WBI ENERGY TRANSMISSION, INC.

Wahpeton Expansion Project

Resource Report 6
Geological Resources

Draft

Docket No.
PF21-4-000

March 2022

WBI ENERGY TRANSMISSION, INC.
WAHPETON EXPANSION PROJECT
RESOURCE REPORT 6—GEOLOGICAL RESOURCES

Minimum Filing Requirements for Environmental Reports:	**Addressed In:**
1. Describe, by milepost, mineral resources that are currently or potentially exploitable—Title 18 Code of Federal Regulations (CFR) part (§) 380.12 (h)(1).	Section 6.3
2. Describe, by milepost, existing and potential geological hazards and areas of nonroutine geotechnical concern, such as high seismicity areas, active faults, and areas susceptible to soil liquefaction; planned, active, and abandoned mines; karst terrain; and areas of potential ground failure, such as subsidence, slumping, and landsliding. Discuss the hazards posed to the facility from each one—18 CFR § 380.12 (h)(2).	Section 6.4
3. Describe how the project would be located or designed to avoid or minimize adverse effects to the resources or risk to itself, including geotechnical investigations and monitoring that would be conducted before, during, and after construction. Discuss also the potential for blasting to affect structures, and the measures to be taken to remedy such effects—18 CFR § 380.12 (h)(3).	Section 6.6
4. Specify methods to be used to prevent project-induced contamination from surface mines or from mine tailings along the right-of-way and whether the project would hinder mine reclamation or expansion efforts—18 CFR § 380.12 (h)(4).	Not Applicable
5. If the application involves a liquefied natural gas facility located in zones 2, 3, or 4 of the Uniform Building Code's Seismic Risk Map, or where there is potential for surface faulting or liquefaction, prepare a report on earthquake hazards and engineering in conformance with "Data Requirements for the Seismic Review of liquefied natural gas facilities." National Bureau of Standards Information Report 84-2833. This document may be obtained from the Commission staff—18 CFR § 380.12 (h)(5).	Not Applicable
6. If the application is for underground storage facilities: i. Describe how the applicant would control and monitor the drilling activity of others within the field and buffer zone; ii. Describe how the applicant would monitor potential effects of the operation of adjacent storage or production facilities on the proposed facility, and vice versa; iii. Describe measures taken to locate and determine the condition of old wells within the field and buffer zone and how the applicant would reduce risk from failure of known an undiscovered wells; and iv. Identify and discuss safety and environmental safeguards required by state and federal drilling regulations. —18 CFR § 380.12 (h)(6).	Not Applicable
Additional Information:	
1. Identify any sensitive paleontological resource areas crossed by the proposed facilities.	Section 6.5
2. Briefly summarize the physiography and bedrock geology of the project.	Sections 6.1 and 6.2
3. If a proposed pipeline crosses active drilling areas, describe the plan for coordinating with drillers to ensure early identification of other companies' planned new wells, gathering lines, and aboveground facilities.	Section 6.3
4. Provide a table that identifies areas of steep slopes that would be crossed by the project. Include the following in the table: i. start milepost (of steep slope crossing); ii. end milepost (of steep slope crossing); and iii. the range of slope for each crossing location (i.e., 15–30 percent slopes, 30–50 percent slopes, 50–70 percent slopes, and greater than 70 percent).	Section 6.4.3, table 6.4-1

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ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
FERC Plan	Federal Energy Regulatory Commission's *Upland Erosion Control, Revegetation, and Maintenance Plan*
MDU	Montana-Dakota Utilities Company
MP	milepost
NDDOT	North Dakota Department of Transportation
Project	Wahpeton Expansion Project
RFFA	reasonably foreseeable future actions
USGS	United States Geological Survey
WBI Energy	WBI Energy Transmission, Inc.

WBI ENERGY TRANSMISSION, INC.
WAHPETON EXPANSION PROJECT

6.0 RESOURCE REPORT 6—GEOLOGICAL RESOURCES

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)—Wahpeton Border Station near Wahpeton, North Dakota. The Project will also include minor modifications at the Mapleton Compressor Station; a new MDU—Kindred Border 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(h), Resource Report 6 describes the surficial and bedrock geological setting of the area, identifies potential mineral and paleontological resources in the vicinity, describes geologic hazards that may affect the Project, and details mitigation measures to avoid or mitigate the impact on geological resources and from potential geological hazards.

6.1 Geological Setting

The proposed Project is located within the Red River basin of eastern North Dakota. The Red River basin reflects the prehistoric bounds of glacial Lake Agassiz, which extended from the Hudson Bay to the eastern portion of North Dakota and formed during the end of the Pleistocene epoch about 11,700 years ago. Around 9,000 years ago, Lake Agassiz drained and retreated from North Dakota, leaving behind thick deposited layers of fine silt and clay (Bluemle, 2021). In addition, evidence in the sedimentary record indicates fluctuating glaciation, flooding, postglacial rebound, and other smaller glacial lakes in the region that predate glacial Lake Agassiz (Bluemle, 2021).

The bedrock underlying surficial deposits in the Red River basin consists of crystalline Precambrian basement rock, overlain by Cretaceous sedimentary rocks including the Dakota (also referred to as Inyan Kara) sandstone, Graneros (also referred to as Mowry, Belle Fourche, and Newcastle) shale, and the Greenhorn formation (Klausing, 1968; Baker Jr., 1967). These Cretaceous formations, which were deposited when a shallow epicontinental sea extended from the Arctic Ocean to the Gulf of Mexico, consist primarily of gray to dark gray silty to sandy shale that was deposited in a marine offshore or shoreline setting. The marine offshore Graneros (Mowry, Belle Fourche, and Newcastle) shale underlies the Project area between approximate mileposts (MP) 0.0 and 19.3, MPs 32.0 and 33.2, MPs 37.4 and 44.6, and MPs 55.2 and 60.6. In addition to the marine offshore Cretaceous formations, the Cretaceous-age Dakota (Inyan Kara) formation—which consists of fine to coarse-grained sandstone with interbedded shale and underlies the Project area between approximate MPs 44.6 and 46.2, MPs 49.0 and 52.3, and MPs 53.2 and 55.2—represents a nearshore marine or river/lake deposition setting. Finally, between approximate MPs 19.3 and 32.0, MPs 46.2 and 49.0, and MPs 52.3 and 53.1, Precambrian crystalline rocks underlie the surficial sediments (NDGS, 2021b).

The surficial geology underlying the Project area consists primarily of Quaternary (Pleistocene and Holocene) age glacial till, glacial lake, and glaciofluvial (originating from streams carrying glacial runoff) deposits. The thickness of the glacial drift ranges from approximately 130 feet to 490 feet (Klausing, 1968; Baker, Jr., 1967). The glacial deposits in the Project area are referred to as the Coleharbor Group, which predominantly consist of glacial lake deposits. The Coleharbor Group sediments underlie the proposed pipeline between approximate MPs 11.8 and 16.6, MPs 51.8 and 52.4, MPs 55.2 and 56.9, and MPs 57.9 and 60.6 (NDGS, 2021b).

In addition to glacial deposits, portions of the Project area are underlain by fluvial sediments including sand, silt, and clay of late Quaternary age referred to as the Oahe Formation (Clayton et al., 1976). The Oahe Formation consists largely of organic clay and silt deposited in sloughs and in shallow channels eroded during deglaciation. This sediment, which in places overlies the sand and gravel of the glacial Coleharbor Group, was deposited by Holocene streams, intermittent runoff from valley sides, and wind. The Oahe Formation deposits are generally thin throughout the Project area (between 0.2 and 1 meter thick) and confined to the valley and slough bottoms. The Oahe Formation found in sloughs throughout the Project area consists of fine-grained, organic-rich sediment deposited by runoff from surrounding higher ground, wind, and the decomposition of vegetation that grows in the wet environment (Clayton et al., 1976). The pipeline will cross windblown deposits of the Oahe Formation between approximate MPs 32.9 and 37.0 and river sediments of the Oahe Formation between approximate MPs 0.0 and 11.8, MPs 16.6 and 32.9, MPs 37.0 and 51.8, MPs 52.4 and 55.2, and MPs 56.9 and 57.9 (NDGS, 2021b). Figure 6.1-1 depicts the surficial geologic deposits that underlie the Project area.

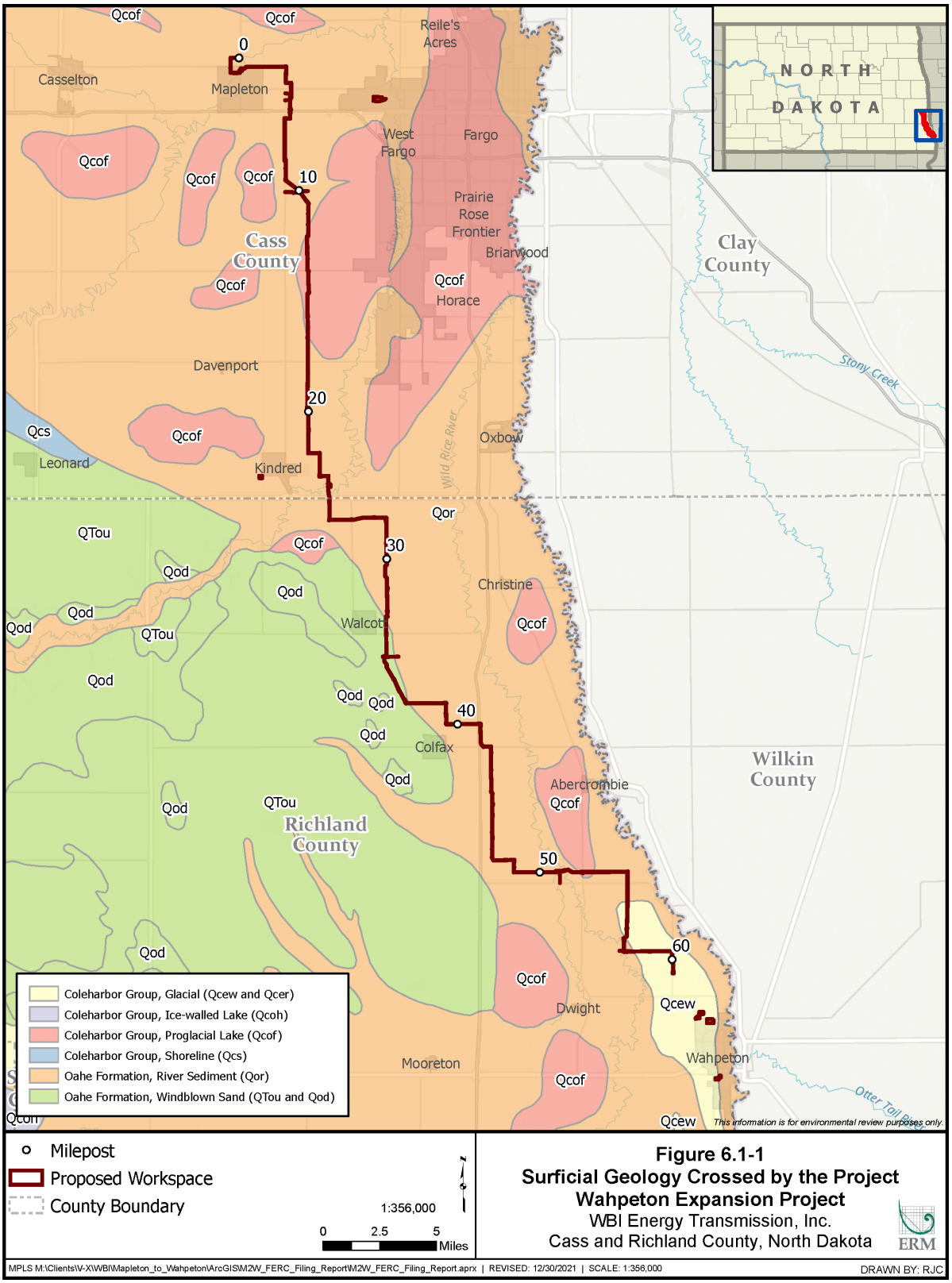

Figure 6.1-1
Surficial Geology Crossed by the Project
Wahpeton Expansion Project
WBI Energy Transmission, Inc.
Cass and Richland County, North Dakota

6.2 Physiographic Setting and Topography

Physiographic provinces are distinguished by geologic structures, rock units, soil types, and vegetation that reflect a similar climatic and geological history. The elevations and characteristics of landforms within each physiographic province differ from those in adjacent regions. The proposed Project will be located within the Red River Valley physiographic province, a 30- to 40-mile-wide flat plain that is separated from the Glaciated Plains province to the west by a north to south trending linear topographic boundary referred to as the Pembina Escarpment (Bluemle and Biek, 2007). Elevations in the Red River Valley generally range from approximately 800 feet above mean sea level at the northern boundary of the state to approximately 1,000 feet above mean sea level at the southern boundary (Simpson, 1929).

In Cass County, the land surface is generally very flat and featureless, reflecting the low energy depositional environment of the glacial Lake Agassiz lakebed. As such, the topography where the proposed Project will cross the Red River Valley has an eastward slope of about 2 feet per mile near the Red River and a northward slope of about 1 to 1.5 feet per mile. Apart from a few isolated ridges to the east and beaches to the west and where rivers and streams are incised about 30 feet into the plain, local relief is about 5 feet (Klausing, 1968). Characteristics of Richland County are similar to those of Cass County with the addition of sand dunes near Hankinson, North Dakota, where the crests of the dunes rise up to 75 feet above the plain (Baker Jr., 1967). Figure 6.2-1 provides an elevation profile of the topography of the Project area.

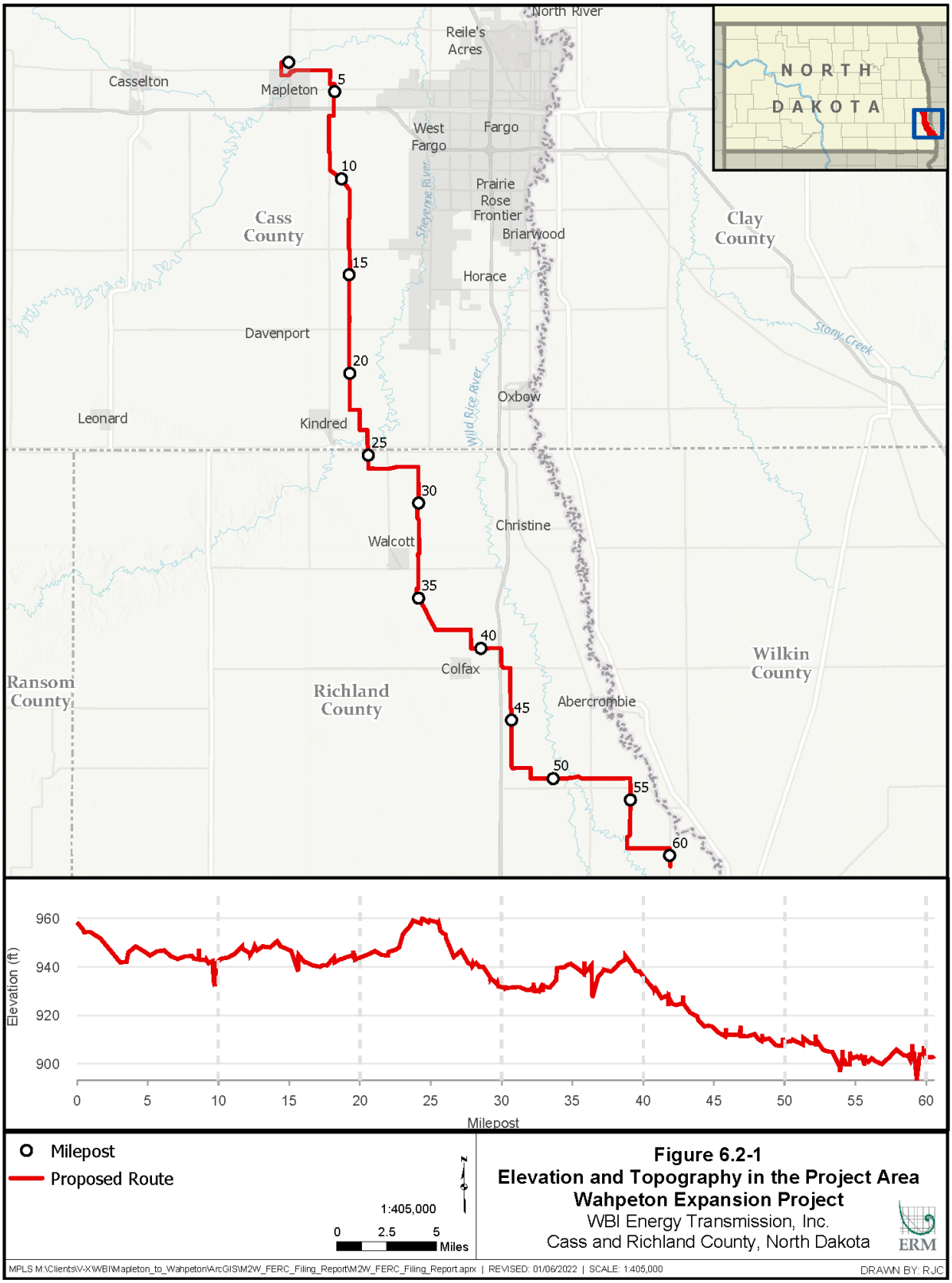

Figure 6.2-1
Elevation and Topography in the Project Area
Wahpeton Expansion Project
WBI Energy Transmission, Inc.
Cass and Richland County, North Dakota

6.3 Mineral Resources

Due in part to the expansive boundary of glacial Lake Agassiz during the Pleistocene epoch, glacial sediments cover three-fourths of North Dakota and contain sand and gravel that is mined for industrial and commercial purposes (Murphy, 2021; USGS, 2021c). Sand and gravel is the third largest mineral industry in the state after oil and gas and lignite. According to the 2016 Minerals Yearbook for North Dakota (USGS, 2021c), the quantity of construction sand and gravel decreased by almost 30 percent from 2015 to 2016. The United States Geological Survey (USGS) Mineral Resources Data System was queried to determine the number of nonfuel mining sites near the Project. According to the Mineral Resources Data System database, the closest mineral resource site is the Turner Pitsd Mill construction sand and gravel mine located approximately 10 miles northeast of MP 41 of the proposed Project (USGS, 2021b).

Based on review of available aerial imagery, USGS topographic maps, and mines mapped by the North Dakota Department of Transportation (NDDOT) and North Dakota Public Services Commission, no gravel or scoria pits or abandoned mines were identified within 0.5 mile of the proposed Project (ESRI, 2021; NDDOT, 2021; NDPSC, 2021). As such, it is not anticipated that the Project will affect existing nonfuel mineral resources.

Based on a query of the North Dakota Department of Mineral Resources database, there is no permitted oil and gas well located within 0.25 mile of the Project workspaces (North Dakota Department of Mineral Resources, 2021). As such, it is not anticipated that the Project will affect existing fuel mineral resources.

6.4 Geologic Hazards

Geologic hazards encompass geologic conditions capable of causing damage or loss of property and life. These hazards include seismic events and earthquakes, mass wasting events such as landslides and slump or debris flows, land subsidence or collapse, and flooding and scouring along waterbodies. Potential hazards in the Project area are described below.

6.4.1 Seismic-Related Hazards

Seismicity refers to the frequency, intensity, and distribution of earthquakes within a given area. Earthquakes generally occur when the two sides of a fault suddenly slip past each other. The movement creates ground motion, which can damage property and structures if the motion is sufficiently intense. The majority of earthquakes occur along boundaries of tectonic plates.

Seismic risk can be quantified by the motions experienced by the ground surface or structures during a given earthquake. The USGS Hazard Mapping Program produced probabilistic seismic hazard maps that show an estimate of the probability that ground motion would exceed a certain value, the peak ground acceleration, in 50 years (Rukstales and Petersen, 2019). The maps are generally based on the historic distribution, frequency, and magnitude of earthquakes in the United States. The peak ground acceleration, or the force caused by shaking, is expressed as a percentage of gravity. Low percentage of gravity values reflect low ground acceleration values and are generally associated with low seismic risk. According to the USGS, probabilistic hazard maps for the Project area indicate a 10 percent probability of experiencing an earthquake with an effective peak ground acceleration of between 0 and 1 percent gravity in a 50-year period and a 2 percent probability of experiencing an earthquake with an effective peak ground acceleration of 2 to 4 percent gravity in a 50-year period (Rukstales and Petersen, 2019).

Additionally, according to the USGS Quaternary Fault and Fold Database, there are no Quaternary faults or Quaternary fault areas mapped within North Dakota (USGS, 2021a). These values and information indicate that the seismic risk is low in the Project area.

Based on earthquake records in Minnesota and North Dakota, the closest recorded earthquake to the Project area was a 3.0 to 3.9-magnitude earthquake that occurred in 1939 (Chandler, 2020). The earthquake was located about 47 miles east-northeast of MP 11.0 and was reportedly felt within an 8,000-square kilometer area. The shaking was categorized as a IV on the Modified Mercalli Intensity Scale (Chandler, 2020), which classifies earthquake intensity based on observed effects on people and structures and ranges from Roman Numeral I (not felt) to X (extreme shaking). An earthquake classified as IV would be felt by people indoors and would disturb dishes, windows, and doors (USGS, 1989). Due to the distance from the earthquake epicenter, it is unlikely that an 8,000-square kilometer area would include any portion of the Project area. No recorded earthquakes in North Dakota have been located within 50 miles of the Project. Due to the low seismic risk and rarity of earthquakes in the Project area, it is unlikely that an earthquake would affect the proposed aboveground facilities or buried steel natural gas pipeline.

Soil liquefaction is a process whereby earthquake shaking or other rapid loading reduces the strength and stiffness of a saturated sandy soil. The result is a transformation of soil to a liquid state. Due to the reported absence of Quaternary faults and low seismic hazard, it is not anticipated that soil liquefaction will affect the Project area.

6.4.2 Subsidence

Subsidence can manifest as rapid sinking or gradual settling of the ground surface and can be caused by aquifer-system compaction, drainage of organic soils, underground mining, hydro-compaction, natural compaction, sinkholes (dissolution of bedrock), and thawing permafrost. Underground mining also poses risks to engineered structures due to the potential of the overlying strata to collapse into the void formed by the extraction of minerals.

Potential subsidence near the Project area could occur from the dissolution of evaporite rocks (salt) deep beneath the land surface or from mining exploration and extraction activities. However, no karst topography, evaporite rocks, recent subsidence events, or large-scale mineral mining sites are in, or near, the Project area (Bluemle, 1983). In most areas, the Project will require excavating a trench that is approximately 5 feet in depth through the surface sediments and, therefore, it is unlikely to contribute to land subsidence.

6.4.3 Landslides

Landslides are defined as the downslope movement of soil, rock, and organic materials induced by gravity and include, but are not limited to, rock falls, debris flows, and slumps. Common landslide triggers include earthquakes, heavy rains, volcanic eruptions, erosion, or human activities. Landslides are more likely to occur in areas with steep slopes and soils that shrink or swell due to changes in moisture content. Landslide hazards are often assessed by evaluating landslide incidence (areas where landslides have occurred in the past) and by evaluating landslide susceptibility (areas where previous landslides are susceptible to future movement). Susceptibility to landslides is rated from low to high, based on the percent of an area affected by landslides (Godt, 1997). The Project area is rated as low landslide incidence per the descriptions below:

- low (less than 1.5 percent of the area affected by landslides);
- moderate (1.5 to 15 percent of the area affected by landslides); and
- high (greater than 15 percent of the area affected by landslides).

In North Dakota, landslides typically occur in the form of soil slides or rotational slumps, where soil and weathered rock glide or rotate downslope as a coherent layer caused by a combination of saturated soils and gravity. Soil slides or slumps tend to occur along steep slopes of river valleys, particularly along the Red River of the North (Murphy, 2017). Landslide deposit maps of the Red River Valley province indicate that most landslide deposits are associated with the banks of waterbodies; in particular, small-scale landslide deposits are mapped along the banks of Antelope Creek and the Wild Rice River near MPs 50.9 and 51.1 (NDGS, 2021a). The surficial geology of the Red River Valley, particularly the high shrink-swell properties of the clays that were deposited in the glacial lakebed, can cause slope instability in these riverine settings (Anderson, 2005). However, it is unlikely that the Project would be affected by landslides as the proposed entry and exit locations for the guided bore crossings of Antelope Creek and the Wild Rice River will be set back from the banks by at least approximately 250 feet.

Based on the National Elevation Dataset provided by the USGS, the Project is primarily located within areas with slopes of less than or equal to 10 percent (USGS, 2013). Table 6.4-1 provides a summary of the percent slope crossed by the proposed pipeline route. The Project crosses 2 short segments where the slope exceeds 20 percent, which coincide with the north and south banks of the Sheyenne River between approximate MPs 24.1 and 24.2. At this location, the Sheyenne River will be crossed using the guided bore method. As the Project will cross river banks where the risk of a landslide is higher using the guided bore method and the Project is generally located in areas of low relief, it is not anticipated that landslides will affect the Project.

TABLE 6.4-1

Wahpeton Expansion Project
Summary of Slopes Crossed by the Proposed Pipeline Route [a]

	Slope (percent)	Crossing Length (feet)	Crossing Length (miles)
Mapleton-Wahpeton	0 to 2	312,759	59.2
	2 to 5	5,075	1.0
	5 to 10	1,750	0.3
	10 to 15	125	<0.01
	15 to 20	25	<0.01
	20 to 40	25	<0.01
	40+	25	<0.01

[a] Sourced from USGS, 2013.

6.4.4 Flooding

Hazards associated with flooding include stream bank erosion, scour, channel relocation, bedload movement, and debris flows. Based on information available from the Federal Emergency Management Agency for Cass and Richland Counties, portions of the Project area—including the proposed new border station facility located near Kindred, North Dakota (MDU—Kindred Border Station)—are located within the 100-year special flood hazard zone (Zone AE or

Zone A). Construction of the MDU—Kindred Border Station will involve installing impervious footprints for a 10-foot-wide by 14-foot-long communications building and a 20-foot-wide by 24-foot-long filtration/meter building within the 100-year floodplain. Refer to section 2.2.5 of Resource Report 2 for detailed information regarding potential impacts to the floodplain storage capacity associated with these new impervious surfaces.

Heavy or excessive rainfall in a relatively short time period and/or spring thaw and associated snowmelt can cause flash flooding and scour along streambanks and within flood zones. The Red River has a long recorded history of significant flooding events, beginning in the late 1700s and continuing to the present day. The largest flood of the Red River in recorded history was in 1997, which prompted planning changes and discussions regarding potential mitigation strategies including, but not limited to, enhanced wetland restoration and/or impoundments to carry the water (Schwert, 2003; Shultz, 1999). Flooding within the Red River Valley and associated Maple River and Wild Rice River watersheds is exacerbated by several factors including the synchrony between the northward flow of the river and northward spring thaw, build-up of ice jams, and decreasing gradient as the river flows to the north (Schwert, 2003). To minimize potential flooding impacts on the proposed pipeline, where the Project crosses perennial waterbodies—including the Wild Rice River, Pitcairn Creek, the Sheyenne River, and the Maple River—the Project will be designed, installed, and weighted, as necessary, to prevent scour or flooding from exposing the pipelines in accordance with 49 CFR Part 192.

6.5 Paleontological Resources

Paleontological resources are vertebrate and invertebrate fossils that are sometimes discovered at locations under excavation or in areas exposed by erosion. Direct effects on paleontological resources could occur during Project construction by activities such as grading or trenching. Indirect effects on fossil beds could result from erosion caused by slope regrading, vegetation clearing, and/or unauthorized collection. The Project will cross several geologic units that may host paleontological resources including the Quaternary Coleharbor Group.

The Quaternary Coleharbor Group hosts fossils of vertebrates that existed during the Pleistocene including mammoths, mastodons, ground sloths, giant bison, beavers, and horses and smaller organisms such as frogs, insects, fish, mollusks, and crustaceans. The remains found in these Pleistocene-age deposits tend to be poorly preserved (Hoganson, 2006). Moreover, studies of the geology of Richland County indicate that few fossils have been found in the county (Baker Jr., 1967). This suggests that there is a low potential to encounter high quality paleontological resources during construction of the Project.

If paleontological resources are discovered during construction of the Project, they will be managed in accordance with WBI Energy's *Plan for Unanticipated Discovery of Paleontological Resources during Construction* (see Appendix 6A).

6.6 Blasting

Based on a query of the Soil Survey Geographic database for soil characteristics in Cass and Richland Counties (United States Department of Agriculture Natural Resources Conservation Service, 1975; 1985), soils where bedrock is shallower than 60 inches from the ground surface are not located within the Project area. As such, blasting is not anticipated to be necessary.

6.7 Design, Construction, and Mitigation

The proposed pipeline will be designed and installed in accordance with United States Department of Transportation standards (49 CFR Part 192, *Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards*), which will minimize or avoid potential impacts on the proposed facilities from potential geological hazards. Under these regulations, pipelines must be designed and constructed to provide adequate protection from washouts, floods, unstable soils, landslides, or other hazards that may cause the pipe to move or sustain abnormal loads. In addition, the proposed aboveground MDU—Kindred Border Station would be designed to withstand anticipated seasonal flooding. For the proposed Project, no areas requiring special design or construction considerations as a result of geological hazards have been identified. Where the pipeline route crosses slopes, potential impacts will be mitigated through the use of erosion control measures as described below. Additionally, WBI Energy notes that it avoided slopes to the extent practicable in routing the proposed pipeline.

With regard to topography, the construction techniques described in Resource Reports 1 and 7 will minimize the potential for slope failure and erosion. These techniques include the use of erosion control devices and other best management practices described in the Federal Energy Regulatory Commission's *Upland Erosion Control, Revegetation, and Maintenance Plan* (FERC Plan) and *Wetland and Waterbody Construction and Mitigation Procedures*. WBI Energy will install temporary sediment barriers such as silt fences, straw bales, or straw logs during construction to prevent the movement of disturbed soil off the right-of-way (in accordance with the FERC Plan). Trench breakers (stacked sand bags or foam) may be installed in the trench around the pipe in sloped areas to prevent movement of subsurface water along the pipeline. Temporary slope breakers consisting of mounded and compacted soil also will be installed across the right-of-way during construction in accordance with the FERC Plan and permanent slope breakers will be installed during cleanup or as soon as weather conditions permit. Trench breakers are designed to prevent preferential water flow along the pipeline trench by diverting subsurface water flow to the land surface; groundwater discharging at the land surface is then redirected off the right-of-way by the slope breakers. Used in combination, these structures prevent subsurface erosion of soils that can lead to slope instability and failure.

Based on the soils present in the Project area, WBI Energy does not expect that blasting will be required to excavate the trench; however, blasting may be required if shallow bedrock or boulders are encountered that cannot be removed by conventional methods. If blasting is necessary, WBI Energy's construction contractor will use blasting techniques in compliance with state and federal regulations governing the use of explosives to assist in the removal of rock from the pipeline trench. WBI Energy will use the minimum explosive charge necessary to fracture bedrock and keep shot-rock from leaving the construction right-of-way. To avoid damage, the contractor will conduct pre-blasting evaluations of the rock, as needed, and develop specific blasting operations and monitoring plans. Control of blasting will limit stresses on existing pipelines, nearby domestic structures, water supply wells, or electric transmission tower footings that may be located near the Project area. Blasting will be conducted during daylight hours and will not begin until occupants of nearby buildings, stores, residences, places of business, and farms have been notified.

Due to the nature of the unsorted glacial sediments in the Project area, the Project may generate minor quantities of rock debris. If rock debris is generated during construction, WBI Energy will not permanently windrow rock along the right-of-way without permission from the

landowner. Disposal of rock debris will be in areas approved by the individual landowners in accordance with the FERC Plan and regulatory requirements. Should WBI Energy have to dispose of excess rock outside the right-of-way, an approved landfill or alternative upland area will be utilized and necessary permits and clearances will be obtained.

WBI Energy does not plan to conduct geotechnical investigations for guided bore installations associated with the Project. As discussed in section 6.1, the underlying surficial geology consists primarily of fine-grained lakebed and glacial sediments. WBI Energy's considerable pipeline/boring experience in the area has shown little to no need for such surveys due to the high continuity and consistency of the subsoil. The guided bore method is generally being employed to provide additional depth at the crossings, to maintain function of the ditches and roads during construction, and to minimize disturbance to these features. The majority of the guided bores associated with Project activities are short and shallow guided bores under roads, railroads, waterbodies, and wetlands. Generally, the majority of these crossings could be installed using the traditional open-cut method; however, WBI Energy has elected to install the crossings using a guided bore to avoid direct impacts on these features. More information regarding the guided bore method is provided in sections 1.3.2.1 and 1.3.2.3 of Resource Report 1. WBI Energy will employ a qualified guided bore contractor to complete bore operations. The guided bore contractor will minimize risks by being prepared with the proper equipment, tools, and supplies prior to drilling and by closely adhering to the measures described in WBI Energy's *Guided Bore Drilling Fluid Monitoring and Operations Plan* to monitor drill activities and immediately respond to any abnormal conditions or inadvertent returns.

6.8 Cumulative Impacts

Section 1.10 of Resource Report 1 defines a cumulative impact and describes the general scope of the cumulative impact analysis. This section describes the potential cumulative impacts on geological resources from the Project combined with the past, present, and reasonably foreseeable future actions (RFFA) identified in Appendix 1I and figure 1.10-1 of Resource Report 1. The location, proposed schedule, and a description of each RFFA are provided in Appendix 1I of Resource Report 1.

Impacts on geologic resources will be limited to the period of active construction and will include temporary disturbance of slopes within the Project's right-of-way resulting from grading and trenching operations. The overall effects of construction and operation of the proposed Project facilities on geological resources are anticipated to be minor. WBI Energy will minimize impacts by returning contours to preconstruction conditions to the extent practicable with the exception of the proposed aboveground facility sites where grading and filling will be required to create a safe and stable land surface to support the facilities.

There are six past, present, and RFFAs that fall within the Project's geographic scope for geological resources. An assessment of the potential for cumulative effects on geologic resources from these projects is provided below.

- MDU Distribution System for Kindred: The distribution system will be built to provide natural gas to industrial and residential customers in Kindred. The area of overlap between the distribution system and the Project would be anticipated to occur within the workspace required to construct the MDU—Kindred Border Station. The distribution system would be constructed in 2024 and may cause the soil surface to

become more prone to wind and water erosion in the areas affected by both projects and may also result in additional soil compaction.

- MDU Distribution System for Wahpeton: The distribution system will be built to provide natural gas to customers in Wahpeton. The area of overlap between the distribution system and the Project would be anticipated to occur within the workspace required to construct the MDU—Wahpeton Border Station. The distribution system would be constructed in 2024 and may cause the soil surface to become more prone to wind and water erosion in the areas affected by both projects and may also result in additional soil compaction.

- MDU Distribution—Farm Tap Service: The locations of any farm taps that would be built off the mainline are still unknown and it is possible that cumulative impacts could occur in areas affected by both projects, similar to what was described for the MDU Border Stations for Kindred and Wahpeton.

- Power lines: Power lines are anticipated to be built to serve non-jurisdictional facilities at the proposed MDU—Kindred and MDU—Wahpeton Border Stations. The area of overlap between the power lines and the Project would be limited to the workspace used for construction of the MDU—Kindred and MDU—Wahpeton Border Stations; because they will be constructed in a similar time frame as the Project, the soil could become more prone to wind and water erosion in the areas affected by both projects and may also result in additional soil compaction.

- Ongoing agricultural activities: Agricultural activities are expected to continue throughout the life of the Project. The Project would contribute to a cumulative impact on surficial geology by disturbing lands that are also commonly disturbed by agricultural activities.

- NDDOT 9, NDDOT 10, and NDDOT 19: These NDDOT highway construction and maintenance projects cross the Project—NDDOT 9 crosses the Project at MP 6.0, NDDOT 10 crosses the Project at MP 0.7, and NDDOT crosses the Project at MP 5.9. Although each of these road crossings will occur within the geologic scope for cumulative impacts, the Project will cross each of these paved roads using a bore method, effectively eliminating the potential for cumulative impacts on surficial geological resources.

WBI Energy will implement mitigation measures to avoid or mitigate the Project's impact on geological resources as described in section 6.7, which will include, but not be limited to, implementing best management practices, regrading contours, and revegetating disturbed areas to minimize soil erosion. The Project, therefore, will generate limited temporary impacts on geological resources. While both the Project and the RFFAs could contribute to impacts on geological resources within the overlapping construction areas during pipeline construction and restoration, these impacts would be temporary and highly localized. As a result, the Project (in combination with other RFFAs) is not expected to have a significant cumulative impact on geological resources.

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APPENDIX 6A PLAN FOR UNANTICIPATED DISCOVERY OF PALEONTOLOGICAL RESOURCES DURING CONSTRUCTION

WBI ENERGY TRANSMISSION, INC.

Wahpeton Expansion Project

Appendix 6A

Plan for Unanticipated Discovery of Paleontological Resources During Construction

Draft

Docket No.
CPF21-4-000

March 2022

WBI ENERGY TRANSMISSION, INC.
WAHPETON EXPANSION PROJECT
PLAN FOR UNANTICIPATED DISCOVERY OF PALEONTOLOGICAL RESOURCES DURING CONSTRUCTION

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ACRONYMS AND ABBREVIATIONS

EI	Environmental Inspector
WBI Energy	WBI Energy Transmission, Inc.

1.0 INTRODUCTION

This Plan for Unanticipated Discovery of Paleontological Resources During Construction was prepared for WBI Energy Transmission, Inc.'s (WBI Energy) proposed Wahpeton Expansion Project. This plan identifies procedures to be implemented in the event that previously unreported and unanticipated paleontological resources are found during construction of the proposed Wahpeton Expansion Project.

2.0 TRAINING

Prior to the commencement of construction, WBI Energy and contractor personnel will receive environmental training that will include instruction on the identification of paleontological resources and implementation of the procedures outlined in this plan.

3.0 UNANTICIPATED DISCOVERY OF PALEONTOLOGICAL RESOURCES

North Dakota Century Code Chapter 54-17.3-05 requires the reporting of all quaternary paleontological finds that potentially, or actually, contain cultural resources to the state historical society in addition to the State Geologist (State of North Dakota, 2016). Refer to the state historical society contact listed in the Plan for Unanticipated Discovery of Historic Properties or Human Remains during Construction (see appendix 4G of Resource Report 4).

WBI Energy will implement the following procedures if paleontological resources are discovered during construction:

1. The contractor will stop work in the immediate area of the find to protect the integrity of the find.

2. The contractor will notify WBI Energy's Environmental Inspector (EI) of the find. The contractor will not restart work in the area of the find until approved by the EI.

   Environmental Inspector:
   Name To be determined
   Cell: To be determined
   Email: To be determined

3. The EI will confirm the presence of paleontological resources and, upon confirmation, will notify WBI Energy's Designated Representative. The representative will notify the Federal Energy Regulatory Commission Project Manager of the find.

   WBI Energy Designated Representative:
   Name: To be determined
   Address: To be determined
   Phone: To be determined
   Cell: To be determined
   Email: To be determined

   Federal Energy Regulatory Commission Project Manager:
   Name: David Hanobic X
   Address: 888 First Street, Washington, DC 20426

Phone: 202-502-8312
Email: David.Hanobic@ferc.gov

4. Upon confirmation of the find and notifications, the EI will photograph the representative specimens of fossils identified at the site. The EI will prepare a brief written description that identifies the location of the potential fossil material along the route, the depth and apparent thickness of the stratum containing the fossil material, local topography, and other pertinent conditions or observations.

5. The WBI Energy Designated Representative will notify the State Geologist and, upon request, provide copies of the written and photographic documentation of the paleontological materials.

   State Geologist:
   Name: Edward Murphy
   Phone: 701-328-8000
   Email: emurphy@nd.gov

6. Once documentation of the find is completed, WBI Energy's Designated Representative will direct the EI to grant clearance to the contractor to resume work in the vicinity of the site.

4.0 REFERENCES

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