Appendix D

Air Conformity Applicability Study

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BNSF Sandpoint Junction Connector Project

BNSF Railway Company

June 26, 2019

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Project No.: W3X76600

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ACRONYMS AND ABBREVIATION

CFR	Code of Federal Regulations
Fed. Reg.	Federal Register
GHG	greenhouse gas
GWP	Global Warming Potential
IDEQ	Idaho Department of Environmental Quality
MOVES	Motor Vehicle Emission Simulator
NAAQS	National Ambient Air Quality Standards
PM_{10}	particulate matter 10 micrometers or smaller
Project	BNSF Sandpoint Junction Connector Project
SIP	State Implementation Plan
USEPA	U.S. Environmental Protection Agency
VMT	vehicle miles traveled

1 INTRODUCTION

The purpose of this air quality conformity applicability study is to determine whether pollutant emissions resulting from construction of the proposed BNSF Sandpoint Junction Connector Project (Project) would require a conformity determination. Air pollutant emissions may stem from both direct and indirect pollutant emission sources. While direct pollutant emissions occur at the same time or place as a proposed Project, indirect emissions occur at a different time or place. Since the proposed Project is a congestion relief project that would not increase rail system capacity, the potential for direct emissions would be limited to bridge construction activities while indirect emissions would be limited to off-site construction truck travel and worksite commuting.

Using the latest available non-road equipment and on-road vehicle emissions modeling systems, this study developed conservative pollutant inventories that quantify reasonably foreseeable emissions associated with each construction year of the Project. It is anticipated that the proposed Project would not require a conformity determination as it would not have the potential to create new violations of ambient air quality standards.

2 REGULATORY FRAMEWORK

The Clean Air Act and its amendments provide the primary basis for the regulation of air pollutant emissions. To prevent adverse health effects and protect public welfare, the U.S. Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) for certain pollutants, called criteria pollutants, which have been adopted verbatim by Idaho as state emission standards. These standards accompany a mandate for each state to continually maintain the attainment of or demonstrate progress toward the attainment of the NAAQS. Areas in maintenance or nonattainment of the NAAQS are required to develop a State Implementation Plan (SIP) detailing commitments by which the state will attain the NAAQS for each violating pollutant.

All projects that emit criteria pollutants and are proposed within maintenance or nonattainment areas must demonstrate conformity with emission targets established in the controlling SIP. As the proposed Project would receive federal funding, is not an exempt federal action, and would not expand rail network capacity in Idaho, this air conformity applicability study would be performed under the General Conformity rule established in § 93.153 of Title 40 of the Code of Federal Regulations (40 CFR 93.153): by demonstrating that Project-related emissions would not exceed allowable de minimis criteria in the year during which emissions from the Project are expected to be greatest on an annual basis, the proposed Project may be presumed to conform to the SIP as it would not have the potential to either delay timely attainment or create new violations of the NAAQS.

The Sandpoint area was designated nonattainment for PM smaller than 10 micrometers (PM_{10}) in 1997. An emissions inventory identified the primary PM_{10} source as residential wood burning. Fugitive road dust and some industrial sources were also considered contributors. In December 2011, the Idaho Department of Environmental Quality (IDEQ) submitted a PM_{10} Limited Maintenance Plan and Re-Designation Request to the USEPA to redesignate the area to attainment status. The plan focused on a comprehensive residential wood combustion program, controls on fugitive road dust, and emission limitations on industrial sources. In April 2013, the USEPA redesignated the Sandpoint area to attainment for PM_{10} (USEPA 2019). Sandpoint is currently considered a maintenance area for the 1987 PM_{10} standard (USEPA 2019). As the Sandpoint area is in attainment for all other criteria pollutants, the proposed Project is subject to SIP conformity provisions and related analysis requirements of the Clean Air Act and its amendments for both direct and indirect emissions of criteria pollutant PM_{10}. In addition, per guidance from the Council on Environment Quality, an inventory of both direct and indirect greenhouse gas (GHG) emissions related to the proposed Project would be developed to provide quantitative information to the public and agencies in managing climate change (Draft National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions, 84 Fed. Reg. 30,097 [June 26, 2019]).

3 METHODOLOGY

To demonstrate that direct and indirect pollutant emissions from the proposed Project would conform to the SIP, the latest state-of-the-science and USEPA-approved Motor Vehicle Emission Simulator—MOVES2014b—was used to calculate annual pollutant inventories for both on-road vehicular and non-road equipment emissions (USEPA 2018b). The MOVES model calculates emission inventories by performing a series of calculations that reflect real-world seasonal variability and operating processes.

A complete manifest of construction equipment type, quantity, and usage duration was developed for each construction phase scheduled to begin in 2019 and end in 2022. These data were multiplied by pollutant emission factors calculated by MOVES using default NONROAD parameters (USEPA 2004, 2005, 2010). **Table 1** shows the input mapping of all construction equipment to MOVES emission sources with default equipment characteristics and operational parameters as incorporated with the NONROAD2008a module (e.g., engine technology, horsepower ranges, load factors, and age distribution; USEPA 2004, 2005, 2010). The output pollutant quantities are post-processed into hourly emission factors and applied to Project equipment usage durations.

Table 1: MOVES NONROAD Source Mapping

Construction Equipment Manifest	MOVES NONROAD Source Type	Equipment Quantity
Barges/Tug Boats	Not Applicable(1)	17
Locomotive	Not Applicable(1)	2
Drilling Rigs	Bore/Drill Rigs	65
Concrete Truck	Cement and Mortar Mixers	189
Mechanized Rail Saw	Concrete/Industrial Saws	24
Cranes	Cranes	258
Pettibone R/T 25 Ton Hy-Rail Cranes		21
Sheerleg		1
Dozer	Crawler Tractor/Dozers	80
Excavator/Track Hoe	Excavators	2
Dump Trucks	Off-highway Trucks	82
Vibration Compactor	Plate Compactors	17
Concrete Pump	Pumps	195
Mechanized Anchor Applicator	Railway Maintenance	11
Mechanized Rail Heater		32
Sheep Foot Roller	Rollers	12
Vibration Roller		12
Kershaw 46-2 Ballast Regulator	Sweepers/Scrubbers	42
Harsco Mark IV Tamper	Tampers/Rammers	42

Table 1: MOVES NONROAD Source Mapping (continued)

Construction Equipment Manifest	MOVES NONROAD Source Type	Equipment Quantity
Loaders	Tractors/Loaders/Backhoes	2
Track Loader		25
Welding Machine	Welders	254
	Grand Total	**1,385**

Notes:
MOVES = Motor Vehicle Emission Simulator
(1)See Methodology section.

Pollutant emissions from locomotives and barges/tug boats were calculated using conservative engine characteristics and operational assumptions available in the 2009 USEPA guidance *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories*, as follows:

Pollutants Emitted = Maximum Continuous Rating Power (kilowatts or horsepower) × Engine Load Factor × Activity (hours × days) × Tiered Emission Factor (per kilowatt or horsepower-hour)

- Barges/tugboat emission factors assume Tier 0 non-road marine diesel oil engines with USEPA Category 2 power, typical of oceangoing tugboats: 1,500 kilowatts with the displacement of 5 to 10 liters per cylinder, including concurrent emissions from one Tier 0, 225-kilowatt auxiliary engine.
- Locomotive emission factors assume two line-haul class locomotives per consist: non-retrofitted (i.e., not Tier 0 compliant) year 2005, diesel-powered, 4,000 horsepower engine per locomotive.
- All engines assumed to have no pre-control emission technology installed and fired at load factors of 28 percent for locomotives and 85 percent for barges/tug boats (56 percent for auxiliary engines).

The potential size and daily vehicle miles traveled (VMT) of the worksite truck and commuter fleet were directly input into MOVES with contextual county-level data, including vehicle fleet age and roadway type distribution, VMT assignment time frames, drive-activity cycles, and fuel formulation, that are consistent with the latest available planning assumptions developed by the IDEQ for the 2017 National Emissions Inventory (USEPA 2018a). The data provided by IDEQ accounts for monthly, daily, and hourly VMT patterns by road type, travel speed variations, and seasonal temperature adjustments specific to Bonner County that affect the rate of vehicle pollutant emissions throughout the year. Each worksite commute was assumed to be worst-case with 100 miles per trip for the full population of employee gasoline passenger trucks and single-unit, short-haul diesel trucks used for material delivery and transport vehicles as specified in the construction plan excerpt as follows:

- With regard to daily construction worker commutes: there would be an estimated 24 construction workers on-site at any given time during construction with an associated estimate of 12 separate single-occupancy vehicles commuting back and forth from the Project worksite each day, so there would be 12 vehicle trips to and from the site each day (24 trips); also, to be conservative, assume that each of those 12 vehicles is utilized mid-day for a trip to get lunch (24 trips). In total, this would be 48 single-end trips made by construction workers each day.
- With regard to daily trips by construction-related vehicles: estimated 9 deliveries per day (4.4 trips by 10 to 14 cubic yard standard trucks; 0.5 by 15 to 20 cubic yard standard trucks; 3.6 by semitrailers) and 18 single-end trips (accounts for trip to and from the construction site by construction vehicles).

GHGs in the transportation and industrial sectors are tracked by the emissions of three main pollutants: methane (CH_4), nitrous oxide (N_2O), and carbon dioxide (CO_2). Since the atmospheric effect of these pollutants differs due to factors such as energy absorption rates and persistence length, the cumulative effect of GHG emissions is measured by a unit (CO_{2e}) that is equivalent to the Global Warming Potential (GWP) value of the reference gas, CO_2.

The MOVES model directly calculates the CO_{2e} for all on-road vehicle emissions of CO_2, CH_4, and N_2O using GWP values of 1, 25, and 298, respectively. For non-road equipment, however, MOVES does not calculate N_2O emission factors; therefore, the CO_{2e} quantity of N_2O emitted was calculated by estimating fuel consumption by dividing total CO_2 emitted (calculated in MOVES) by an emission factor of 10.21 kilograms of CO_2 per gallon, then multiplying total fuel consumed by 0.25 grams of N_2O per gallon and applying a GWP factor of 298. These emission factors were provided by the 2016 USEPA *Greenhouse Gas Inventory Guidance: Direct Emissions from Mobile Combustion Sources* for diesel fuel consumption.

4 TEMPORARY CONSTRUCTION

Table 2 lists the emissions inventories calculated for PM_{10} and GHG in each construction year of the proposed Project, which would be phased between 2019 and 2022 with activities totaling approximately 15,394 equipment days (see **Table 3**).

Table 2: Inventory of On-Road, Non-Road and Marine-Based Pollutant Emissions

Pollutant	Project Emissions (short tons/year)				General Conformity	
	2019	2020	2021	2022	De Minimis Threshold (short tons/year)	Exceedance
PM_{10}	1	6	1	1	100	No
CO_{2e}	3,844	18,567	3,040	2,907	Not applicable	Not applicable

Table 3: Equipment Days by Year

Activity	Equipment Days
2019	**295**
Clearing and Grubbing	28
Concrete Placement Drilled Shaft	96
Drilled Shafts	75
Mobilization	0
Steel Piles	96
2020	**9,651**
Ballast	740
Cap Beam Precast	1,310
Communications & Signals	0
Concrete Placement Drilled Shaft	2,160
Cure	0
Drilled Shafts	1,520
Fill	480
Rebar Drilled Shafts	300
Set Pre-assembled Span	1,090
Subbase	525
Thermal Adjust Realigned Track.	50
Track	1,416
Install Timber Bridge	60

Table 4: Equipment Days by Year (continued)

Activity	Equipment Days
2021	**4,588**
Ballast	40
Cap Beam Precast	1,120
Concrete Placement Drilled Shaft	1,300
Cure	0
Drilled Shafts	740
Set Pre-assembled Span	1,200
Track	168
Install Timber Bridge	20
2022	**860**
Ballast	160
Demolition	180
Set Pre-assembled Span	40
Track	480
Total	**15,394**

The total annual emissions of PM_{10} associated with the proposed Project would be below allowable de minimis thresholds. The highest emission year would be 2020, during which marine-based activity would emit 4.6 short tons of PM_{10}. These emissions are due to barge/tugboat operations related to material transport for and the construction of the replacement bridge structure, requiring 17 vessels over 445 operation days, which make up 68 percent of all construction emissions in 2020 using highly conservative modeling assumptions for marine engine type and operational parameters (particularly the EPA default Category 2 harbor craft engine load factor of 85 percent, see Methodology section). Although fugitive dust generation from construction operations (e.g., demolition and debris removal and general earth moving) was not estimated, it is highly unlikely that corresponding PM_{10} emissions would approach the 94 to 99 100 short tons required annually to exceed the allowable 100 short tons de minimis threshold in any construction year.

5 SUMMARY OF FINDINGS

Construction of the proposed Project would directly and indirectly affect temporary emissions of PM_{10} and GHG in the region due to construction equipment operations, material transport, and worksite commute. Based on pollutant inventory modeling with conservative engine and operational assumptions, the annual pollutant burden in the worst emission year (2020) of the proposed Project would be below allowable de minimis annual emission limits established by 40 CFR 93.153 General Conformity requirements for all criteria pollutants of concern. As such, this air conformity applicability study has demonstrated that the proposed Project would not cause new violations of the PM_{10} NAAQS and is presumed to conform to all regional air quality attainment goals and commitments expressed in the controlling Idaho SIP.

During Project construction, certain emission and erosion control measures may be utilized as practicable to minimize engine emissions, as well as limit temporary airborne particulate matter and fugitive dust. For example, control measures used during construction activities include application of wind barriers and water or other soluble moisture-retaining suppression agents to unpaved dirt areas; cleaning construction equipment and adjacent paved areas that may be covered with dirt or dust; covering haul trucks carrying loose materials to and from construction sites; use of clean fuels in construction equipment; deployment of clean diesel construction equipment (new, retrofit, rebuilt or repowered); and the implementation of anti-idling practices at construction sites.

6 REFERENCES

U.S. Environmental Protection Agency (USEPA). 2004. “NONROAD2008a Technical Reports.” https://www.epa.gov/moves/nonroad-technical-reports#2008a. April.

———. 2005. “NONROAD2008a Technical Reports.” https://www.epa.gov/moves/nonroad-technical-reports#2008a. December.

———. 2009. *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories*. Final Report. Prepared by ICF International. April.

———. 2010. “NONROAD2008a Technical Reports.” https://www.epa.gov/moves/nonroad-technical-reports#2008a. July.

———. 2016. *Greenhouse Gas Inventory Guidance, Direct Emissions from Mobile Combustion Sources*. https://www.epa.gov/sites/production/files/2016-03/documents/mobileemissions_3_2016.pdf. January.

———. 2018a. “2017 National Emissions Inventory (NEI) Plan: Revised July 2018.” https://www.epa.gov/sites/production/files/2018-07/documents/2017_nei_plan_final_revised_jul2018.pdf. July 18.

———. 2018b. “MOVES2014b.” https://www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves#manuals. December 18.

———. 2019. “Status of Idaho Designated Areas.” https://www3.epa.gov/airquality/urbanair/sipstatus/reports/id_areabypoll.html. July 23.