Summary: North Spokane Corridor Air Quality Discipline Report

Purpose of Report

This report documents the air quality, energy, and greenhouse gas (GHG) analyses completed for the 2020 reevaluation of the North Spokane Corridor project US 395, North Spokane Corridor Project: Interstate 90 (I-90) to Carlisle Avenue (Formerly Phase II) (the Project).

The Project is currently undergoing a National Environmental Policy Act (NEPA) reevaluation to examine the potential changes to project effects from design revisions in the section from Carlisle Avenue south, across the Spokane River, to I-90. The analysis was triggered because the previous transportation conformity determination was over three years old. This new analysis determined that there is no change to the air quality impacts of the Project.

Study Approach

The analyses performed for this project fulfill federal, state, and Washington State Department of Transportation (WSDOT) requirements and follow standard guidance. This study included the following elements:

- Carbon Monoxide (CO) hotspot analysis to demonstrate conformity
- Coarse Particulate Matter (PM_{10}) hotspot analysis to demonstrate conformity
- Mobile Source Air Toxics (MSAT), GHG, and energy operational analyses
- Quantitative GHG and energy construction and operations analysis
- Qualitative criteria pollutant and MSAT construction analysis

Conformity

Under the Clean Air Act, the U.S. Environmental Protection Agency (EPA), delegates authority to manage air quality issues to the states but sets the criteria for National Ambient Air Quality Standards (NAAQS) and establishes conformity requirements. NAAQS are set for six pollutants: carbon monoxide (CO), lead, nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$), ozone, and sulfur dioxide (SO_2). Lead and SO_2 are not considered in this report because they are not pollutants of concern for transportation projects.

EPA may designate areas not in compliance with the NAAQS as nonattainment areas. An area remains a nonattainment area for that pollutant until monitored concentrations are in

compliance with the NAAQS. When the NAAQS are attained, EPA may redesignate an area as attainment but the area must continue to meet certain requirements for 20 years. One of these requirements is that transportation projects must demonstrate that they will not cause or contribute to a violation of the NAAQS. This demonstration is call a conformity, that is, the project conforms with the air quality plan. EPA sets the requirements for how conformity demonstration analyses are conducted.

This analysis included a conformity demonstration for carbon monoxide (CO) and coarse particulate matter (PM10), the two compounds that the Spokane violated the NAAQs for in the past. Because Spokane has never been in nonattainment for nitrogen dioxide, fine particulate matter particulate matter ($PM_{2.5}$), or ozone, analysis of these pollutants is not required for this project.

Mobile Source Air Toxics

Hazardous air pollutants are a group of 188 compounds that has EPA identified to be among the cancer risk drivers or contributors and non-cancer hazard contributors. Nine of these compounds have significant contributions from mobile sources (cars, trucks, etc.) – these are called mobile source air toxics (MSAT).

Existing Conditions Overview

The Spokane region is currently in attainment of the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants. In the past, the region violated CO and PM_{10} standards and the Environmental Protection Agency (EPA) designated the area as nonattainment. In 2005, EPA redesignated the area as attaining the standards. Since then, the area has been under maintenance plans for these two pollutants and projects must demonstrate conformity.

Project Effects Overview

Transportation projects have environmental effects throughout their lifecycle. This analysis addresses operational, construction, and maintenance effects of the North Spokane Corridor project.

Operational Effects

Operational effects are the effects of the vehicles using the facility. Traffic in the project area would be affected by changes in the number of vehicles, the travel speeds, and the levels of congestion experienced on local roadways. Energy consumption, air quality, and greenhouse gas emissions can be affected by these changes. Traffic data and analysis for

2010 are used to represent existing conditions. Project modeling of build and no build conditions was completed for a design year of 2040. Hotspot analysis for both CO and PM_{10} demonstrate that air quality will stay well within the NAAQS for both pollutants (see Exhibits 1 through 5). Estimated daily operational MSAT and GHG emissions are shown in Exhibit 6, 7, and 8. The NSC project will have no adverse operational air quality, greenhouse gas and energy effects:

- The CO hotspot analysis shows that the project will not cause or contribute to an exceedance of the NAAQS. The project meets all CO conformity requirements.
- The PM_{10} hotspot analysis shows that the project will not cause or contribute to an exceedance of the NAAQS. The project meets all PM_{10} conformity requirements.
- The project followed Federal Highway Administration (FHWA) guidance for MSAT analysis. MSATs decrease dramatically between 2010 and 2040 by 85 percent or more, depending on the pollutant, due to improvements in vehicle technology. MSAT emissions from the build alternative are estimated to be about 14-19 percent less than the no build alternative, depending on the pollutant, because of lower vehicle miles traveled (VMT) in the study area with the North Spokane Corridor project and smoother driving conditions with less idling and stop and go conditions.
- Greenhouse gas emissions are similar under the existing conditions and the no build alternative; vehicle efficiency improvements under the 2040 no build alternative are offset by a 55 percent increase in VMT as compared to the existing conditions VMT in the study area. GHG emissions under the 2040 build alternative are about 15 percent less than the 2040 no build and existing alternatives because the 2040 no build alternative has a lower VMT as compared to the no build alternative in the study area and smoother driving conditions with less idling and stop and go conditions with the North Spokane Corridor project.
- Energy use is similar under the existing conditions and the 2040 no build alternative; vehicle efficiency improvements under the 2040 no build alternative are offset a 55 percent increase in VMT as compared to the existing conditions VMT in the study area. Energy use under the 2040 build alternative is about 15 percent less than the 2040 no build and existing alternatives because the 2040 no build alternative has a lower VMT as compared to the no build alternative in the study area and smoother driving conditions with less idling and stop and go conditions with the North Spokane Corridor project.

Exhibit 1 – Modeled CO Concentrations and NAAQS

Intersection	Existing (2015) (ppm)		Build (2040) (ppm)		NAAQS (ppm)	
	1-hr	8-hr	1-hr	8-hr	1-hr	8-hr
US 2 (S Division St) and E 3rd Ave	3.8	3.6	3.3	3.2	35	9
SR 290/N Hamilton St and E Trent Ave	3.9	3.6	3.3	3.2	35	9
S Freya St and E Sprague Ave	3.9	3.6	3.2	3.1	35	9
S Havana St and E Sprague Ave	3.7	3.5	3.3	3.2	35	9
S Fancher Rd and E Sprague Ave	3.6	3.4	3.2	3.1	35	9
N Thierman Rd and E Broadway Ave	3.4	3.3	3.2	3.1	35	9
I-90 WB Ramps and E Broadway Ave	3.4	3.3	3.1	3.1	35	9
S Thierman Rd and E Appleway Blvd	3.8	3.6	3.4	3.2	35	9

Note: Displayed concentration for each intersection is the receiver with the highest modeled concentration. See Appendix A for model output files.

Exhibit 2 – Modeled 1-Hour CO Concentrations

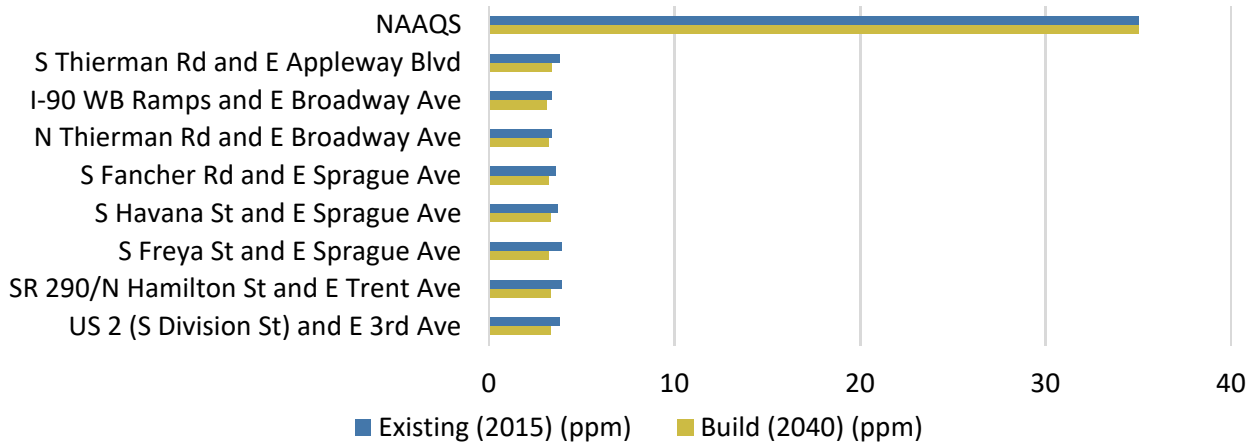


Exhibit 3 – Modeled 8-Hour CO Concentrations

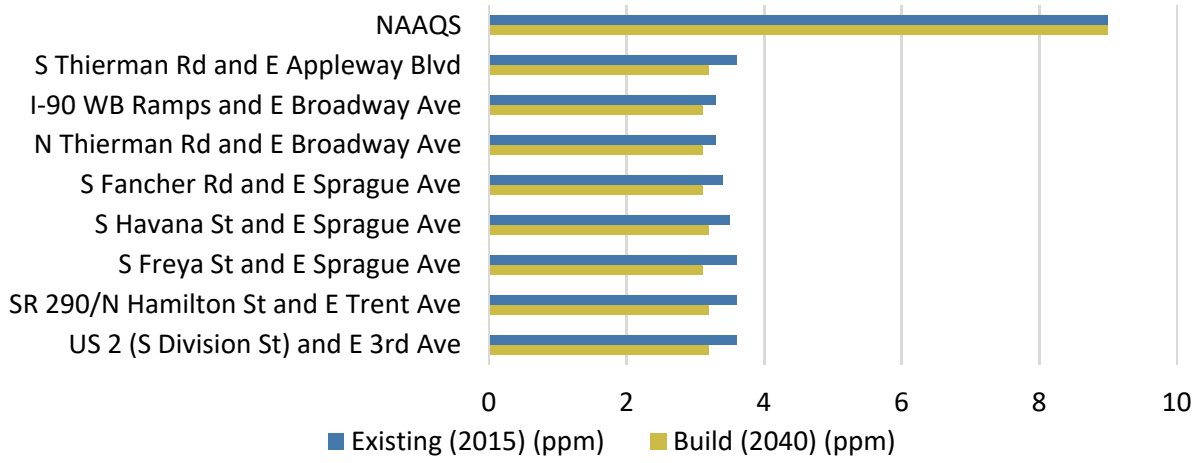


Exhibit 4 – Modeled PM_{10} Concentrations and NAAQS

Description	Value (µg/m³)
Background Value	74
Modeled Value	55.8
Design Value	**130**
PM_{10} NAAQS	150

Exhibit 5 – Modeled PM10 Concentrations and NAAQS

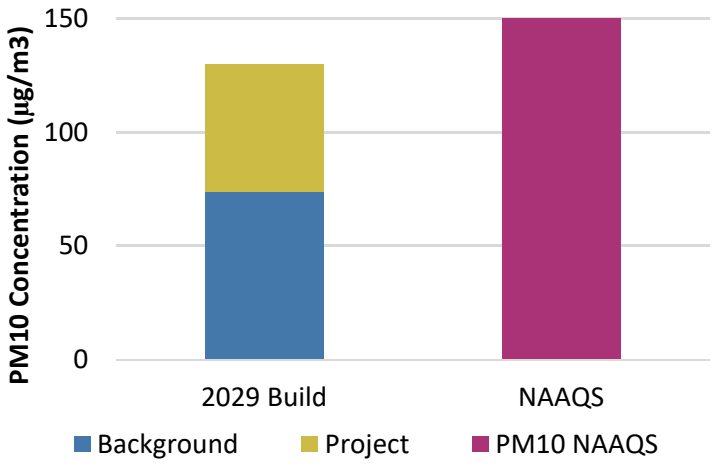


Exhibit 6 – Daily Operational Emissions and Energy Use

Alternative	VMT (miles)	1,3-Butadiene (g)	Acetaldehyde (g)	Acrolein (g)	Benzene (g)	Diesel PM (g)	Ethylbenzene (g)	Formaldehyde (g)	Naphthalene (g)	POM (g)	Energy Use (MMBTU)	GHGs (MT)
Existing (2010)		13.03	41.41	4.38	114.32	320.27	50.38	65.54	115.92	480.21	479.8	3,679
No Build (2040)		0.03	3.42	0.45	5.36	19.61	5.75	9.78	15.54	50.46	483.1	3,696
No Build compared to Existing	55%	-99%	-92%	-90%	-95%	-94%	-89%	-85%	-87%	-89%	1%	0%
Build (2040)		0.02	2.86	0.37	4.52	16.51	4.68	8.12	12.79	43.42	411.0	3,145
Build compared to Existing	36%	-99%	-93%	-92%	-96%	-95%	-91%	-88%	-89%	-91%	-14%	-15%
Build compared to No Build	-12%	-18%	-16%	-17%	-16%	-16%	-19%	-17%	-18%	-14%	-15%	-15%

Exhibit 7 – Daily Operational Emissions and Energy Use

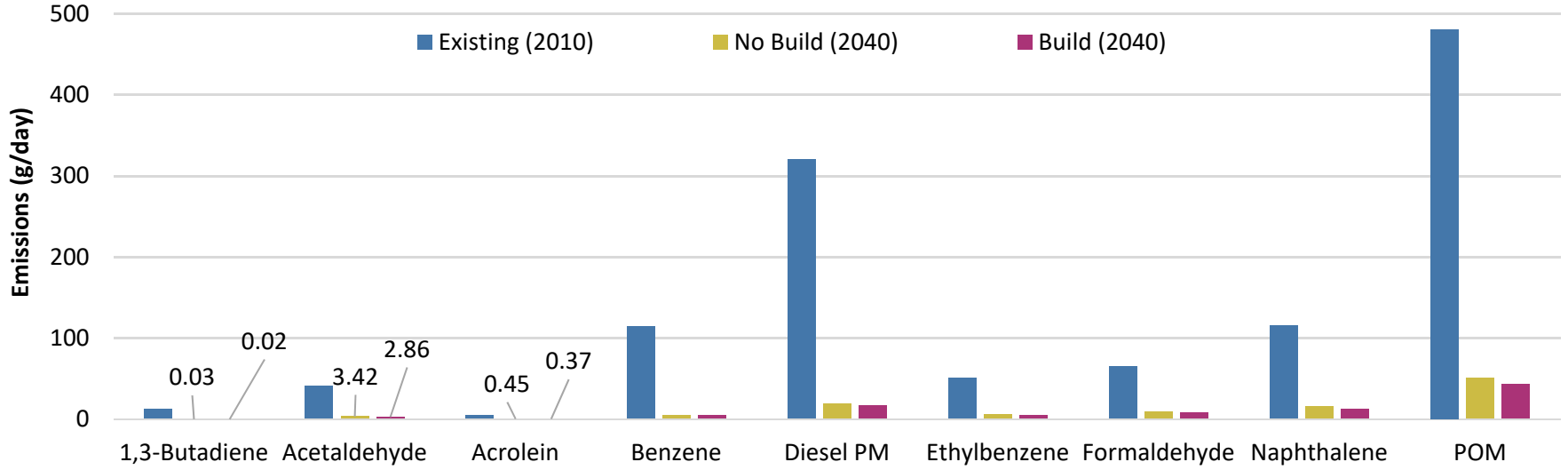
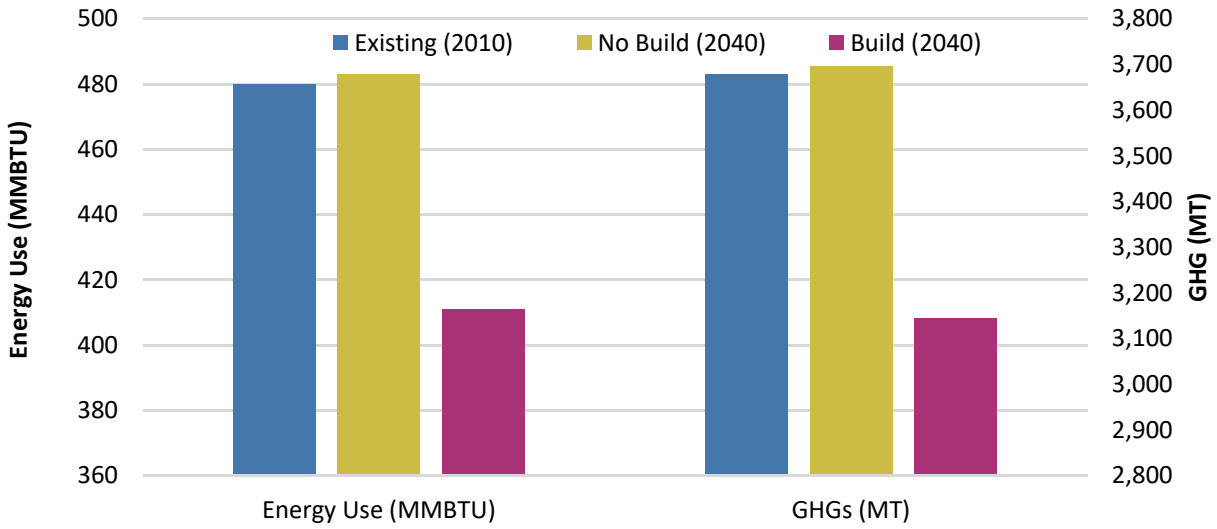


Exhibit 8 – Daily Operational Emissions and Energy Use



Construction Effects Overview

Air quality, greenhouse gas, and energy impacts during construction of the project could occur as a result of energy use and emissions generated from construction equipment, construction activities, and vehicles experiencing congestion because of construction detours or delays.

Air quality effects from the emission of fugitive dust emissions are associated with land clearing, ground excavation, grading, cut-and-fill operations, and structure erection. In addition to potential air quality effects, some construction work activities (particularly those involving paving operations using asphalt) could result in short-term odors, which could be detectable to some people near the site and would be diluted as distance from the odorous activity increases.

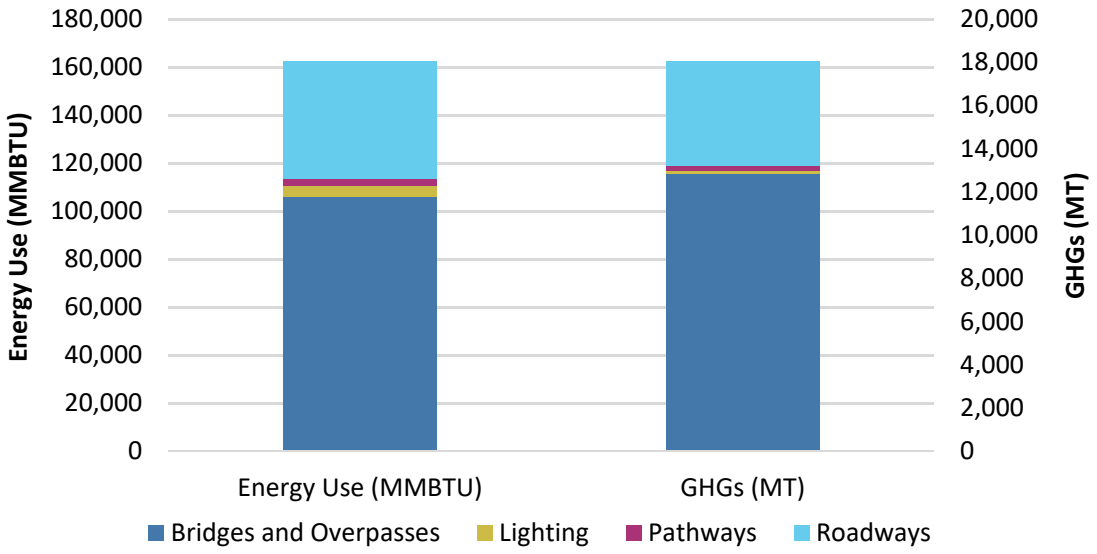
Greenhouse gas emissions and energy consumed during maintenance and project construction were quantitatively estimated (see Exhibits 9 and 10).

Exhibit 9 – Project Construction and Maintenance Energy and GHG Emissions

Alternative	Energy Use (MMBTU)	GHGs (MT)
Bridges and Overpasses	105,756	12,818
Lighting	4,808	158
Pathways	2,519	215
Roadways	49,205	4,836
Total	162,287	18,027

Notes: MMBTU= one million British Thermal Units, MT= metric tons

Exhibit 10 – Project Construction and Maintenance Energy and GHG Emissions



Measures to Avoid or Minimize Effects

Operational Measures to Avoid or Minimize Effects

No meaningful impacts on energy use and criteria pollutant, MSAT and greenhouse gas emissions are predicted during operations, therefore no mitigation measures are proposed for operational conditions.

Construction Measures to Avoid or Minimize Effects

Construction effects would be temporary, including fugitive dust from excavation and earth moving, and emissions from diesel-fueled construction equipment. WSDOT would implement best management practices (BMPs) to avoid or minimize potential effects on the environment.

The project traffic control plan will include detours and strategic construction timing (such as night work) to continue moving traffic through the area and reduce backups and delays to the traveling public to the extent possible. It is standard practice for WSDOT to set up active construction areas, staging areas, and material transfer sites in a way that reduces standing wait times for equipment during construction. WSDOT will also work with its partners to promote ridesharing and other commute trip reduction efforts for employees working on the project.