Memorandum

Date:	Monday, August 02, 2021
Project:	Northwest Billings Connector and Marathon Trail Project
To:	Heidy Bruner, PE, FHWA
From:	Jon Schick, CEP, HDR Environmental Planner
Subject:	MSAT Analysis

Introduction

The purpose of this memorandum is to provide information to determine the proposed Northwest Billings Connector and Marathon Trail Project's potential for having effects on emissions of Mobile Source Air Toxics (MSAT). The MSATs of concern for roadway projects are 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. Assessing air toxic emissions is done in accordance with FHWA guidance on factoring these emissions into project-level decision-making within the context of the National Environmental Policy Act (NEPA) per the 2016 *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*. The proposed project is being processed as an unlisted Categorical Exclusion under 23 CFR 771.117(d) and is not an exempt project per Table 2 of 40 CFR 93.126 and therefore is required to analyze potential effects of MSATs. This memorandum provides information to supplement Section C, Air Quality, of the Initial Site Assessment (ISA) form and Part 6.2, Air Quality, of the Categorical Exclusion Documentation Form.

Project Description

In 2020, the City of Billings (City) was awarded $11.6 million in funding from the Federal Better Utilizing Investments to Leverage Development, or BUILD, Transportation Discretionary Grant program to fund transportation improvements in the northwest Billings area. The overall scope of the proposed Northwest Billings Connector and Marathon Trail Project (project) includes design and construction of five miles of new collector roadway and eight miles of trails. The proposed project includes two main project elements—the Inner Belt Loop and the Skyline Trail—as described in the 2020 grant application and as shown in Figure 1 and described below.

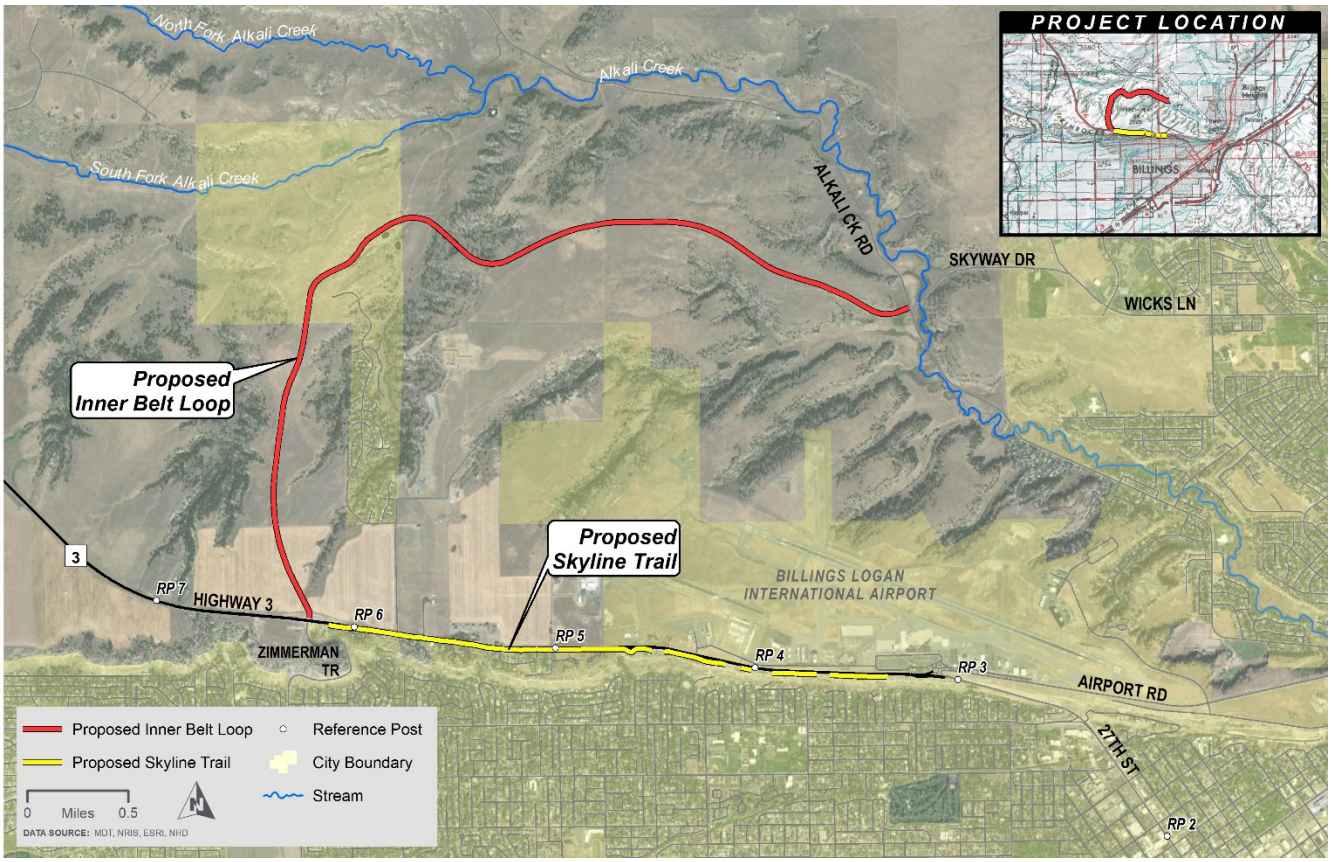

Figure 1. Northwest Billings Connector and Marathon Trail Project Elements

1. The Inner Belt Loop: This is a five-mile stretch of two-lane rural section roadway connecting Montana Highway 3 (MT-3)/Zimmerman Trail Road to Akali Creek Road/Skyway Drive accompanied by a separated multi-use trail. It will create a new connection between the Heights and West End. This proposed road has also been referred to as the Northwest Billings Connector.
2. The Skyline Trail: This is an approximately three-mile long 10-ft-wide multi-use trail that will extend from the intersection of MT-3/Zimmerman Trail through Airport Road along the south side of MT-3.

The purpose of the project is to construct a new arterial roadway to provide an alternative transportation route between Billings' Heights area and West End area to alleviate widespread congestion near downtown resulting from a constrained arterial roadway and limited transportation options. In addition, the proposed project will enhance safety and travel time, provide economic development opportunities, and improve access to recreational opportunities.

Presently, Main Street (Highway 312) is the primary connector route between the Heights and downtown Billings and the West End and is the second highest volume roadway in Montana with a 2019 average annual daily traffic (AADT) volume of 41,309. High traffic volumes have resulted in above average crash rates and severe congestion occurring in the corridor. Providing a new connection between the Heights and West End to address traffic and safety concerns has long been a transportation goal for the City of Billings.

Project Location

The project area is located on the northern edge of Billings, Montana, and is partially located within the City of Billings limits. The project area is located to the north of MT-3 and to the west of Alkali Creek Road. The project area is located within portions of Section 18 of Township 1 North, Range 26 East and Sections 13, 14, 15, 22, and 27 of Township 1 North, Range 25 East. The proposed project includes components that intersect with the Billings Carbon Monoxide (CO) and Sulfur Dioxide (SO2) Maintenance Areas. It is important to note that the proposed Skyline Trail, a non-motorized trail, intersects the CO and SO2 Maintenance Areas, while the proposed Inner Belt Loop roadway corridor does not. Therefore, for the purposes of the air quality analysis, the proposed project is conservatively assumed to be partially within the CO Maintenance Area.

Traffic Volumes and Transportation Analysis Results

The Billings Metropolitan Planning Organization (MPO) Travel Demand Model (TDM) was used to analyze existing traffic volumes and predict future volumes as well as future levels of service (LOS). The TDM was updated in 2018 and has a forecast planning horizon of year 2040. Figure 2 through Figure 5 below are excerpted from the 2018 *Billings Urban Area Long Range Transportation Plan* (LRTP) and show the existing traffic volumes and intersection LOS in the project vicinity for 2017 (Figure 2 and Figure 3, respectively) and the future traffic volumes and intersection LOS for the future year of 2040 (Figure 4 and Figure 5, respectively).

The proposed project ties into two existing intersections: the MT-3/Zimmerman Road intersection, which is shown as a LOS E in 2017, and the Akali Creek Road/Skyway Drive intersection, which is shown as no data in 2017. These two intersections affected by the proposed project are projected to operate at an acceptable LOS (“D” or better) under year 2040 conditions with the proposed 2-lane Inner Belt Loop. With the proposed Inner Belt Loop in place, the MT-3/Zimmerman Road intersection improves to LOS C or better in 2040 and the Akali Creek Road/Skyway Drive intersection operates at a LOS C or better.

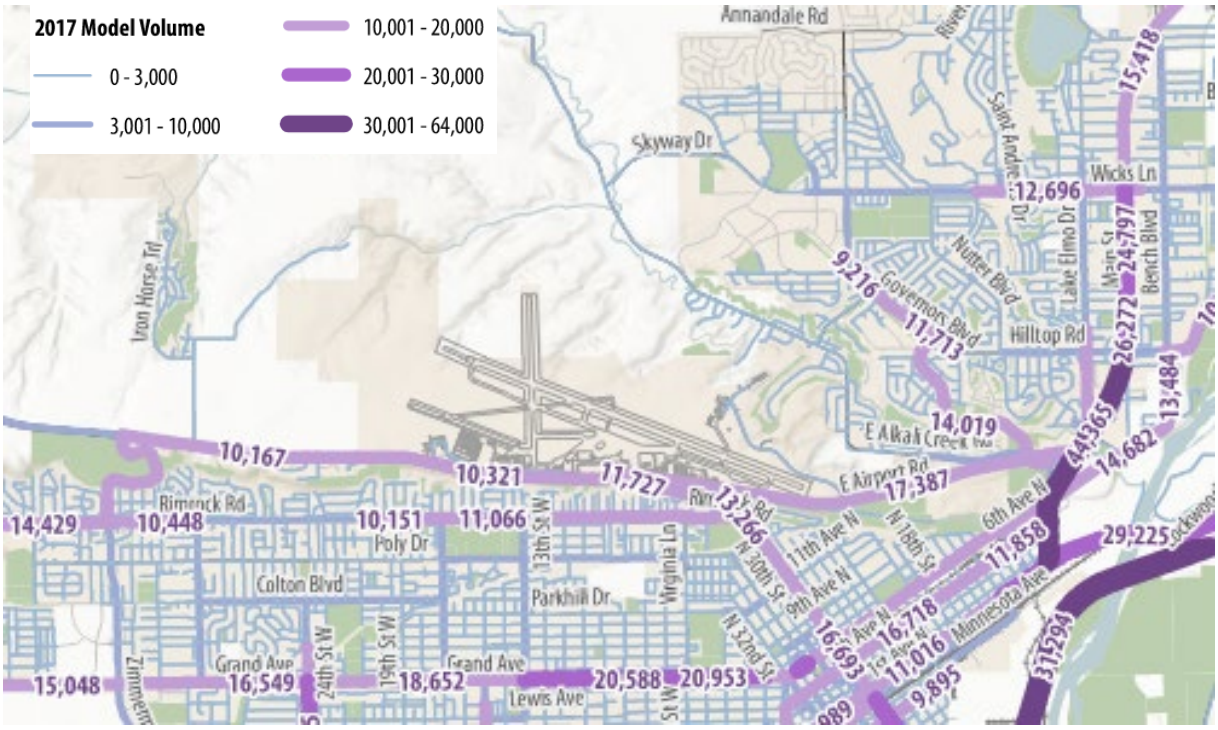

Figure 2. Existing Traffic Volumes in 2017 for Project Area Vicinity Roads

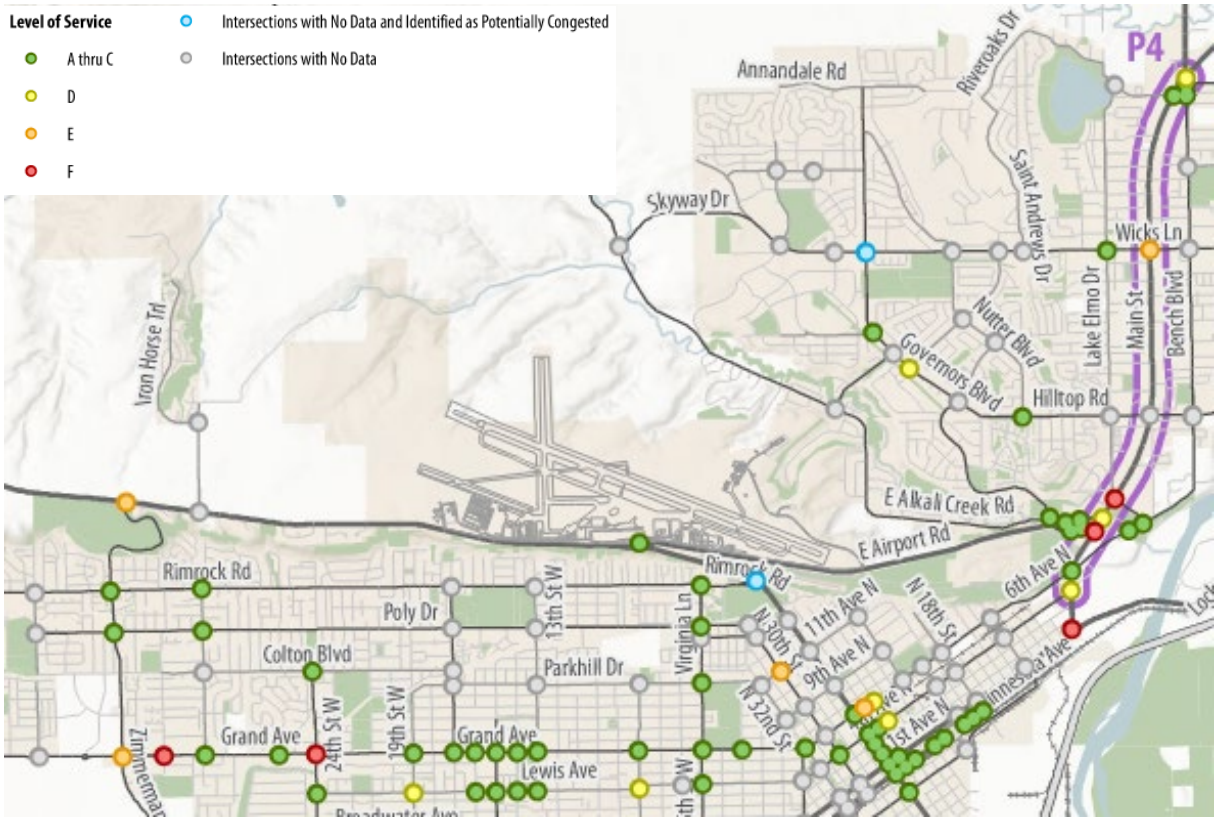

Figure 3. Existing Levels of Service (LOS) in 2017 for Project Area Vicinity Intersections

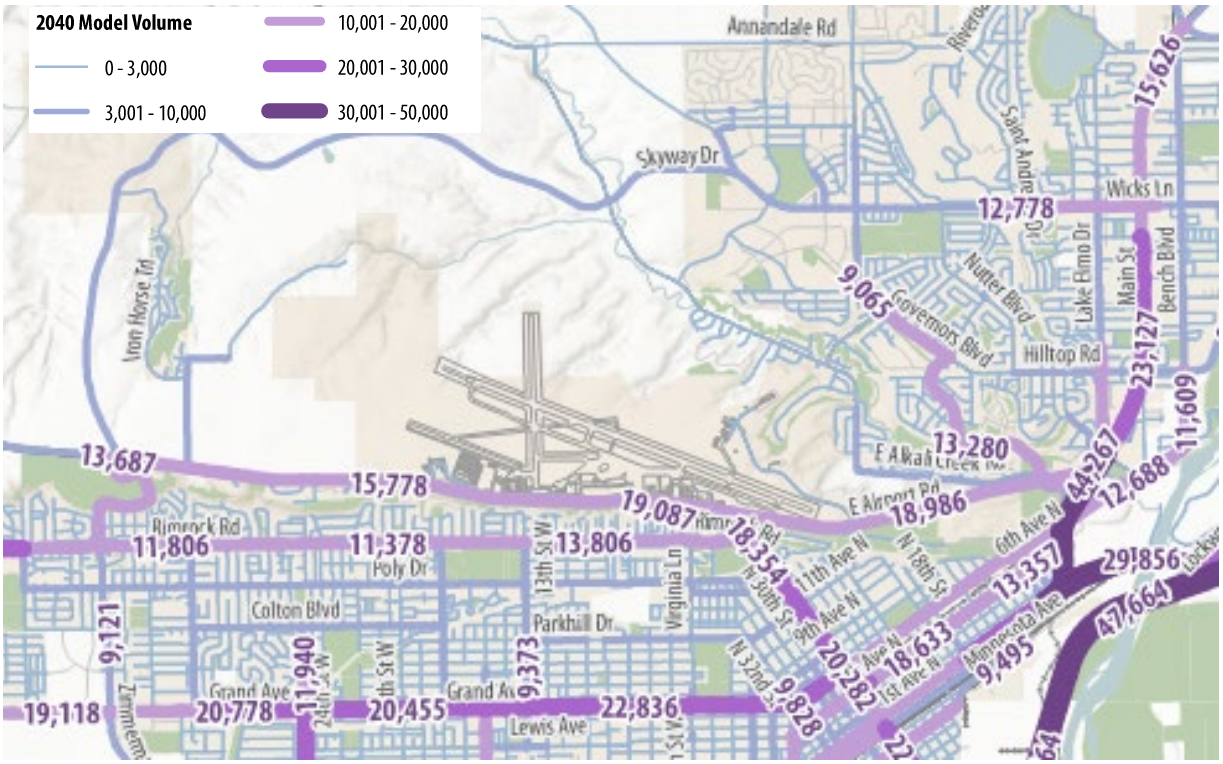

Figure 4. Future Traffic Volumes in 2040 for Project Area Vicinity Roads

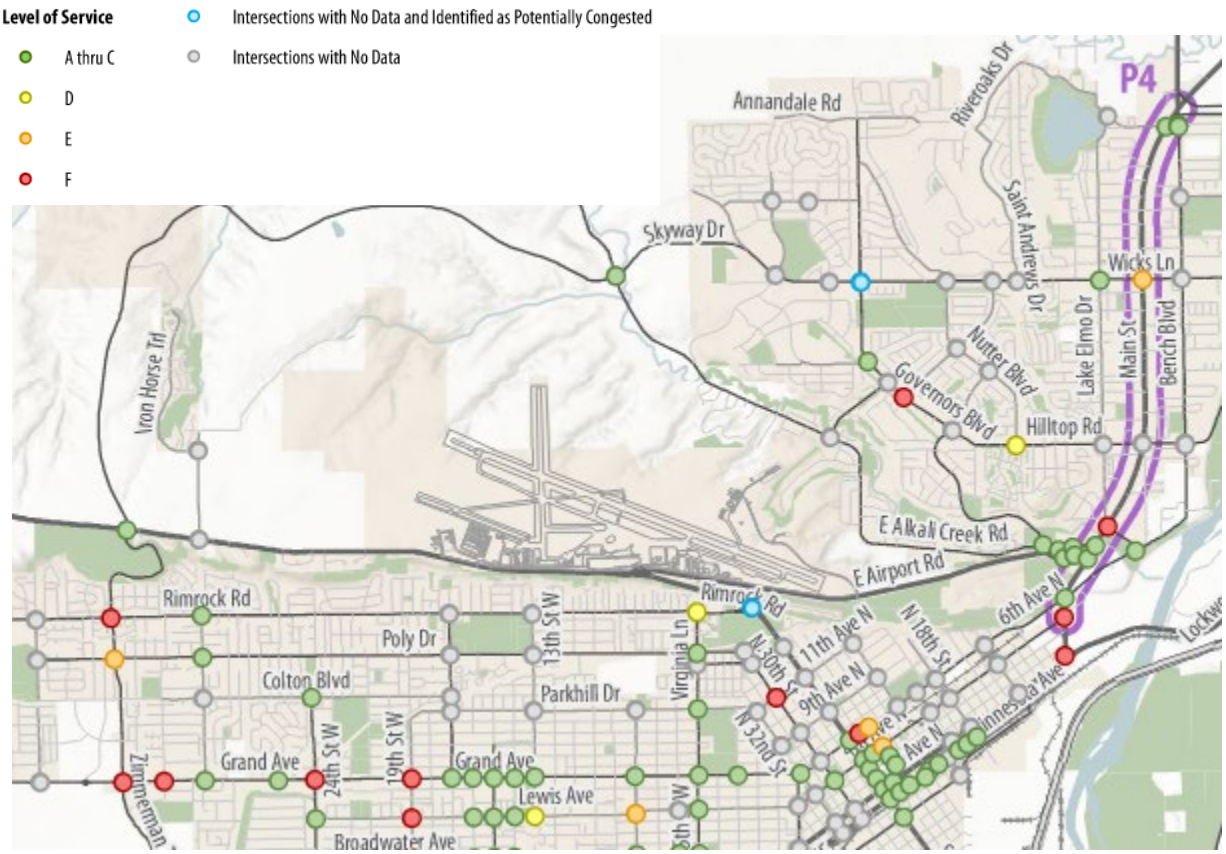

Figure 5. Future Levels of Service (LOS) in 2040 for Project Area Vicinity Intersections

Additional traffic analyses were conducted by the MPO to evaluate the effect the proposed Inner Belt Loop would have on vicinity roadways based on existing and projected future traffic volumes. Two scenarios, a no build scenario without the proposed Inner Belt Loop and a build scenario with the proposed Inner Belt Loop, were evaluated based on existing roadway configurations using current (2017) and projected future (2040) traffic volumes. Figure 6 and Figure 7 show the current and future forecasted daily traffic results, respectively, and call out daily traffic volumes for important roadways currently experiencing congestion.

As reported by the City in the 2019 BUILD grant application, the addition of the Inner Belt Loop was found to slow the growth of vehicle miles of travel (VMT) and vehicle hours of travel (VHT) relative to conditions without the Inner Belt Loop. Figure 6 shows that the immediate impact of building the Inner Belt Loop would be to lower daily traffic in already-developed parts of the city, including the Heights and downtown Billings. Figure 7 shows that this effect will continue into 2040. Importantly, the addition of the Inner Belt Loop is shown to have a positive effect in reducing daily traffic volumes along the congested Main Street and connecting streets.

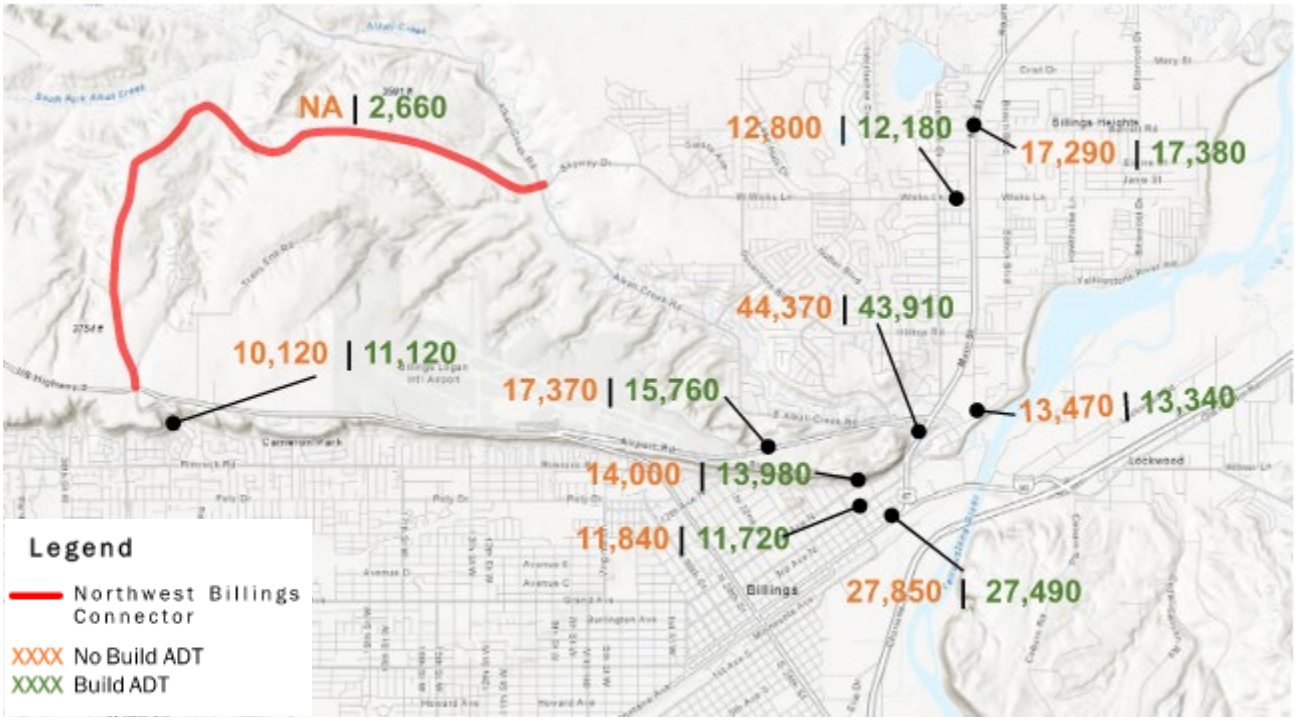

Figure 6. Current (2017) Daily Traffic – With and Without the Inner Belt Loop (NW Billings Connector)

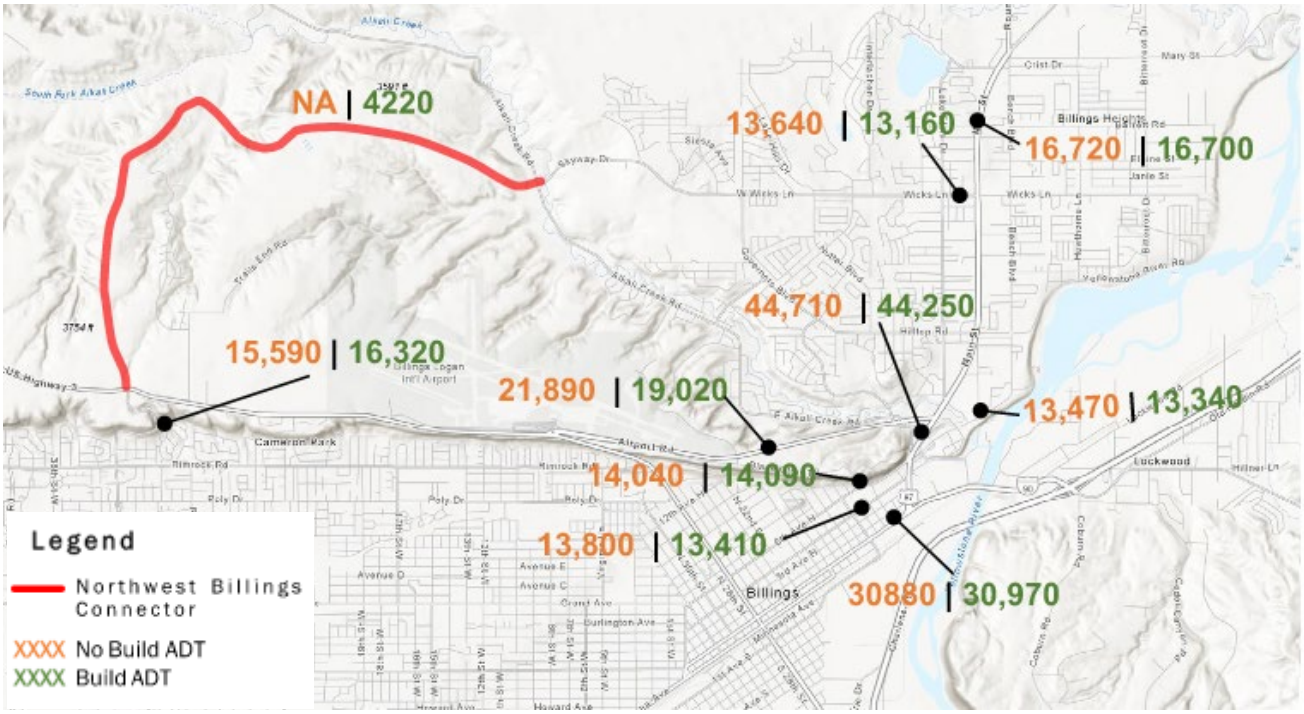

Figure 7. Forecasted (2040) Daily Traffic – With and Without the Inner Belt Loop (NW Billings Connector)

Air Quality Benefits Analysis

Information reported within this section was taken from the following publication:

- *Northwest Billings Connector and Marathon Trail – 2020 BUILD Program Application Benefit-Cost Analysis Memorandum* prepared on May 15, 2020, by SRF Consulting Group for the City of Billings

The 2020 Benefit-Cost Analysis (BCA) was prepared for the 2020 BUILD grant application and includes an in-depth analysis of select roadways evaluated within the constrained artery (i.e., Main Street and immediate connecting roadways) connecting the Heights to Billings and the West End. Several analyses were conducted in the BCA that provide a useful metric in demonstrating the air quality benefits that would be realized following implementation of the Inner Belt Loop. To establish estimates for VMT and VHT on routes in the constrained artery, a series of select link analyses were prepared using the Billing MPO TDM. Select link analysis included the following roadway segments: 1st Avenue/Main Street, 6th Avenue, 4th Avenue, Airport Road, Alkali Creek Road, and the proposed Inner Belt Loop. Results from the No Build and Build scenarios were compared to estimate the VMT and VHT impacts of adding the proposed Inner Belt Loop to the transportation network. The TDM captured travel time changes related to trip diversion. Benefits for the years between 2017 and 2040 were interpolated based on model results using an annual growth rate. VMT and VHT for years beyond 2040 were extrapolated based on the same growth rate. The analysis assumed that the project would be constructed in 2022 and, therefore, benefits are quantified beginning in 2023 and are projected out to 2043.

Table 1 lists the estimated VMT for the 20-year analysis period of 2023 through 2042 for the No Build and Build scenarios and the decrease in annual VMT as a result of the proposed project. Table 1 also includes the estimated change in emissions for the regulated pollutants of nitrogen oxides (NOx), particulate matter under 2.5 microns diameter (PM2.5), carbon dioxide (CO2), and carbon monoxide (CO), which were calculated based on the change in VMT. As shown in Table 1, long-term air quality benefits are estimated to occur as a result of the proposed project.

Table 1. Vehicular Miles of Travel and Emissions for the 20-Year Period of 2023 through 2042, No Build versus Build Scenario

Analysis Year	No Build Annual VMT	Build Annual VMT	Decrease in Annual VMT	Decrease in NOx (tons)	Decrease in CO2 (tons)	Decrease in PM2.5 (tons)	Decrease in CO* (tons)
2023	193,225,889	192,664,009	561,880	0.37	216.58	0.002	4.94
2024	194,505,474	193,747,366	758,108	0.50	292.22	0.003	6.67
2025	195,793,533	194,836,814	956,719	0.63	368.78	0.004	8.41
2026	197,090,122	195,932,389	1,157,733	0.76	446.26	0.005	10.18
2027	198,395,297	197,034,124	1,361,173	0.89	524.68	0.006	11.97
2028	199,709,115	198,142,054	1,567,061	1.03	604.05	0.006	13.78
2029	201,031,633	199,256,214	1,775,420	1.17	684.36	0.007	15.61
2030	202,362,910	200,376,638	1,986,271	1.30	765.64	0.008	17.47
2031	203,703,002	201,503,363	2,199,639	1.44	847.88	0.009	19.34
2032	205,051,969	202,636,424	2,415,545	1.59	931.10	0.010	21.24
2033	206,409,869	203,775,856	2,634,013	1.73	1015.32	0.011	23.16
2034	207,776,761	204,921,695	2,855,066	1.87	1100.52	0.012	25.11
2035	209,152,706	206,073,977	3,078,728	2.02	1186.74	0.012	27.08
2036	210,537,762	207,232,739	3,305,023	2.17	1273.97	0.013	29.07
2037	211,931,990	208,398,016	3,533,974	2.32	1362.22	0.014	31.08
2038	213,335,451	209,569,845	3,765,606	2.47	1451.50	0.015	33.12
2039	214,748,206	210,748,264	3,999,942	2.63	1541.83	0.016	35.18
2040	216,170,317	211,933,309	4,237,008	2.78	1633.21	0.017	37.26
2041	217,601,845	213,125,018	4,476,827	2.94	1725.65	0.018	39.37
2042	219,042,853	214,323,428	4,719,426	3.10	1819.17	0.019	41.50
TOTAL 2023 to 2042	**4,117,576,703**	**4,066,231,542**	**51,345,161**	**33.7**	**19,792**	**0.21**	**451.55**

Source: SRF Consulting Group, Northwest Billings Connector and Marathon Trail – 2020 BUILD Program Application Benefit-Cost Analysis Memorandum, May 2020

Notes:

1. Emissions per VMT, for both auto and truck, were obtained from the United States Environmental Protection Agency, Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks. These rates were applied to the difference in VMT between the Build and No Build Alternatives.
2. Truck percentage is estimated based on year 2018 Yearly Automatic Traffic Recorders (ATR) Profile prepared by Montana DOT.
3. * CO emissions were not included in the 2020 BCA and have been calculated by HDR using the same methodology and BCA spreadsheet.

Mobile Source Air Toxics

The following analysis is developed in accordance with FHWA's *Updated Interim Guidance Update on Air Toxic Analysis in NEPA Documents* published on October 18, 2016.

The FHWA developed a tiered approach with three categories for analyzing MSAT in NEPA documents, depending on specific project circumstances:

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

The proposed project falls within category 2, which covers a broad range of projects and, in general, includes projects where design year traffic is projected to be less than 140,000 to 150,000 annual ADT. For this project type, FHWA requires a qualitative assessment of emission projections to compare in narrative form the expected effect of the proposed project on traffic volumes, vehicle mix, or changes in traffic patterns and associated changes in MSAT for the build scenario (with proposed project) and a no build scenario. The following information provides the qualitative assessment to demonstrate that the proposed project is not anticipated to result in an increase in MSAT. This satisfies documentation needs for NEPA purposes.

Qualitative MSAT Analysis

A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives.*[1]

For the proposed project, the amount of MSAT emitted would be proportional to the VMT. Based on the results presented in Table 1, estimated future VMT for the build scenario is lower than under the no build scenario; therefore, higher levels of MSATs are not expected as a result of the proposed project. Also, emissions will likely be lower than present levels in the design year as a result of the EPA national control programs that are projected to reduce annual MSAT emissions by over 90 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 project area vicinity are likely to be lower in the future than existing levels.

Existing and future traffic volumes are presented in the figures provided above. While future ADT (and, correspondingly, VMT) is projected to increase within the immediate project area as a result of the added capacity of the new Inner Belt Loop, the completion of this new connector route within a constrained artery will serve to reduce traffic volumes and congestion on Main Street, Airport Road, Bench Boulevard, and Wicks Lane, to name a few, and thereby reduce regional VMT. As a result, localized increases in MSAT would likely be most pronounced along the new Inner Belt Loop and adjoining Zimmerman Trail Road. However, net reductions in MSAT are expected to occur locally along Main Street and other adjacent or nearby roads due to the projected reductions in traffic volumes as a result of the proposed project. Even with the minor localized increases along the proposed Inner Belt Loop and immediate vicinity roadways,

[1] FHWA. 2017. Recent Examinations of Mobile Source Air Toxics: A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives. Accessed at <https://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.cfm. >. Accessed on Sep. 10, 2020.

future MSAT levels are anticipated to be substantially reduced due to implementation of EPA's vehicle and fuel regulations.

In sum, under the proposed project in the design year it is expected there would be slightly higher MSAT emissions in the immediate area of the project, relative to the no build scenario, due to the new Inner Belt Loop and added capacity; however, net MSAT emissions in the broader project area vicinity are expected to be reduced when taking into account projected VMT reductions along the constrained artery, and due to EPA's MSAT reduction programs.

Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis
In compliance with the Council on Environmental Quality (CEQ) regulations (40 CFR 1502.21), it is important to note that, in FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with the proposed project. In essence, current scientific techniques, tools, and data are not sufficient to accurately estimate human health impacts that could result from a transportation project in a way that would be useful to decision makers. Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between the proposed project and the no build scenario is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities, that are better suited for quantitative analysis. The EPA is the lead authority for administering the CAA and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT.