



WBI ENERGY TRANSMISSION, INC.

Wahpeton Expansion Project

**Resource Report 9
Air Quality and Noise**

Draft

**Docket No.
PF21-4-000**

March 2022

**WBI ENERGY TRANSMISSION, INC.
WAHPETON EXPANSION PROJECT
RESOURCE REPORT 9 – AIR QUALITY AND NOISE**

Minimum Filing Requirements for Environmental Reports:	Addressed in:
<p>1. Describe the existing air quality, including background levels of nitrogen dioxide and other criteria pollutants which may be emitted above United States Environmental Protection Agency-identified significance levels. – Title 18 of the Code of Federal Regulations (CFR) Part § 380.12(k)(1)</p>	Section 9.1.2
<p>2. Quantitatively describe existing noise levels at noise sensitive areas, such as schools, hospitals, or residences and include any areas covered by relevant state or local noise ordinances.</p> <p>(i) Report existing noise levels as the equivalent sound level (day), equivalent sound level (night), and day-night sound level and include the basis for the data or estimates.</p> <p>(ii) For existing compressor stations, include the results of a sound level survey at the site property line and nearby noise sensitive areas while the compressors are operated at full load.</p> <p>(iii) For proposed new compressor station sites, measure or estimate the existing ambient sound environment based on current land uses and activities.</p> <p>(iv) Include a plot plan that identifies the locations and duration of noise measurements, the time of day, weather conditions, wind speed and direction, engine load, and other noise sources present during each measurement.</p> <p>- 18 CFR § 380.12(k)(2)</p>	Section 9.2.3 and Appendix 9D
<p>3. Estimate the impact of the project on air quality, including how existing regulatory standards would be met.</p> <p>(i) Provide the emission rate of nitrogen oxides from existing and proposed facilities, expressed in pounds per hour and tons per year for maximum operating conditions, include supporting calculations, emission factors, fuel consumption rates, and annual hours of operation.</p> <p>(ii) For major sources of air emissions (as defined by the United States Environmental Protection Agency), provide copies of applications for permits to construct (and operate, if applicable) or for applicability determinations under regulations for the prevention of significant air quality deterioration and subsequent determinations.</p> <p>- 18 CFR § 380.12(k)(3)</p>	Section 9.1.4

<p>4. Provide a quantitative estimate of the impact of the project on noise levels at noise sensitive areas, such as schools, hospitals, or residences.</p> <p>(i) Include step-by-step supporting calculations or identify the computer program used to model the noise levels, the input and raw output data and all assumptions made when running the model, far-field sound level data for maximum facility operation, and the source of the data.</p> <p>(ii) Include sound pressure levels for unmuffled engine inlets and exhausts, engine casings, and cooling equipment; dynamic insertion loss for all mufflers; sound transmission loss for all compressor building components, including walls, roof, doors, windows, and ventilation openings; sound attenuation from the station to nearby noise-sensitive areas; the manufacturer's name, the model number, and the performance rating; and a description of each noise source and noise control component to be employed at the proposed compressor station. For proposed compressors, the initial filing must include at least the proposed horsepower, type of compression, and energy source for the compressor.</p> <p>(iii) Far-field sound level data measured from similar units in service elsewhere, when available, may be substituted for manufacturer's far-field sound level data.</p> <p>(iv) If specific noise control equipment has not been chosen, include a schedule for submitting the data prior to certification.</p> <p>(v) The estimate must demonstrate that the project will comply with applicable noise regulations and show how the facility will meet the following requirements:</p> <p>(A) The noise attributable to any new compressor station, compression added to an existing station, or any modification, upgrade or update of an existing station, must not exceed a day-night sound level of 55 decibels on the A-weighted scale at any pre-existing noise-sensitive area (such as schools, hospitals, or residences).</p> <p>(B) New compressor stations or modifications of existing stations shall not result in a perceptible increase in vibration at any noise-sensitive area.</p> <p>– 18 CFR § 380.12(k)(4)</p>	Section 9.2.5
<p>5. Describe measures and manufacturer's specifications for equipment proposed to mitigate impact to air and noise quality, including emission control systems, installation of filters, mufflers, or insulation of piping and buildings, and orientation of equipment away from noise-sensitive areas.</p> <p>– 18 CFR § 380.12(k)(5)</p>	Section 9.1.4, 9.2.4, and 9.2.5

Additional Information:	Addressed in:
1. Provide copies of application for state air permits and agency determinations, as appropriate.	Not Applicable
2. For major sources of air emissions (as defined by the USEPA), provide copies of applications for permits to construct (and operate, if applicable) or for applicability determinations under regulations for the prevention of significant air quality deterioration and subsequent determinations	Not Applicable
3. Identify any nearby noise-sensitive areas by distance and direction from the proposed compressor unit building/enclosure or meter station.	Section 9.2.3
4. Identify any applicable state or local noise regulations. Specify how the facility will meet the regulations	Section 9.2.2 and 9.2.5

**WBI ENERGY TRANSMISSION, INC.
WAHPETON EXPANSION PROJECT
RESOURCE REPORT 9 – AIR QUALITY AND NOISE**

TABLE OF CONTENTS

9.0	RESOURCE REPORT 9 – AIR QUALITY AND NOISE	9-1
9.1	AIR QUALITY	9-1
9.1.1	Local Climate	9-1
9.1.2	Existing Air Quality.....	9-2
9.1.3	Regulatory Requirements for Air Quality	9-4
9.1.3.1	Federal Requirements	9-4
9.1.3.1	State Regulations.....	9-7
9.1.4	Air Emissions Impacts	9-8
9.1.4.1	Construction Emissions	9-8
9.1.4.2	Operational Emissions	9-11
9.2	NOISE	9-12
9.2.1	Principles of Noise	9-12
9.2.2	Noise Regulations.....	9-13
9.2.3	Existing Ambient Noise Levels	9-14
9.2.3.1	Mapleton Compressor Station	9-14
9.2.3.2	MDU – Kindred Border Station	9-14
9.2.3.3	MDU – Wahpeton Border Station	9-14
9.2.4	Operational Noise Impacts	9-16
9.2.4.1	MDU – Kindred Border Station	9-16
9.2.4.2	MDU – Wahpeton Border Station	9-16
9.2.5	Blowdown Events	9-16
9.2.5.1	Mapleton Compressor Station	9-16
9.2.6	Vibration	9-17
9.3	CUMULATIVE IMPACTS	9-17
9.3.1	Air	9-17
9.3.1.1	Construction Emissions Impacts.....	9-17
9.3.1.2	Operational Emissions Impacts	9-18
9.3.1.3	Climate Change	9-18
9.3.2	Noise	9-20
9.3.2.1	Construction Noise Impacts	9-20
9.3.2.2	Operational Noise Impacts.....	9-21
9.4	REFERENCES.....	9-21

LIST OF TABLES

Table 9.1.2-1	U.S. Environmental Protection Agency National Ambient Air Quality Standards	9-2
Table 9.1.2-2	North Dakota Ambient Air Quality Standards	9-3
Table 9.1.3-1	Nearest Class I Areas to Mapleton Compressor Station	9-5
Table 9.1.4-1	Total Construction-Related Emissions for the Project	9-10
Table 9.1.4-2	Operational Emission Calculation Results.....	9-12
Table 9.2.1-1	Sound Levels (dBA) and Relative Loudness	9-13
Table 9.2.3-1	Noise Sensitive Areas near the MDU – Wahpeton Border Station.....	9-15

Table 9.2.4-1	Noise Levels of Predominant Noise-Producing Construction Equipment.....	9-15
Table 9.2.5-1	Noise Analysis for Operation of Wahpeton Border Station.....	9-16

APPENDICES

APPENDIX 9A	Fugitive Dust Control Plan	
APPENDIX 9B	Construction Emissions Calculations	
APPENDIX 9C	Operation Emissions Calculations	
APPENDIX 9D	Pre-Construction Noise Survey and Acoustical Analysis Report (Figures showing NSAS are included in the current draft. A full noise survey and report will be provided in the final application, if necessary).	

ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
AAQS	Ambient Air Quality Standards
CAA	Clean Air Act
CAAA	CAA Amendments
CFR	Code of Federal Regulations
CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalents
dB	decibel
dBA	A-weighted scale
Department	North Dakota Department of Environmental Quality - Division of Air Quality
USEPA	U.S. Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
GHG	greenhouse gas
GWP	global warming potential
H ₂ S	hydrogen sulfide
HAP	hazardous air pollutant
L _{dn}	day-night sound level
L _{eq}	equivalent sound level
MP	milepost
mph	miles per hour
NAAQS	National Ambient Air Quality Standards
NDAC	North Dakota Administrative Code
NDDEQ	North Dakota Department of Environmental Quality
NDDOT	North Dakota Department of Transportation
NESHAP	National Emission Standards for Hazardous Air Pollutant
NNSR	Nonattainment New Source Review
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
NSA	Noise Sensitive Area
NSPS	New Source Performance Standards
NWS	National Weather Service
O ₃	ozone
Pb	lead
PM	particulate matter
PM _{2.5}	particulate matter with an aerodynamic diameter less than or equal to 2.5 microns
PM ₁₀	particulate matter with an aerodynamic diameter less than or equal to 10 microns
Project	Wahpeton Expansion Project
PSD	Prevention of Significant Deterioration
RFFA	reasonably foreseeable future action
scf	standard cubic feet
SIP	State Implementation Plan
SO ₂	sulfur dioxide

tpy	tons per year
USGCRP	U.S. Global Change Research Program
VOC	volatile organic compound
WBI Energy	WBI Energy Transmission, Inc.

**WBI ENERGY TRANSMISSION, INC.
WAHPETON EXPANSION PROJECT**

9.0 RESOURCE REPORT 9 – AIR QUALITY AND NOISE

WBI Energy Transmission, Inc. (WBI Energy) proposes to construct, modify, and operate the Wahpeton Expansion Project (Project). The Project will involve the construction of approximately 60.6 miles of 12-inch-diameter natural gas pipeline from WBI Energy's existing Mapleton Compressor Station near Mapleton, North Dakota, to a new Montana-Dakota Utilities Company (MDU) delivery station near Wahpeton, North Dakota. The Project will also include minor modifications at the Mapleton Compressor Station; a new MDU delivery station near Kindred, North Dakota; new block valve settings; and new pig launcher/receiver settings. The Project may also include newly constructed farm taps along the pipeline route. The proposed Project facilities will be located in Cass and Richland Counties, North Dakota. Figure 1.1-1 of Resource Report 1 provides an overview of the proposed pipeline and associated facilities.

In accordance with Title 18 of the Code of Federal Regulations (CFR) Part 380.12(k), Resource Report 9 describes the existing air and noise environment that may be affected by WBI Energy's proposed Project. The report addresses the impacts of the Project on the existing air and noise environment, and measures that will be implemented to mitigate the impacts. Resource Report 1 provides a detailed Project description.

9.1 AIR QUALITY

Construction and operation of the Project could affect air quality in the Project vicinity. Aboveground facilities associated with the Project that may generate emissions are associated with the existing Mapleton Compressor Station, the two new MDU – Border Stations, valve settings, and pig launchers/receivers. Construction of additional pipeline facilities will also impact air quality on a short-term basis in the immediate area during construction activities. The operation and maintenance of the proposed pipeline facilities will have a minor, but additional, impact on air quality.

The purpose and need for the Project is to transport an additional 20.6 million cubic feet of natural gas per day to help meet a growing demand for natural gas in southeastern North Dakota.

The regional climate, regulatory requirements for air emission sources, and air quality impacts from construction and operation of this Project are discussed in the sections that follow.

9.1.1 Local Climate

WBI Energy accessed National Weather Service (NWS)¹ information for the Fargo, North Dakota area. Based on available information from 1991 to 2020, the driest month is January which averages under an inch of precipitation, and the wettest month is June which averages just over 4 inches of precipitation. Temperature in that same time period indicates January is the coldest month with an average temperature of 9.1 °F. The warmest month is July with an average temperature of 70.2 °F and maximum average temperatures in the low 80's °F. Historically temperatures have risen over 100 °F in July.

¹ <https://www.weather.gov/wrh/climate>

Information on wind direction and speed statistics for the Fargo area was obtained for the Fargo airport. The average wind speed ranges from 33 miles per hour (mph) to 26 mph with the highest average wind speeds in the winter months. The dominate wind direction in December, January, and February is northwest. In the summer months, the wind direction shifts to the west and southwest².

9.1.2 Existing Air Quality

The U.S. Environmental Protection Agency (USEPA), as required by the Clean Air Act (CAA) of 1970, has established National Ambient Air Quality Standards (NAAQS) to protect public health and welfare (referred to as primary standards), and to protect plant and animal life, buildings, and other features in the public interest (referred to as secondary standards) (USEPA, 2022). States have the authority to adopt more stringent Ambient Air Quality Standards (AAQS) for other pollutants. North Dakota has adopted the federal primary and secondary NAAQS for the six principal pollutants described below. In addition, North Dakota has established AAQS for hydrogen sulfide (H₂S).

Standards have been set for six principal pollutants, called “criteria pollutants”: ground-level ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), respirable and fine particulate matter (PM) (inhalable particulate matter with an aerodynamic diameter less than or equal to 10 microns [PM₁₀] and less than or equal to 2.5 microns [PM_{2.5}]), and airborne lead (Pb).

Ozone develops as a result of a chemical reaction between nitrogen oxides (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. Accordingly, NO_x and VOCs are often referred to as O₃ precursors. PM_{2.5} may be directly emitted and can also be secondarily formed in the atmosphere as a result of SO₂ and NO_x emissions. SO₂ and NO_x are also referred to as PM_{2.5} precursors. Table 9.1.2-1 lists NAAQS for the criteria pollutants described above.

TABLE 9.1.2-1				
Wahpeton Expansion Project				
U.S. Environmental Protection Agency National Ambient Air Quality Standards				
Criteria Pollutant	Primary/ Secondary	Averaging Time	Level	Form of Air Quality Standard
CO	Primary	8 hours	9 ppm	Not to be exceeded more than once per year
Pb	Primary	1 hour	35 ppm	Not to be exceeded more than once per year
	Primary and Secondary	Rolling 3-month average	0.15 µg/m ³ ^a	Not to be exceeded
NO ₂	Primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Primary and Secondary	1 year	53 ppb ^b	Annual mean
O ₃	Primary and Secondary	8 hours	0.070 ppm ^c	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution PM _{2.5}	Primary	1 year	12 µg/m ³	Annual mean, averaged over 3 years
	Secondary	1 year	15 µg/m ³	Annual mean, averaged over 3 years
	Primary and Secondary	24 hours	35 µg/m ³	98th percentile, averaged over 3 years
PM ₁₀	Primary and Secondary	24 hours	150 µg/m ³	Not to be exceeded more than once per year on average over 3 years
SO ₂	Primary	1 hour	75 ppb ^d	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years

² https://www.windfinder.com/windstatistics/fargo_airport

TABLE 9.1.2-1			
Wahpeton Expansion Project U.S. Environmental Protection Agency National Ambient Air Quality Standards			
	Secondary	3 hours	0.5 ppm Not to be exceeded more than once per year
Source: USEPA, 2022 $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter; ppb = parts per billion; ppm = parts per million ^a 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 ($1.5 \mu\text{g}/\text{m}^3$ as a calendar quarter average) also remain in effect. ^b The annual NO_2 standard is 0.053 ppm. It is shown here in terms of parts per billion (ppb) for the purposes of clearer comparison to the 1-hour standard level. ^c Final rule published 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. ^d 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 an implementation plan providing for attainment of the current (2010) standard has 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 USEPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.			

Table 9.1.2-2 lists the North Dakota AAQS for H_2S .

TABLE 9.1.2-2			
Wahpeton Expansion Project North Dakota Ambient Air Quality Standards			
Criteria Pollutant	Averaging Time	Level	Form of Air Quality Standard
H_2S	Instantaneous	$14,000 \mu\text{g}/\text{m}^3$	Not to be exceeded
	1 hour	$280 \mu\text{g}/\text{m}^3$	Not to be exceeded more than once per month
	24 hour	$140 \mu\text{g}/\text{m}^3$	Not to be exceeded more than once per year
	Quarter	$28 \mu\text{g}/\text{m}^3$	Not to be exceeded
$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter			

Revisions to Section 107 of the CAA in 1977 required the states and USEPA to identify areas of the country that meet and do not meet the NAAQS. Areas where ambient air concentrations of the criteria pollutants are below the levels listed in the NAAQS are considered in attainment. If ambient air concentration of a criteria pollutant exceeds the NAAQS, then the area is considered to be nonattainment for that pollutant. Areas that have been designated nonattainment but have since demonstrated compliance with the NAAQS are designated maintenance for that pollutant. Maintenance areas are treated similarly to attainment areas for permitting stationary sources; however, specific provisions may be incorporated through the state's approved maintenance plan to ensure that air quality remains in compliance with the NAAQS for that pollutant. Maintenance areas retain the classification for 20 years before being reclassified as attainment areas. Areas where air quality data are not available are considered to be unclassifiable and are treated as attainment areas. No counties in North Dakota are currently listed as nonattainment or maintenance areas for any criteria pollutants.

In April 2007, the United States Supreme Court ruled that greenhouse gases (GHG) fall within the CAA's definition of "air pollutant." The USEPA identified the following six well-mixed GHGs in the atmosphere:

- carbon dioxide (“CO₂”);
- methane;
- nitrous oxide;
- hydrofluorocarbons;
- perfluorocarbons; and
- sulfur hexafluoride.

The USEPA has expanded its regulations to include the emission of GHGs from major stationary sources under the Prevention of Significant Deterioration (PSD) program. The USEPA’s current rules require that a stationary source that is a major source for a non-GHG regulated New Source Review pollutant must also obtain a GHG PSD permit prior to beginning construction of a new or modified major source with mass-based GHG emissions equal to or greater than zero tons per year (tpy) and significant net emission increases of carbon dioxide equivalent (“CO₂e”) equal to or greater than 75,000 tpy. There is no NAAQS for GHGs.

Some gases have a higher warming effect on the atmosphere than other gases. For each GHG, a Global Warming Potential (GWP) has been calculated to reflect how long it remains in the atmosphere, on average, and how strongly it absorbs energy. Gases with a higher GWP absorb more energy, per pound, than gases with a lower GWP, and thus contribute more to warming the Earth. The GWP of various gases are found in 40 CFR Appendix Table A-1 to Subpart A of Part 98 – Global Warming Potentials. For example, methane (CH₄) has a GWP 25 times that of carbon dioxide (CO₂). The term “carbon dioxide equivalent” (or CO₂e) is used to compare the emissions from various GHGs on the basis of their GWP by converting the amounts of other gases to the equivalent amount of CO₂. For example, 1 ton of CH₄ would be equivalent to 25 tons of CO₂ for purposes of evaluating GHG emissions.

9.1.3 Regulatory Requirements for Air Quality

The Project was reviewed for the applicability of federal and state level requirements for sources of air emissions. The analysis is presented in the sections that follow.

9.1.3.1 Federal Requirements

The CAA of 1970, as amended in 1977 and 1990, is the basic federal statute governing air quality. The provisions of the CAA that are potentially applicable to construction and operation of the Project include the following:

- PSD/Nonattainment New Source Review (NNSR);
- Federal Class I Area Protection;
- New Source Performance Standards (NSPS);
- National Emission Standards for Hazardous Air Pollutants (NESHAP);
- Mandatory GHG Reporting;
- Title V Operating Permits; and
- Conformity of General Federal Actions.

The following is a brief description of these regulations and their requirements.

Prevention of Significant Deterioration/Nonattainment New Source Review

The CAA requires any new major stationary source of air pollution, or existing source proposing major modification, to obtain an air pollution permit before commencing construction. Air construction permits for major sources or modifications in an attainment area are issued under the PSD regulations, whereas air construction permits for sources in a nonattainment area are issued under the NNSR program. The entire program, including both PSD and NNSR permitting, is referred to as the New Source Review program. This Project area is classified as attainment, and therefore NNSR will not apply.

In 2017, the Mapleton Compressor Station was reviewed by the North Dakota Department of Health and determined to be an air pollution source of minor significance and a Permit-to-Construct was not required per Subdivision 33-15-14-02.13.n of the North Dakota Air Pollution Control Rules. The Project does not include any new emission sources at the compressor station subject to PSD; and therefore, the minor modifications for pipeline interconnect to the compressor station will not change the station's permitting status as being a source of minor significance.

Federal Class I Area Protection

The U.S. Congress designated certain lands as Mandatory Federal Class I areas in 1977. Class I areas were designated because the air quality was considered a special feature of the area (e.g., in national parks or wilderness areas). These Class I areas, as well as any other areas that have been re-designated Class I since 1977, are given special protection under the PSD program. This program establishes air pollution increment increases that are allowed by new or modified air emission sources. If the new source is a major PSD source and is near (within 100 kilometers of) a Class I area, the source is required to determine its impacts on the Class I area. The source also is required to notify the appropriate federal land manager for the nearby Class I area. There are no Class I areas within 100 kilometers of the Mapleton Compressor Station. The nearest Class I areas are listed in Table 9.1.3-1 along with distance and relative direction.

TABLE 9.1.3-1 Wahpeton Expansion Project Nearest Class I Areas to Mapleton Compressor Station	
Class 1 Area, State	Mapleton Compressor Station (miles/direction)
Theodore Roosevelt National Park, ND	279 miles west (449 km)
Lost Wood Wilderness, ND	222 miles northwest (357 km)
Chase Lake Wilderness, ND	171 miles west (275 km)
Voyageurs National Park, MN	200 miles northeast (322 km)
Source: 40 CFR 52.21 km = kilometers; MN = Minnesota; ND = North Dakota	

New Source Performance Standards

The NSPS, codified in 40 CFR 60, establishes pollutant emissions limits and monitoring, reporting, and recordkeeping requirements for various emissions sources based on source type and size. No new equipment subject to an NSPS is proposed.

National Emission Standards for Hazardous Air Pollutants

The NESHAPs, codified in 40 CFR Parts 61 and 63, regulate hazardous air pollutants (HAP) emissions. Part 61, which was promulgated prior to the 1990 CAA Amendments (CAAA), regulates eight types of hazardous substances: asbestos, benzene, beryllium, coke oven emissions, inorganic arsenic, mercury, radionuclides, and vinyl chloride. The 1990 CAAA established a list of 189 HAPs, resulting in the promulgation of Part 63. This part, also known as the Maximum Achievable Control Technology standards, regulates HAP emissions from major sources of HAP emissions and specific source categories of non-major (area) sources that emit HAPs. Part 63 defines a major source of HAPs as any source that has the potential to emit 10 tpy of any single HAP or 25 tpy of HAPs in aggregate.

The existing Mapleton Compressor Station is classified as an area source of HAPs because the existing potential emissions of HAPs are below the major source thresholds. No new emission sources are planned for the Mapleton Compressor Station that would be subject to a NESHAP are planned.

During construction, it is anticipated that insignificant amounts of HAPs will be emitted through the use of diesel and gasoline fired construction equipment and tail pipe emissions from vehicles; however, NESHAPs are not applicable to mobile sources. Construction emissions are discussed in more detail in section 9.1.4.1.

Mandatory Greenhouse Gas Reporting

On October 30, 2009, the USEPA published a rule for mandatory reporting (codified in 40 CFR 98) of GHG from sources that emit 25,000 metric tons or more of CO₂e per year. The collection of data is intended to provide a better understanding of the GHG sources and to guide the development of policies and programs to reduce emissions. However, this rule does not require permitting or mitigation measures to be implemented. WBI Energy will monitor actual emissions to determine on an annual basis if reporting is required and comply with the GHG reporting rule and its applicable subparts in the event that actual GHG emissions meet the reporting thresholds.

Title V Operating Permits

Title V of the 1990 CAAA required states to establish an air operating permit program in an effort to standardize air quality permits across the United States. The requirements of Title V are outlined in 40 CFR 70, and the permits required by these regulations are often referred to as Part 70 or Title V permits. North Dakota has promulgated these requirements under North Dakota Administrative Code (NDAC) 33.1-15-14-06, *Title V Permit to Operate*.

If a facility's potential to emit exceeds the criteria pollutant or HAP thresholds, the facility is considered a major source. The Title V major source threshold level for an air emission source

is 100 tpy for criteria pollutants. The major source HAP thresholds for a source are 10 tpy of any single HAP or 25 tpy of HAPs in aggregate.

The minor piping modifications at the Mapleton Compressor Station will only affect fugitive emissions and will not increase those significantly. A permit to construct or operate is not required.

Conformity of General Federal Actions

A conformity analysis must be conducted by the lead federal agency if a federal action would generate emissions that exceed the conformity threshold levels (*de minimis*) of the pollutant(s) for which an air basin is in nonattainment. According to section 176(c)(1) of the CAA (40 CFR section 51.853), a federal agency cannot approve or support activity that does not conform to an approved State Implementation Plan (SIP). As stated previously, the Project area is designated as attainment or unclassified for all NAAQS; consequently, a general conformity determination is not required.

9.1.3.1 State Regulations

North Dakota air emissions are regulated by the North Dakota Department of Environmental Quality (NDDEQ)³ Division of Air Quality, also referred to as the Department, under NDAC 33-15. Listed below are the applicable air quality regulations from the NDAC that apply to the Project, as well as required air impact reviews (dispersion modeling).

Applicable North Dakota Air Quality Regulations

NDAC 33.1-15-01 sets the general provisions pertaining to all state-level regulations, including definitions of terms used by the regulations.

NDAC 33-15-02 establishes AAQS that are identical to the NAAQS promulgated by the USEPA, with the exception of an additional state standard for H₂S. Emissions of H₂S associated with the proposed Project are included with the emissions inventory that is part of the state permit to construct applications. Emissions of H₂S for the Project are considered negligible.

NDAC 33.1-15-03 restricts emissions of visible air contaminants. This regulation applies to both point sources and fugitive sources of visible emissions. WBI Energy will maintain equipment to not exceed opacity standards and perform construction to minimize dust. Appendix 9A of this resource report contains the Project's *Fugitive Dust Control Plan*.

NDAC 33.1-15-04 establishes restrictions on open burning. No open burning is planned; however, if the need arises, WBI Energy will follow all requirements stipulated in 33.1-15-04 for permissible open burning.

NDAC 33.1-15-07-01 and 33.1-15-07-02 address emission requirements for VOCs. Per 33.1-15-07-02, no person is allowed to emit organic compound gases and vapors, except from an emergency vapor blowdown system or emergency relief system, unless these gases and vapors are burned by flares, or an equally effective control device as approved by the Department. Minor

³ The NDDEQ became an independent agency on April 29, 2019. Previously, the NDDEQ was part of the North Dakota Department of Health. Air permitting is a function of the Division of Air Quality) within the NDDEQ organization.

sources, as determined by the Department and not subject to NSPS, may be granted exemptions to this subsection. This Project will not involve emissions of VOCs from process equipment under normal operating conditions.

NDAC 33.1-15-17 restricts fugitive emissions from any source, including emissions of particulates (dust) and various gaseous emissions such as those subject to an AAQS or PSD increment, an odorous substance, or those subject to the restrictions of a visible air contaminant. WBI Energy will comply with the applicable requirements of this regulation during Project construction and operation. Information regarding specific techniques for the control of fugitive dust during construction is included in the Project's *Fugitive Dust Control Plan* (see appendix 9A).

NDAC 33.1-15-22 address emission standards for HAPs. Emission standards for this chapter are the federal NESHAPs incorporated by reference. WBI Energy will comply with NDAC 33.1-15-22 by complying with the federal NESHAPs, which are addressed above.

North Dakota Dispersion Modeling and Air Toxics Review

This project does not trigger air dispersion modeling or air toxics review for sources of HAPs requirements for North Dakota because no compressor engines are being constructed as part of this Project.

State Permitting

In North Dakota, facilities requiring air permits first apply and receive permits to construct, followed by a permit to operate once construction has been completed. The permit to operate ensures a facility stays in compliance with air quality control rules.

The exception to this requirement is if the project is deemed of minor significance by the NDDEQ. The existing Mapleton Compressor Station was deemed of minor significance not requiring a permit to construct by the NDDEQ. None of the proposed modifications will change the status of the compressor station. WBI Energy will update the NDDEQ with the modifications being proposed for the Mapleton Compressor Station so they can confirm the minor significance status which was previously confirmed by the NDDEQ is unchanged.

9.1.4 Air Emissions Impacts

This section describes the emission rates and air quality impacts associated with construction and operation of the proposed Project.

9.1.4.1 Construction Emissions

Air quality impacts associated with construction of the Project will include emissions from fossil-fueled construction equipment, vehicle traffic exhaust, and fugitive dust. However, such air quality impacts will generally be temporary, short-term, and localized and will not significantly affect regional air quality.

Emissions from construction equipment will depend on the duration and type of construction activity, together with the number and type of vehicles and engine-powered equipment in use at any point in time. Earth-moving equipment and other mobile sources may be powered by diesel or gasoline engines that are sources of combustion-related emissions

including NO_x, CO, VOCs, SO₂, PM₁₀, PM_{2.5}, GHGs, and minimal amounts of HAPs. Emissions from equipment will be short-term and localized in an area as equipment and activities move along the route. Construction of the pipeline facilities will progress along the linear pipeline corridor, and likely crews will be at any given location along the route for a few days to weeks. The construction days associated with each pipeline segment are listed in the detailed construction emission calculations included in appendix 9B.

Fugitive dust emissions may result from vehicular traffic exhaust and soil disturbance associated with land clearing, grading, excavation, and backfilling. The amount of fugitive dust generated will depend on a variety of factors including: duration and type of construction activity; moisture content and type of soils that will be disturbed; wind speed and frequency of precipitation; and the number and types of vehicles traveling over the construction areas and commuting to and from the work site.

WBI Energy will implement industry-standard procedures to reduce fugitive dust. These procedures may include spraying disturbed areas or dirt/gravel roads with water; covering areas susceptible to fugitive dust with mulch or a suitable biodegradable or water-soluble chemical; installing fencing in areas susceptible to dust to reduce wind speeds; modifying the speed of truck and equipment traffic in disturbed areas or on dirt/gravel roads; and/or removing dirt tracked onto paved roads by construction equipment. Detailed information on these measures are included in the *Fugitive Dust Control Plan* (see appendix 9A).

In order to minimize vehicular and equipment exhaust and crankcase emissions from gasoline and diesel engines, WBI Energy will comply with the applicable USEPA mobile source emissions performance standards by using modern, well-maintained vehicles, and equipment will be shut down when not in use to minimize idling emissions.

No open burning is anticipated. If that were to change, WBI Energy will obtain all necessary permits and follow any applicable local and state regulations as stipulated in NDAC 33.1-15-04.

Pipeline construction activities are considered temporary and transient in nature and are not expected to cause or contribute to any significant degradation of air quality. Likewise, emissions from construction activities associated with the compressor station, border stations, valve settings, and pig launchers/receivers will be temporary. Establishment of contractor yards could occur in fall of 2023, but Project construction is anticipated to take place from April 2024 through October 2024, with all facilities being placed in service in November 2024. Table 9.1.4-1 presents the estimated air pollutant emissions from Project construction. Detailed construction calculations are included in appendix 9B.

TABLE 9.1.4-1								
Wahpeton Expansion Project ^a Total Construction-Related Emissions for the Project (tons)								
Construction Activity	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOCs	HAPs	CO _{2e}
2024 EMISSIONS								
Mapleton Compressor Station								
Diesel non-road equipment	0.02	0.06	4.13E-03	4.00E-03	7.23E-05	6.55E-03	3.40E-03	24.64
Diesel and gas on-road equipment	0.06	0.01	2.46E-04	2.22E-04	3.11E-05	2.12E-03	5.20E-04	6.36
Construction activity fugitive dust	N/A	---	2.65E-02	2.92E-03	---	---	---	---
Roadway fugitive dust	N/A	---	3.02E-03	3.02E-04	---	---	---	---
Subtotal	0.09	0.08	3.39E-02	7.45E-03	1.03E-04	8.67E-03	3.92E-03	31.00
MDU – Kindred Border Station								
Diesel non-road equipment	0.16	0.33	3.18E-02	3.09E-02	3.95E-04	3.70E-02	1.90E-02	133.82
Diesel and gas on-road equipment	0.12	0.03	5.79E-04	5.25E-04	6.89E-05	4.26E-03	1.02E-03	15.08
Construction activity fugitive dust	N/A	---	2.99E-01	4.49E-02	---	---	---	---
Roadway fugitive dust	N/A	---	3.64E-03	3.64E-04	---	---	---	---
Subtotal	0.28	0.35	0.34	7.67E-02	4.64E-04	4.13E-02	2.00E-02	148.89
MDU – Wahpeton Border Station								
Diesel non-road equipment	0.15	0.30	3.05E-02	2.96E-02	3.81E-04	3.46E-02	1.77E-02	129.21
Diesel and gas on-road equipment	0.12	0.03	5.79E-04	5.25E-04	6.89E-05	4.27E-03	1.03E-03	15.09
Construction activity fugitive dust	N/A	---	2.99E-01	4.49E-02	---	---	---	---
Roadway fugitive dust	N/A	---	3.29E-03	3.29E-04	---	---	---	---
Subtotal	0.27	0.33	0.33	7.53E-02	4.50E-04	3.89E-02	1.88E-02	144.30
Cass County Pipeline Segment								
Diesel non-road equipment	29.49	12.10	1.37	1.31	1.95E-02	1.00E+01	3.39E+00	6,475.88
Diesel and gas on-road equipment	11.80	1.02	2.39E-02	2.11E-02	3.81E-03	3.46E-01	8.96E-02	576.89
Construction activity fugitive dust	N/A	---	34.26	4.73	---	---	---	---
Roadway fugitive dust	N/A	---	3.46	0.35	---	---	---	---
Subtotal	41.28	13.12	39.11	6.41	2.33E-02	1.04E+01	3.48E+00	7,052.77
Richland County Pipeline Segment								
Diesel non-road equipment	41.99	17.23	1.95	1.87	2.78E-02	1.43E+01	4.83E+00	9,221.66

Diesel and gas on-road equipment	16.98	1.46	3.40E-02	3.01E-02	5.44E-03	4.95E-01	1.28E-01	823.53
Construction activity fugitive dust	N/A	---	49.88	6.88	---	---	---	---
Roadway fugitive dust	N/A	---	5.09	0.51	---	---	---	---
Subtotal	58.96	18.69	56.96	9.29	3.33E-02	1.48E+01	4.96E+00	10,045.19
Total Construction Emissions	100.61	32.22	96.43	15.78	0.06	25.21	8.46	17,273.26
N/A = not applicable								
^a The numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the sum of the addends.								

9.1.4.2 Operational Emissions

Some air emissions will be associated with ongoing operation and maintenance of the pipeline and the associated above ground facilities. Natural gas trapped within pig launching and receiving apparatuses will be vented to the atmosphere each time a pig device is removed from or inserted into the pipeline. Routine pigging is not anticipated for this pipeline and any pigging would result in minor emissions of natural gas to the atmosphere when the pig is inserted or removed from service. Emissions from pig launching and receiving are considered negligible.

Some fugitive emissions leaks will also be expected from leaking components at aboveground facilities and along the pipeline. Underground pipelines have some losses due to leaks across the length of line. To calculate the losses, the methodology contained in 40 CFR Part 98 Subpart W was used. The emission calculations, which depend on the pipeline material and the length of pipe, use factors contained in table W-7 to Subpart W of Part 98 – *Default Methane Emission Factors for Natural Gas Distribution*. The total length of pipeline to be installed for the Project is 60.6 miles. The emission factor for protected steel is 0.35 standard cubic feet (scf) of CH₄ per hour per mile of pipeline.

- 60.6 miles of pipeline x 0.35 CH₄ scf/hour = 21.21 scf CH₄/hour
- 21.21 scf CH₄/hour x 8,760 hours/year = 185,800 scf CH₄/year
- 185,800 scf CH₄ x 0.03 pounds/scf CH₄ = 5,574 pounds CH₄/year

WBI Energy used a GWP for CH₄ of 25, based on the values provided in table A-1 to Subpart A of 40 CFR Part 98.

- 5,574 pounds CH₄ x 25 GWP = 139,350 pounds CO₂e/year (69.67 tons)

Table 9.1.4-2 summarizes the operational emissions, including fugitive emissions from aboveground facilities and the pipeline. The detailed pipeline operation emission calculations are provided in appendix 9C.

TABLE 9.1.4-2 Wahpeton Expansion Project Operational Emission Calculation Results								
Emission Unit	NO _x (tpy)	CO (tpy)	VOCs (tpy)	PM ₁₀ /PM _{2.5} (tpy)	SO ₂ (tpy)	CO _{2e} (tpy)	Largest Single HAP ^a (tpy)	Total HAPs (tpy)
Aboveground Facilities (fugitive leaks)	N/A	N/A	0.28	N/A	N/A	1,657	N/A	0.001
Pipeline	N/A	N/A	N/A	N/A	N/A	69.67	N/A	N/A
Pig Launching & Receiving	N/A	N/A	Neg.	N/A	N/A	Neg.	N/A	Neg.
TOTAL Proposed PTE^e	NA	NA	0.28	NA	NA	1,727	NA	0.001
N/A = not applicable; Neg. = Negligible; PTE = potential to emit, tpy = tons per year ^a Note: Short tons (2,000 pounds), not long or metric tons, are used in PSD applicability calculations. Metric tons are used in the GHG reporting rule.								

9.2 NOISE

9.2.1 Principles of Noise

Sound is a sequence of waves of pressure that propagates through compressible media such as air or water. When sound becomes excessive, annoying, or unwanted, it is often referred to as noise.

The ambient sound level of a region is defined by the total noise generated within the specific environment, and usually comprises natural and man-made sounds. At any location, both the magnitude and frequency of environmental noise may vary considerably over the course of a day and throughout the year. This variation may be caused in part by changing weather conditions and seasonal changes in vegetative cover.

Sound levels, measured in decibels (dB), are perceived differently, depending on length of exposure and time of day. Two measurements used to relate the time-varying quality of environmental noise to its known effects on people are the equivalent sound level (L_{eq}) and the day-night sound level (L_{dn}). L_{eq} is a sound level over a specific time period corresponding to the same sound energy as measured for an instantaneous sound level, assuming it is a constant noise source. L_{dn} is a sound level that takes into account the duration and time the noise is encountered. Specifically, in the calculation of the L_{dn} , late night (after 10:00 p.m.) and early morning (prior to 7:00 a.m.), noise levels are penalized by adding 10 dB to account for people's greater sensitivity to sound during nighttime hours. To account for the human ear being less sensitive to low and high frequencies than to mid-range frequencies, dB levels are corrected using the A-weighted scale (dBA). A 3 dB change of sound level is threshold of a perceptible change by the human ear. A 6 dB change of sound level is considered clearly noticeable, and a 10 dB change is perceived as if the sound level has doubled or halved.

Table 9.2.1-1 demonstrates the relative dBA levels of common sounds measured in the environment and industry, and their loudness relative to the sound level associated with a conversation at a distance of 3 feet.

TABLE 9.2.1-1 Wahpeton Expansion Project Sound Levels (dBA) and Relative Loudness ^a		
Description of Sound	Sound Level (dBA)	Relative Loudness
Threshold of pain	140	256
Jet taking off (200 feet away)	130	128
Operating heavy equipment	120	64
Night club (with music)	110	32
Construction site	100	16
Boiler room	90	8
Freight train (100 feet away)	80	4
Classroom chatter	70	2
Conversation (3 feet away)	60	1
Urban residence	50	1/2
Soft whisper (5 feet away)	40	1/4
North rim of grand canyon	30	1/8
Silent study room	20	1/16
Threshold of human hearing (1,000 Hertz)	0	1/64
^a Adapted from U.S. Department of Labor, 2016		

9.2.2 Noise Regulations

In 1974, the USEPA published a document entitled *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin on Safety* (USEPA 1974). This publication evaluated the effects of environmental noise with respect to health and safety. As set forth in that publication, the USEPA has determined that noise levels should not exceed an L_{dn} of 55 dBA, which is the level that protects the public from indoor and outdoor activity interference. This noise level has been useful for state and federal agencies to establish noise limitations for various noise sources. A 55 dBA L_{dn} noise level equates to a L_{eq} of 48.6 dBA (i.e., a facility that does not exceed a continuous noise impact of 48.6 dBA will not exceed 55 dBA L_{dn}).

In addition to the USEPA publication, WBI Energy's proposed compressor station must comply with the Federal Energy Regulatory Commission's (FERC) noise regulations for interstate pipelines at 18 CFR 380.12(k)(4)(v). These regulations state the following.

- The noise attributable to any new compressor station, compression added to an existing station, or any modification, upgrade, or update of an existing station, must not exceed a L_{dn} of 55 dBA at any pre-existing Noise Sensitive Area (NSA). NSAs include but are not limited to residences, schools and day-care facilities, hospitals, long-term care facilities, places of worship, and libraries. NSAs may also include campgrounds, parks, and wilderness areas valued specifically for their solitude and tranquility.
- New compressor stations or modifications of existing stations shall not result in a perceptible increase in vibration at any NSA.

WBI Energy’s construction activities would comply with FERC guidelines for construction noise. FERC Guidelines state the following: “Construction activity that would or may occur during nighttime hours should be performed with the goal that the activity contribute noise levels below 55 dBA L_{dn} and 48.6 Leq, or no more than 10 dBA over background if ambient noise levels are above 55 dBA L_{dn} ” (FERC, 2017).

North Dakota regulates noise using public nuisance laws but does not impose property-line noise limits for new facilities. Cass and Richland Counties do not regulate noise. The city of Wahpeton has an ordinance *Section 26-168 Loud, Disturbing and Unnecessary Noises Prohibited; Declared a Nuisance*. The ordinance does not contain limits on noise levels but a listing of noises that are considered nuisances such as yelling, loudspeakers, music, and horns. The ordinance does state that noises between 11:00 pm and 7:00 am is considered annoying to disturbing the quiet.

The FERC guidance for operational noise will be the standard used by WBI Energy. The FERC guidance for nighttime construction noise is 55 dBA L_{dn} .

9.2.3 Existing Ambient Noise Levels

9.2.3.1 Mapleton Compressor Station

There are no proposed modifications to the Mapleton Compressor Station that would impact noise emissions; therefore, the Mapleton Compressor Station will not be discussed further in this section.

9.2.3.2 MDU – Kindred Border Station

The MDU – Kindred Border Station will be located in a primarily agricultural area. As shown in figure 9D-1 in Appendix 9D, there are no NSAs within 0.5 mile of the station.

9.2.3.3 MDU – Wahpeton Border Station

The MDU – Wahpeton Border Station will be located in a primarily agricultural area. As shown in figure 9D-2 in appendix 9D, the closest NSA is a residence located 1,660 feet to the south. An ambient noise survey is pending to assess ambient noise levels at NSAs within 0.5 mile of the MDU – Wahpeton Border Station. The resulting *Pre-Construction Noise Survey and Acoustical Analysis Report* will be provided for the final application.

The L_{dn} at each NSA was calculated using the following formula:

$$L_{dn} = 10 * \log \left(\frac{15 * 10^{\frac{L_{eq \text{ day}}}{10}} + 9 * 10^{\frac{L_{eq \text{ night}} + 10}{10}}}{24} \right)$$

Table 9.2.3-1 lists the nearest NSA, its proximity to the border station, and ambient noise survey results.

TABLE 9.2.3-1 Wahpeton Expansion Project Noise Sensitive Areas near the MDU – Wahpeton Border Station				
NSA Name (type)	Distance and Direction to NSA from Project Area	Surveyed Daytime Ambient Noise Level ^a (L _{eq}) dBA	Surveyed Nighttime Ambient Noise Level ^b (L _{eq}) dBA	Calculated Ambient L _{dn} at NSA dBA
NSA 1 (residential)	1,660 feet south	TBD	TBD	TBD
^a Daytime noise survey duration was 1 hour. ^b Nighttime noise survey duration was 15 minutes.				

9.2.4 Construction Noise

The principal noise sources associated with construction of the Project will be operation of heavy equipment (e.g., bulldozers, backhoes, cranes, rollers, and trucks). As referenced in table 9.2.4-1 below, noise from the heavy equipment typically ranges from 55 to 85 dBA at a distance of 50 feet from the source. Noise will be intermittent during most of the 8-month construction period and will occasionally exceed background noise levels that currently characterize the area. The majority of construction activities will take place during the day (7:00 a.m. to 7:00 p.m.) and will not have an impact on nighttime sounds levels; however, nighttime construction activities outlined in section 1.2 of Resource Report 1, may be carried out 24 hours a day until completed.

TABLE 9.2.4-1 Wahpeton Expansion Project Noise Levels of Predominant Noise-Producing Construction Equipment	
Construction Equipment Type	Sound Pressure Levels at 50 feet (dBA)
Trucks	85
Cranes	85
Rollers	80
Bulldozers	85
Pickup trucks	55
Trackhoes	85
Source: U.S. Department of Transportation, 2006	

Noise associated with construction of the pipeline and aboveground facilities will be short term and temporary at any given location because of the assembly-line method of pipeline installation and short timeframes (approximately 1 month) of construction at aboveground facilities. While the noise levels attributable to construction equipment could noticeably increase ambient noise levels at the NSAs nearest the workspace, this noise will be temporary and localized. With the exception of the potential nighttime construction activities outlined in section 1.2 of Resource Report 1, construction activities will be limited to daytime hours. Therefore, most construction noise will not have impacts on residents near the pipeline corridor between the hours of 7:00 pm and 7:00 am. Additionally, due to the temporary nature of these activities, no associated long-term impacts on noise levels are anticipated.

9.2.5 Operational Noise Impacts

9.2.5.1 MDU – Kindred Border Station

WBI Energy proposes to construct, own, and operate metering facilities at the MDU – Kindred Border Station near MP 23.4 of the Project. No NSAs are located within 0.5 mile of the MDU – Kindred Border Station; therefore, no noise impacts are anticipated.

9.2.5.2 MDU – Wahpeton Border Station

WBI Energy proposes to construct, own, and operate metering facilities at the MDU – Wahpeton Border Station on a new tract of land at about MP 60.6 of the Project. WBI operated noise-generating equipment at the MDU – Wahpeton Border Station will include the following:

- *Design of the metering equipment is still ongoing and a noise analysis will be provided with the final application as applicable.*

The calculated noise impact associated with operation of WBI operated equipment at the proposed Wahpeton Border Station at the nearby NSA is provided in table 9.2.5-1.

TABLE 9.2.5-1					
Wahpeton Expansion Project Noise Analysis for Operation of MDU – Wahpeton Border Station					
Nearest NSA Name (type)	Distance and Direction of NSA	Estimated Ambient Noise Level ^a (L _{dn}) dBA	Estimated L _{dn} of the Transfer Station (dBA)	L _{dn} of Station Plus Ambient L _{dn} (dBA)	Estimated Noise Increase (dB)
NSA 1 (residential)	1,660	TBD	TBD	TBD	TBD

Operational noise contributed by WBI operated equipment at the proposed MDU – Wahpeton Border Station is not expected to exceed the 55-dBA L_{dn} requirement at the NSA.

9.2.6 Blowdown Events

Blowdown events of varying duration will occur at compressor stations during startup and commissioning, annual operation, and emergencies but this will not change from what is already occurring at the Mapleton Compressor Station. The sound levels associated with high-pressure gas venting are a function of initial blowdown pressure, the diameter and type of blowdown valve, and the diameter and arrangement of the downstream vent piping. Blowdown sound levels are loudest at the beginning of the blowdown event, and they decrease as the blowdown pressure decreases.

9.2.6.1 Mapleton Compressor Station

No additional preventative maintenance blowdowns will be caused by the Project; therefore, the Project will not result in increased noise at NSAs near the Mapleton Compressor Station due to blowdowns.

9.2.7 Vibration

Operation of construction equipment can cause ground vibrations that dissipate with distance from the source of the vibration. The distance that vibration can be felt from its source is impacted by the soil type and proximity of bedrock. WBI is not anticipating any unconsolidated soils or bedrock in the construction areas so vibration will be localized to the construction site. WBI Energy will comply with the FERC requirement that new compressor stations or modifications of existing stations shall not result in a perceptible increase in vibration at any NSA (18 CFR § 380.12(k)(4)(v)).

9.3 CUMULATIVE IMPACTS

Cumulative impacts are the result of the incremental impacts of an action that, when added to the impacts of other past, present, and reasonably foreseeable future actions (RFFA), would affect the same resources, regardless of what agency or person undertakes those actions (40 CFR 1508.7). Compliance with National Environmental Policy Act requires an analysis of these cumulative impacts (40 CFR 1508.25(a) (2) and 40 CFR 1508.25(c) (3)). An RFFA should have a realistic probability of occurring. These cumulative impacts can derive not only from projects currently under the review of federal regulatory agencies, but also major projects that are being proposed to state or local governments.

WBI Energy has identified projects that have been considered for potential cumulative impacts. These projects were identified by searching publicly available information within and in the vicinity of the Project Study Area. Appendix 1I to Resource Report 1 identifies the location, schedule, and general scope of each RFFA project or activity that may cumulatively impact resources affected by construction of the Project.

9.3.1 Air

As discussed in section 1.10 of Resource Report 1, the geographic scope for cumulative air quality analysis is within 0.25 mile of construction work areas because air emissions during construction would be limited to vehicle and construction equipment emissions and dust and would be highly localized to Project construction sites.

Minimal permanent impacts on air quality resulting from the Project are expected. There will be temporary air quality impacts at all construction locations due to fugitive dust, elevated levels of ambient pollutants, and air emissions from mobile sources and construction equipment during the construction period.

9.3.1.1 Construction Emissions Impacts

While several RFFA projects are located within the geographic scope for construction-related air emissions impacts (within 0.25 mile of the proposed workspace), only the NuStar Pipeline Operating Partnership Pipeline Relocation Project, ongoing agricultural activities, and the North Dakota Department of Transportation (NDDOT) roadway improvement project have the potential to occur within the geographic and temporal scope of the Project since the construction schedules will likely overlap. The pipeline relocation project and roadway improvement project are likely to have similar impacts on air quality as the Project during construction, which would be minimal and temporary. There is potential for the Project and the ongoing agricultural activities to result in increased fugitive dust, however, WBI Energy will operate equipment properly and

minimize potential fugitive dust impacts by adhering to the Department's requirements to monitor dust emissions and provide water trucks. Construction emissions will not extend significantly beyond the project site and no significant cumulative impacts are anticipated with other nearby construction activities.

9.3.1.2 Operational Emissions Impacts

No additional combustion equipment is proposed to be installed for the Project, and the leaking components at above ground facilities, pipeline, and pig launcher/receiver sites are the only anticipated sources of fugitive emissions associated with the Project. Therefore, the Project's permanent impact on existing air quality is expected to be negligible, and the cumulative impacts analysis for the Project's potential to contribute to a cumulative impact on air quality was limited to the construction phase of the Project.

9.3.1.3 Climate Change

The U.S. Global Change Research Program (USGCRP⁴), which is the leading U.S. scientific body on climate change, and the Intergovernmental Panel on Climate Change have recognized the following:

- globally, GHG has been accumulating in the atmosphere since the beginning of the industrial era (circa 1750);
- combustion of fossil fuels (coal, petroleum, and natural gas), combined with agriculture and clearing of forests, is primarily responsible for the accumulation of GHG;
- anthropogenic GHG emissions are the primary contributing factor to climate change; and
- impacts extend beyond atmospheric climate change alone and include changes to water resources, transportation, agriculture, ecosystems, and human health.

In 2017 and 2018, the USGCRP issued its *Climate Science Special Report: Fourth National Climate Assessment, Volumes I and II* (Fourth Assessment Report) (USGCRP, 2017 and 2018, respectively). The Fourth Assessment Report states that climate change has resulted in a wide range of impacts across every region of the country, and the impacts extend beyond atmospheric climate change alone and include changes to water resources, transportation, agriculture, ecosystems, and human health. These changes are driven by the accumulation of GHGs in the atmosphere from the combustion of fossil fuels (coal, petroleum, and natural gas) combined with agriculture, clearing of forests, and other natural sources. These impacts have accelerated throughout the end of the 20th and into the 21st century (USGCRP, 2018).

⁴ The following departments comprise the USGCRP: USEPA, U.S. Department of Energy, U.S. Department of Commerce, U.S. Department of Defense, U.S. Department of Agriculture, U.S. Department of the Interior; U.S. Department of State, Pipeline and Hazardous Materials Safety Administration, Department of Health and Human Services, National Aeronautics and Space Administration, National Science Foundation, Smithsonian Institution, and Agency for International Development.

Observations of environmental impacts attributed to climate change for the Northern Great Plains region include (USGCRP, 2017):

- an increase in average annual temperatures in the region by 1.7°F from 1986 to 2016, with greater changes occurring during the winter season;
- a decrease in the severity of cold extremes, with the coldest daily temperature increasing by 4.4°F, and a decrease in the number of cold extreme days;
- increases in precipitation throughout the year, with the greatest increase seen in the fall (15 percent) and the smallest increase seen in the winter (2 percent);
- decreases in snowfall alongside earlier seasonal snowmelt; and
- an increase in the length of the growing season and the frost-free period (11 days).

The following climate change impacts in the Project region are presented with a high or very high level of confidence (USGCRP, 2017 and 2018):

- warming rates in this region are likely to be higher than for those at lower latitudes (approximately 9.7°F for the late century [2071 to 2100] under a high-emissions scenario);
- extreme precipitation events are likely to increase in frequency and intensity;
- surface soil moisture deficits (especially related to evapotranspiration increases due to increased temperatures);
- risk to existing infrastructure (including transportation and energy) from climate change effects and the risk of cascading infrastructure failures;
- risk to agriculture due to increased temperature extremes, changing precipitation patterns, and changing distribution and incidence of pests and diseases for crops and livestock; and
- risks to human health and wellbeing due to increased heat events, water excess or shortage, and other extreme weather events.

Currently, there is no standard methodology to determine how a project's relatively small incremental contribution to GHGs will translate into physical effects on the global environment. GHGs will be emitted during construction of the Project through the use of diesel and gasoline-fired construction equipment and worker vehicles. There will be no sources of combustion emissions associated with the operation of the Project, and there will be emissions of CH₄ and CO₂ as a result of component leaks and occasional blowdown events or pigging operations. Emissions of GHGs during construction and operation of the Project will cause an incremental increase to the existing inventory of GHG emissions; however, the significance of the incremental increase is unknown.

In addition, the downstream end use of transported natural gas would result in GHG emissions. The Project will help satisfy natural gas demand in Wahpeton and Kindred, North Dakota and the Project is being completed per the request of government officials and residents of those communities. The gas will be used for residential heating as well as supporting the growing value-added agricultural processors in the area.

Accordingly, it is unknown whether the Project's increase in transportation capacity will result in a proportional increase in end-use GHG emissions since end users could be using another source such as propane or oil for their energy needs. If all of the natural gas being delivered was combusted and the offsets for the energy source the natural gas is replacing are not factored in, the resulting GHG emissions would be 450,000 CO₂e tons per year. According to the USEPA, the global emissions of CO₂e in 2015 were 47 billion tons and have risen since 2015. The contribution of CO₂e from this project is very small compared to the global emissions (<https://www.epa.gov/climate-indicators/climate-change-indicators-global-greenhouse-gas-emissions>).

9.3.2 Noise

As discussed in section 1.10 of Resource Report 1, the geographic scope for cumulative noise analysis is 0.25 mile for daytime construction and 0.5 mile for nighttime or 24-hour construction because areas in the immediate proximity of construction activities have the potential to be affected by construction noise. The geographic scope for cumulative operational noise impacts is areas within 0.5 mile of an aboveground facility because noise from the Project's permanent facilities is not anticipated to have an impact beyond 0.5 mile.

It is expected that the Project will have minimal new permanent impacts on noise quality since additional compressors are not being added. There will also be temporary noise impacts due to sound emissions from mobile sources and construction equipment during the construction period. These impacts will be minimized to the extent possible by complying with federal and local noise standards.

9.3.2.1 Construction Noise Impacts

There are four RFFAs within the geographic and temporal scope of the Project that may cumulatively affect noise during construction: The NuStar Pipeline Operating Partnership, L.P. pipeline relocation project, ongoing agricultural activities, and two NDDOT transportation projects (NDDOT 19 and NDDOT 23). NDDOT 9, NDDOT 10, and the MDU Distribution Service project are located within the geographic scope for construction noise impacts, but the NDDOT projects will be completed prior to the Project, and work related to the MDU Distribution Service will likely occur simultaneously or after the Project has been completed. Although MDU's construction may occur simultaneously with the Project, construction noise is highly localized and very little if any construction activity associated with the MDU Distribution Service would occur within the 0.25 mile geographic scope for cumulative construction noise impacts. In addition, these activities would likely be limited to daytime hours, and minimal cumulative effects on noise during construction are anticipated. Since these projects will not occur within the temporal scope of the Project, they will not contribute to a cumulative construction noise impact.

While increases over existing ambient sound levels may occur at nearby NSAs, noise generated by pipeline construction will be short term and transient, lasting for short durations at any nearby NSAs. Additionally, it is unlikely that simultaneous construction of all RFFA projects

will occur at any given location along the proposed Project areas. No significant or long-term cumulative construction noise impacts are therefore expected to occur.

9.3.2.2 Operational Noise Impacts

The Kindred Airport Expansion project would extend to be located within 0.5 mile from the Kindred Border Station and could contribute to a cumulative noise impact during operation of the Project and the airport. However, because airport traffic is already prevalent in the area due to the existing runway, and because any operational noise at the Kindred Border Station is expected to be minimal, no significant cumulative impacts on noise are anticipated. Noise generated by past and present actions is part of the measured ambient noise levels and have therefore already been taken into account.

9.4 REFERENCES

- Federal Energy Regulatory Commission. 2017. Guidance Manual for Environmental Report Preparation for Applications Filed Under the Natural Gas Act, Volume I. February 2017.
- U.S. Department of Labor. 2016. OSHA Technical Manual. Available online at https://www.osha.gov/dts/osta/otm/otm_extended_toc.html. Accessed September 2019.
- U.S. Department of Transportation. 2006. Construction Noise Handbook. Available online at: https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm. Accessed September 2019.
- U.S. Environmental Protection Agency. 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. Report No. 550/9-74-004.
- U.S. Environmental Protection Agency. 2021. Green Book Nonattainment Areas. Available online at: <http://www.epa.gov/airquality/greenbook/index.html>. December 2021.
- U.S. Environmental Protection Agency. 2022. National Ambient Air Quality Standards Table. Available online at: <https://www.epa.gov/criteria-air-pollutants/naaqs-table>. Accessed January 2022.
- U.S. Environmental Protection Agency. Climate Change Indicators Website. <https://www.epa.gov/climate-indicators/climate-change-indicators-global-greenhouse-gas-emissions>. Accessed January 2022.
- U.S. Global Change Research Program. 2017. Climate Science Special Report: Fourth National Climate Assessment, Volume I. Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock, Eds., U.S. Global Change Research Program. Available online at: <https://science2017.globalchange.gov/>. Accessed February 2022.
- U.S. Global Change Research Program. 2018. Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II. Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart, Eds., U.S.

Global Change Research Program. Available online at:
<https://nca2018.globalchange.gov/>. Accessed February 2022.

Wahpeton, North Dakota. 2021. City Ordinance Questions. Available online at
<https://www.wahpeton.com/ordinancequestions> December 2021.

APPENDIX 9A FUGITIVE DUST CONTROL PLAN



WBI ENERGY TRANSMISSION, INC.

Wahpeton Expansion Project

Appendix 9A

Fugitive Dust Control Plan

Draft

**Docket No.
PF21-4-000**

March 2022

**WAHPETON EXPANSION PROJECT
WBI ENERGY TRANSMISSION, INC.
FUGITIVE DUST CONTROL PLAN**

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
2.0	NORTH DAKOTA REGULATORY REQUIREMENTS.....	1
3.0	FUGITIVE DUST SOURCES	2
4.0	BEST PRACTICAL METHODS OF FUGITIVE DUST CONTROL.....	2
5.0	RESPONSIBLE PARTY	4
6.0	PROJECT CONTACT FOR LANDOWNERS	4
7.0	GENERAL CONTRACTORS.....	4

ACRONYMS AND ABBREVIATIONS

BMP	best management practice
EI	Environmental Inspector
NDAC	North Dakota Administrative Code
Project	North Bakken Expansion Project
WBI Energy	WBI Energy Transmission, Inc.

1.0 INTRODUCTION

This *Fugitive Dust Plan* was prepared for WBI Energy Transmission, Inc.'s (WBI Energy) proposed Wahpeton Expansion Project (Project). This *Fugitive Dust Control Plan* was developed as a guide for construction and field personnel on the implementation of appropriate measures to minimize and control the generation of fugitive dust during construction activities associated with the Project. It will be the responsibility of the Project contractors, working with WBI Energy field representatives, to identify activities that are generating dust and to at all times control airborne dust levels during construction activities to acceptable levels that are in compliance with any applicable standards, including those established by the North Dakota Department of Health, and other regulating agencies and local ordinances.

Construction of the Project will involve land disturbing activities, which can increase the susceptibility of soils to erosion caused by wind and water. Wind erosion can damage the productivity of the land by reducing soil moisture, altering soil structure, and carrying away soil nutrients and topsoil. A small amount of soil loss from wind erosion occurs naturally; however, human activity, such as pipeline construction, can dramatically increase soil loss due to wind erosion (fugitive dust) and potentially create conditions that could be detrimental to air quality and safety. Fugitive dust is a type of non-point source air pollution that can cause respiratory distress for construction workers as well as nearby residents and wildlife. Additionally, fugitive dust can create a safety hazard by obscuring visibility for equipment operators, construction personnel, and traffic on public roads near the Project.

2.0 NORTH DAKOTA REGULATORY REQUIREMENTS

Fugitive dust emissions are regulated under the North Dakota Administrative Code (NDAC) Title 33, Article 15, Chapter 17. This regulation dictates that, "No person shall cause or permit fugitive emissions from any source whatsoever, including a building, its appurtenances, or a road, to be used, constructed, altered, repaired, or demolished; or activities such as loading, unloading, storing, handling, or transporting of materials without taking reasonable precautions to prevent such emissions from causing air pollution as defined in NDAC Section 33-15-01-04."

Specifically, NDAC § 33-15-17-02 restricts emissions of fugitive particulate [dust] which:

- "Exceed the ambient air quality standards of chapter 33-15-02 at or beyond the property line of the source.
- Exceed the prevention of significant deterioration of air quality increments of chapter 33-15-15 at or beyond the property line of the source for sources subject to chapter 33-15-15.
- Exceed the restrictions on the emission of visible air contaminants of chapter 33-15-03, at or beyond the property line of the source, except as provided in section 33-15-03-04.
- Would have an adverse impact on visibility, as defined in chapter 33-15-19, on any class I federal area."

Title 33, Article 15, Chapter 17, Section 03, Subdivision 29 of the NDAC lists reasonable precautions for abating and preventing fugitive particulate [dust] emissions. Abatement and preventative fugitive particulate control measure include, but are not limited to:

- (1) "Wetting down, including prewatering.
- (2) Landscaping and replanting with native vegetation.
- (3) Covering, shielding or enclosing the area.
- (4) Paving, temporary or permanent.
- (5) Treating, the use of dust palliatives and chemical stabilization.
- (6) Detouring.
- (7) Restricting the speed of vehicles on sites.
- (8) Preventing the deposit of dirt and mud on improved streets and roads.
- (9) Minimizing topsoil disturbance and reclaiming as soon as possible."

3.0 FUGITIVE DUST SOURCES

Fugitive dust is created when particulate matter is disturbed and becomes airborne. During construction of the Project, various activities have the potential to cause emissions of fugitive dust. These activities include, but may not be limited to:

- vegetation clearing activities;
- grading of topsoil and subsoil, including cut-and-fill areas on steep side slopes;
- excavation, temporary side casting of spoil, and backfilling;
- grading associated with reestablishing contours and restoring segregated topsoil;
- vehicle traffic on unpaved access roads;
- vehicle track-out onto roads;
- vehicle and equipment travel down the Project right-of-way;
- loading bulk materials; and
- open-bodied trucks hauling sand, soil, gravel, or other materials.

WBI Energy's contractors and field representatives will identify activities that are generating fugitive dust, implement feasible dust abatement techniques or best management practices (BMP) to control dust, and maintain compliance with applicable fugitive dust regulations.

4.0 BEST PRACTICAL METHODS OF FUGITIVE DUST CONTROL

Dust suppression measures will be employed as necessary to control fugitive dust emissions to maintain compliance with the regulations set forth in the NDAC. To minimize wind erosion and fugitive dust emissions during construction, WBI Energy will implement the following reasonably available control measures:

- To the extent possible, utilize existing highways, frontage roads, and secondary roads, for access to the Project's construction right-of-way.
- Keep paved access roads free of mud and soil that is tracked onto the road surface from construction vehicles.

- If soil is transported onto a public road surface or other paved area, including parking lots, by construction equipment and vehicles, it will be removed as soon as practical from the road by shoveling or sweeping, and will be transported back to a designated sediment control disposal area within the construction right-of-way.
- Use dust abatement techniques (i.e., applying water or approved nontoxic chemical dust suppressants) on unpaved or un-vegetated areas or other areas susceptible to wind erosion, including the Project's construction right-of-way, approved work areas, and unpaved roads, at least daily as needed in areas of active construction. Magnesium chloride may be used on unpaved roads as a dust suppressant, only water will be used on the right-of-way. Application of dust suppressants will be repeated as necessary and as determined by an Environmental Inspector (EI).
- Water for dust control will be obtained from municipal sources and nearby water sources where the necessary permits required by federal, state, and local agencies for the procurement of water have been secured. No unapproved water sources may be used for Project activities including dust control.
- Temporarily stockpiled soils (topsoil and spoil) will be stabilized by spraying with water to create a semi-hard protective layer to minimize wind erosion or with a temporary cover species such as oats or ryegrass, when necessary, and as determined by an EI.
- Project-related traffic speeds will be controlled on the construction right-of-way and within other Project facilities to limit the amount of disturbance from vehicle traffic;
- Speed limits will be decreased when excessive winds prevail and where sensitive areas such as public roads are adjacent to access roads or the construction right-of-way.
- Open-bodied trucks carrying sand, soil, gravel, or other materials will be covered where necessary to prevent such materials from being expelled.
- Construction entrance/exit access locations onto paved roads will be cleaned at a minimum of once every 48 hours, or as needed, if materials are observed to be accumulating on the road surface.
- In construction areas adjacent to highways where dust could cause poor visibility, WBI Energy will implement additional BMPs to minimize dust and potential safety issues. These additional BMPs may include applying water as close to earth-moving equipment as possible, slowing the speed of construction equipment, spacing equipment further apart, increased traffic control, or shutting down operations during high wind periods. WBI Energy will coordinate with the appropriate highway authorities to ensure adequate traffic control measures are in place, including the possibility of using flaggers to control traffic if extreme low visibility conditions develop.

- When opacity along dirt roads and the right-of-way exceeds 20 percent (objects partially obscured), construction activity shall cease until dust control measures are employed.
- Other dust control measures, such as the use of wind fences or berms, may also be implemented as needed.

The frequency of water application will largely depend on weather conditions. Additionally, WBI Energy will attempt to begin cleanup and rough grading of an area within 72 hours after backfilling occurs in that area and complete cleanup within 20 days after backfilling, weather and soil conditions permitting. If seasonal or other weather conditions prevent compliance with the time frames, the contractor shall stabilize the right-of-way and maintain erosion and sediment control measures until cleanup can be conducted. Disturbed areas will be permanently revegetated in accordance with applicable permit conditions and landowner requirements.

5.0 RESPONSIBLE PARTY

WBI Energy or their designated contractor will be responsible for dust control in their respective Project areas during the construction phase of the Project (7 days a week, including weekends and holidays). WBI Energy or their designated contractor will have a copy of this *Fugitive Dust Control Plan* available on-site at all times. Problem areas or potential problem areas that are identified during construction must be controlled as soon as possible after being brought to the attention of the contractor.

6.0 PROJECT CONTACT FOR LANDOWNERS

An environmental complaint resolution process will be implemented for the Project to quickly and effectively remedy environmental issues that may be reported by landowners. Prior to construction, landowners will be provided with a Project phone number to facilitate communication regarding environmental complaints, including fugitive dust.

7.0 GENERAL CONTRACTORS

The general contractors' contact information will be incorporated into this plan prior to construction. The contractors chosen for the Project will implement the dust control measures specified in this plan, while WBI Energy's EIs will be primarily responsible for monitoring and enforcing the implementation of needed dust control measures as well as ensuring that dust control is effective and proper documentation is maintained. Construction site personnel will be educated on the measures outlined in this plan.

APPENDIX 9B CONSTRUCTION EMISSIONS CALCULATIONS



Project: Wahpeton Expansion Project
 Subject: Construction Emissions
 Task: Construction Emission Totals for Entire Project - Appendix 9B

Prepared by: PCB
 Reviewed by: AMC
 Date: 2/17/2022

Total Emissions	Pollutant (Tons)							
	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	HAP	CO ₂ e ¹
Mapleton Compressor Station - Cass County								
Diesel Non-Road Equipment	0.02	0.06	4.13E-03	4.00E-03	7.23E-05	6.55E-03	3.40E-03	24.64
Diesel and Gas On-Road Equipment	0.06	0.01	2.46E-04	2.22E-04	3.11E-05	2.12E-03	5.20E-04	6.36
Construction Activity Fugitive Dust	---	---	2.65E-02	2.92E-03	---	---	---	---
Unpaved Roadway Fugitive Dust	---	---	3.02E-03	3.02E-04	---	---	---	---
Emissions Total:	0.09	0.08	3.39E-02	7.45E-03	1.03E-04	8.67E-03	3.92E-03	31.00
Kindred Border Station - Cass County								
Diesel Non-Road Equipment	0.16	0.33	3.18E-02	3.09E-02	3.95E-04	3.70E-02	1.90E-02	133.82
Diesel and Gas On-Road Equipment	0.12	0.03	5.79E-04	5.25E-04	6.89E-05	4.26E-03	1.02E-03	15.08
Construction Activity Fugitive Dust	---	---	2.99E-01	4.49E-02	---	---	---	---
Unpaved Roadway Fugitive Dust	---	---	3.64E-03	3.64E-04	---	---	---	---
Emissions Total:	0.28	0.35	0.34	7.67E-02	4.64E-04	4.13E-02	2.00E-02	148.89
Wahpeton Border Station - Richland County								
Diesel Non-Road Equipment	0.15	0.30	3.05E-02	2.96E-02	3.81E-04	3.46E-02	1.77E-02	129.21
Diesel and Gas On-Road Equipment	0.12	0.03	5.79E-04	5.25E-04	6.89E-05	4.27E-03	1.03E-03	15.09
Construction Activity Fugitive Dust	---	---	2.99E-01	4.49E-02	---	---	---	---
Unpaved Roadway Fugitive Dust	---	---	3.29E-03	3.29E-04	---	---	---	---
Emissions Total:	0.27	0.33	0.33	7.53E-02	4.50E-04	3.89E-02	1.88E-02	144.30
Cass County Pipeline Segment²								
Diesel Non-Road Equipment	29.49	12.10	1.37	1.31	1.95E-02	1.00E+01	3.39E+00	6,475.88
Diesel and Gas On-Road Equipment	11.80	1.02	2.39E-02	2.11E-02	3.81E-03	3.46E-01	8.96E-02	576.89
Construction Activity Fugitive Dust	---	---	34.26	4.73	---	---	---	---
Unpaved Roadway Fugitive Dust	---	---	3.46	0.35	---	---	---	---
Emissions Total:	41.28	13.12	39.11	6.41	2.33E-02	1.04E+01	3.48E+00	7,052.77
Richland County Pipeline Segment²								
Diesel Non-Road Equipment	41.99	17.23	1.95	1.87	2.78E-02	1.43E+01	4.83E+00	9,221.66
Diesel and Gas On-Road Equipment	16.98	1.46	3.40E-02	3.01E-02	5.44E-03	4.95E-01	1.28E-01	823.53
Construction Activity Fugitive Dust	---	---	49.88	6.88	---	---	---	---
Unpaved Roadway Fugitive Dust	---	---	5.09	0.51	---	---	---	---
Emissions Total:	58.96	18.69	56.96	9.29	3.33E-02	1.48E+01	4.96E+00	10,045.19
Project Emission Totals:	100.61	32.22	96.43	15.78	0.06	25.21	8.46	17,273.26

¹ CO₂e is the sum of CO₂, CH₄, and N₂O multiplied by the applicable global warming potential expressed in tons.

² Valve Station emissions are included in the other emissions categories as follows:

- Valve Station #1 - Mapleton Compressor Station
- Valve Station #2 - Cass County Pipeline
- Valve Station #3 - Kindred Border Station
- Valve Stations #4-6 - Richland County Pipeline
- Valve Station #7 - Wahpeton Border Station



Project: Wahpeton Expansion Project
 Subject: Construction Emissions
 Task: Off-Road Construction Equipment Information - Appendix 9B

Prepared by: PCB
 Reviewed by: AMC
 Date: 2/17/2022

Equipment Type	MOVES Category	Fuel Type ¹	Load Factor ¹	Engine Rating ¹	Quantity ¹	Hours Per Week ¹	Total Weeks ¹	Total Hours for Project ¹	Estimated Fuel Consumption (gallons/hr)	Estimated Fuel Consumption (MMBtu/hr)	MOVES Emission Factor												
				(hp)							CO ²	NO _x ²	PM ₁₀ ²	PM _{2.5} ²	SO ₂ ²	VOCs ²	Total HAP ²	CO ₂ ²	CH ₄ ³	N ₂ O ³			
											(g/hp-hr)	(g/hp-hr)	(g/hp-hr)	(g/hp-hr)	(g/hp-hr)	(g/hp-hr)	(g/hp-hr)	(g/hp-hr)	(kg/MMBtu)	(kg/MMBtu)			
Mapleton Compressor Station - Cass County																							
Trackhoes	Tractors/Loaders/Backhoes	Diesel	0.59	200	1	10	2	20	2.162	0.296	0.8360	1.5001	0.1660	0.1610	0.0019	0.2013	0.1057	626	0.003	0.0006			
Air Compressors	Air Compressors	Diesel	0.59	100	1	10	1	10	1.081	0.148	0.2223	1.0343	0.0556	0.0539	0.0015	0.0480	0.0255	531	0.003	0.0006			
Concrete Mixer Truck	Cement & Mortar Mixers	Diesel	0.59	250	1	1	1	1	2.702	0.370	0.4038	1.6244	0.0686	0.0666	0.0016	0.1132	0.0573	531	0.003	0.0006			
Truck Mounted Crane	Cranes	Diesel	0.59	250	1	20	4	80	2.702	0.370	0.1141	0.4403	0.0227	0.0220	0.0015	0.0303	0.0149	531	0.003	0.0006			
Dump Truck	Dumpers/Tenders	Diesel	0.59	325	1	1	1	1	3.513	0.481	1.1140	2.1175	0.2520	0.2444	0.0019	0.2630	0.1346	626	0.003	0.0006			
Welding Rigs	Welders	Diesel	0.59	25	3	40	4	480	0.811	0.111	1.3603	3.4305	0.2060	0.1998	0.0022	0.3644	0.1901	695	0.003	0.0006			
Kindred Border Station - Cass County																							
Scraper	Scrapers	Diesel	0.59	350	1	10	1	10	3.783	0.518	0.2660	0.6740	0.0461	0.0448	0.0015	0.0388	0.0199	537	0.003	0.0006			
Dozers	Crawler Tractor/Dozers	Diesel	0.59	200	1	50	2	100	2.162	0.296	0.0798	0.2581	0.0178	0.0173	0.0014	0.0187	0.0084	537	0.003	0.0006			
Grader	Graders	Diesel	0.59	200	1	50	1	50	2.162	0.296	0.0736	0.2431	0.0166	0.0161	0.0014	0.0177	0.0079	537	0.003	0.0006			
Trackhoes	Tractors/Loaders/Backhoes	Diesel	0.59	200	1	50	3	150	2.162	0.296	0.8360	1.5001	0.1660	0.1610	0.0019	0.2013	0.1057	626	0.003	0.0006			
Air Compressors	Air Compressors	Diesel	0.59	100	1	50	1	50	1.081	0.148	0.2223	1.0343	0.0556	0.0539	0.0015	0.0480	0.0255	531	0.003	0.0006			
Concrete Mixer Truck	Cement & Mortar Mixers	Diesel	0.59	250	1	10	2	20	2.702	0.370	0.4038	1.6244	0.0686	0.0666	0.0016	0.1132	0.0573	531	0.003	0.0006			
Skid Steer Loader	Skid Steer Loaders	Diesel	0.59	50	1	50	3	150	0.540	0.074	1.6747	3.3090	0.2333	0.2263	0.0023	0.3219	0.1583	695	0.003	0.0006			
Large Crane	Cranes	Diesel	0.59	350	1	5	1	5	3.783	0.518	0.3433	1.1178	0.0558	0.0541	0.0016	0.0698	0.0370	531	0.003	0.0006			
Truck Mounted Crane	Cranes	Diesel	0.59	250	1	50	3	150	2.702	0.370	0.1141	0.4403	0.0227	0.0220	0.0015	0.0303	0.0149	531	0.003	0.0006			
Front End Loader	Tractors/Loaders/Backhoes	Diesel	0.59	200	1	50	1	50	2.162	0.296	0.8360	1.5001	0.1660	0.1610	0.0019	0.2013	0.1057	626	0.003	0.0006			
Dump Truck	Dumpers/Tenders	Diesel	0.59	325	1	50	4	200	3.513	0.481	1.1140	2.1175	0.2520	0.2444	0.0019	0.2630	0.1346	626	0.003	0.0006			
Welding Rigs	Welders	Diesel	0.59	25	3	40	3	360	0.811	0.111	1.3603	3.4305	0.2060	0.1998	0.0022	0.3644	0.1901	695	0.003	0.0006			
Wahpeton Border Station - Richland County																							
Scraper	Scrapers	Diesel	0.59	350	1	10	1	10	3.783	0.518	0.2660	0.6740	0.0461	0.0448	0.0015	0.0388	0.0199	537	0.003	0.0006			
Dozers	Crawler Tractor/Dozers	Diesel	0.59	200	1	50	2	100	2.162	0.296	0.0798	0.2581	0.0178	0.0173	0.0014	0.0187	0.0084	537	0.003	0.0006			
Grader	Graders	Diesel	0.59	200	1	50	1	50	2.162	0.296	0.0736	0.2431	0.0166	0.0161	0.0014	0.0177	0.0079	537	0.003	0.0006			
Trackhoes	Tractors/Loaders/Backhoes	Diesel	0.59	200	1	50	3	150	2.162	0.296	0.8360	1.5001	0.1660	0.1610	0.0019	0.2013	0.1057	626	0.003	0.0006			
Air Compressors	Air Compressors	Diesel	0.59	100	1	50	1	50	1.081	0.148	0.2223	1.0343	0.0556	0.0539	0.0015	0.0480	0.0255	531	0.003	0.0006			
Concrete Mixer Truck	Cement & Mortar Mixers	Diesel	0.59	250	1	10	2	20	2.702	0.370	0.4038	1.6244	0.0686	0.0666	0.0016	0.1132	0.0573	531	0.003	0.0006			
Skid Steer Loader	Skid Steer Loaders	Diesel	0.59	50	1	50	3	150	0.540	0.074	1.6747	3.3090	0.2333	0.2263	0.0023	0.3219	0.1583	695	0.003	0.0006			
Large Crane	Cranes	Diesel	0.59	350	1	5	1	5	3.783	0.518	0.3433	1.1178	0.0558	0.0541	0.0016	0.0698	0.0370	531	0.003	0.0006			
Truck Mounted Crane	Cranes	Diesel	0.59	250	1	50	3	150	2.702	0.370	0.1141	0.4403	0.0227	0.0220	0.0015	0.0303	0.0149	531	0.003	0.0006			
Front End Loader	Tractors/Loaders/Backhoes	Diesel	0.59	200	1	50	1	50	2.162	0.296	0.8360	1.5001	0.1660	0.1610	0.0019	0.2013	0.1057	626	0.003	0.0006			
Dump Truck	Dumpers/Tenders	Diesel	0.59	325	1	50	4	200	3.513	0.481	1.1140	2.1175	0.2520	0.2444	0.0019	0.2630	0.1346	626	0.003	0.0006			
Welding Rigs	Welders	Diesel	0.59	25	3	40	3	120	0.811	0.111	1.3603	3.4305	0.2060	0.1998	0.0022	0.3644	0.1901	695	0.003	0.0006			
Cass County Pipeline Segment2																							
Bulldozer (Cat D8T)	Crawler Tractor/Dozers	Diesel	0.59	354	10	48	5	2,376	38.267	5.243	0.2504	0.6379	0.0437	0.0424	0.0015	0.0370	0.0188	537	0.003	0.0006			
Motor Grader (Cat 150)	Graders	Diesel	0.59	200	3	48	5	713	6.486	0.889	0.0736	0.2431	0.0166	0.0161	0.0014	0.0177	0.0079	537	0.003	0.0006			
Frontend Loader (Cat 950GC)	Tractors/Loaders/Backhoes	Diesel	0.59	225	5	48	5	1,188	12.161	1.666	0.8360	1.5001	0.1660	0.1610	0.0019	0.2013	0.1057	626	0.003	0.0006			
Backhoe Loader (Cat 416F2)	Tractors/Loaders/Backhoes	Diesel	0.59	87	10	24	13	3,069	9.405	1.288	2.6303	2.3953	0.3856	0.3740	0.0021	0.2561	0.1319	695	0.003	0.0006			
Skid-steer Loader (Cat 249D)	Skid Steer Loaders	Diesel	0.59	67	10	24	13	3,069	7.243	0.992	1.6747	3.3090	0.2333	0.2263	0.0023	0.3219	0.1583	695	0.003	0.0006			
Trencher (Wolfe 7000)	Trenchers	Diesel	0.59	440	1	48	2	79	4.756	0.652	0.5973	1.3502	0.0961	0.0932	0.0016	0.0830	0.0436	537	0.003	0.0006			
Trackhoe (Cat 336GC)	Tractors/Loaders/Backhoes	Diesel	0.59	273	30	24	13	9,208	88.533	12.129	0.8360	1.5001	0.1660	0.1610	0.0019	0.2013	0.1057	626	0.003	0.0006			
Guided Bore Machine (D220X500)	Bore/Drill Rigs	Diesel	0.59	415	1	48	2	79	4.486	0.615	0.4621	1.6000	0.0655	0.0635	0.0016	0.0972	0.0501	531	0.003	0.0006			
Guided Bore Machine (D100x140)	Bore/Drill Rigs	Diesel	0.59	275	5	48	2	594	14.864	2.036	0.3966	1.5415	0.0731	0.0709	0.0016	0.1077	0.0550	531	0.003	0.0006			
Bending Machine (6"-12")	Welders	Diesel	0.59	51	1	24	5	119	0.551	0.076	1.8811	3.4250	0.2612	0.2534	0.0023	0.3654	0.1763	695	0.003	0.0006			
Sideboom (Cat PL83)	Cranes	Diesel	0.59	319	10	12	2	297	34.484	4.724	0.3433	1.1178	0.0558	0.0541	0.0016	0.0698	0.0370	531	0.003	0.0006			
Telehandler (Cat TL943D)	Cranes	Diesel	0.59	111	3	24	13	921	3.600	0.493	0.1491	0.6355	0.0371	0.0360	0.0015	0.0298	0.0157	531	0.003	0.0006			
Boom Truck (20-ton)	Cranes	Diesel	0.59	260	2	12	13	307	5.621	0.770	0.1141	0.4403	0.0227	0.0220	0.0015	0.0303	0.0149	531	0.003	0.0006			
Dump Truck (58,000 GVWR)	Dumpers/Tenders	Diesel	0.59	330	5	24	13	1,535	17.836	2.444	1.1140	2.1175	0.2520	0.2444	0.0019	0.2630	0.1346	626	0.003	0.0006			
Water Truck (4000-gal)	Off-highway Trucks	Diesel	0.59	260	2	12	13	307	5.621	0.770	0.0228	0.1187	0.0071	0.0069	0.0014	0.0101	0.0036	537	0.003	0.0006			
Utility Tractor (Deere 5100R)	Off-Highway Tractors	Diesel	0.59	175	2	48	3	317	3.783	0.518	0.1004	0.3066	0.0217	0.0211	0.0014	0.0219	0.0102	537	0.003	0.0006			
Concrete Mixer Truck (10-yd3)	Cement & Mortar Mixers	Diesel	0.59	475	7	24	0	69	35.943	4.924	0.4492	1.5958	0.0585	0.0567	0.0016	0.0966	0.0498	531	0.003	0.0006			
Welding Rig (RT6)	Welders	Diesel	0.59	155	10	48	5	2,376	16.755	2.295	1.1540	2.2104	0.2463	0.2389	0.0019	0.2878	0.1447	626	0.003	0.0006			
Welding Machine (20-400 A)	Welders	Diesel	0.59	20	20	48	5	4,752	4.324	0.592	2.1509	3.9802	0.2529	0.2453	0.0026	0.5104	0.2685	695	0.003	0.0006			
Air Compressors (1800 CFM)	Air Compressors	Diesel	0.59	525	1	144	1	119	5.675	0.778	0.3663	1.2990	0.0560	0.0543	0.0016	0.0740	0.0383	531	0.003	0.0006			
Air Compressors (185 CFM)	Air Compressors	Diesel	0.59	49	5	48	2	396	2.648	0.363	0.3166	2.5766	0.0282	0.0273	0.0016	0.1022	0.0556	590	0.003	0.0006			
Generators (145REOZT4)	Generator Sets	Diesel	0.59	201	2	12	13	307	4.346	0.595	0.4004	1.6416	0.0716	0.0694	0.0016	0.1128	0.0558	531	0.003	0.0006			
Generators (55REOZT4)	Generator Sets	Diesel	0.59	75	5	12	13	767	4.054	0.555	1.1764	2.5415	0.1950	0.1891	0.0018	0.1720	0.0838						



Project: Wahpeton Expansion Project
 Subject: Construction Emissions
 Task: Off-Road Construction Equipment Information - Appendix 9B

Prepared by: PCB
 Reviewed by: AMC
 Date: 2/17/2022

Equipment Type	MOVES Category	Fuel Type ¹	Load Factor ¹	Engine Rating ¹	Quantity ¹	Hours Per Week ¹	Total Weeks ¹	Total Hours for Project ¹	Estimated Fuel Consumption (gallons/hr)	Estimated Fuel Consumption (MMBtu/hr)	MOVES Emission Factor											
											CO ²	NO _x ²	PM ₁₀ ²	PM _{2.5} ²	SO ₂ ²	VOCs ²	Total HAP ²	CO ₂ ²	CH ₄ ³	N ₂ O ³		
				(hp)							(g/hp-hr)	(g/hp-hr)	(g/hp-hr)	(g/hp-hr)	(g/hp-hr)	(g/hp-hr)	(g/hp-hr)	(kg/MMBtu)	(kg/MMBtu)			
Richland County Pipeline Segment2																						
Bulldozer (Cat D8T)	Crawler Tractor/Dozers	Diesel	0.59	354	10	48	7	3,384	38.267	5.243	0.2504	0.6378	0.0437	0.0424	0.0015	0.0370	0.0188	537	0.003	0.0006		
Motor Grader (Cat 150)	Graders	Diesel	0.59	200	3	48	7	1,015	6.486	0.889	0.0736	0.2431	0.0166	0.0161	0.0014	0.0177	0.0079	537	0.003	0.0006		
Frontend Loader (Cat 950GC)	Tractors/Loaders/Backhoes	Diesel	0.59	225	5	48	7	1,692	12.161	1.666	0.8360	1.5001	0.1660	0.1610	0.0019	0.2013	0.1057	626	0.003	0.0006		
Backhoe Loader (Cat 416F2)	Tractors/Loaders/Backhoes	Diesel	0.59	87	10	24	18	4,371	9.405	1.288	2.6303	2.3953	0.3856	0.3740	0.0021	0.2561	0.1319	695	0.003	0.0006		
Skid-steer Loader (Cat 249D)	Skid Steer Loaders	Diesel	0.59	67	10	24	18	4,371	7.243	0.992	1.6747	3.3090	0.2333	0.2263	0.0023	0.3219	0.1583	695	0.003	0.0006		
Trencher (Wolfe 7000)	Trenchers	Diesel	0.59	440	1	48	2	113	4.756	0.652	0.5973	1.3502	0.0961	0.0932	0.0016	0.0830	0.0436	537	0.003	0.0006		
Trackhoe (Cat 336GC)	Tractors/Loaders/Backhoes	Diesel	0.59	273	30	24	18	13,112	88.533	12.129	0.8360	1.5001	0.1660	0.1610	0.0019	0.2013	0.1057	626	0.003	0.0006		
Guided Bore Machine (D220X500)	Bore/Drill Rigs	Diesel	0.59	415	1	48	2	113	4.486	0.615	0.4621	1.6000	0.0655	0.0635	0.0016	0.0972	0.0501	531	0.003	0.0006		
Guided Bore Machine (D100x140)	Bore/Drill Rigs	Diesel	0.59	275	5	48	4	846	14.864	2.036	0.3966	1.5415	0.0731	0.0709	0.0016	0.1077	0.0550	531	0.003	0.0006		
Bending Machine (6'-12")	Welders	Diesel	0.59	51	1	24	7	169	0.551	0.076	1.8811	3.4250	0.2612	0.2534	0.0023	0.3654	0.1763	695	0.003	0.0006		
Sideboom (Cat PL83)	Cranes	Diesel	0.59	319	10	12	4	423	34.484	4.724	0.3433	1.1178	0.0558	0.0541	0.0016	0.0698	0.0370	531	0.003	0.0006		
Telehandler (Cat TL943D)	Cranes	Diesel	0.59	111	3	24	18	1,311	3.600	0.493	0.1491	0.6355	0.0371	0.0360	0.0015	0.0298	0.0157	531	0.003	0.0006		
Boom Truck (20-ton)	Cranes	Diesel	0.59	260	2	12	18	437	5.621	0.770	0.1141	0.4403	0.0227	0.0220	0.0015	0.0303	0.0149	531	0.003	0.0006		
Dump Truck (58,000 GVWR)	Dumpers/Tenders	Diesel	0.59	330	5	24	18	2,185	17.836	2.444	1.1140	2.1175	0.2520	0.2444	0.0019	0.2630	0.1346	626	0.003	0.0006		
Water Truck (4000-gal)	Off-highway Trucks	Diesel	0.59	260	2	12	18	437	5.621	0.770	0.0228	0.1187	0.0071	0.0069	0.0014	0.0101	0.0036	537	0.003	0.0006		
Utility Tractor (Deere 5100R)	Off-Highway Tractors	Diesel	0.59	175	2	48	5	451	3.783	0.518	0.1004	0.3066	0.0217	0.0211	0.0014	0.0219	0.0102	537	0.003	0.0006		
Concrete Mixer Truck (10-yd3)	Cement & Mortar Mixers	Diesel	0.59	475	7	24	1	99	35.943	4.924	0.4492	1.5958	0.0585	0.0567	0.0016	0.0966	0.0498	531	0.003	0.0006		
Welding Rig (RT6)	Welders	Diesel	0.59	155	10	48	7	3,384	16.755	2.295	1.1540	2.2104	0.2463	0.2389	0.0019	0.2878	0.1447	626	0.003	0.0006		
Welding Machine (20-400 A)	Welders	Diesel	0.59	20	20	48	7	6,768	4.324	0.592	2.1509	3.9802	0.2529	0.2453	0.0026	0.5104	0.2685	695	0.003	0.0006		
Air Compressors (1800 CFM)	Air Compressors	Diesel	0.59	525	1	144	1	169	5.675	0.778	0.3663	1.2990	0.0560	0.0543	0.0016	0.0740	0.0383	531	0.003	0.0006		
Air Compressors (185 CFM)	Air Compressors	Diesel	0.59	49	5	48	2	564	2.648	0.363	0.3166	2.5766	0.0282	0.0273	0.0016	0.1022	0.0556	590	0.003	0.0006		
Generators (145REOZT4)	Generator Sets	Diesel	0.59	201	2	12	18	437	4.346	0.595	0.4004	1.6416	0.0716	0.0694	0.0016	0.1128	0.0558	531	0.003	0.0006		
Generators (55REOZT4)	Generator Sets	Diesel	0.59	75	5	12	18	1,093	4.054	0.555	1.1764	2.5415	0.1950	0.1891	0.0018	0.1720	0.0838	590	0.003	0.0006		
Pickup Truck (3/4 Ton)	Off-highway Trucks	Diesel	0.59	350	60	12	18	13,112	227.008	31.100	0.0519	0.1829	0.0118	0.0115	0.0014	0.0134	0.0054	537	0.003	0.0006		
ATV/UTV	Snowmobiles	Gasoline	0.53	40	30	12	18	6,556	12.980	1.687	116.6520	5.5602	1.3971	1.2853	0.0114	43.3091	13.5727	1,877	0.003	0.0006		

Conversion Factors	
gallons of diesel per hour to horsepower	55
scf/gallon	7.4805
Btu/gallon diesel ⁴	137,000
gallons of gasoline per hour to horsepower	49
Btu/gallon gasoline ⁴	130,000
Btu/MMBtu	1,000,000
lb/kg	2.20
lb/ton	2,000

¹ Type, quantity, load factor, and duration of use of construction equipment provided by WBI Energy. Work schedule will be 10 hour days, 6 days a week.

² Emission Factors come from MOVES3.0.2 Emission Runs for Cass and Richland Counties, ND.

³ Emission Factor Comes from 40 CFR Part 98 Table C-2.

⁴ Btu/gallon from USEPA AP-42 Appendix A Typical Parameters of Various Fuels.



Project: Wahpeton Expansion Project
 Subject: Construction Emissions
 Task: Off-Road Construction Equipment Emissions - Appendix 9B

Prepared by: PCB
 Reviewed by: AMC
 Date: 2/17/2022

Equipment Type	Pollutant (TPY)										
	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOCs	Total HAP	CO ₂	CH ₄	N ₂ O	CO ₂ e ¹
Mapleton Compressor Station - Cass County											
Trackhoes	3.69E-03	6.61E-03	7.32E-04	7.10E-04	8.31E-06	8.87E-04	4.66E-04	2.76E+00	1.96E-05	3.92E-06	2.76E+00
Air Compressors	2.45E-04	1.14E-03	6.13E-05	5.95E-05	1.65E-06	5.29E-05	2.81E-05	5.85E-01	4.90E-06	9.79E-07	5.86E-01
Concrete Mixer Truck	1.11E-04	4.48E-04	1.89E-05	1.83E-05	4.50E-07	3.12E-05	1.58E-05	1.46E-01	1.22E-06	2.45E-07	1.46E-01
Truck Mounted Crane	2.52E-03	9.71E-03	5.01E-04	4.86E-04	3.21E-05	6.67E-04	3.29E-04	1.17E+01	9.79E-05	1.96E-05	1.17E+01
Dump Truck	3.99E-04	7.59E-04	9.03E-05	8.76E-05	6.91E-07	9.42E-05	4.82E-05	2.24E-01	1.59E-06	3.18E-07	2.24E-01
Welding Rigs	1.80E-02	4.54E-02	2.72E-03	2.64E-03	2.92E-05	4.82E-03	2.51E-03	9.19E+00	1.76E-04	3.53E-05	9.21E+00
Mapleton Compressor Station - Cass County Total	2.50E-02	6.40E-02	4.13E-03	4.00E-03	7.23E-05	6.55E-03	3.40E-03	2.46E+01	3.02E-04	6.03E-05	2.46E+01
Kindred Border Station - Cass County											
Scraper	1.03E-03	2.60E-03	1.78E-04	1.73E-04	5.79E-06	1.50E-04	7.66E-05	2.07E+00	1.71E-05	3.43E-06	2.07E+00
Dozers	1.76E-03	5.69E-03	3.93E-04	3.81E-04	3.17E-05	4.12E-04	1.86E-04	1.18E+01	9.79E-05	1.96E-05	1.18E+01
Grader	8.11E-04	2.68E-03	1.83E-04	1.78E-04	1.58E-05	1.95E-04	8.69E-05	5.92E+00	4.90E-05	9.79E-06	5.92E+00
Trackhoes	2.76E-02	4.96E-02	5.49E-03	5.33E-03	6.23E-05	6.66E-03	3.50E-03	2.07E+01	1.47E-04	2.94E-05	2.07E+01
Air Compressors	1.23E-03	5.70E-03	3.06E-04	2.97E-04	8.24E-06	2.64E-04	1.40E-04	2.93E+00	2.45E-05	4.90E-06	2.93E+00
Concrete Mixer Truck	2.23E-03	8.95E-03	3.78E-04	3.67E-04	9.00E-06	6.24E-04	3.16E-04	2.93E+00	2.45E-05	4.90E-06	2.93E+00
Skid Steer Loader	1.38E-02	2.74E-02	1.93E-03	1.87E-03	1.86E-05	2.66E-03	1.31E-03	5.75E+00	3.67E-05	7.35E-06	5.75E+00
Large Crane	6.62E-04	2.16E-03	1.08E-04	1.04E-04	3.03E-06	1.35E-04	7.13E-05	1.02E+00	8.57E-06	1.71E-06	1.02E+00
Truck Mounted Crane	4.72E-03	1.82E-02	9.39E-04	9.11E-04	6.01E-05	1.25E-03	6.17E-04	2.19E+01	1.84E-04	3.67E-05	2.20E+01
Front End Loader	9.21E-03	1.65E-02	1.83E-03	1.78E-03	2.08E-05	2.22E-03	1.17E-03	6.90E+00	4.90E-05	9.79E-06	6.90E+00
Dump Truck	7.98E-02	1.52E-01	1.81E-02	1.75E-02	1.38E-04	1.88E-02	9.64E-03	4.48E+01	3.18E-04	6.37E-05	4.49E+01
Welding Rigs	1.35E-02	3.40E-02	2.04E-03	1.98E-03	2.19E-05	3.62E-03	1.89E-03	6.89E+00	1.32E-04	2.64E-05	6.91E+00
Kindred Border Station - Cass County Total	1.56E-01	3.25E-01	3.18E-02	3.09E-02	3.95E-04	3.70E-02	1.90E-02	1.34E+02	1.09E-03	2.18E-04	1.34E+02



Project: Wahpeton Expansion Project
 Subject: Construction Emissions
 Task: Off-Road Construction Equipment Emissions - Appendix 9B

Prepared by: PCB
 Reviewed by: AMC
 Date: 2/17/2022

Equipment Type	Pollutant (TPY)										
	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOCs	Total HAP	CO ₂	CH ₄	N ₂ O	CO ₂ e ¹
Wahpeton Border Station - Richland County											
Scraper	1.03E-03	2.60E-03	1.78E-04	1.73E-04	5.79E-06	1.50E-04	7.66E-05	2.07E+00	1.71E-05	3.43E-06	2.07E+00
Dozers	1.76E-03	5.69E-03	3.93E-04	3.81E-04	3.17E-05	4.12E-04	1.86E-04	1.18E+01	9.79E-05	1.96E-05	1.18E+01
Grader	8.11E-04	2.68E-03	1.83E-04	1.78E-04	1.58E-05	1.95E-04	8.69E-05	5.92E+00	4.90E-05	9.79E-06	5.92E+00
Trackhoes	2.76E-02	4.96E-02	5.49E-03	5.33E-03	6.23E-05	6.66E-03	3.50E-03	2.07E+01	1.47E-04	2.94E-05	2.07E+01
Air Compressors	1.23E-03	5.70E-03	3.06E-04	2.97E-04	8.24E-06	2.64E-04	1.40E-04	2.93E+00	2.45E-05	4.90E-06	2.93E+00
Concrete Mixer Truck	2.23E-03	8.95E-03	3.78E-04	3.67E-04	9.00E-06	6.24E-04	3.16E-04	2.93E+00	2.45E-05	4.90E-06	2.93E+00
Skid Steer Loader	1.38E-02	2.74E-02	1.93E-03	1.87E-03	1.86E-05	2.66E-03	1.31E-03	5.75E+00	3.67E-05	7.35E-06	5.75E+00
Large Crane	6.62E-04	2.16E-03	1.08E-04	1.04E-04	3.03E-06	1.35E-04	7.13E-05	1.02E+00	8.57E-06	1.71E-06	1.02E+00
Truck Mounted Crane	4.72E-03	1.82E-02	9.39E-04	9.11E-04	6.01E-05	1.25E-03	6.17E-04	2.19E+01	1.84E-04	3.67E-05	2.20E+01
Front End Loader	9.21E-03	1.65E-02	1.83E-03	1.78E-03	2.08E-05	2.22E-03	1.17E-03	6.90E+00	4.90E-05	9.79E-06	6.90E+00
Dump Truck	7.98E-02	1.52E-01	1.81E-02	1.75E-02	1.38E-04	1.88E-02	9.64E-03	4.48E+01	3.18E-04	6.37E-05	4.49E+01
Welding Rigs	4.50E-03	1.13E-02	6.81E-04	6.61E-04	7.29E-06	1.21E-03	6.29E-04	2.30E+00	4.41E-05	8.82E-06	2.30E+00
Wahpeton Border Station - Richland County Total	1.47E-01	3.03E-01	3.05E-02	2.96E-02	3.81E-04	3.46E-02	1.77E-02	1.29E+02	1.00E-03	2.00E-04	1.29E+02
Cass County Pipeline Segment2											
Bulldozer (Cat D8T)	2.32E-01	5.91E-01	4.05E-02	3.93E-02	1.39E-03	3.43E-02	1.75E-02	4.98E+02	4.12E-02	8.24E-03	5.01E+02
Motor Grader (Cat 150)	1.16E-02	3.82E-02	2.61E-03	2.54E-03	2.26E-04	2.78E-03	1.24E-03	8.44E+01	2.09E-03	4.19E-04	8.45E+01
Frontend Loader (Cat 950GC)	2.46E-01	4.42E-01	4.89E-02	4.75E-02	5.55E-04	5.93E-02	3.12E-02	1.84E+02	6.55E-03	1.31E-03	1.85E+02
Backhoe Loader (Cat 416F2)	7.74E-01	7.05E-01	1.14E-01	1.10E-01	6.19E-04	7.54E-02	3.88E-02	2.05E+02	1.31E-02	2.62E-03	2.06E+02
Skid-steer Loader (Cat 249D)	3.80E-01	7.50E-01	5.29E-02	5.13E-02	5.10E-04	7.30E-02	3.59E-02	1.58E+02	1.01E-02	2.01E-03	1.58E+02
Trencher (Wolfe 7000)	2.29E-02	5.19E-02	3.69E-03	3.58E-03	6.23E-05	3.19E-03	1.67E-03	2.06E+01	1.71E-04	3.41E-05	2.06E+01
Trackhoe (Cat 336GC)	2.32E+00	4.16E+00	4.60E-01	4.46E-01	5.22E-03	5.58E-01	2.93E-01	1.73E+03	3.69E-01	7.39E-02	1.77E+03
Guided Bore Machine (D220X500)	1.67E-02	5.80E-02	2.37E-03	2.30E-03	5.92E-05	3.52E-03	1.82E-03	1.92E+01	1.61E-04	3.22E-05	1.92E+01
Guided Bore Machine (D100x140)	7.14E-02	2.78E-01	1.32E-02	1.28E-02	2.92E-04	1.94E-02	9.90E-03	9.56E+01	4.00E-03	8.00E-04	9.59E+01
Bending Machine (6"-12")	1.26E-02	2.29E-02	1.74E-03	1.69E-03	1.52E-05	2.44E-03	1.18E-03	4.64E+00	2.97E-05	5.94E-06	4.64E+00
Sideboom (Cat PL83)	3.59E-02	1.17E-01	5.82E-03	5.65E-03	1.64E-04	7.29E-03	3.86E-03	5.54E+01	4.64E-03	9.28E-04	5.58E+01
Telehandler (Cat TL943D)	1.68E-02	7.16E-02	4.18E-03	4.05E-03	1.64E-04	3.35E-03	1.77E-03	5.98E+01	1.50E-03	3.00E-04	5.99E+01
Boom Truck (20-ton)	1.00E-02	3.87E-02	2.00E-03	1.94E-03	1.28E-04	2.66E-03	1.31E-03	4.67E+01	7.82E-04	1.56E-04	4.68E+01
Dump Truck (58,000 GVWR)	6.22E-01	1.18E+00	1.41E-01	1.36E-01	1.08E-03	1.47E-01	7.51E-02	3.49E+02	1.24E-02	2.48E-03	3.50E+02
Water Truck (4000-gal)	2.01E-03	1.04E-02	6.23E-04	6.04E-04	1.24E-04	8.86E-04	3.13E-04	4.72E+01	7.82E-04	1.56E-04	4.73E+01
Utility Tractor (Deere 5100R)	6.13E-03	1.87E-02	1.33E-03	1.29E-03	8.84E-05	1.34E-03	6.26E-04	3.28E+01	5.43E-04	1.09E-04	3.29E+01
Concrete Mixer Truck (10-yd3)	1.63E-02	5.79E-02	2.12E-03	2.06E-03	5.92E-05	3.50E-03	1.81E-03	1.93E+01	1.13E-03	2.26E-04	1.94E+01
Welding Rig (RT6)	4.69E-01	8.97E-01	1.00E-01	9.70E-02	7.77E-04	1.17E-01	5.87E-02	2.54E+02	1.80E-02	3.61E-03	2.56E+02
Welding Machine (20-400 A)	2.25E-01	4.17E-01	2.65E-02	2.57E-02	2.68E-04	5.35E-02	2.81E-02	7.28E+01	9.31E-03	1.86E-03	7.36E+01
Air Compressors (1800 CFM)	2.52E-02	8.93E-02	3.85E-03	3.73E-03	1.08E-04	5.09E-03	2.63E-03	3.65E+01	3.05E-04	6.11E-05	3.65E+01
Air Compressors (185 CFM)	6.77E-03	5.51E-02	6.03E-04	5.85E-04	3.36E-05	2.19E-03	1.19E-03	1.26E+01	4.75E-04	9.50E-05	1.27E+01
Generators (145REOZT4)	2.72E-02	1.12E-01	4.87E-03	4.72E-03	1.09E-04	7.67E-03	3.79E-03	3.61E+01	6.04E-04	1.21E-04	3.61E+01
Generators (55REOZT4)	7.46E-02	1.61E-01	1.24E-02	1.20E-02	1.15E-04	1.09E-02	5.32E-03	3.74E+01	1.41E-03	2.82E-04	3.75E+01
Pickup Truck (3/4 Ton)	1.84E-01	6.50E-01	4.21E-02	4.08E-02	5.06E-03	4.75E-02	1.93E-02	1.91E+03	9.47E-01	1.89E-01	1.99E+03
ATV/UTV	2.37E+01	1.13E+00	2.84E-01	2.61E-01	2.31E-03	8.79E+00	2.76E+00	3.81E+02	2.57E-02	5.14E-03	3.83E+02
Cass County Pipeline Segment2 Total	2.95E+01	1.21E+01	1.37E+00	1.31E+00	1.95E-02	1.00E+01	3.39E+00	6.35E+03	1.47E+00	2.94E-01	6.48E+03



Project: Wahpeton Expansion Project
 Subject: Construction Emissions
 Task: Off-Road Construction Equipment Emissions - Appendix 9B

Prepared by: PCB
 Reviewed by: AMC
 Date: 2/17/2022

Equipment Type	Pollutant (TPY)										
	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOCs	Total HAP	CO ₂	CH ₄	N ₂ O	CO ₂ e ¹
Richland County Pipeline Segment2											
Bulldozer (Cat D8T)	3.31E-01	8.42E-01	5.77E-02	5.60E-02	1.97E-03	4.88E-02	2.48E-02	7.09E+02	5.87E-02	1.17E-02	7.14E+02
Motor Grader (Cat 150)	1.65E-02	5.44E-02	3.72E-03	3.61E-03	3.21E-04	3.96E-03	1.76E-03	1.20E+02	2.98E-03	5.97E-04	1.20E+02
Frontend Loader (Cat 950GC)	3.51E-01	6.29E-01	6.97E-02	6.76E-02	7.91E-04	8.45E-02	4.44E-02	2.63E+02	9.32E-03	1.86E-03	2.63E+02
Backhoe Loader (Cat 416F2)	1.10E+00	1.00E+00	1.62E-01	1.57E-01	8.81E-04	1.07E-01	5.53E-02	2.91E+02	1.86E-02	3.72E-03	2.93E+02
Skid-steer Loader (Cat 249D)	5.41E-01	1.07E+00	7.53E-02	7.30E-02	7.27E-04	1.04E-01	5.11E-02	2.24E+02	1.43E-02	2.87E-03	2.26E+02
Trencher (Wolfe 7000)	3.27E-02	7.39E-02	5.26E-03	5.10E-03	8.87E-05	4.54E-03	2.38E-03	2.94E+01	2.43E-04	4.86E-05	2.94E+01
Trackhoe (Cat 336GC)	3.30E+00	5.92E+00	6.55E-01	6.35E-01	7.44E-03	7.94E-01	4.17E-01	2.47E+03	5.26E-01	1.05E-01	2.51E+03
Guided Bore Machine (D220X500)	2.38E-02	8.26E-02	3.38E-03	3.28E-03	8.42E-05	5.01E-03	2.59E-03	2.74E+01	2.29E-04	4.58E-05	2.74E+01
Guided Bore Machine (D100x140)	1.02E-01	3.95E-01	1.88E-02	1.82E-02	4.16E-04	2.76E-02	1.41E-02	1.36E+02	5.70E-03	1.14E-03	1.37E+02
Bending Machine (6"-12")	1.79E-02	3.26E-02	2.48E-03	2.41E-03	2.16E-05	3.48E-03	1.68E-03	6.61E+00	4.23E-05	8.45E-06	6.61E+00
Sideboom (Cat PL83)	5.11E-02	1.66E-01	8.29E-03	8.04E-03	2.34E-04	1.04E-02	5.50E-03	7.90E+01	6.61E-03	1.32E-03	7.95E+01
Telehandler (Cat TL943D)	2.39E-02	1.02E-01	5.95E-03	5.77E-03	2.33E-04	4.77E-03	2.51E-03	8.52E+01	2.14E-03	4.28E-04	8.54E+01
Boom Truck (20-ton)	1.43E-02	5.51E-02	2.85E-03	2.76E-03	1.82E-04	3.79E-03	1.87E-03	6.65E+01	1.11E-03	2.23E-04	6.66E+01
Dump Truck (58,000 GVWR)	8.86E-01	1.68E+00	2.00E-01	1.94E-01	1.53E-03	2.09E-01	1.07E-01	4.97E+02	1.77E-02	3.53E-03	4.99E+02
Water Truck (4000-gal)	2.86E-03	1.49E-02	8.86E-04	8.60E-04	1.77E-04	1.26E-03	4.45E-04	6.72E+01	1.11E-03	2.23E-04	6.73E+01
Utility Tractor (Deere 5100R)	8.74E-03	2.67E-02	1.89E-03	1.83E-03	1.26E-04	1.91E-03	8.91E-04	4.67E+01	7.73E-04	1.55E-04	4.68E+01
Concrete Mixer Truck (10-yd3)	2.32E-02	8.25E-02	3.02E-03	2.93E-03	8.44E-05	4.99E-03	2.57E-03	2.74E+01	1.61E-03	3.21E-04	2.76E+01
Welding Rig (RT6)	6.67E-01	1.28E+00	1.42E-01	1.38E-01	1.11E-03	1.66E-01	8.36E-02	3.62E+02	2.57E-02	5.14E-03	3.64E+02
Welding Machine (20-400 A)	3.21E-01	5.94E-01	3.77E-02	3.66E-02	3.81E-04	7.62E-02	4.01E-02	1.04E+02	1.33E-02	2.65E-03	1.05E+02
Air Compressors (1800 CFM)	3.59E-02	1.27E-01	5.48E-03	5.32E-03	1.54E-04	7.24E-03	3.75E-03	5.20E+01	4.35E-04	8.70E-05	5.20E+01
Air Compressors (185 CFM)	9.64E-03	7.85E-02	8.58E-04	8.33E-04	4.79E-05	3.11E-03	1.69E-03	1.80E+01	6.77E-04	1.35E-04	1.80E+01
Generators (145REOZT4)	3.88E-02	1.59E-01	6.93E-03	6.72E-03	1.56E-04	1.09E-02	5.40E-03	5.14E+01	8.60E-04	1.72E-04	5.15E+01
Generators (55REOZT4)	1.06E-01	2.30E-01	1.76E-02	1.71E-02	1.63E-04	1.55E-02	7.57E-03	5.33E+01	2.01E-03	4.01E-04	5.35E+01
Pickup Truck (3/4 Ton)	2.63E-01	9.25E-01	5.99E-02	5.81E-02	7.21E-03	6.76E-02	2.75E-02	2.72E+03	1.35E+00	2.70E-01	2.83E+03
ATV/UTV	3.37E+01	1.61E+00	4.04E-01	3.72E-01	3.29E-03	1.25E+01	3.92E+00	5.43E+02	3.66E-02	7.32E-03	5.46E+02
Richland County Pipeline Segment2 Total	4.20E+01	1.72E+01	1.95E+00	1.87E+00	2.78E-02	1.43E+01	4.83E+00	9.04E+03	2.10E+00	4.19E-01	9.22E+03

Conversion Factors	
g/lb	453.59
lb/ton	2,000
Global Warming Potential	
CO ₂	1
CH ₄	25
N ₂ O	298

1 CO₂e is the sum of CO₂, CH₄, and N₂O multiplied by the applicable global warming potential expressed in tons.



Project: Wahpeton Expansion Project
 Subject: Construction Emissions
 Task: On-Road Vehicle Information - Appendix 9B

Prepared by: PCB
 Reviewed by: AMC
 Date: 2/17/2022

Equipment Type	MOVES Source ID and Reg Class	Fuel Type	Quantity ¹	Total Days	Miles per Day ²	Total Miles per Project	Fuel Usage MMBtu	MOVES Emission Factors ³										
								CO	NO _x	PM10	PM _{2.5}	SO ₂	VOC	HAP	CO ₂ ⁴	CH ₄ ⁵	N ₂ O ⁶	
								(g/MT)	(g/MT)	(g/MT)	(g/MT)	(g/MT)	(g/MT)	(g/MT)	(lb/MMBtu)	(kg/MMBtu)	(kg/MMBtu)	
Mapleton Compressor Station - Cass County																		
Construction & Delivery/Removal Vehicles	Single Unit Short-haul T	Diesel	1	6	400	2,400	21.92	0.99	2.33	0.05	0.04	0.00	0.11	1.92E-02	1,268	3.00E-03	6.00E-04	
Piping Truck	Single Unit Short-haul T	Diesel	1	6	400	2,400	21.92	0.99	2.33	0.05	0.04	0.00	0.11	1.92E-02	1,268	3.00E-03	6.00E-04	
Water Truck	Single Unit Short-haul T	Diesel	0	5	0	0	0.00	0.98	1.34	0.04	0.03	0.00	0.09	1.53E-02	783	3.00E-03	6.00E-04	
Workers Commuter Vehicles	Passenger Truck, Class	Gasoline	8	8	55	3,520	22.88	15.93	1.37	0.03	0.03	0.01	0.47	1.21E-01	771	3.00E-03	6.00E-04	
Kindred Border Station - Cass County																		
Construction & Delivery/Removal Vehicles	Single Unit Short-haul T	Diesel	2	6	275	3,300	30.14	0.99	2.33	0.05	0.04	0.00	0.11	1.92E-02	1,268	3.00E-03	6.00E-04	
Piping Truck	Single Unit Short-haul T	Diesel	2	6	275	3,300	30.14	0.99	2.33	0.05	0.04	0.00	0.11	1.92E-02	1,268	3.00E-03	6.00E-04	
Water Truck	Single Unit Short-haul T	Diesel	2	5	25	250	2.28	0.98	1.34	0.04	0.03	0.00	0.09	1.53E-02	783	3.00E-03	6.00E-04	
Workers Commuter Vehicles	Passenger Truck, Class	Gasoline	15	30	15	6,600	42.90	15.93	1.37	0.03	0.03	0.01	0.47	1.21E-01	771	3.00E-03	6.00E-04	
Wahpeton Border Station - Richland County																		
Construction & Delivery/Removal Vehicles	Single Unit Short-haul T	Diesel	2	6	275	3,300	30.14	0.99	2.33	0.05	0.04	0.00	0.11	1.92E-02	1,268	3.00E-03	6.00E-04	
Piping Truck	Single Unit Short-haul T	Diesel	2	6	275	3,300	30.14	0.99	2.33	0.05	0.04	0.00	0.11	1.92E-02	1,268	3.00E-03	6.00E-04	
Water Truck	Single Unit Short-haul T	Diesel	2	5	25	250	2.28	0.98	1.34	0.04	0.03	0.00	0.09	1.53E-02	783	3.00E-03	6.00E-04	
Workers Commuter Vehicles	Passenger Truck, Class	Gasoline	15	30	15	6,600	42.90	16.10	1.37	0.03	0.03	0.01	0.47	1.21E-01	773	3.00E-03	6.00E-04	
Cass County Pipeline Segment2																		
Construction & Delivery/Removal Vehicles	Single Unit Short-haul T	Diesel	8	77	120	73,663	672.79	0.99	2.33	0.05	0.04	0.00	0.11	1.92E-02	1,268	3.00E-03	6.00E-04	
Piping Truck	Single Unit Short-haul T	Diesel	10	10	555	56,845	519.19	0.99	2.33	0.05	0.04	0.00	0.11	1.92E-02	1,268	3.00E-03	6.00E-04	
Water Truck	Single Unit Short-haul T	Diesel	5	10	120	5,941	54.26	0.98	1.34	0.04	0.03	0.00	0.09	1.53E-02	783	3.00E-03	6.00E-04	
Workers Commuter Vehicles	Passenger Truck, Class	Gasoline	175	77	50	671,411	4,364.17	15.93	1.37	0.03	0.03	0.01	0.47	1.21E-01	771	3.00E-03	6.00E-04	
Richland County Pipeline Segment2																		
Construction & Delivery/Removal Vehicles	Single Unit Short-haul T	Diesel	8	109	120	104,897	958.06	0.99	2.33	0.05	0.04	0.00	0.11	1.92E-02	1,268	3.00E-03	6.00E-04	
Piping Truck	Single Unit Short-haul T	Diesel	10	15	555	80,948	739.32	0.99	2.33	0.05	0.04	0.00	0.11	1.92E-02	1,268	3.00E-03	6.00E-04	
Water Truck	Single Unit Short-haul T	Diesel	5	14	120	8,459	77.26	0.98	1.34	0.04	0.03	0.00	0.09	1.53E-02	783	3.00E-03	6.00E-04	
Workers Commuter Vehicles	Passenger Truck, Class	Gasoline	175	109	50	956,089	6,214.58	16.10	1.37	0.03	0.03	0.01	0.47	1.21E-01	773	3.00E-03	6.00E-04	

Conversion Factors	
Btu/gallon diesel ⁶	137,000
Construction & delivery vehicle, water truck, and piping truck, miles/gal	15
Commuter vehicles, miles/gal	20
Btu/gallon gasoline ⁶	130,000
Btu/MMBtu	1,000,000

Notes

1 Commuter vehicle quantities estimated from workforce schedule, based on the average workforce throughout the project and assuming 2 workers per commuter vehicle.

2 Miles per day based on 30 miles one way.

3 Emission factors based on EPA MOVES3.0.2 Model for Cass and Richland Counties, ND.

4 Emission Factor Comes from USEPA AP-42 Table 3.3-1

5 Emission Factor Comes from 40 CFR Part 98 Table C-2, CH₄ 3.0 10-2 kg/MMBtu, N₂O 6.0 x 10-4 kg/MMBtu.

6 Btu/gallon from USEPA AP-42 Appendix A Typical Parameters of Various Fuels.



Project: Wahpeton Expansion Project
 Subject: Construction Emissions
 Task: On-Road Vehicle Emissions - Appendix 9B

Prepared by: PCB
 Reviewed by: AMC
 Date: 2/17/2022

Equipment Type	Emissions (Tons)										
	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	HAP	CO ₂	CH ₄	N ₂ O	CO _{2e} ¹
Mapleton Compressor Station - Cass County											
Construction & Delivery/Removal Vehicles	2.63E-03	6.17E-03	1.22E-04	1.13E-04	1.12E-05	3.03E-04	5.08E-05	3.35	7.25E-05	1.45E-05	3.36
Piping Truck	2.63E-03	6.17E-03	1.22E-04	1.13E-04	1.12E-05	3.03E-04	5.08E-05	3.35	7.25E-05	1.45E-05	3.36
Workers Commuter Vehicles	6.18E-02	5.32E-03	1.24E-04	1.10E-04	1.99E-05	1.81E-03	4.69E-04	2.99	7.57E-05	1.51E-05	3.00
Mapleton Compressor Station - Cass County Total	6.44E-02	1.15E-02	2.46E-04	2.22E-04	3.11E-05	2.12E-03	5.20E-04	6.34	1.48E-04	2.96E-05	6.36
Kindred Border Station - Cass County											
Construction & Delivery/Removal Vehicles	3.62E-03	8.49E-03	1.68E-04	1.55E-04	1.54E-05	4.17E-04	6.99E-05	4.61	9.97E-05	1.99E-05	4.62
Piping Truck	3.62E-03	8.49E-03	1.68E-04	1.55E-04	1.54E-05	4.17E-04	6.99E-05	4.61	9.97E-05	1.99E-05	4.62
Water Truck	2.70E-04	3.70E-04	9.98E-06	9.18E-06	7.24E-07	2.52E-05	4.22E-06	0.22	7.55E-06	1.51E-06	0.22
Workers Commuter Vehicles	1.16E-01	9.98E-03	2.32E-04	2.06E-04	3.73E-05	3.40E-03	8.79E-04	5.61	1.42E-04	2.84E-05	5.62
Kindred Border Station - Cass County Total	1.23E-01	2.73E-02	5.79E-04	5.25E-04	6.89E-05	4.26E-03	1.02E-03	15.05	3.49E-04	6.98E-05	15.08
Wahpeton Border Station - Richland County											
Construction & Delivery/Removal Vehicles	3.62E-03	8.49E-03	1.68E-04	1.55E-04	1.54E-05	4.17E-04	6.99E-05	4.61	9.97E-05	1.99E-05	4.62
Piping Truck	3.62E-03	8.49E-03	1.68E-04	1.55E-04	1.54E-05	4.17E-04	6.99E-05	4.61	9.97E-05	1.99E-05	4.62
Water Truck	2.70E-04	3.70E-04	9.98E-06	9.18E-06	7.24E-07	2.52E-05	4.22E-06	0.22	7.55E-06	1.51E-06	0.22
Workers Commuter Vehicles	1.17E-01	9.98E-03	2.32E-04	2.06E-04	3.73E-05	3.41E-03	8.82E-04	5.62	1.42E-04	2.84E-05	5.63
Wahpeton Border Station - Richland County Total	1.25E-01	2.73E-02	5.79E-04	5.25E-04	6.89E-05	4.27E-03	1.03E-03	15.06	3.49E-04	6.98E-05	15.09
Cass County Pipeline Segment2											
Construction & Delivery/Removal Vehicles	8.08E-02	1.89E-01	3.76E-03	3.46E-03	3.45E-04	9.31E-03	1.56E-03	102.93	2.22E-03	4.45E-04	103.12
Piping Truck	6.23E-02	1.46E-01	2.90E-03	2.67E-03	2.66E-04	7.19E-03	1.20E-03	79.43	1.72E-03	3.43E-04	79.57
Water Truck	6.41E-03	8.79E-03	2.37E-04	2.18E-04	1.72E-05	5.99E-04	1.00E-04	5.13	1.79E-04	3.59E-05	5.14
Workers Commuter Vehicles	1.18E+01	1.02E+00	2.37E-02	2.09E-02	3.79E-03	3.46E-01	8.95E-02	570.52	1.44E-02	2.89E-03	571.74
Cass County Pipeline Segment2 Total	1.18E+01	1.02E+00	2.39E-02	2.11E-02	3.81E-03	3.46E-01	8.96E-02	575.65	1.46E-02	2.92E-03	576.89
Richland County Pipeline Segment2											
Construction & Delivery/Removal Vehicles	1.15E-01	2.70E-01	5.35E-03	4.92E-03	4.91E-04	1.33E-02	2.22E-03	146.57	3.17E-03	6.34E-04	146.84
Piping Truck	8.88E-02	2.08E-01	4.13E-03	3.80E-03	3.79E-04	1.02E-02	1.71E-03	113.11	2.44E-03	4.89E-04	113.31
Water Truck	9.12E-03	1.25E-02	3.38E-04	3.11E-04	2.45E-05	8.54E-04	1.43E-04	7.30	2.56E-04	5.11E-05	7.32
Workers Commuter Vehicles	1.70E+01	1.45E+00	3.37E-02	2.98E-02	5.41E-03	4.94E-01	1.28E-01	814.47	2.06E-02	4.11E-03	816.21
Richland County Pipeline Segment2 Total	1.70E+01	1.46E+00	3.40E-02	3.01E-02	5.44E-03	4.95E-01	1.28E-01	821.77	2.08E-02	4.16E-03	823.53

Conversion Factors	
g/lb	453.59
lb/ton	2,000
Global Warming Potential	
CO ₂	1
CH ₄	25
N ₂ O	298

1 CO_{2e} is the sum of CO₂, CH₄, and N₂O multiplied by the applicable global warming potential expressed in tons.



Project: Wahpeton Expansion Project
 Subject: Construction Emissions
 Task: Construction Activity Fugitive Dust Emissions - Appendix 9B

Prepared by: AMC
 Reviewed by: PCB
 Date: 2/17/2022

Construction Activities	Mapleton Compressor Station - Cass County	Kindred Border Station - Cass County	Wahpeton Border Station - Richland County	Cass County Pipeline Segment2	Richland County Pipeline Segment2	Valve Stations - Pig Launcher/Receivers
	Cass County	Cass County	Richmond County	Cass County	Richmond County	Cass and Richmond County
Assumptions:						
Approximate Pipeline Installation Length ¹ , ft	200	N/A	N/A	126,192	183,744	N/A
Approximate Pipeline Diameter, in	N/A	N/A	N/A	12	12	N/A
Total Project Area, acres	0.05	2.50	2.50	217.27	316.36	13.00
Construction Start Date	Apr-24	Apr-24	Apr-24	Apr-24	Apr-24	Apr-24
Construction End Date	Nov-24	Nov-24	Nov-24	Nov-24	Nov-24	Nov-24
Construction Duration, days	42	42	42	214	214	214
PM _{2.5} /PM ₁₀ Ratio ² (construction and demolition)	0.1	0.1	0.1	0.1	0.1	0.1
PM _{2.5} /PM ₁₀ Ratio ² (industrial wind erosion)	0.15	0.15	0.15	0.15	0.15	0.15
Average Excavation Width at Surface, ft	10	N/A	N/A	12.00	12.00	N/A
Average Excavation Width at Bottom of Trench, ft	10	N/A	N/A	3.00	3.00	N/A
Average Excavation Depth, ft	6	N/A	N/A	5.00	5.00	N/A
Soil Density, lb/cf	100	100	100	100	100	100
Excavation, tons	600	0	0	236,610	344,520	0
Pipeline Backfilling, tons	600	0	0	231,654	337,304	0

Conversion Factors	
lb/ton	2000
in/ft	12
ft/acre	2.E-05
days/yr	365

	Excavation		Backfilling		Windblowing			Total Emissions
Construction Emissions	Emission Factor ³	Emissions	Emission Factor ³	Emissions	Emission Factor ³	Control Efficiency ⁴	Emissions	
	(lb/ton)	(Tons)	(lb/ton)	(Tons)	(ton/acre)	(%)	(Tons)	
Mapleton Compressor Station - Cass County								
Construction Activity PM ₁₀ Emissions	0.058	0.017400	0.012	0.003600	0.38	69%	0.01	0.03
Construction Activity PM _{2.5} Emissions	0.0058	0.0017400	0.0012	0.0003600	0.057	69%	0.00	0.00
Kindred Border Station - Cass County								
Construction Activity PM ₁₀ Emissions	0.058	0.000000	0.012	0.000000	0.38	69%	0.30	0.30
Construction Activity PM _{2.5} Emissions	0.0058	0.0000000	0.0012	0.0000000	0.057	69%	0.04	0.04
Wahpeton Border Station - Richland County								
Construction Activity PM ₁₀ Emissions	0.058	0.000000	0.012	0.000000	0.38	69%	0.30	0.30
Construction Activity PM _{2.5} Emissions	0.0058	0.0000000	0.0012	0.0000000	0.057	69%	0.04	0.04
Cass County Pipeline Segment2								
Construction Activity PM ₁₀ Emissions	0.058	6.861690	0.012	1.389927	0.38	69%	26.01	34.26
Construction Activity PM _{2.5} Emissions	0.0058	0.6861690	0.0012	0.1389927	0.057	69%	3.90	4.73
Richland County Pipeline Segment2								
Construction Activity PM ₁₀ Emissions	0.058	9.991080	0.012	2.023826	0.38	69%	37.87	49.88
Construction Activity PM _{2.5} Emissions	0.0058	0.9991080	0.0012	0.2023826	0.057	69%	5.68	6.88
Valve Stations - Pig Launcher/Receivers								
Construction Activity PM ₁₀ Emissions	0.058	0.000000	0.012	0.000000	0.38	69%	1.56	1.56
Construction Activity PM _{2.5} Emissions	0.0058	0.0000000	0.0012	0.0000000	0.057	69%	0.23	0.23

1 The pipeline length as measured.

2 PM_{2.5}/PM₁₀ ratios based on USEPA AP-42 Chapter 13.2.2 Background Document for Revisions to Fine Fraction Ratios Used for USEPA AP-42 Fugitive Dust Emission Factors, Table 1, November 2006.

3 Emission factors are based on topsoil removal, overburden replacement and wind erosion assuming TSP=PM₁₀, USEPA AP-42 Chapter 11.9 Western Surface Coal Mining, Table 11.9-4, October 1998.

4 Control efficiency based on project measures to minimize dust utilizing water truck to dampen the material handling and storage locations under dry-dusty conditions, "Control of Open Fugitive Dust Sources", USEPA EPA-450/3-38-008, Section



Project: Wahpeton Expansion Project
 Subject: Construction Emissions
 Task: Unpaved Roadway Fugitive Dust Emissions - Appendix 9B

Prepared by: AMC
 Reviewed by: PCB
 Date: 2/17/2022

Equipment Type	Average Vehicle Weight (tons)	Quantity ¹	Total Days ²	Unpaved Access Road Round Trip (Miles) ³	Total Miles per Project	PM ₁₀ Emission Factor (lb/MT)	PM _{2.5} Emission Factor (lb/MT)	PM ₁₀ Uncontrolled Emissions (Tons)	PM ₁₀ Controlled Emissions ⁴ (Tons)	PM _{2.5} Uncontrolled Emissions (Tons)	PM _{2.5} Controlled Emissions ⁴ (Tons)
Mapleton Compressor Station - Cass County											
2 Ton Flat Beds	2.0	1	2	0.25	0	0.67	0.07	0.00	0.00	0.00	0.00
Crane Trucks	20.0	1	1	0.25	0	1.88	0.19	0.00	0.00	0.00	0.00
Pickup Trucks	0.5	8	8	0.25	16	0.36	0.04	0.00	0.00	0.00	0.00
Dump Trucks	25.0	2	2	0.25	1	2.07	0.21	0.00	0.00	0.00	0.00
TDW ⁵ Trucks	1.0	2	2	0.25	1	0.49	0.05	0.00	0.00	0.00	0.00
Tractor Trailers	25.0	4	5	0.25	5	2.07	0.21	0.01	0.00	0.00	0.00
Mapleton Compressor Station - Cass County Total								0.01	0.00	0.00	0.00
Kindred Border Station - Cass County											
2 Ton Flat Beds	2.0	1	7	0.06	0	0.67	0.07	0.00	0.00	0.00	0.00
Crane Trucks	20.0	1	4	0.06	0	1.88	0.19	0.00	0.00	0.00	0.00
Pickup Trucks	0.5	15	30	0.06	29	0.36	0.04	0.01	0.00	0.00	0.00
Dump Trucks	25.0	2	7	0.06	1	2.07	0.21	0.00	0.00	0.00	0.00
TDW ⁵ Trucks	1.0	2	6	0.06	1	0.49	0.05	0.00	0.00	0.00	0.00
Tractor Trailers	25.0	4	18	0.06	5	2.07	0.21	0.00	0.00	0.00	0.00
Kindred Border Station - Cass County Total								0.01	0.00	0.00	0.00
Wahpeton Border Station - Richland County											
2 Ton Flat Beds	2.0	1	7	0.06	0	0.67	0.07	0.00	0.00	0.00	0.00
Crane Trucks	20.0	1	4	0.06	0	1.88	0.19	0.00	0.00	0.00	0.00
Pickup Trucks	0.5	15	30	0.06	26	0.36	0.04	0.00	0.00	0.00	0.00
Dump Trucks	25.0	2	7	0.06	1	2.07	0.21	0.00	0.00	0.00	0.00
TDW ⁵ Trucks	1.0	2	6	0.06	1	0.49	0.05	0.00	0.00	0.00	0.00
Tractor Trailers	25.0	4	18	0.06	4	2.07	0.21	0.00	0.00	0.00	0.00
Wahpeton Border Station - Richland County Total								0.01	0.00	0.00	0.00
Cass County Pipeline Segment2											
2 Ton Flat Beds	2.0	1	18	4.1	75	0.67	0.07	0.02	0.01	0.00	0.00
Crane Trucks	20.0	1	9	4.1	37	1.88	0.19	0.04	0.01	0.00	0.00
Pickup Trucks	0.5	175	77	4.1	55,921	0.36	0.04	9.97	3.14	1.00	0.31
Dump Trucks	25.0	2	16	4.1	133	2.07	0.21	0.14	0.04	0.01	0.00
TDW ⁵ Trucks	1.0	2	16	4.1	133	0.49	0.05	0.03	0.01	0.00	0.00
Tractor Trailers	25.0	4	45	4.1	747	2.07	0.21	0.77	0.24	0.08	0.02
Cass County Pipeline Segment2 Total								10.97	3.46	1.10	0.35
Richland County Pipeline Segment2											
2 Ton Flat Beds	2.0	1	25	4.3	108	0.67	0.07	0.04	0.01	0.00	0.00
Crane Trucks	20.0	1	12	4.3	52	1.88	0.19	0.05	0.02	0.00	0.00
Pickup Trucks	0.5	175	109	4.3	82,279	0.36	0.04	14.67	4.62	1.47	0.46
Dump Trucks	25.0	2	23	4.3	198	2.07	0.21	0.21	0.06	0.02	0.01
TDW ⁵ Trucks	1.0	2	22	4.3	190	0.49	0.05	0.05	0.01	0.00	0.00
Tractor Trailers	25.0	4	64	4.3	1,104	2.07	0.21	1.14	0.36	0.11	0.04
Richland County Pipeline Segment2 Total								16.15	5.09	1.61	0.51

Emission Factor Equation ⁶	
$E = k \cdot (s/12)^a \cdot (W/3)^b \cdot [(365-P)/365]$	
Constant, k (PM ₁₀) ⁷ , lb/MT	1.5
Constant, k (PM _{2.5}) ⁷ , lb/MT	0.15
Silt Content of Road Surface ⁸ , s, %	8.5
Empirical Constant ⁷ , a	0.9
Mean Vehicle Weight, W, tons	---
Empirical Constant ⁴ , b	0.45
Number of Wet Days (≥0.01" precip) ⁹ , P	100

Conversion Factors	
lb/ton	2,000

1 Vehicle quantities estimated from a similar pipeline project. Pickup truck quantities estimated from workforce schedule, based on the average workforce throughout the project and assuming 2 workers per vehicle.

2 Total days estimated from a similar pipeline project, adjusted for the total expected working days for each project segment.

3 TWD - Two wheel drive.

4 WBI Energy will use existing public and private access roads on a temporary basis to transport personnel, equipment, vehicles, and materials to project work areas during construction. New permanent roads will be required for access to the new MDU-Kindred and MDU-Wahpeton border station (i.e. Border Stations) to each valve setting or pig launcher/receiver site, and along the pipeline corridor. The existing gravel road to Mapleton Compressor Station is 0.125 mile. The new roads to the MDU-Kindred and MDU-Wahpeton Border Stations will be gravel. The new roads to the valve setting and pig launcher/receiver sites will likely be gravel and/or dirt. Unpaved access road lengths for Kindred Border Station is 0.3 miles and Wahpeton Border Station is 0.3 miles. The total lengths of access roads in the pipeline corridor and at valve settings and pig launcher access roads are 2.05 miles in Cass County and 2.15 miles in Richland County.

5 Control efficiency based on project measures to minimize dust utilizing water truck to dampen the ROW under dry-dusty conditions, "Control of Open Fugitive Dust Sources", EPA-450/3-38-008, Section 5.3.1.1, September 1988.

6 Emission factor equation based on industrial sites from AP-42 Chapter 13.2.2 Unpaved Roads, Equations 1a and 2, November 2006.

7 Constant based on industrial roads from AP-42 Chapter 13.2.2 Unpaved Roads, Table 13.2.2-2, November 2006.

8 Silt content based on construction sites from AP-42 Chapter 13.2.2 Unpaved Roads, Table 13.2.2-1, November 2006.

9 Number of wet days based on site location from AP-42 Chapter 13.2.2 Unpaved Roads, Figure 13.2.2-1, November 2006.

APPENDIX 9C OPERATION EMISSIONS CALCULATIONS

Facility Name: Wahpeton Expansion Project
 Subject: Pipeline Operating Emission Calculations
 Task: Pipeline Operating Emissions Summary - Appendix 9C

Prepared: AMC
 Reviewed: PCB
 Date: 17-Feb-02

Emission Unit	Pollutant (TPY ¹)									
	NO _x	CO	VOC	PM	PM ₁₀	PM _{2.5}	SO ₂	Lead	Total HAPs	CO ₂ e
Pigging ²	NA	NA	neg.	NA	NA	NA	NA	---	neg.	neg.
Pipeline Length (fugitive leaks)	---	---	NA	---	---	---	---	---	NA	69.67
Above Ground Facilities (fugitive leaks)	---	---	0.28	---	---	---	---	---	9.70E-04	1,657
Total Pipeline Operating Emissions:	NA	NA	0.28	NA	NA	NA	NA	NA	9.70E-04	1,727

¹ TPY - Tons Per Year

²Pigging occurs infrequently for maintenance purposes and emissions to the atmosphere are limited to the amount of natural gas trapped in the receiving or launching apparatus when the pig is inserted or removed from the pipeline. The amount of gas that could be emitted to the atmosphere during this activity is small due to the size of the piping and the area displaced by the pig.

NA -Not Applicable

neg. - negligible



ERM *The business of sustainability*

Facility Name: Wahpeton Expansion Project

Subject: Pipeline Operating Emission Calculations

Task: Pipeline Fugitive Emissions Based on Length - Appendix C

Prepared: AMC

Reviewed: PCB

Date: 17-Feb-02

Pipeline	
Assumptions:	
Pipeline Length, miles	60.60
Protected Steel Factor, scf/methane-hr-mile	0.35
Pounds of CH ₄ per scf	0.03
Conversion Factors:	
lb/ton	2,000
hours per year	8,760
CH ₄ to CO ₂ e	25

CH ₄ (tons/year)	CO ₂ e (tons/year)
2.79	69.67

Pipelines have some losses due to leaks across the length of line. To calculate the losses, the methodology contained in 40 CFR Part 98 Subpart W was used. The emission calculations, which depend on the pipeline material and the length of pipe, use the factors contained in table W-7 to Subpart W of Part 98 – Default Methane Emission Factors for Natural Gas Distribution Mains.

Fugitive Emissions Leaks		
Assumptions:		
Hours of Operation	8,760	
Gas Analysis:		
VOC Weight Percent ¹ , %	0.38%	
CH ₄ Weight Percent ² , %	88.77%	
CO ₂ Weight Percent ³ , %	1.622%	
HAP Weight Percent ⁴ , %	0.001%	
Gas Weight, lb/scf	0.047	
Conversion Factors:		
specific gravity of air	1	
weight of scf air, lb/scf	0.0807	
lb/ton	2,000	
lb/kg	2.204	
hours per year	8,760	
CO ₂ to CO _{2e}	1	
CH ₄ to CO _{2e}	25	
N ₂ O to CO _{2e}	298	

Pollutant	Hourly Emissions (lb/hr)	Annual Emissions (TPY)
NO _x	---	---
CO	---	---
VOC	0.06	0.28
PM	---	---
PM ₁₀	---	---
PM _{2.5}	---	---
SO ₂	---	---
HAP	0.0002	0.0010
CO _{2e}	378	1,657
CO ₂	0.28	1.21
CH ₄	15.12	66.23
N ₂ O	---	---

¹ Weight percent of VOC taken from WBI gas analysis and excludes methane and ethane hydrocarbons.

² Weight percent of methane taken from WBI gas analysis.

³ Weight percent of carbon dioxide taken from WBI gas analysis.

⁴ Weight percent of total HAPS is the weight percent of C6 from the WBI gas analysis. This is a conservative estimate of HAPS.

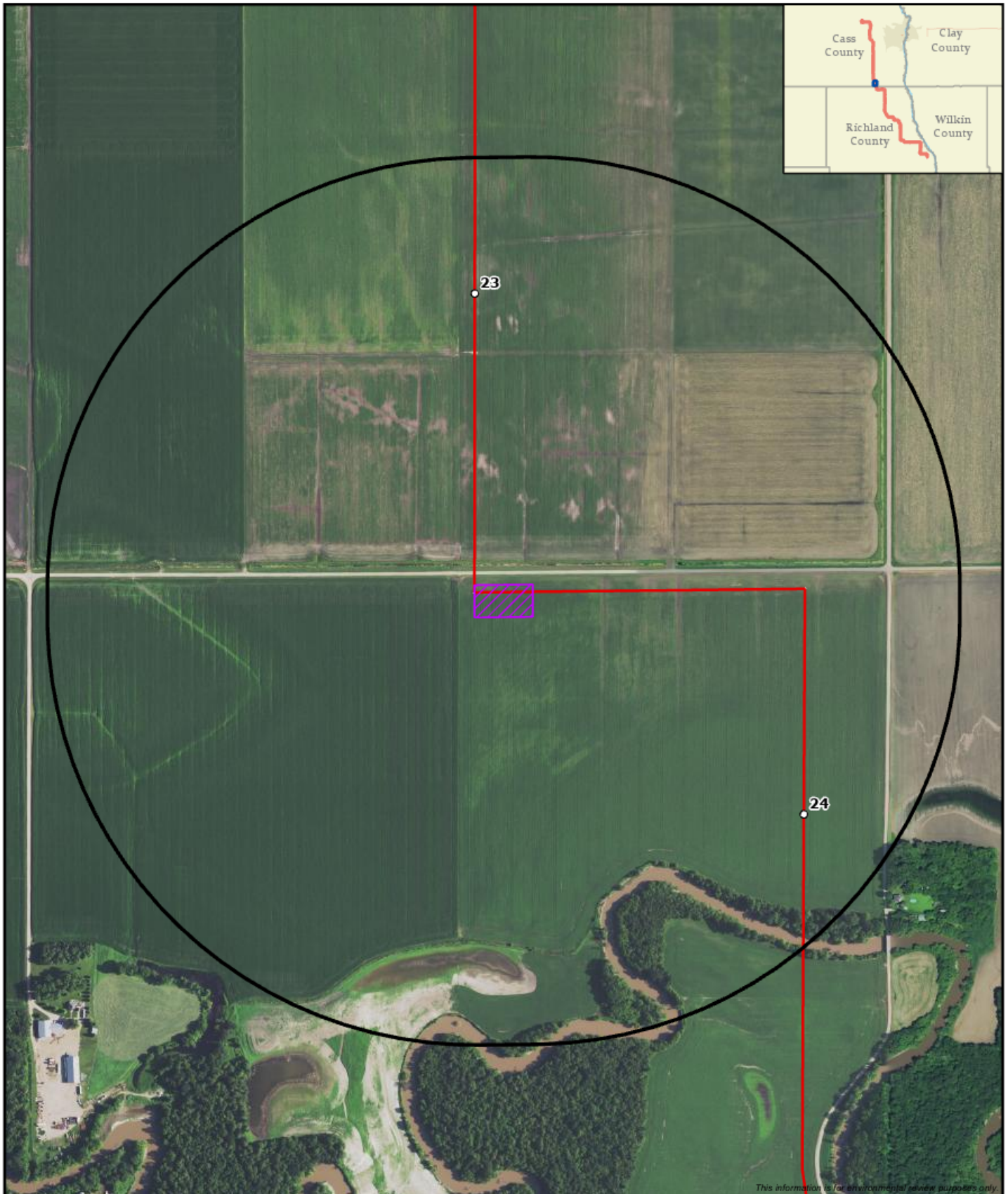
⁵ Component estimated from a similar facility and buffer was applied for conservatism in the estimate.

⁶ Emission factors obtained from 40 CFR 98 Subpart W Table W-1A for Western U.S. Service Components:

https://www.ecfr.gov/cgi-bin/text-idx?SID=145a39a5af564132eeb6a8489d675324&mc=true&node=ap40.23.98_1238.1&rgn=div9

Component	Product	Component Count ⁵	20% Buffer to Accommodate any Changes	Emission Factor ⁶ (scf/comp-hr)	Emission Rate (scf/hr)	Emission Rate (lbs/hr)
Mapleton Compressor Station Additional Components						
Connector	Gas	1,250	1,500	0.02	25.50	1.209
Flanges	Gas	incl. with connectors	incl. with connectors	--	--	--
Valve	Gas	350	420	0.12	50.82	2.409
Other	Gas	2	2	0.02	0.04	0.002
Open Ended Line	Gas	175	210	0.03	6.51	0.309
Pressure Relief Valve	Gas	30	36	0.19	6.95	0.329
					89.82	4.26
Kindred Border Station						
Connector	Gas	1,250	1,500	0.02	25.50	1.209
Flanges	Gas	incl. with connectors	incl. with connectors	--	--	--
Valve	Gas	350	420	0.12	50.82	2.409
Other	Gas	2	2	0.02	0.04	0.002
Open Ended Line	Gas	175	210	0.03	6.51	0.309
Pressure Relief Valve	Gas	30	36	0.19	6.95	0.329
					89.82	4.26
Wahpeton Border Station						
Connector	Gas	1,250	1,500	0.02	25.50	1.209
Flanges	Gas	incl. with connectors	incl. with connectors	--	--	--
Valve	Gas	350	420	0.12	50.82	2.409
Other	Gas	2	2	0.02	0.04	0.002
Open Ended Line	Gas	175	210	0.03	6.51	0.309
Pressure Relief Valve	Gas	30	36	0.19	6.95	0.329
Valve Stations					89.82	4.26
Valve Stations						
Connector	Gas	1,250	1,500	0.02	25.50	1.209
Flanges	Gas	incl. with connectors	incl. with connectors	--	--	--
Valve	Gas	350	420	0.12	50.82	2.409
Other	Gas	2	2	0.02	0.04	0.002
Open Ended Line	Gas	175	210	0.03	6.51	0.309
Pressure Relief Valve	Gas	30	36	0.19	6.95	0.329
					89.82	4.26
Total					269.46	17.03

APPENDIX 9D PRE-CONSTRUCTION NOISE SURVEY AND ACOUSTICAL ANALYSIS REPORT (FIGURES SHOWING NSAS ARE INCLUDED IN THE CURRENT DRAFT. A FULL NOISE SURVEY AND REPORT WILL BE PROVIDED IN THE FINAL APPLICATION, IF NECESSARY).

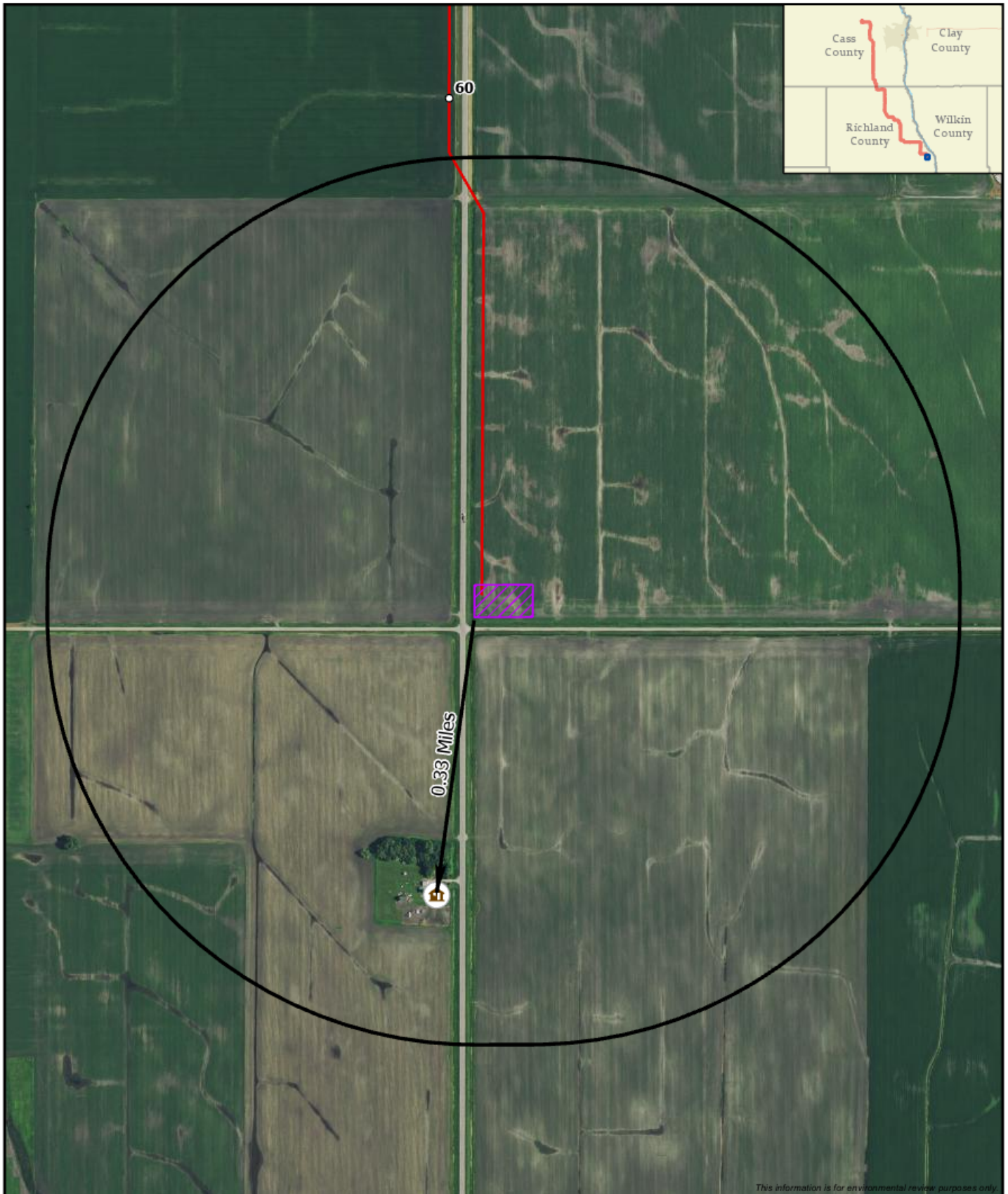







This information is for environmental review purposes only.



Figure 9D-1
Noise Sensitive Areas within 1/2 Mile of the
MDU - Kindred Border Station
Wahpeton Expansion Project
 WBI Energy Transmission, Inc.
 Richland County, North Dakota





-  NSA Point
-  Milepost
-  Proposed Route
-  Permanent Border Station
-  NSA Radius

1:10,000

0 250 500 1,000 Feet

Figure 9D-2
Noise Sensitive Areas within 1/2 Mile of the
MDU - Wahpeton Border Station
Wahpeton Expansion Project
 WBI Energy Transmission, Inc.
 Richland County, North Dakota

