WBI ENERGY TRANSMISSION, INC.

North Bakken Expansion Project

Resource Report 10
Alternatives

Final

Docket No.
CP20-52-000

February 2020

WBI ENERGY TRANSMISSION, INC.
NORTH BAKKEN EXPANSION PROJECT
RESOURCE REPORT 10 – ALTERNATIVES

Minimum Filing Requirements:	**Addressed in:**
Address the "no action" alternative - 18 CFR §380.12(1)(1) Discuss the costs and benefits associated with the alternative	Section 10.1
For large projects, address the effect of energy conservation or energy alternatives to the project - 18 CFR §380.12(1)(1)	Sections 10.2 and 10.3
Identify system alternatives considered during the identification of the project and provide the rationale for rejecting each alternative - 18 CFR §380.12(1)(1)	Section 10.4
Identify major and minor route alternatives considered to avoid impact on sensitive environmental areas (e.g., wetlands, parks, or residences) and provide sufficient comparative data to justify the selection of the proposed route - 18 CFR §380.12(1)(2)(ii)	Section 10.6
Identify alternative sites considered for the location of major new aboveground facilities and provide sufficient comparative data to justify the selection of the proposed site - 18 CFR §380.12(1)(2)(ii)	Section 10.7

WBI ENERGY TRANSMISSION, INC.
NORTH BAKKEN EXPANSION PROJECT
RESOURCE REPORT 10 – ALTERNATIVES

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ACRONYMS AND ABBREVIATIONS

Alliance	Alliance Pipeline
COE	U.S. Army Corps of Engineers
DASK	Dakota skipper
EIA	U.S. Energy Information Administration
HDD	horizontal direction drill
hp	horsepower
MP	milepost
Northern Border	Northern Border Pipeline Company
Project	North Bakken Expansion Project
USFS	U.S. Forest Service
WBI Energy	WBI Energy Transmission, Inc.

WBI ENERGY TRANSMISSION, INC.
NORTH BAKKEN EXPANSION PROJECT

10.0 RESOURCE REPORT 10 – ALTERNATIVES

WBI Energy Transmission, Inc. (WBI Energy) proposes to construct and operate the North Bakken Expansion Project (or Project), which consists of an approximately 61.9-mile-long, new 24-inch-diameter natural gas pipeline from new facilities at WBI Energy's Tioga Compressor Station near Tioga, North Dakota, to a new compressor station (Elkhorn Creek Compressor Station) southeast of Watford City, North Dakota.

The Project also involves construction of approximately 0.3 mile of new 24-inch-diameter natural gas pipeline between the proposed Elkhorn Creek Compressor Station to a new interconnect with Northern Border Pipeline Company (Northern Border), approximately 20.4 miles of new 12-inch-diameter natural gas pipeline looping along WBI Energy's Line Section 25, approximately 9.4 miles of new 12-inch-diameter natural gas pipeline looping along WBI Energy's Line Section 30, approximately 0.5 mile of new 20-inch-diameter receipt lateral to the Tioga Compressor Station, and uprating of WBI Energy's Line Section 25. The Project includes additional horsepower at the Tioga Compressor Station; the installation of new and modifications to existing delivery, receipt, and transfer stations along WBI Energy's pipeline routes; the replacement of small segments of pipeline facilities; and the installation of block valves, pig launcher/receiver stations, and other associated appurtenances. Figure 1.1-1 of Resource Report 1 provides an overview of the proposed pipeline system and associated facilities.

Resource Report 10 describes alternatives that WBI Energy has evaluated to determine whether they would be reasonable and environmentally preferable to the proposed Project. Alternatives considered include the no-action alternative, alternative energy sources and energy conservation, system alternatives, facility alternatives, route alternatives, and aboveground facility site alternatives. Route variations to address localized issues along the proposed route may be identified as a result of ongoing environmental and civil field surveys, engineering design work, agency consultations, landowner communications, and other stakeholder input. Route variations identified as a result of these activities will be provided in a supplemental filing (if applicable).

To be considered preferable to the proposed Project, an alternative must provide a significant environmental advantage over the Project; meet the objectives and timeframes of the Project, and be technically and economically feasible and practicable. As discussed in Resource Report 1, the primary objectives of the Project are to (1) reduce the amount of natural gas being flared due to lack of existing natural gas pipeline infrastructure and to assist in meeting established state-mandated natural gas capture targets; (2) create new infrastructure in hydrocarbon-producing areas of northwestern North Dakota not currently served by existing transmission pipelines; (3) provide producers with expanded open access opportunities to pursue commercial arrangements in competitive markets which are not available via existing infrastructure; and (4) place the proposed facilities in service by November 1, 2021.

10.1 NO-ACTION ALTERNATIVE

The Williston Basin is one of the most prolific oil and associated natural gas production areas within the United States, due to the presence of the Bakken and Three Forks Formations. The Bakken and Three Forks Formations are primarily targeted for oil production (Energy of North Dakota, 2020a); however, there are significant volumes of associated rich natural gas produced

in conjunction with the oil (Energy Information Administration, 2020). Rich natural gas generally needs to be processed by the appropriate natural gas processing infrastructure before it can be delivered to market (Energy of North Dakota, 2020b). The Project will provide an outlet for this natural gas. Under the no-action alternative, the Project would not be built, and the environmental impacts associated with construction and operation of the proposed facilities would not occur.

By not constructing the Project, however, WBI Energy would be unable to provide the incremental firm transportation capacity requested by shippers through the open season process. In particular, WBI Energy would be unable to transport incremental volumes of processed natural gas, which would leave the processed natural gas stranded, possibly flared and unable to reach markets. In November 2019, natural gas production from the Bakken and Three Forks Formations was approximately 3.1 billion cubic feet per day, of this amount, approximately 2.6 billion cubic feet per day was captured and processed. Conversely, approximately 0.5 billion cubic feet per day, or approximately 17 percent, was flared due to limited or insufficient field gathering facilities, inadequate natural gas processing capacity and/or pipeline infrastructure (North Dakota Department of Mineral Resources, 2020). In addition, North Dakota has established state-mandated natural gas capture targets (North Dakota Industrial Commission, 2020). These targets require producers to capture a certain percentage of natural gas production on an annual basis. The current state-mandated target is 12 percent flared. Under the no-action alternative, other natural gas pipeline companies could propose to construct similar, new facilities to meet the contracted demand for the transportation of processed natural gas from the Williston Basin area. Such actions would likely result in impacts similar to or greater than the proposed Project, and might not meet the Project's objectives within the proposed timeframe. Therefore, the no-action alternative does not meet the primary objectives of the Project and provides no advantage over the proposed Project.

10.2 ALTERNATIVE ENERGY SOURCES

The use of alternative energy sources, such as solar, wind, geothermal or biofuels, or the use of energy conservation measures are not reasonable options to meet the objectives of the Project, which is to transport gas from the Williston Basin area to Northern Border's interstate pipeline system. The natural gas that will be transported by the proposed Project is associated natural gas resulting from oil drilling in the Bakken and Three Forks Formations and neither alternative energy sources nor energy conservation would provide an outlet for the gas after it is processed.

10.3 ENERGY CONSERVATION

Energy conservation could help alleviate some of the nation's growing demand for energy. State and federal energy conservation measures most likely will continue to play an increasing role in slowing the growth of energy demand in the country. However, it is unlikely that these measures will offset the demand for new unconventional natural gas sources. The U.S. Energy Information Administration (EIA) indicates in their 2019 Annual Energy Outlook that even with the enacted energy efficiency policies and increases in energy prices, total primary energy consumption, including fuels used for electricity generation, will grow by 0.2 percent per year from 2019 to 2050 (EIA, 2019). To meet this demand, along with the increased demand in the export of natural gas, the EIA predicts that total domestic production of natural gas in the United States will grow from about 30 trillion cubic feet in 2019 to about 43 trillion cubic feet by 2050 (EIA, 2019). The anticipated growth in natural gas demand is driven primarily by its increased use for electric power generation and industrial applications.

Reduction in the need for additional energy is the preferred option wherever possible. Conservation of energy reduces the demand for limited existing reserves. Although energy conservation measures will be important elements in addressing future energy demands, it is unlikely that they will be able to offset more than a fraction of anticipated demand in the foreseeable future. Thus, energy conservation alone is not a viable alternative to the Project as it does not preclude the need for natural gas infrastructure projects like that proposed by WBI Energy.

10.4 SYSTEM ALTERNATIVES

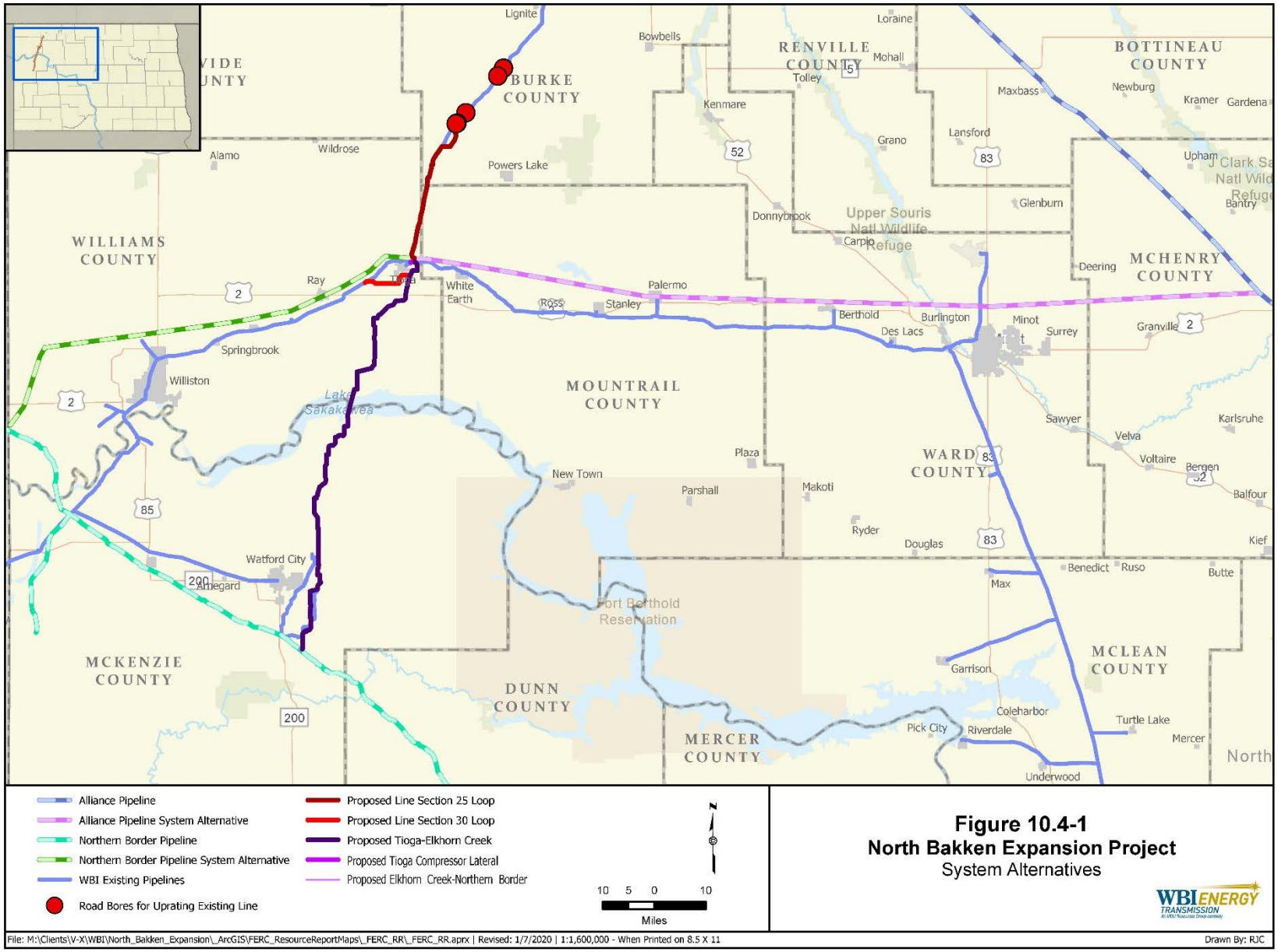
System alternatives would make use of other existing, modified, or proposed pipeline systems to meet the objectives of the Project. Use of a system alternative would make it unnecessary to construct all or part of the proposed Project, though some modifications or additions to the existing or proposed systems may be required. Such modifications or additions would result in environmental impacts; however, the impacts could be less than, similar to, or greater than those associated with construction of the proposed Project.

North Dakota has a broad network of high-pressure, high-volume, natural gas pipelines operating throughout the state. Of these, WBI Energy identified two existing systems that potentially could meet the objectives of the Project: the Alliance Pipeline (Alliance) and Northern Border (see figure 10.4-1). Each of these existing pipeline systems is described below, followed by a discussion of the potential for these pipelines to serve as system alternatives to the proposed Project. WBI Energy is not aware of any proposed pipeline systems in northwestern North Dakota that could meet the objectives of the Project.

10.4.1 Alliance Pipeline System Alternative

According to its website, the Alliance pipeline system consists of 2,391 miles of integrated Canadian and U.S. natural gas transmission pipelines, delivering liquids rich natural gas from the Western Canadian Sedimentary Basin and the Williston Basin in North Dakota to the Chicago market hub. The U.S. portion of the system consists of approximately 887 miles of 36-inch-diameter pipeline with a maximum operating pressure of 1,935 pounds per square inch. The system has been in commercial service since December 2000 and delivers an average of 1.6 billion standard cubic feet of natural gas per day to the Chicago market.

As an alternative to the proposed Project, WBI Energy examined a connection with Alliance in northcentral North Dakota. This alternative would consist of approximately 124 miles of 24-inch-diameter pipeline from WBI Energy's Tioga Compressor Station traversing east to an interconnect with the Alliance pipeline system near Towner, North Dakota, and construction of a new compressor station near the interconnect. Construction of the proposed Line Section 25 and 30 pipeline loopings, the Tioga Compressor Lateral, and the required additional compression at the Tioga Compressor Station would be required for this alternative. The new compressor station near the Alliance interconnect would be much larger than the proposed Elkhorn Creek Compressor Station (estimated at 6,300 horsepower [hp] or higher) due to the higher operating pressure of the Alliance pipeline as well as the additional distance to the Alliance interconnect. Due to the increased costs for the longer pipeline, the additional environmental impacts associated with the longer pipeline, as well as the increased costs for compressor horsepower, associated fuel and operating costs as well as construction and operational environmental impacts, this alternative was not selected.


Lignite
Bowbells
Loraine
RENVILLE COUNTY
Mohall
Tolley
BOTTINEAU COUNTY
Newburg
Kramer
Gardena
Maxbass
BURKE COUNTY
Kenmare
Lansford
Grano
Alamo
Wildrose
Powers Lake
Upham
Glenburn
Donnybrook
Upper Souris Natl Wildlife Refuge
Carpio
Bantry
WILLIAMS COUNTY
Ray
White Earth
Ross
Stanley
Palermo
Deering
MCHENRY COUNTY
Berthold
Burlington
Minot
Surrey
Granville
Des Lacs
Springbrook
Williston
Lake Sakakawea
MOUNTRAIL COUNTY
Sawyer
Velva
Karlsruhe
Voltaire
Bergen
Plaza
WARD COUNTY
New Town
Parshall
Makoti
Balfour
Ryder
Douglas
Kief
Watford City
Benedict
Ruso
Butte
Max
Ft Berthold Reservation
MCKENZIE COUNTY
Garrison
MCLEAN COUNTY
DUNN COUNTY
Coleharbor
Turtle Lake
Pick City
Riverdale
Mercer
MERCER COUNTY
Underwood
North
Alliance Pipeline
Alliance Pipeline System Alternative
Northern Border Pipeline
Northern Border Pipeline System Alternative
WBI Existing Pipelines
Road Bores for Uprating Existing Line
Proposed Line Section 25 Loop
Proposed Line Section 30 Loop
Proposed Tioga-Elkhorn Creek
Proposed Tioga Compressor Lateral
Proposed Elkhorn Creek-Northern Border
10 5 0 10
Miles
Figure 10.4-1
North Bakken Expansion Project
System Alternatives
WBI ENERGY TRANSMISSION
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10.4.2 Northern Border System Alternative

According to its website, the Northern Border pipeline system, owned by TC Pipelines, LP and ONEOK Partners, is a major natural gas transportation system that links the Midwestern United States with reserves in the Western Canadian Sedimentary Basin and transports natural gas produced in the Williston and Powder River Basins in the United States to the Chicago area (Northern Border, 2019). WBI Energy currently has five interconnects with the Northern Border pipeline system in northwestern and central North Dakota. The system has a total design capacity of about 2.4 billion cubic feet per day. Although the Northern Border Pipeline serves the Chicago market area.

WBI Energy examined constructing a 24-inch-diameter pipeline from the Tioga Compressor Station traversing west to its interconnection with Northern Border west of Williston, North Dakota that would be about 3 miles longer than the proposed Tioga-Elkhorn Creek pipeline. The pipeline would be routed around the north side of Williston, North Dakota and traverse southwest towards WBI Energy's Stateline interconnect with Northern Border. Construction of the proposed Line Section 25 and 30 pipeline looping, the Tioga Compressor Lateral, and the required additional compression at the Tioga Compressor Station would be the same as the proposed Project. This alternative has the advantage of avoiding the crossing of Lake Sakakawea; however, the route is slightly longer than the Tioga-Elkhorn Creek pipeline, reduces pipeline collocation opportunities, and increased the length of the pipeline that would be constructed through less heavily oil- and gas-developed areas. Furthermore, the interconnect location is further upstream on Northern Border's system; therefore, customers on Northern Border would incur additional fuel and transportation costs on its system when compared to the Project's proposed tie-in to Northern Border's existing mainline near the proposed Elkhorn Creek Compressor Station. In addition, the town of Williston is considered a hub city within the region. The town's population has tripled over that last 10 years and expanded to provide new housing and infrastructure to meet the demands of a growing city (City of Williston, 2019). This alternative route would be in close proximity to Williston and would increase the likelihood of encroachment. Due to reduced flexibility, encroachment of the town of Williston, and increased fuel and transportation costs, this alternative was not selected.

10.5 FACILITY ALTERNATIVES

Facility alternatives are those alternatives that consider modifications to the proposed Project facilities including varying diameter pipelines, increased compression, and the reduction of proposed pipeline facilities. During Project planning, WBI Energy considered a facility alternative to the proposed Line Section 30 Loop.

The proposed Project includes approximately 9.4 miles of new 12-inch-diameter natural gas pipeline looping between an existing valve setting and WBI Energy's Tioga Compressor Station in order to transport additional volumes as efficiently as possible. The proposed Line Section 30 Loop would also provide increased system security and operational flexibility for the Project. An alternative to the proposed Line Section 30 Loop would entail installing additional compression at the Tioga Compressor Station. It would be possible to transport the contracted volumes east to the Tioga Compressor Station with the installation of an additional approximately 4,300 hp at the Tioga Compressor Station. Although this alternative would reduce Project costs, there would be increased fuel and operating costs associated with the additional compressor horsepower. This increase in horsepower and fuel would lead to a greater operational

environmental impact for the alterative. Additionally, this alternative does not increase system security and operational flexibility on WBI Energy's Line Section 30. For these reasons, this alternative was not selected.

10.6 ROUTE ALTERNATIVES AND ROUTE VARIATIONS

The goal of the proposed route selection analysis was to identify a Project alignment that represents a minimal and acceptable level of environmental impact coupled with attainment of the Project goals. Through the identification of the proposed Project pipeline facility routes, WBI Energy worked to co-locate the proposed pipeline facilities with existing utility corridors and minimize impacts on environmental resources and stakeholders.

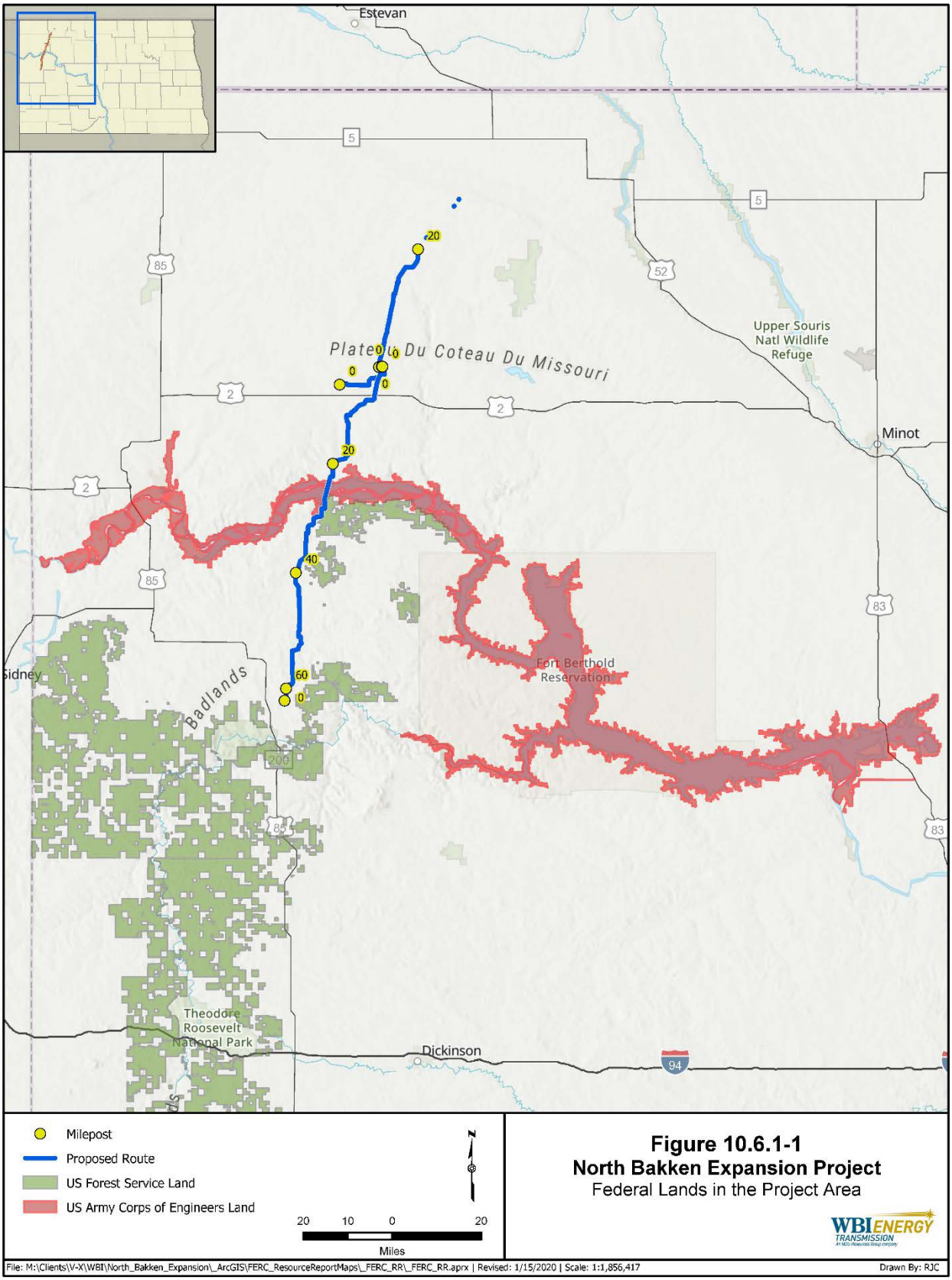
10.6.1 Major Route Alternatives

WBI Energy evaluated two major route alternatives that would minimize federal lands crossed by the Project. As depicted in figure 10.6.1-1, the Project route crosses both U.S. Army Corps of Engineers (COE) land and U.S. Forest Service (USFS) land. The COE land extends approximately 45 miles west and over 100 miles southeast of the proposed Lake Sakakawea crossing location. Route alternatives to avoid COE lands were deemed impracticable as they would add an additional 90 and 200 miles to the proposed routes, which in turn would add additional environmental constraints including but not limited to additional wetland crossings, waterbody crossings, wetland easements, and vegetation impacts. However, both alternative routes would eliminate USFS land crossed, as depicted in figure 10.6.1-2.

Western Alternative

The Western Alternative would extend west from milepost (MP) 22.3 of the Tioga-Elkhorn Creek pipeline, follow the north side of 51st Lane NW until it connects with Highway 1804, and then continues along the north side of Highway 1804 for an additional 2 miles. The alternative route would then head southwest through steep topography along the north side of Lake Sakakawea between existing oil and gas well pad development. The alternative route then crosses Lake Sakakawea following an existing ONEOK Rockies Midstream gathering line through a valley on the south side of the lake. The route then continues south paralleling Highway 1806 west for about 1 mile before turning east and following 45th Street NW for an additional 0.9 mile. At this point, the alternative would rejoin the Tioga-Elkhorn Creek pipeline route near MP 30.6.

The Western Alternative is 12.1 miles in length, compared with the 8.3-mile corresponding segment of the proposed Tioga-Elkhorn Creek pipeline route. In addition to the crossing of Lake Sakakawea, the Western Alternative would cross a total of 3.8 miles of COE-owned land compared with 2.7 miles of the proposed Tioga-Elkhorn Creek pipeline route including COE-owned lands that extend on the north side of Highway 1804 near Lund's Landing Boat Ramp. The Western Alternative would be within 0.25 mile of both Lund's Landing and 3 D's Campground, which would have temporary impacts (visual, noise, traffic) on these existing recreation area during construction.


Estevan
Minot
Upper Souris
Natl Wildlife
Refuge
Plateau Du Coteau Du Missouri
Fort Berthold
Reservation
Badlands
Theodore
Roosevelt
National Park
Dickinson
Sidney
20
0
0
0
20
40
60
0
Milepost
Proposed Route
US Forest Service Land
US Army Corps of Engineers Land
20 10 0 20
Miles
Figure 10.6.1-1
North Bakken Expansion Project
Federal Lands in the Project Area
WBI ENERGY TRANSMISSION
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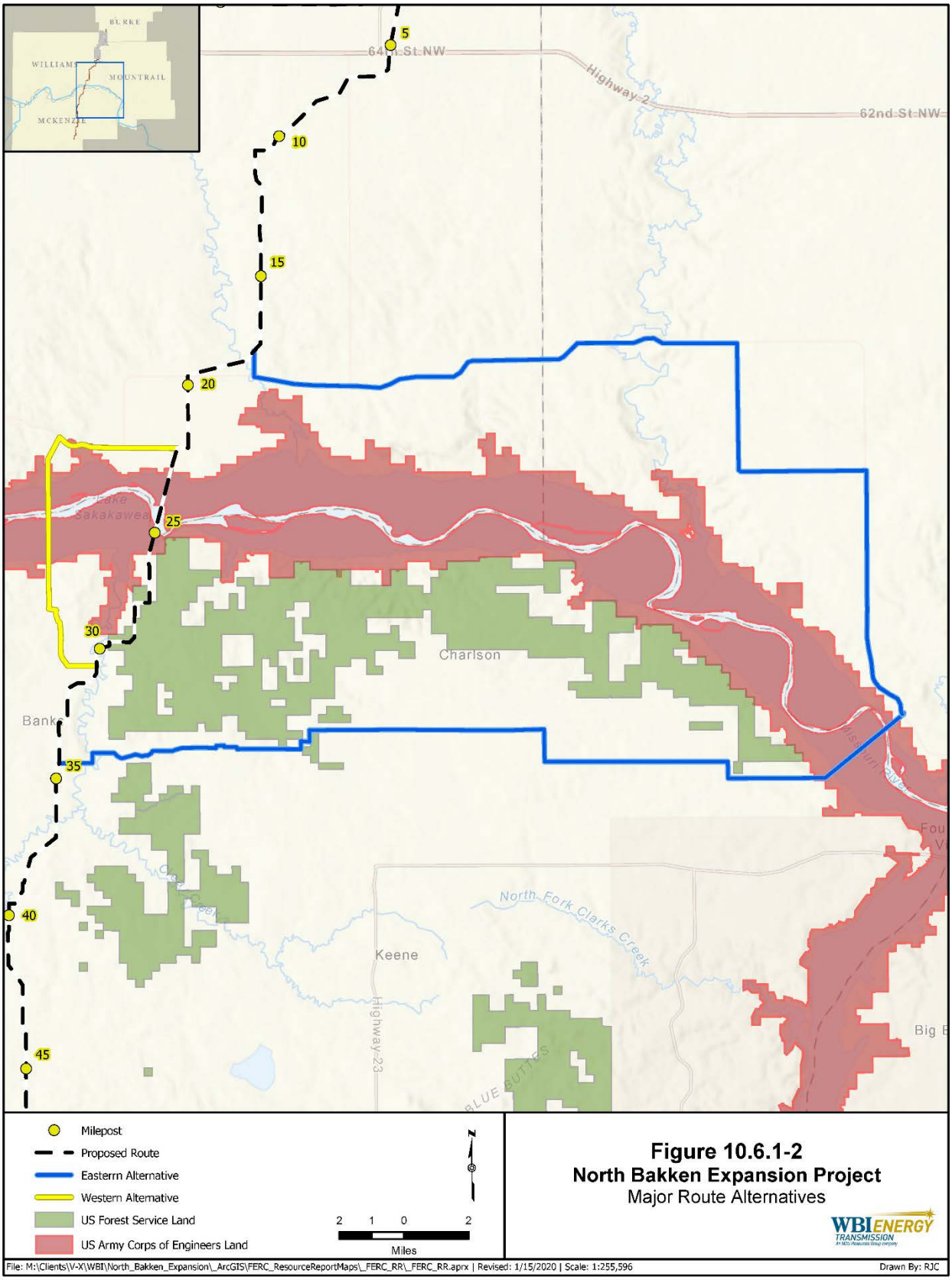
BURKE
WILLIAMS
MOUNTRAIL
MCKENZIE
5
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25
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35
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45
64th St NW
Highway 2
62nd St NW
Lake Sakakawea
Charlson
Bank
North Fork Clarks Creek
Keene
Highway 23
Big B
Milepost
Proposed Route
Easterrn Alternative
Western Alternative
US Forest Service Land
US Army Corps of Engineers Land
N
2 1 0 2
Miles
Figure 10.6.1-2
North Bakken Expansion Project
Major Route Alternatives
WBI ENERGY TRANSMISSION
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Review of National Wetlands Inventory data shows that the Western Alternative would cross three additional emergent wetlands compared to the proposed route. Review of National Hydrography Dataset data indicates that the same amount of intermittent and perennial waterbodies would be crossed by the Western Alternative as the proposed segment of the Tioga-Elkhorn Creek pipeline. The crossing of Lake Sakakawea (waterbody itself) would be 2.7 miles compared to 2.4 miles for the proposed route. While a configuration of a horizontal direction drill (HDD) layout was not developed for the Western Alternative, it is anticipated that the drill itself would need to extend north and south of the lake proper, making the drill a minimum of 0.3 mile longer than that of the proposed lake crossing. As previously mentioned, the topography on the north shore of Lake Sakakawea on the Western Alternative is much steeper than that of the proposed route and could potentially require grading for placement of the pipe pullback for the HDD. The south shore of Lake Sakakawea has the potential viability of a pipe pullback area for the Western Alternative; however, only approximately 0.7 mile of contiguous agricultural fields are present versus 2.7 miles on the proposed route. Additional shrub/tree clearing would be required for a pullback on the south shore.

While the Western Alternative would avoid the crossing of the USFS Little Missouri National Grassland, it would add approximately 4 miles to the pipeline route, increase the length of COE-lands crossed, be in close proximity to two existing recreation areas, cross additional wetland areas, and require a longer HDD crossing of Lake Sakakawea. For these reasons, the Western Alternative was not selected as a viable route alternative.

Eastern Alternative

The Eastern Alternative would extend south from MP 17.4 of the Tioga-Elkhorn Creek pipeline for approximately 1 mile before heading east following 54th and 55th Streets NW for an additional 16 miles, head south following 96th Avenue NW for about 4 miles and turn east along 51st Street NW for an additional 4 miles. The Eastern Alternative would then head southeast along Highway 1804 for approximately 8 miles before heading southwest across Lake Sakakawea. The alternative would then head west for about 21 miles generally following existing roads where possible and following existing utility rights-of-way for another 5 miles before rejoining the Tioga-Elkhorn Creek pipeline route near MP 34.5.

The Eastern Alternative is approximately 61.8 miles in length, compared with the 17.1 mile corresponding segment of the proposed Tioga-Elkhorn Creek pipeline route. The Eastern Alternative would cross a total of 3.2 miles of COE-owned land compared with 2.7 miles of the proposed route and would avoid crossing of USFS-owned land. While the alternative was routed to follow existing roads for the majority of the route, this does put the alternative in close proximity to various homes and businesses primarily along 54th Street NW, 92nd Avenue NW, 91st Avenue NW, 43rd Avenue NW, and 42nd Avenue NW. While the Eastern Alternative would not extend into the Fort Berthold Indian Reservation, it would be located approximately 2 miles west of the reservation boundary for approximately 10 miles along the route. The Eastern Alternative crossing of Lake Sakakawea would be just upstream of the reservation boundary.

Review of National Wetlands Inventory data shows that the Eastern Alternative would cross approximately 25 additional emergent wetlands compared to the proposed route. Review of National Hydrography Dataset data indicates that the Eastern Alternative would cross over 40 additional intermittent waterbodies compared with the corresponding segment of the proposed segment of the Tioga-Elkhorn Creek pipeline. The crossing of Lake Sakakawea (waterbody itself) would be 2.6 miles compared to 2.4 miles for the proposed route. While a configuration of an HDD crossing was not developed for the Eastern Alternative, it is anticipated that the HDD would

need to extend on either side of the lake proper, making the drill a minimum of 0.2 mile longer than that of the proposed lake crossing. Similar to the Western Alternative, the topography on both shores of Lake Sakakawea is much steeper than that of the proposed route and could potentially require grading and/or tree clearing for placement of the HDD pipe pullback.

While the Eastern Alternative would avoid crossing the USFS Little Missouri National Grassland, it would add over 50 miles to the pipeline route, increase the length of COE lands crossed, be in close proximity to homes and businesses, cross additional wetland and waterbody areas, and would require a longer HDD crossing of Lake Sakakawea. For these reasons, the Eastern Alternative was not selected as a viable route alternative

10.6.2 Minor Route Alternatives

During the scoping period, WBI Energy received comment letters regarding potential route alternatives (see appendix 1I to Resource Report 1). As an alternative to constructing the proposed Tioga-Elkhorn Creek pipeline, it was suggested that WBI Energy consider replacing an existing pipeline that extends east of Watford City and ties into Northern Border south of Watford City with a larger diameter pipeline. WBI Energy's North Badlands sub-system's 16-inch-diamater pipeline generally follows a portion of the proposed Project route. This pipeline is designed to flow 200,000 million cubic feet per day, which would be interrupted for approximately 8 months during the construction of a replacement pipeline. The interruption would have a significant impact on upstream gas processing plants. To accommodate the combined volume level that would be flowing on the replacement pipeline, either the diameter of the pipeline would need to be increased or additional horsepower installed at the Elkhorn Creek Compressor Station, increasing Project costs. The pipeline would have to be extended from its current interconnect with Northern Border at Spring Creek to the Elkhorn Creek Compressor Station. In addition, WBI Energy's North Badlands sub-system is operated independently of WBI Energy's integrated system, with separate pressure requirements, transportation rates, and fuel reimbursement provision, which would be affected by replacing the current 16-inch-diameter pipeline. For these reasons, replacing the existing pipeline was not selected as a viable route alternative.

A second minor route alternative was suggested that would involve routing the Tioga-Elkhorn Creek pipeline between two existing WBI Energy pipelines from approximately MPs 51.8 to 52.8. The two existing WBI Energy pipelines run parallel with the space between the pipelines varying from a minimum of 11 feet to a maximum of 60 feet. Given the space required to safely install the proposed 24-inch-diameter pipeline, this alternative is not considered feasible. WBI Energy did attempt to collocate the proposed pipeline with existing energy infrastructure across the property involved. The proposed route runs between an existing WBI Energy pipeline and an existing ONEOK pipeline for the first 0.6 mile and then parallels an existing Hiland crude oil pipeline for the remaining 0.4 mile. The current route was also engineered to minimize sidehill construction across the property. For these reasons, the second minor route alternative proposed was not selected as a viable alternative.

10.6.3 Minor Route Variations

As a result of ongoing environmental field surveys, consultations with regulatory agencies, and continued Project engineering design, WBI Energy identified several minor pre-filing route variations along the current proposed route to avoid or minimize crossings of sensitive environmental features, address landowner concerns, and/or address engineering concerns. Table 10.6.3-1 summarizes the minor route variations identified and incorporated into the proposed pipeline routes since the submittal of the preliminary draft of Resource Reports 1 and 10 on August 2, 2019.

TABLE 10.6.3-1

Summary of Minor Route Variations Identified During the Pre-Filing Process and Incorporated into the Proposed Pipeline Routes

Pipeline Facility/ Route Variation	Approximate Milepost Begin	Approximate Milepost End	County	Justification for Variation
Tioga-Elkhorn Creek				
Route Variation 1	0.0	2.0	Williams	Route change to avoid cultural site
Route Variation 2	12.0	13.4	Williams	Route change to avoid cultural sites
Route Variation 3	17.7	19.7	Williams	Route change to avoid cultural sites
Route Variation 4	29.0	29.7	McKenzie	Route change to avoid cultural sites
Route Variation 5	31.6	31.8	McKenzie	Route change to avoid Dakota skipper (DASK) habitat
Route Variation 6	39.2	41.1	McKenzie	Route change to avoid cultural sites and DASK habitat
Route Variation 7	49.9	50.3	McKenzie	Route change to avoid DASK habitat
Route Variation 8	52.4	53.4	McKenzie	Route change to avoid cultural sites
Route Variation 9	55.1	56.9	McKenzie	Route change to avoid DASK habitat
Route Variation 10	58.3	59.1	McKenzie	Route change to avoid cultural sites and DASK habitat
Route Variation 11	59.3	59.6	McKenzie	Route change to avoid DASK habitat
Route Variation 12	60.0	61.5	McKenzie	Route change to avoid DASK habitat
Line Section 25 Loop				
Route Variation 13	0.0	0.7	Williams	Route change to avoid cultural sites
Route Variation 14	0.9	1.2	Williams	Route change to avoid cultural sites
Route Variation 15	4.8	4.9	Williams	Route change to avoid cultural site
Route Variation 16	13.1	13.4	Williams	Workspace adjustments to avoid cultural sites
Route Variation 17	18.9	19.3	Williams	Route change to avoid U.S. Fish and Wildlife Service wetland basins
Line Section 30 Loop				
Route Variation 18	0.0	0.5	Williams	Engineering constraints of the proposed receipt station
Route Variation 19	0.5	1.5	Williams	Route change to avoid U.S. Fish and Wildlife Service wetland basins
Route Variation 20	4.5	4.6	Williams	Pipeline engineering constraints
Route Variation 21	5.7	6.3	Williams	Landowner route variation request
Route Variation 22	7.5	9.4	Williams	Route change to avoid cultural site and landowner route variation request
Uprate Line Section 25				
Route Variation 23	N/A	N/A	Burke	Realignment of proposed bore replacement across 86th Street due to engineering and environmental constraints

TABLE 10.6.3-1 (cont'd)

Summary of Minor Route Variations Identified During the Pre-Filing Process and Incorporated into the Proposed Pipeline Routes

Pipeline Facility/ Route Variation	Approximate Milepost Begin	Approximate Milepost End	County	Justification for Variation
Route Variation 24	N/A	N/A	Burke	Realignment of proposed bore replacement across Highway 40 due to engineering and environmental constraints
Route Variation 26	N/A	N/A	Burke	Realignment of proposed bore replacement across 92nd Avenue due to engineering and environmental constraints
Route Variation 26	N/A	N/A	Burke	Realignment of proposed bore replacement across 89th Avenue and 93rd Street due to engineering and environmental constraints

If any additional minor route variations are identified during ongoing environmental surveys, agency consultations, landowner discussions, and Project engineering, WBI Energy will provide the information in a supplemental filing.

10.7 COMPRESSOR STATION ALTERNATIVES

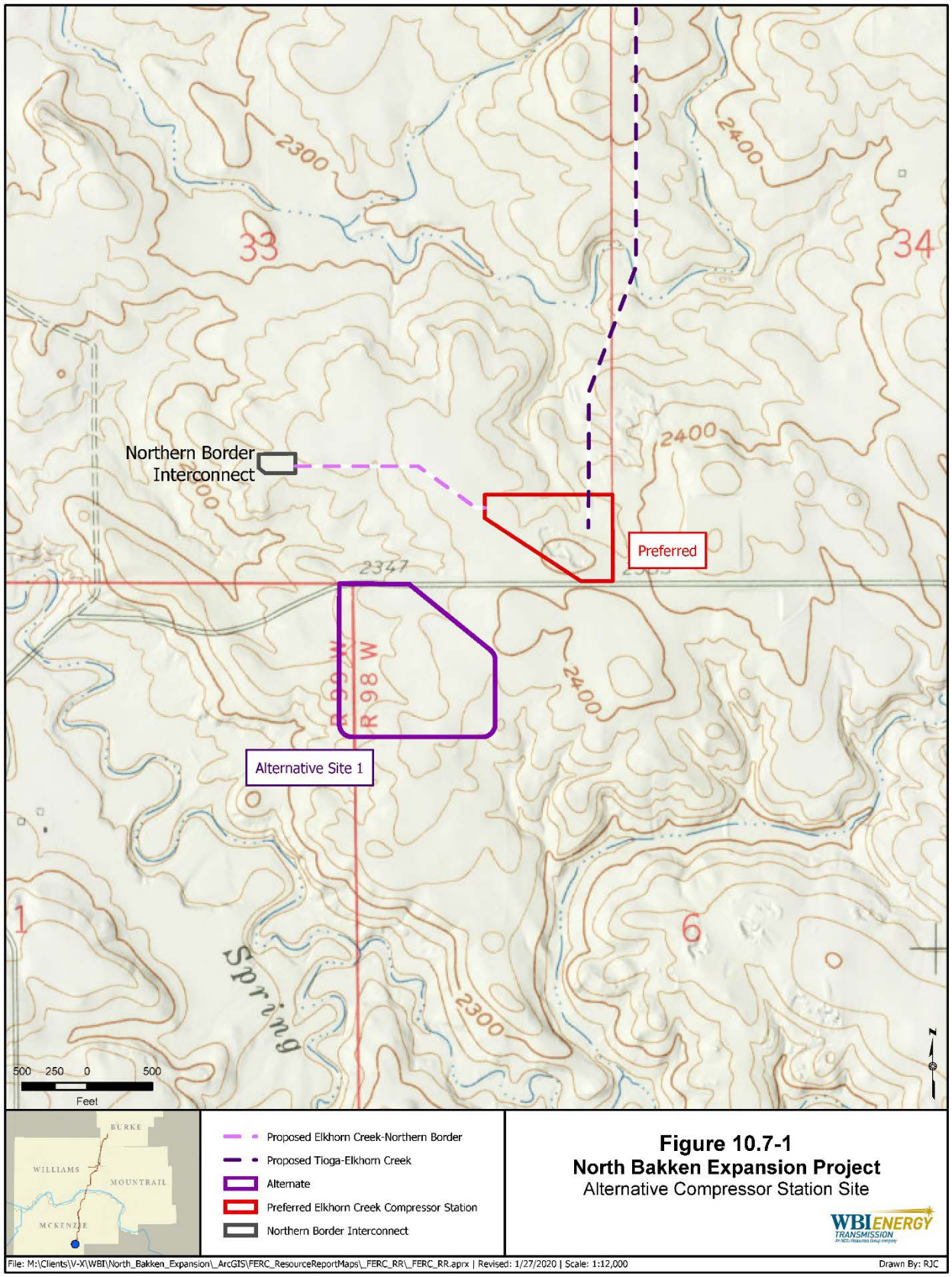
The location of the proposed Elkhorn Creek Compressor Station was primarily determined by its proximity to Northern Border's pipeline for tie-in capabilities, landowner considerations, its position near existing roads and electric power facilities, , and the availability of land for purchase. WBI Energy identified one alternative site using the same criteria (see figure 10.7-1): Alternative Site 1. The alternative site was then evaluated to determine if it provides any significant environmental advantages over the proposed site. Factors considered in this analysis included: landownership and landowner considerations, land use, conservation easements, wetlands and waterbodies, and slope of terrain.

No alternative sites were evaluated for the proposed expansion of the Tioga Compressor Station.

10.7.1 Alternative Site 1

Alternative Site 1 is located approximately 0.1 mile southwest of the proposed compressor station site on the south side of 18th Street NW. It encompasses about 20 acres of land that is entirely privately owned agricultural land (see figure 10.7-1). Selection of this site would increase the length of the Tioga-Elkhorn Creek pipeline by about 0.2 mile. As is the case with the proposed site, there are no conservation easements, wetlands, waterbodies, prime farmland, or critical habitats with Alternative Site 1. Because of the sand/gravel pit area within proposed site, more grading and filling would be necessary to prepare the proposed site for construction.

The same landowner owns the lands associated with Alternative Site 1 as the proposed site location. WBI Energy conducted extensive discussions with this landowner to determine the best location for the compressor station that minimizes environmental impacts and meets landowner needs. WBI Energy has signed a purchase agreement for the required easement of the proposed compressor station site, therefore Alternative Site 1 is no longer being evaluated as a potential alternative to the proposed site.


2300
2400
33
34
Northern Border
Interconnect
2400
Preferred
2347
R98 W
2400
Alternative Site 1
1
6
Spring
2300
500 250 0 500
Feet
BURKE
WILLIAMS
MOUNTRAIL
MCKENZIE
Proposed Elkhorn Creek-Northern Border
Proposed Tioga-Elkhorn Creek
Alternate
Preferred Elkhorn Creek Compressor Station
Northern Border Interconnect
Figure 10.7-1
North Bakken Expansion Project
Alternative Compressor Station Site
WBI ENERGY TRANSMISSION
File: M:\Clients\V-X\WBI\North_Bakken_Expansion_ArcGIS\FERC_ResourceReportMaps_FERC_RR_FERC_RR.aprx | Revised: 1/27/2020 | Scale: 1:12,000
Drawn By: RJC

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