within a geographically-defined “study area” would not capture the effects from changes in traffic on roadways outside of that area, which is a particularly important consideration for projects that create alternative routes or divert traffic from one roadway class to another. On the other hand, analyzing an entire metropolitan area’s roadway network would result in emission estimates for many roadway links not affected by the project, diluting the results of the analysis. The FHWA, EPA, and other agencies have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. FHWA monitors the developing research in this emerging field.

FHWA developed a tiered approach for analyzing MSAT in NEPA documents, depending on specific project circumstances. FHWA has identified three levels of analysis:

- No analysis for projects with no potential for meaningful MSAT effects;
- Qualitative analysis for projects with low potential for MSAT effects; or
- Quantitative analysis to differentiate alternatives for projects with higher potential for MSAT effects.

Projects needing no analysis are those that have no meaningful impacts on traffics volumes or vehicle mix or are exempt under 23 CFR 771.117 or 40 CFR 93.126. Most projects are categorized as having low potential MSAT effects. These include projects that improve operations of highway, transit, or freight without adding substantial new capacity or without creating a new facility that is likely to meaningfully increase MSAT emissions. The Project has low potential MSAT effects and, therefore, requires qualitative analysis only.

The qualitative analysis for the Project presents, in narrative form, the expected effect of the Project on traffic volumes, vehicle mix, or routing of traffic, and the associated changes in MSAT emissions based on VMT, vehicle mix, and speed.

3. Applicable Regulations and Criteria

This section defines the Air Quality resource category set forth by the EPA and the Clean Air Act (CAA). The air quality assessment quantifies and summarizes the NAAQS criteria pollutants emissions resulting from the operation of the Project and the corresponding effect on ambient air. Air Pollution is a general term that refers to one or more substances determined to degrade the quality of the atmosphere. Seven main air pollutants have been identified by the EPA as being of nationwide concern, based on their potential effect on human health. From a transportation perspective in Rhode Island, the primary pollutants of concern are carbon monoxide (CO), particulate matter (PM), volatile organic compounds (VOC’s) and oxides of nitrogen (NOx), which are emitted from gasoline and diesel engines. Highway agencies are required to consider the impacts of their projects on a local and a regional level.

The Federal Highway Administration (FHWA) has established procedures for the Transportation Conformity requirements of the CAA, as amended in 1990. The Transportation Conformity provisions of the CAA are intended to integrate transportation and air quality planning in areas that are designated by the EPA as not meeting the NAAQS. Improved roadway projects are an important part of improving air quality by improving transportation operations and reducing vehicle delay. The CAA is the primary statute that drives regulating air quality and sets the nation's air quality standards for pollutants. The act protects the quality of the nation's air resources at both the federal and state level. The CAA authorizes the USEPA to "protect public health by regulating emissions of harmful pollutants." NEPA and the Conformity Rule also require the analysis of potential impacts in terms of the project's context, intensity, and duration. It established NAAQS for various criteria pollutants in order to protect the health and welfare of the general public

To protect public health, the EPA has set the NAAQS for criteria pollutants which are outlined in Table 1. The predominant source of pollution anticipated from the proposed development is emissions from project-related motor vehicle traffic.

Table 1 National Ambient Air Quality Standards

	Primary Standards		
Pollutant	**Level**	**Averaging Time**	**Form**
Carbon Monoxide	9 ppm	8-hour	Not to be exceeded more than once per year
	35 ppm	1-hour	
Lead	0.15 µg/m^3	Rolling 3-Month Average[1]	Not to be exceeded
Nitrogen Dioxide	53 ppb	Annual[2]	Annual Mean
	100 ppb	1-hour	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
Particulate Matter (PM_{10})	150 µg/m^3	24-hour	Not to be exceeded more than once per year on average over 3 years
Particulate Matter ($PM_{2.5}$)	12 µg/m^3	Annual	Annual mean, averaged over 3 years
	35 µg/m^3	24-hour	98th percentile, averaged over 3 years
Ozone	0.070 ppm	8-hour[3]	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Sulfur Dioxide	75 ppb	1-hour[4]	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m3 as a calendar quarter average) also remain in effect.

(2) The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2)any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO_2 standards or is not meeting the requirements of a SIP call under the previous SO_2 standards (40 CFR 50.4(3)), A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the require NAAQS.

Guidance from both the EPA and DEP define the air quality modeling and review criteria for analyses prepared pursuant to the 1990 Clean Air Act Amendments (CAAA) and the SIP. The CAAA and the SIP require that a proposed project not:

- Cause any new violation of the NAAQS;
- Increase the frequency or severity of any existing violations; or
- Delay attainment of any NAAQS.
- These criteria are addressed in a microscale and mesoscale analyses.

The CAAA resulted in states being divided into Attainment and Nonattainment areas with classifications based upon the severity of their air quality problem. A Nonattainment area is an area that has had measured pollutant levels that exceed the NAAQS and that has not been designated to attainment. The CAAA established emission reduction requirements that vary by an area's classification.

4. Impact Assessment

Existing Conditions

Air pollution is of concern because of its demonstrated effects on human health. Of special concern are the respiratory effects of the pollutants and their potential toxic effects, as described below.

Carbon Monoxide

Carbon monoxide is a colorless and odorless gas that is a product of incomplete combustion. Carbon monoxide is absorbed by the lungs and reacts with hemoglobin to reduce the oxygen carrying capacity of the blood. At low concentrations, CO has been shown to aggravate the symptoms of cardiovascular disease. It can cause headaches, nausea, and at sustained high concentration levels, can lead to coma and death. The proposed project site is located in the City of Newport within Newport County which is considered to be in attainment for CO.

Particulate Matter

Particulate matter (PM) is made up of small solid particles and liquid droplets. PM_{10} refers to particulate matter with a nominal aerodynamic diameter of 10 micrometers or less, and $PM_{2.5}$ refers to particulate matter with an aerodynamic diameter of 2.5 micrometers or less. Particulates can enter the body through the respiratory system. Particulates over 10 micrometers in size are generally captured in the nose and throat and are readily expelled from the body. Particles smaller than 10 micrometers, and especially particles smaller than 2.5 micrometers, can reach the air ducts (bronchi) and the air sacs (alveoli) in the lungs. Particulates are associated with increased incidence of respiratory diseases, cardiopulmonary disease, and cancer. The area designation for the City of Newport is the Rhode Island Air Quality Control Region which is in attainment for both PM_{10} and $PM_{2.5}$.

Ozone

Ozone is a strong oxidizer and an irritant that affects the lung tissues and respiratory functions. Exposure to ozone can impair the ability to perform physical exercise, can result in symptoms such as tightness in the chest, coughing, and wheezing, and can ultimately result in asthma, bronchitis, and emphysema. Newport County has been determined to be an attainment area for the 8-hour ozone standard of 2008. On June 15, 2005, the EPA revoked the 1-hour ozone standard for most areas in the country. This action means that the 1-hour ozone Nonattainment area classified as "Serious," is no longer applicable for the county. Only the 8-hour ozone NAAQS applies. Note, a new final rule for the Ozone NAAQS was signed October 1, 2015, and effective as of December 28, 2015. All counties in Rhode Island have been designated as in Attainment for this NAAQS. As ozone is not directly emitted by motor vehicles, the ozone precursors, Oxides of Nitrogen (NOx) and Volatile Organic Compounds (VOC), are analyzed.

Volatile Organic Compounds

VOC are a general class of compounds containing hydrogen and carbon and are a precursor to the formation of the pollutant ozone. While concentrations of VOC in the atmosphere are not generally measured, ground-level ozone is measured and used to assess potential health effects. Emissions of VOC and NO_X react in the presence of heat and sunlight to form ozone in the atmosphere. Accordingly, ozone is regulated as a regional pollutant and is not assessed on a project-specific basis.

Oxides of Nitrogen

When combustion temperatures are extremely high, as in automobile engines, atmospheric nitrogen gas may combine with oxygen gas to form various oxides of nitrogen. Of these, nitric oxide (NO) and nitrogen dioxide (NO_2) are the most significant air pollutants. This group of pollutants is generally referred to as nitrogen oxides or NO_X. Nitric oxide is relatively harmless to humans but quickly converts to NO_2. Nitrogen dioxide has been found to be a lung irritant and can lead to respiratory illnesses. Nitrogen oxides, along with VOC, are also precursors to ozone formation.

Carbon Dioxide

Greenhouse gases (GHG) are essential to maintaining the temperature of the Earth—without them the planet would be so cold as to be uninhabitable. While there are other GHGs, CO_2 is the predominant contributor to global warming, and emissions can be calculated for CO_2 with readily accessible data. CO_2 is used as a proxy to assess the regional greenhouse gas impacts of the project.

Background Concentrations

Background concentrations were obtained from the RIDEM, who maintain a network of ambient air monitors across the state in response to the CAAA. Background concentrations are added to project emission sources to determine the total pollutant concentration at a receptor location for comparison to the NAAQS. The background concentrations were obtained from the RIDEM Annual Monitoring Network Plan.[11] Concentrations were chosen from the highest design values recommended by the network plan. Only pollutants that were considered in the air quality modeling are presented in Table 2. The criteria pollutants not considered in the air quality modeling (Ozone, Nitrogen Dioxide, Sulfur Dioxide, and Lead) are not studied because they are not substantially emitted or directly emitted by motor

[11] "Rhode Island 2017 Annual Monitoring Network Plan" Department of Environmental Management. Office of Air Resources. July 5, 2017.

vehicles. All background concentrations comply the NAAQS and demonstrate Newport's Attainment designation by the EPA.

Table 2 Background Concentrations

Pollutant	Units	Averaging Period	Background Concentration	NAAQS Standard
Carbon Monoxide	ppm	8-hour	1.8	9
	ppm	1-hour	3.0	35
Ozone	ppm	8-hour	0.070	0.070
Particulate Matter 2.5	µg/m3	Annual	9.3	12
	µg/m3	24-hour	24.5	35
Particulate Matter 10	µg/m3	24-hour	52	150

Source: Rhode Island Department of Environmental Management.

Direct Impacts

Direct impacts on air quality are those effects that occur at a local scale. To quantify these and comply with the CAA, the Project has been evaluated in a microscale analysis for the 2040 Build conditions.

All study intersections were compared to the acceptable parameter ranges allowed for by the FHWA Categorical Hotspot Finding to determine their compliance with the regulation under 2040 Build traffic conditions. The output of the online tool for each study intersection is provided in Appendix A and summarized in Table 3. The results of the analysis show that all intersections under Build Conditions comply with the acceptability criteria of the FHWA Categorical Hotspot Finding. As such, the Project is not expected to cause or contribute to an exceedance of the NAAQS and no local air quality impacts are anticipated.

Table 3 Microscale Analysis Results

Intersection	Overall Volume	Level of Service	FHWA Categorical Hotspot Finding Applicable	Complies with NAAQS Criteria
Halsey St at New Ramp Connector	4080	B	Yes	Yes
Admiral Kalbfus Rd at Halsey St	3162	B	Yes	Yes
JT Connell Hwy at New Ramp Connector / Dyer Gate Rd	2593	C	Yes	Yes
JT Connell Hwy at Farewell St / Van Zandt Ave	2325	D	Yes	Yes

Source: VHB, 2018.

Indirect Impacts

Indirect impacts on air quality are those effects that occur at a regional scale and account for secondary effects from the Project. To quantify these and comply with the CAA, the Project has been evaluated in a mesoscale assessment for the relevant criteria pollutants and in mobile source air toxics (MSAT) analysis in accordance with FHWA guidance for the Build Condition.

Daily traffic parameters from the transportation analysis were used to develop a mesoscale inventory of pollutants emitted by vehicles travelling in the network. The daily parameters were extrapolated in order to develop an annual inventory. Due to the proposed roadway and operational improvements, daily vehicle hours travelled (VHT) in the traffic network are expected to decrease from 940 vehicle hours under the No Build Condition to 761 vehicle hours in the Build Condition, while the vehicle miles traveled (VMT) is expected to decrease from 27,260 miles to 16,742 miles. This results in a decrease of pollutants emissions across the project area. NO_X will decrease by 0.38 tons per year, VOC decreases by 0.18 tons per year, PM_{10} will decrease by 0.17 tons per year, $PM_{2.5}$ will decrease by 0.03 tons per year and CO_2 is expected to decrease by 1,009 tons per year. The results of the Mesoscale Analysis are summarized in Table 5. The Project will provide a net benefit under the Build Condition, reducing emissions compared to the No Build Condition. As such, no regional air quality impacts are anticipated from the Project.

Table 5 Mesoscale Analysis Results

Scenario	NOx (tpy)	VOC (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2 (tpy)
Existing Condition	9.94	2.01	0.83	0.42	5,020
No Build Condition	1.14	0.56	0.79	0.14	3,316
Build Condition	0.76	0.38	0.62	0.11	2,308
Pollutant Savings	**0.38**	**0.18**	**0.17**	**0.03**	**1,009**

Source: VHB, 2018.

Mobile Source Air Toxics

For the Build Condition, the amount of MSAT emitted would be proportional to the VMT, assuming that other variables such as fleet mix are the same for each alternative. Because the VMT estimated for the No Build Condition is higher than for the Build Condition, higher levels of MSAT are not expected from the Build Condition compared to the No Build. In addition, because the estimated VMT under the Build Condition are nearly the same, varying by less than 15 percent, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of the Environmental Protection Agency's (EPA) national control programs that are projected to reduce annual MSAT emissions by over 91 percent from 2010 to 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in virtually all locations.

Under the Build Condition there may be localized areas where VMT would increase, and other areas where VMT would decrease. Therefore, it is possible that localized increases and decreases in MSAT emissions may occur. The localized increases in MSAT emissions would likely be most pronounced along the new roadway sections that would be built at Halsey Street and the New Connector Road under the Build Condition. However, even if these increases do occur, they too will be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations. In sum, under the Build Condition in the design year it is expected there would be reduced MSAT emissions in the immediate area of the project, relative to the No Build Condition, due to the reduced VMT associated with more direct vehicle routing and operating conditions, and due to EPA's MSAT reduction programs.

5. Cumulative Impacts

There are no known projects that would otherwise affect air quality conditions in the study area. Therefore, there would be no significant adverse cumulative air quality effects.

6. Mitigation

As no significant adverse air quality impacts are anticipated, mitigation is not required.

7. Summary of Impacts

The air quality analysis for the Project evaluated direct and indirect impacts for both the Build Condition. The FHWA categorical hotspot finding was used to show that the Project would not cause CO concentrations to exceed the NAAQS at study area intersections. As a result, the Project is not expected to substantially affect local air quality and no significant adverse direct air quality impacts are anticipated. The evaluation also considered indirect effects of the Project through a mesoscale analysis of the No Build and Build conditions. Results of the analysis show that the Project will successfully relieve congestion and result in lower emissions of multiple criteria pollutants when comparing the Build conditions to the No Build Condition. As the Project will provide a net benefit to air quality, no significant adverse indirect air quality impacts are anticipated.