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January 5, 2024

VIA FEDERAL EXPRESS

Executive Director
North Dakota Public Service Commission
600 E. Boulevard, Dept. 408
Bismarck, ND 58505-0480

RE: Thunder Butte Pipeline, LLC's Waiver Application and Consolidated Application for a Certificate of Corridor Compatibility and Route Permit for the Thunder Butte Pipeline Project
Case No. PU-24-__

To Whom it May Concern:

Thunder Butte Pipeline, LLC respectfully submits herewith the following for the Thunder Butte Pipeline Project:

1. Application for Waiver or Reduction of Procedures and Time Schedules (five hard copies),
2. Consolidated Application for a Certificate of Corridor Compatibility and Route Permit (five hard copies, each with a compact disc of the Consolidated Application in PDF format and the corresponding GIS Shapefiles), and
3. One compact disc with the *Non-Public* Cultural Resources GIS Shapefiles.

In accordance with N.D.AC. 69-06-05(4) all of the foregoing will be served upon the Ward and Mountrail County Auditors. Enclosed with this Letter is a Certificate of Service for such action.

If you have any questions, please let me know.

Sincerely,

Peter Breuer

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Enc. (4)
Cc: Ward County Auditor
Mountrail County Auditor

CERTIFICATE OF SERVICE

The following documents were filed with the North Dakota Public Service Commission on January 5, 2024 via Federal Express (Tracking Number: attached).

1. Application for Waiver or Reduction of Procedures and Time Schedules (five hard copies), and
2. Consolidated Application for a Certificate of Corridor Compatibility and Route Permit (five hard copies, each with a compact disc of the Consolidated Application in PDF format and the corresponding GIS Shapefiles).

The foregoing were also placed with Federal Express for service upon the following:

Ward County Auditor
Ms. Marisa Haman
225 3rd Street SE
2nd Floor
Minot, ND 58701

Mountrail County Auditor
Ms. Stephanie Pappa
101 N Main Street
Stanley, ND 58784

Kathryn Cloutier

Kathryn Cloutier, M.S.

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Ref: 30192665.8
Dep:

Date: 05Jan24
Wgt: 8.00 LBS

DV:

SHIPPING: 28.85
SPECIAL: 6.75
HANDLING: 0.00
0.00 TOTAL: 35.60

Svcs: ** 2DAY ** DSR
TRCK: 6884 9488 3410

ORIGIN ID:TADA (720) 344-3500
CHRIS THOME
ARCADIS
630 PLAZA DRIVE
SUITE 200
LITTLETON, CO 80129
UNITED STATES US

SHIP DATE: 05JAN24
ACTWGT: 8.00 LB MAN
CAD: 0654483/CAFE3755

BILL SENDER

TO **MA MARISA HAMAN**
WARD COUNTY AUDITOR
225 3RD ST SE, 2ND FLOOR

MINOT ND 58701
(701) 857-6420
PO: 30192665.8

REF: 30192665.8

585C2/40BF/AED7

FedEx Express

J2330230512011uv

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TUE - 09 JAN 5:00P
**** 2DAY ****

PS MOTA

DSR
58701
ND-US **FAR**

Ref: 30192665.8
Dep:

Date: 05Jan24
Wgt: 8.00 LBS

DV: 0.00

SHIPPING: 46.61
SPECIAL: 21.26
HANDLING: 0.00
TOTAL: 67.87

Svcs: PRIORITY OVERNIGHT DSR
TRCK: 6884 9488 3420

ORIGIN ID:TADA (720) 344-3500
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SHIP DATE: 05JAN24
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J233023051201uv

MON - 08 JAN 5:00P
PRIORITY OVERNIGHT

TRK# 0201 **6884 9488 3420**

DSR
58784
ND-US **FAR**

XX MOTA

BEFORE THE PUBLIC SERVICE COMMISSION OF THE STATE OF NORTH DAKOTA

IN THE MATTER OF THE APPLICATIONS OF THUNDER BUTTE PIPELINE, LLC FOR THE THUNDER BUTTE PIPELINE PROJECT	THUNDER BUTTE PIPELINE, LLC CONSOLIDATED APPLICATION FOR A CERTIFICATE OF CORRIDOR COMPATIBILITY AND ROUTE PERMIT AND WAIVER OR REDUCTION OF PROCEDURES AND TIME SCHEDULES FOR THE THUNDER BUTTE PIPELINE PROJECT

Thunder Butte Pipeline, LLC (TBPL), whose address for purposes of this application is 37685 247th Ave., SW, Plaza, North Dakota, 58771, in accordance with the Energy Conversion and Transmission Facility Act (Act), codified at N.D.C.C. Chapter 49-22, submits this Consolidated Application for Certificate of Corridor Compatibility and Route Permit (Consolidated Application) for the Thunder Butte Pipeline Project. TBPL requests the North Dakota Public Service commission (Commission) waive and/or reduce procedures and time schedules required by the Act or in the Commission's regulations set forth in Title 69-06 of the North Dakota Administrative Code. These include, but are not limited to: (1) waive, pursuant to N.D.C.C. §§ 49-22-07.2, 49-22-13(2) and N.D.A.C. § 69-06-01-02(3) and Chapter 69-06-06, provisions of the N.D.C.C. §§ 49-22-08(5), 49-22-08.1(5), 49-22-13 and N.D.A.C. § 69-06-01-02 which requires separate filings of such applications separate notices of such application, hearings on such applications and certain time schedules as set forth in said statutes and rules; (2) not hold a public hearing on this application, but pursuant to N.D.C.C. § 49-22-13(2) and N.D.AC. § 69-06-01-02(3), publish a notice of opportunity for hearing as provided; (3) find that the proposed facilities are of such design, location and purpose that they will produce minimal adverse effects; (4) pursuant to N.D.C.C. § 49-22-13(4), provide in the notice of opportunity for hearing that any request for a hearing be made

in not more than ten days; and (5) designate and approve the requested facilities as identified in this Consolidated Application, and issue the appropriate Certificate of Corridor Compatibility and Route Permit.

This Commission's application guidelines for waiver of procedures and time schedules require the following: (1) a description of the facility, (2) the need for the facility, (3) the cost of the facility, and (4) separate justification for each provision of the Act for which the Applicant is requires a waiver. The foregoing must be provided along with evidence that the project will produce minimal adverse effects or that a demonstrable emergency exists. The Application demonstrates that there will be minimal adverse effects. For ease of reference the remainder of this filing summarizes the Consolidated Application and TBPL's requests for waiver or reduction of procedures and time schedules and the issuance of a corridor certificate and/or route permit and certificate of site compatibility are justified as the proposed facilities are of such design, location and purpose that they will produce minimal adverse effects.

The Project is needed to allow crude oil producers in North Dakota's Bakken production region, especially those on the Fort Berthold Indian Reservation (FBIR), to access to major U.S. crude oil markets. TBPL has received urgent requests from oil producers in the Williston Basin of North Dakota for immediate additional pipeline capacity to transport increased production of crude oil. No existing or planned pipeline projects provide a pipeline connection extending between the TBPS Facility near Makoti, North Dakota and the Enbridge Storage Facility in Stanley, North Dakota or between the TBPS Facility and the interconnection point with the existing pipeline near Plaza, North Dakota. As such, no other pipelines meet the purpose of and need for this Project.

TBPL requests that the Commission grant the waivers requested because the waivers are necessary to prevent significant delays to the Project and potentially impact the profitability of the proposed Project and that of the existing TBPS Facility.

Immediate construction of the proposed new pipeline and appurtenant facilities and conversion of the existing gathering pipeline to a transmission pipeline are required to meet the urgent demand for additional pipeline capacity to allow crude oil producers in North Dakota's Bakken production region, especially those on the Fort Berthold Indian Reservation, to access to major U.S. crude oil markets. The Pipeline will provide a safe and economical means for gathering crude oil and transporting it. Without the waivers of time schedules and procedures requested, completion of the Project will be delayed and the Project will not be able to satisfy the immediate need to transport crude oil.

DESCRIPTION

TBPL proposes the Thunder Butte Pipeline Project (the Project) to transport crude oil from the existing Thunder Butte Petroleum Services, Inc. (TBPS) Crude Storage and Loading Facility (TBPS Facility) within the FBIR, approximately 2.6 miles northwest of Makoti, North Dakota, to the existing Enbridge Stanley Pump Station and Terminal (Enbridge Storage Facility) in Stanley, North Dakota (Figure 1). The Project is a joint venture between Gap Midstream, LLC (Gap) and TBPS doing business as TBPL. The MHA Nation/Three Affiliated Tribes (TAT) owns the TBPS Facility, and Enbridge Pipelines North Dakota (EPND) owns the Enbridge Storage Facility.

The Project will consist of two primary components:

1. Construction of a new 3.84-mile-long underground crude oil pipeline, a midline pump station, and two new access roads, and

2. Conversion of an existing 30.8-mile-long crude oil collector (gathering) pipeline to a crude oil transmission pipeline.

The new pipeline will commence at the TBPS Facility and terminate at the connection with the existing gathering pipeline at T152N R88W S2 SWSW. The existing pipeline which was previously owned by EPND (Line 82-111). From the interconnection point with the existing pipeline approximately 2.1 miles southeast of Plaza, North Dakota, the existing pipeline will transport crude oil to the Enbridge Facility. All but the southern 3.84 miles of the Project is an existing pipeline.

The Project requires approval from North Dakota Public Service Commission (the Commission); therefore, TBPL is submitting an Application for a Certificate of Corridor Compatibility and Route Permit (Consolidated Application) to the Commission requesting a Certificate of Corridor Compatibility and Route Permit for construction and operation of the Project. This Consolidated Application supports TBPL's request for a Certificate of Corridor Compatibility and Route Permit for both the proposed underground crude oil pipeline with appurtenant facilities and conversion of the existing crude oil gathering pipeline to a crude oil transmission pipeline. This Consolidated Application complies with Chapter 49-22 of the North Dakota Century Code (NDCC) and Chapters 69-06-05 and 69-06-08 of the North Dakota Administrative Code (NDAC).

TBPL hereby seeks a Certificate of Corridor Compatibility and Route Permit to allow the construction of the aforementioned proposed facilities and conversion of the existing gathering pipeline to a crude oil transmission pipeline.

Enclosed with Consolidated Application are maps of the proposed Project.

TBPL desires to begin construction as soon as possible. The time schedule for

completion is set forth in this Consolidated Application.

PURPOSE OF AND NEED FOR FACILITY

As previously stated, TBPL has received urgent requests from oil producers in the Williston Basin of North Dakota for immediate additional pipeline capacity to transport increased production of crude oil. Immediate construction of the proposed new pipeline and appurtenant facilities and conversion of the existing gathering pipeline to a transmission pipeline are required to meet the urgent demand for additional pipeline capacity to allow crude oil producers in North Dakota's Bakken production region, especially those on the FBIR, to access to major U.S. crude oil markets. No other pipelines meet the purpose of and need for this Project.

COSTS

The estimated cost of the Project is $19,600,000.00.

JUSTIFICATION

The environmental and cultural resource studies and reports commissioned by TBPL for this Project demonstrate that there will be minimal adverse effects by construction of the proposed facilities and conversion of the existing pipeline.

For the foregoing reasons, TBPL submits there is substantial justification for waivers and/or reduction of time schedules and procedures as these pipeline facilities will produce minimal adverse effects.

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BEFORE THE PUBLIC SERVICE COMMISSION OF THE STATE OF NORTH DAKOTA

IN THE MATTER OF THE APPLICATIONS OF THUNDER BUTTE PIPELINE, LLC FOR THE THUNDER BUTTE PIPELINE PROJECT	THUNDER BUTTE PIPELINE, LLC APPLICATION FOR WAIVER OR REDUCTION OF PROCEDURES AND TIME SCHEDULES FOR A CERTIFICATE OF CORRIDOR COMPATIBILITY AND ROUTE PERMIT FOR THE THUNDER BUTTE PIPELINE PROJECT

As part of its submission of the Application for a Certificate of Corridor Compatibility and Route Permit (Consolidated Application) for construction of a 3.84-mile-long underground crude oil pipeline with associated facilities, and for conversion of an existing 30.8-mile-long crude oil collector pipeline to a crude oil transmission pipeline located in Ward and Mountrail Counties, North Dakota (Thunder Butte Pipeline Project), Thunder Butte Pipeline, LLC (TBPL), submits to the North Dakota Public Service Commission (Commission), this application for a waiver or reduction of procedures and time schedules set forth in Chapter 49-22 of the North Dakota Century Code and Article 69-06 of the North Dakota Administrative Code. Pursuant to N.D.C.C. § 49-22-07.2 and N.D.A.C. 69-06-06, TBPL requests that the commission waive the following requirements for the Thunder Butte Pipeline Project:

1. The requirements to hold a separate hearing on a waiver request, a Certificate of Corridor Compatibility Application, and a Route Permit Application, as may be required by N.D.C.C. §§ 49-22-07.2, 49-22-08, 49-22-08.1, and 49-22-13 and N.D.A.C. § 69-06-01-02. TBPL further requests that the Commission hold a single consolidated hearing on this waiver request and TBPL's Consolidated Application. Furthermore, TBPL requests that the Commission shorten the three-month period specified by N.D.C.C. § 49-22-08(5), and the six-month period specified by N.D.C.C. § 49-22-08.1(5).
2. The requirements of N.D.C.C. §§ 49-22-09 and 49-22-08.1 insofar as these sections may require the separate filing of applications for a Certificate of Corridor Compatibility and a

Route Permit, and insofar as they require separate publication of notices for said applications.

Consistent with N.D.A.C. § 69-060-06-01(2), TBPL provides the following information in support of its waiver requests:

A. Description of Proposed Project.

1. Type:

TBPL proposes the Thunder Butte Pipeline Project (Project) to transport crude oil from the existing Thunder Butte Petroleum Services, Inc. (TBPS) Crude Storage and Loading Facility (TBPS Facility) within the Fort Berthold Indian Reservation (FBIR), approximately 2.6 miles northwest of Makoti, North Dakota, to the existing Enbridge Stanley Pump Station and Terminal (Enbridge Storage Facility) in Stanley, North Dakota. The Project is a joint venture between Gap Midstream, LLC (Gap) and the Mandan, Hidatsa, and Arikara Nation/Three Affiliated Tribes (MHA Nation/TAT) doing business as TBPS. The MHA Nation/TAT owns the TBPS Facility and Enbridge Pipelines North Dakota (EPND) owns the Enbridge Storage Facility.

The Project facilities are comprised of two primary components:

1. Construction of a new 3.84-mile-long underground crude oil pipeline, a midline pump station, and two new access roads, and
2. Conversion of an existing 30.8-mile-long crude oil collector (gathering) pipeline to a crude oil transmission pipeline.

The Project design will allow unilateral flow of crude oil from the existing TBPS Facility to the existing Enbridge Storage Facility.

2. Product to be Transmitted:

The Project will transmit light sweet Bakken crude oil.

3. **Capacity and Design:**

The proposed pipeline will be approximately 3.84 miles long. The existing pipeline is approximately 30.8 miles long.

The proposed pipeline will be comprised of a 6.625-inch outer diameter (OD) carbon steel mainline pipeline with a nominal wall thickness of 0.188 inch. The pipe material will be API-5L CS X52. At the proposed railroad crossing, approximately 60 feet of 6.625-inch OD, 0.188-inch wall thickness, API 5L CS X52 carrier pipe will be installed using common jack and bore installation methods to avoid having to install casing pipe.

The existing pipeline comprises 6.625-inch OD pipe with a nominal wall thickness of 0.188 inch. The pipeline meets the API 5L specification, with PSL-2 and X-42 carrier pipe ratings, and a 0.250-inch wall thickness where the pipeline encounters railway or roadway crossings; natural drainages; ponds, sloughs, or other wetlands; and on each side of the two existing aboveground block valve stations.

The Project will provide a maximum flowrate of 24,000 barrels per day (bpd).

The maximum operating pressure for the proposed pipeline is 1,440 psi gauge (psig) throughout the Project. The new pipeline will be designed to operate at a maximum of 120°F.

The maximum allowable operation pressure for the existing pipeline is 1,400 psig at a maximum operating temperature of 100°F.

Pipe welds were inspected by a qualified weld inspector according to industry standard practice using non-destructive methods. The pipeline was installed at depths varying between 4 and 8 feet below ground surface.

4. Location of Proposed Facilities:

The proposed pipeline will be located within the following portions of Ward and Mountrail Counties, North Dakota: Sections 2, 11, 14 of T152N, R88W. Approximately 3 miles of the proposed pipeline will be within the FBIR, approximately 2.28 miles of which will be constructed abutting the existing Canadian Pacific Railway (CPR) right-of-way (ROW).

1. The proposed midline pump station will be located on 4.0 acres of land approximately 12 miles northwest of Plaza, North Dakota, in Section 21 of T154N, R89W. Two permanent access roads will be required, each approximately 40-foot long, 30-foot wide.

2. During construction, several temporary access roads and temporary workspaces/laydown areas may be required.

5. Geographical Service Area

The geographic service area is the Williston Basin region of North Dakota. The Project will allow Bakken crude oil producers in North Dakota's Bakken production region, especially those on the FBIR, to access to major U.S. crude oil markets.

6. Time Schedule:

- December 2023 – Completion of ROW Acquisition
- January 2024 – TBPL files Consolidated Application for Certificate of Corridor Compatibility and Route Permit
- March 2024 - Commission issues Certificate of Corridor Compatibility and Route Permit
- March 2024 or as soon as the Commission issues Certificate of Corridor Compatibility and Route Permit – TBPL Begins Construction on Pipeline
- April 2024 – TBPL Begins Construction on Facility
- July 2024 – Construction Complete
- June/July 2024 – Hydrostatic Testing
- July 2024 – Operation Commences Commencing Operations

7. Future Plans:

TBPL filed its Ten-Year Plan for 2024 through 2034 with the Commission in January 2024. The proposed Project is consistent with TBPL's Ten-Year Plan. TBPL has no current plans to expand the crude oil transport pipeline system in the vicinity of the Project.

8. Purpose of and Need for the Facility:

The purpose of the Project is to provide infrastructure for transportation of crude oil from the TBPS Facility near Makoti, North Dakota to the Enbridge Storage Facility in Stanley, North Dakota, where it will be safely and efficiently distributed to multiple third-party interconnecting pipelines in Stanley, North Dakota.

The Project is needed to allow crude oil producers in North Dakota's Bakken production region, especially those on the Fort Berthold Indian Reservation (FBIR), to access to major U.S. crude oil markets. TBPL has received urgent requests from oil producers in the Williston Basin of North Dakota for immediate additional pipeline capacity to transport increased production of crude oil. The Project is needed to provide an additional outlet for crude oil and to provide crude oil to the existing TBPS Facility. TBPL requests that the Commission grant the waivers requested because the waivers are necessary to prevent significant delays to the Project and potentially impact the profitability of the Project and the TBPS Facility.

No existing or planned pipeline projects provide a pipeline connection extending between the TBPS Facility near Makoti, North Dakota and the Enbridge Storage Facility in Stanley, North Dakota or between the TBPS Facility and the interconnection point with the existing pipeline near Plaza, North Dakota. No other pipelines meet the purpose of and need for this Project.

The Project will also directly benefit Bakken crude oil producers by allowing for the efficient aggregation of volumes of crude oil from within Ward and Mountrail Counties and adjacent counties for shipment to major U.S. markets, thereby offering producers the potential for better netbacks.

9. Alternatives Considered:

- **No Action**

Under No Action, the proposed Project will not be constructed. Without the Project, a pipeline connection between the TBPS Facility and the existing pipeline, and then to other third-party pipelines, will not be established. The ultimate purpose to provide producers with

access to major U.S. markets will not be fulfilled. For these reasons, No Action is not a feasible alternative because it does not meet the purpose of and need for this Project.

- **Other Pipelines**

No existing or planned pipeline projects provide a pipeline connection extending between the TBPS Facility near Plaza, North Dakota and the Enbridge Storage Facility in Stanley, North Dakota or between the TBPS Facility and the interconnection point with the existing pipeline near Plaza, North Dakota. As such, no other pipelines meet the purpose of and need for this Project.

- **Rail**

No rail facilities currently exist or are planned that will provide a means to transport crude oil between the TBPS Facility and the Enbridge Storage Facility or between the TBPS Facility and the interconnection point with the existing pipeline near Plaza, North Dakota. Given the lack of existing rail infrastructure between the proposed endpoints, construction of permanent, aboveground rail lateral service lines and ancillary facilities would be required. Such facilities would require permanent conversion of agricultural land to an industrial purpose. Thus, rail facilities would have greater permanent environmental, and landowner impacts than the Project. This alternative would also require participation of a third-party rail operator. This alternative was determined not feasible because of the associated environmental impacts and financial, logistic, and time constraints necessary to acquire land and construct the requisite rail infrastructure. For this reason, the rail transportation alternative was eliminated from consideration.

- **Trucking**

The TBPS Facility's existing Synthetic Minor New Source Review (SMNSR) air permit (SMNSR-TAT-000781-2021.002) was issued in June 2022. The 2022 permit requires the use of the Project pipelines for crude loadout because the permit does not allow crude to be trucked from the site; therefore, construction of the modifications to the existing TBPS Facility for a pipeline connection are required for operation of the existing TBPS Facility.

Under the current air permit for the TBPS Facility, transport of crude oil by truck is not a viable option because emissions would not comply with the permit limits. The trucking alternative was reviewed and eliminated because it does not meet the purpose of and need for the Project.

- **Route Alternatives**

TBPL dedicated a significant amount of work in review of route alternatives to identify the Preferred Route for the proposed pipeline. TBPL obtained and analyzed public and proprietary information to identify sensitive areas and features within the Corridor Study Area and Route, such as Exclusion and Avoidance Areas, populated areas, wetlands, waterbodies, natural resources, areas of cultural significance, and public lands. TBPL also considered ROWs (e.g., existing pipelines, railroads, and roads) to maximize collocation with other utilities.

Once an initial route was selected, TBPL sought input from potentially affected landowners, resource agencies, local governments, and owners of existing infrastructure regarding the proposed route, and the route was further refined based on input received. In addition, TBPL completed civil and environmental field surveys and additional constructability reviews to identify the Preferred Route.

The Preferred Route for the proposed pipeline was selected to minimize the effects of construction on environmentally sensitive areas and to collocate with existing roads, railroads, and pipelines in the area as much as possible from the TBPS Facility to the interconnection point of the existing pipeline near Plaza, North Dakota by using existing ROWs to the maximum extent feasible. Approximately 2.28 miles (59.4 percent) of the Preferred Route for the proposed pipeline is collocated with existing utility corridors. The Preferred Route meets the needs of the Project, complies with the Commission's siting criteria, minimizes impacts to landowners and the environment, and maximizes collocation with existing utility corridors.

There are no route alternatives for conversion of the existing gathering pipeline to a transmission pipeline. The Preferred Route is limited to the centerline of the existing

pipeline. The Preferred Route for the existing pipeline is generally collocated with railroads and roads and traverses agricultural land including cultivated cropland.

10. Ten Year Plan:

TBPL filed its Ten-Year Plan for 2024 through 2034 with the Commission in January 2024. The proposed Project is consistent with TBPL's Ten-Year Plan.

11. Cost:

TBPL estimates that it will cost approximately $19,600,000 to develop the Project.

B. Waiver Request.

TBPL requests that the Commission grant the waivers requested because the waivers are necessary to prevent significant delays to the Project and potentially impact the profitability of the Pipeline. As explained above, the Project is needed to provide an additional outlet for crude oil and to provide crude oil to the existing TBPS Facility. The Pipeline will provide a safe and economical means for gathering crude oil and transporting it. The Project will allow crude oil producers in North Dakota's Bakken production region, especially those on the FBIR to access to major U.S. crude oil markets. Without the waivers of time schedules and procedures requested, Project completion will be delayed, and the Project will not be able to satisfy the immediate need to transport crude oil.

N.D.C.C. § 49.22-07.2 provides that this Commission may waive procedures and time schedules upon a finding that "the proposed facility is of such length, design, location, or purposes that it will produce minimal adverse effects". The investigation and analysis set forth in TBPL's Consolidated Application, granting the waivers request is appropriate because the proposed Project will produce minimal adverse effects due to its length, its

design, and its location, the proposed construction work areas avoid Exclusion and Avoidance Areas as set forth in N.D.A.C. § 69-06-08-02, and its purpose.

In determining whether the proposed Project will result in adverse impacts on the environment, TBPL evaluated the impacts of the Project considering the siting criteria set fort in N.D.A.C. § 69-06-08-02 and the factors set forth in N.D.C.C. § 49-22-09. Impacts associated with the Project, and mitigation measures that will be taken with respect to said impacts are summarized in Sections 18 through 20 of the Consolidated Application. Based upon TBPL's evaluation of other Route Selection criteria, the proposed Project will have minimal adverse effects.

Accordingly, TBPL respectfully requests that the commission grant the requested waivers and render an expeditious decision.

Peter Breuer

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Thunder Butte Pipeline, LLC

Certificate of Corridor Compatibility and Route Permit Application

Thunder Butte Pipeline Project

January 2024

Certificate of Corridor Compatibility and Route Permit Application

Thunder Butte Pipeline Project

January 2024

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Kathryn Cloutier
Project Manager

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Contents

Checklist for Combined Corridor Compatibility and Route Permit Application xi

Introduction 1

1 Facility Type 3

1.1 Proposed New Pipeline 3

1.2 Conversion of Existing Pipeline 3

1.3 Proposed Aboveground Facilities 3

1.4 Existing Storage Facilities 3

2 Location 5

2.1 Location of Proposed Facilities 5

2.2 Location of Existing Pipeline 5

2.3 Locations of Existing Storage Facilities 5

2.4 Project Corridor Study Area and Field Survey Area 5

2.5 Preferred Location of Project Corridor and Route 6

3 Purpose of and Need for the Facility 7

4 Product 9

4.1 Type of Product to be Transmitted 9

4.2 Source of Product 9

4.3 Final Destination of Product 9

5 Technology to be Deployed 11

6 Estimated Total Cost for Construction 13

7 Schedule 15

7.1 Obtaining Certificate of Corridor Compatibility 15

7.2 Obtaining Route Permit 15

7.3 Completing Right-of-Way Acquisition 15

7.4 Starting Construction 15

7.5 Completing Construction 15

7.6 Testing Operations 15

7.7 Commencing Operations 15

8 Ten-Year Plan 17

9 Facility Size and Design 19

9.1 Pipeline 19

9.1.1 Width of Rights-of-Way 19

9.1.2 Length of Pipelines 19
9.1.3 Pipe Size 19
9.1.4 Maximum Design Operating Pressure and Temperature 19
9.2 Proposed and Existing Aboveground Facilities 19
9.2.1 Proposed Midline Pump Station 19
9.2.2 Modifications to Existing Storage Facilities 20
9.2.3 Estimated Distance between Surface Structures 20
9.2.4 Maximum Design Flow Rate for Pipeline Facilities 21
9.2.5 Number and Location for Pumping Stations 21
10 Easement Acquisition 23
10.1 Informing Landowners of Easement Acquisition 23
10.2 Compensation for Easement 23
11 Right-of-Way Preparation, Construction, and Reclamation Procedures 25
11.1 Description of Right-of-Way Preparation and Construction of New Pipeline 25
11.1.1 Clearing and Grading 25
11.1.2 Trenching 26
11.1.3 Pipe Stringing, Bending, and Welding 26
11.1.4 Pipeline Installation and Trench Backfilling 26
11.2 Special Construction Techniques 27
11.2.1 Horizontal Directional Drilling Method Construction 27
11.2.2 Highway and County Road Crossings 27
11.2.3 Wetland and Waterbody Crossings 27
11.3 Restoration Procedures 28
12 Operation and Maintenance 29
13 Alternatives Considered 31
13.1 Project Alternatives 31
13.1.1 No Action 31
13.1.2 Other Pipelines 31
13.1.3 Rail 31
13.1.4 Trucking 31
13.1.5 Route Alternatives 32
14 Environmental Studies 33
14.1 Wetland and Waterbody Inventory 33
14.2 Cultural Resource Inventory 33

14.3 Habitat Assessment 33
14.3.1 Tree/Sapling/Shrub Inventory 34
14.3.2 Federally Protected Species 34
14.3.3 Migratory Bird Treaty Act 37
14.3.4 Bald and Golden Eagle Protection Act Consultation 37
15 Consultations 39
15.1 U.S. Army Corps of Engineers 40
15.2 State Historical Society of North Dakota and Tribal Historic Preservation Office 41
15.3 North Dakota Game and Fish Department 41
15.4 North Dakota Parks and Recreation Department 41
15.5 North Dakota Department of Environmental Quality 42
15.6 North Dakota Department of Water Resources 43
15.7 North Dakota Department of Transportation 44
15.8 North Dakota Geological Survey 44
16 Siting Criteria 45
16.1 Exclusion Areas 45
16.1.1 Designated or Registered: National Parks, Memorial Parks, Historic Sites and Landmarks, Natural Landmarks, Monuments, and Wilderness Areas 45
16.1.2 Designated or Registered: State Parks, Sites, Monuments, Archaeological Sites, and Natural Preserves 45
16.1.3 County Parks and Recreational Areas, Municipal Parks, and Parks Owned or Administered by Other Governmental Subdivisions 45
16.1.4 Areas Critical to the Life Stages of Threatened or Endangered Animal or Plant Species 45
16.1.5 Areas Where Animal or Plant Species that are Unique or Rare to This State Would be Irreversibly Damaged 46
16.1.6 Areas within 1,200 Feet of the Geographic Center of an Intercontinental Ballistic Missile Launch or Launch Control Facility 46
16.1.7 Areas within 30 Feet on Either Side of a Direct Line between Intercontinental Ballistic Missile Launch or Launch Control Facility 46
16.1.8 Areas Critical to the Life Stages of Threatened or Endangered Animal or Plant Species 46
16.1.9 Areas Where Animal or Plant Species that are Unique or Rare to This State Would be Irreversibly Damaged 49
16.1.10 Areas within 1,200 Feet of the Geographic Center of an Intercontinental Ballistic Missile Launch or Launch Control Facility 49
16.1.11 Areas within 30 Feet on Either Side of a Direct Line between Intercontinental Ballistic Missile Launch or Launch Control Facility 49

16.2 Avoidance Areas 49
16.2.1 Designated or Registered National Historic Districts; Wildlife Areas; Wild, Scenic, or Recreational Rivers; Wildlife Refuges; and Grasslands 50
16.2.2 Designated or Registered State Wild, Scenic, Recreational Rivers; Game Refuges; Game Management Areas; Management Areas; Forest; Forest Management Lands; and Grasslands 50
16.2.3 Historical Resources Not Specifically Designated as Exclusion or Avoidance Areas 53
16.2.4 Areas which are Geologically Unstable 53
16.2.5 Within 500 Feet of a Residence, School, or Place of Business 53
16.2.6 Reservoirs and Municipal Water Supplies 53
16.2.7 Water Sources for Organized Rural Water Districts 54
16.2.8 Area of Recreational Significance Which Are Not Designated as Exclusion Areas 54
16.3 Selection Criteria Considered 54
16.3.1 Agricultural Production 54
16.3.2 Family Farms and Ranches 55
16.3.3 Land Economically Suitable for Irrigation 55
16.3.4 Surface Drainage Patterns and Groundwater Flow Patterns 55
16.3.5 Sound Sensitive Land Uses 57
16.3.6 Visual Effect on Adjacent Areas 57
16.3.7 Extractive and Storage Resources 58
16.3.8 Wetlands, Woodlands, and Wooded Areas 58
16.3.9 Radio and Television Reception and Other Communication or Electronic Facilities 59
16.3.10 Human Health and Safety 59
16.3.11 Animal Health and Safety 59
16.3.12 Plant Life 60
16.4 Policy Criteria 60
16.4.1 Location and Design 60
16.4.2 Training and Use of In-State Labor 60
16.4.3 Economies of Construction and Operation 60
16.4.4 Use of Citizen Coordinating Committees 61
16.4.5 Commitment of a Portion of Transmitted Product for Use in State 61
16.4.6 Labor Relations 61
16.4.7 Coordination of Facilities 62
16.4.8 Monitoring Impacts 62
16.4.9 Using Existing and Proposed Rights-of-Way and Corridors 62

16.4.10 Other Existing or Proposed Transmission Facilities 62
17 Identification of Potential Permits and Approvals 63
18 Evaluation of NDCC Section 49-22-09 Factors 65
18.1 Effects on Public Health, Welfare, Natural Resources, and the Environment 65
18.2 Transmission Technologies and Systems Designed to Minimize Adverse Environmental Effects 65
18.3 Potential for Beneficial Uses of Waste Energy from a Proposed Energy Conversion Facility 65
18.4 Unavoidable Adverse Direct and Indirect Environmental Effects 65
18.5 Corridor or Route Alternatives Developed During the Hearing that Minimize Adverse Effects 66
18.6 Irreversible and Irretrievable Commitments of Natural Resources if Designated 66
18.7 Direct and Indirect Economic Impacts of the Facility 66
18.8 Existing Plans for Other Developments (State, Local, and Private) in the Vicinity of the Project 67
18.9 Effects of the Proposed Route on Existing Scenic Areas, Historic Sites and Structures, and Cultural Resources 67
18.10 Effects of the Proposed Route on Areas Which are Unique Because of Biological Wealth or Rare and Endangered Species Habitats 67
18.11 Problems Raised by Federal Agencies, other State Agencies, and Local Entities 67
19 Other Factors Considered 69
19.1 Design Construction Limitations 69
19.2 Economic Considerations 69
19.3 Present and Future Natural Resource Development 69
20 Applicant's Mitigation Measures and Policies and Commitments to Limit Environmental Impact 71
21 Qualifications of Preparers 73
22 References Cited 75

Tables

Table 1 Potentially Affected Endangered Species 34
Table 2 Agency Consultations 39
Table 3 Exclusion Areas Summary 47
Table 4 Avoidance Areas Summary 51
Table 5 Farmland in Corridor Study Area 54
Table 6 Potential Permits and Approvals 63

Appendices

Appendix A Project Maps

Appendix B Ten-Year Plan

Appendix C Environmental Mitigation Plan and Engineering Schematic Drawings

Appendix D Agency Correspondence and Consultations

Appendix E Wetland and Waterbody Delineation Report

Appendix F Cultural Resources Report

Appendix G Black and White Project Location Map

Acronyms and Abbreviations

°F	degrees Fahrenheit
AJD	Approved Jurisdictional Determination
ANSI	American National Standards Institute
APE	Area of Potential Effect
API	American Petroleum Institute
Arcadis	Arcadis U.S., Inc.
ARO	abrasive-resistant overlay
BABE	Biological Assessment and Biological Evaluation
BGEPA	Bald and Golden Eagle Protection Act
bgs	below ground surface
BIA	U.S. Bureau of Indian Affairs
BLE	base level engineering
BMP	best management practice
bpd	barrels per day
CC	Certificate for a Corridor
CFR	Code of Federal Regulations
Commission	North Dakota Public Service Commission
Consolidated Application	Consolidated Certificate of Corridor Compatibility and Route Permit Application
Corridor Study Area	Proposed Preferred Project Corridor
CPR	Canadian Pacific Railway
CUP	Conditional Use Permit
DBH	diameter at breast height
DWR	Department of Water Resources
E	endangered
EMP	Environmental Mitigation Plan
Enbridge Storage Facility	Enbridge Stanley Pump Station and Terminal
EPND	Enbridge Pipelines North Dakota
FBIR	Fort Berthold Indian Reservation
FEMA	Federal Emergency Management Agency
Gap	Gap Midstream, LLC
HDD	horizontal directional drilling
ICBM	intercontinental ballistic missile

IMP	Integrity Management Plan
IPaC	Information for Planning and Consultation
km	kilometer
LACT	lease acquisition custody transfer
LWCF	Land and Water Conservation Fund
MBTA	Migratory Bird Treaty Act
Metcalf	Metcalf Archaeological Consultants, Inc.
MHA Nation	Mandan, Hidatsa, and Arikara Nation
N/A	Not Applicable
ND DEQ	North Dakota Department of Environmental Quality
ND DOT	North Dakota Department of Transportation
NDAC	North Dakota Administrative Code
NDCC	North Dakota Century Code
NDDA	North Dakota Department of Agriculture
NDGF	North Dakota Game and Fish Department
NDGS	North Dakota Geological Survey
NDPR	North Dakota Parks and Recreation Department
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NPDES	National Pollutant Discharge Elimination System
NRCS	U.S. Department of Agriculture, Natural Resources Conservation Service
NRHP	National Register of Historic Places
OD	outer diameter
OSHA	Occupational Safety and Health Administration
PEM	palustrine emergent
PHMSA	Pipeline Hazardous Materials Safety Administration
PLC	programmable logic controller
Project	Thunder Butte Pipeline Project
psi	pound per square inch
psig	pound per square inch gauge
ROW	right-of-way
RP	Route Permit
SCADA	supervisory control and data acquisition

SHSND	State Historical Society of North Dakota
SMNSR	Synthetic Minor New Source Review
SPCC Plan	Spill Prevention, Control, and Countermeasures Plan
SWPPP	Stormwater Pollution Prevention Plan
T	threatened
TAT	Three Affiliated Tribes
TBPL	Thunder Butte Pipeline, LLC
TBPS	Thunder Butte Petroleum Services, Inc.
TBPS Facility	TBPS Crude Storage and Loading Facility
THPO	Tribal Historic Preservation Office
USACE	U.S. Army Corp of Engineers
USC	United States Code
USDOT	U.S. Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WOUS	waters of the United States
WPA	Waterfowl Production Areas

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Checklist for Combined Corridor Compatibility and Route Permit Application

Authority	Description	Section(s)
Chapter 49-22 CENTURY CODE – Title 49		
49-22-08	Application for a Certificate for a Corridor (CC)	
1.a.	Description of size and type of facility	1.0, 9.0
1.b.	Summary of any studies of environmental impacts	14.0
1.c.	Need for the facility	3.0
1.d.	Site for energy conversion facility	N/A
1.e.	Preferred transmission (pipeline) corridor	2.2
1.f.	Analysis of merits and detriments of facility location	2.2, 13.0
1.g.	Mitigating measures	20.0
1.h.	Corridor evaluation pursuant to 49-22-09 and 49-22-05.1	16.1, 16.2, 18.0
49-22-08.1	Application for Route Permit (RP)	
1.a.	Description of size and type of facility	1.0, 9.0
1.b.	Description of the location	2.0
1.c.	Route evaluation relative to 49-22-09 and 49-22-05.1	16.1, 16.2, 18.0
1.d.	Mitigating measures	20.0
1.e.	Right-of-way preparation, construction, and reclamation	11.0
1.f.	Statement identifying how: 1) landowners informed of right-of-acquisition; and 2) how landowners will be compensated	10.0
1.g.	Other relevant information	19.0
49-22-09	Factors to be considered in evaluating corridor and route applications	18.0
1	Research and investigation into effects of the project on public health, welfare, natural resources, and the environment	18.1
2	Effects of transmission technology and design to minimize adverse effects	18.2
3	Potential beneficial uses of waste energy from energy conversion facility	18.3
4	Unavoidable adverse direct and indirect environmental effects	18.4
5	Corridor or route alternatives developed during the hearing which minimize adverse effects	18.5
6	Irreversible and irretrievable commitments of natural resources if designated	18.6
7	Direct and indirect economic impacts of the facility	18.7
8	Existing plans for other developments at or in the vicinity	18.8
9	Effect of project on scenic areas, historic sites and structures, paleontological and archaeological sites	18.9
10	Effect of route on unique biological areas	18.10

Authority	Description	Section(s)
11	Problems raised by federal, state, or local entities	18.11
ADMINISTRATIVE CODE – ARTICLE 69-06		
69-06-05-01	Application for a Transmission Facility Permit (CC)	
2.a.(1)	Type of facility proposed	1.0
2.a.(2)	Purpose of facility	3.0
2.a.(3)	Technology to be deployed	5.0
2.a.(4)	Type of product to be transmitted	4.1
2.a.(5)	Source of product being transmitted	4.2
2.a.(6)	Final destination of product being transmitted	4.3
2.a.(7)	Size and design detail and any alternative size and design	9.0
2.a.(7)(a)	The width of right-of-way	9.1.1
2.a.(7)(b)	The approximate length of facility	9.1.2
2.a.(7)(c)	The estimated span length for electric facilities	N/A
2.a.(7)(d)	The anticipated type of structure for electric facilities	N/A
2.a.(7)(e)	The voltage for electric facilities	N/A
2.a.(7)(f)	The requirement for and general location of any associate facilities	9.2.1
2.a.(7)(g)	The estimated distance between pipeline surface structures	9.2.2
2.a.(7)(h)	The pipe size	9.1.3
2.a.(7)(i)	The maximum design for pipeline operating pressure and temperature	9.1.4
2.a.(7)(j)	The maximum design pipeline flow rate	9.2.3
2.a.(7)(k)	The number and general location of compressor or pumping stations	9.2.4
2.b.	Time schedule	7.0
2.b.(1)	Obtaining the certificate of corridor compatibility	7.1
2.b.(2)	Obtaining route permit	7.2
2.b.(3)	Completing right-of-way acquisition	7.3
2.b.(4)	Starting construction	7.4
2.b.(5)	Completing construction	7.5
2.b.(6)	Testing operations	7.6
2.b.(7)	Commencing operations	7.7
2.c.	A copy of each evaluative study or assessment of environmental impact of the proposed facility submitted to the agencies listed in section 69-06-01-05 and each response received	Appendix E and F
2.d.	Need for facility	3.0
2.e.	Description of alternatives	13.0
2.f	Corridor width	2.2, 9.1.1
2.g.	Study area to enable the Commission to evaluate the factors in the Century Code section 49-22-09	2.1, 14.0, 18.0

Authority	Description	Section(s)
2.h.	Discussion of factors in Century Code 49-22-09 to aid Commission's evaluation	18.0
2.i.	A discussion of the applicant's policies and commitments to limit the environmental impact of its facilities, including copies of board resolutions and management directives.	20.0
2.j.	Map of criteria that lead to route location	Appendix A
2.k.	Discuss relative value of each criterion and how the location was selected; how operation will affect criteria	2.0, 14.0, 16.0, 18.0
2.l.	Mitigating measures	20.0
2.m.	Qualifications of each person involved in location study	21.0
2.n.	Map identifying criteria that led to the route location and new facilities	Appendix A
2.o.	8½ × 11 black and white map suitable for newspaper publication	Appendix G
2.p.	Discussion of present and future natural resource development in the area	19.3
2.q.	Maps and GIS data meeting Commission requirements	Appendix A and GIS CD
69-06-06-01	Application for Waiver of Procedures and Time Schedule	
69-06-08-02	Transmission Facility Corridor and Route Criteria	
1	Exclusion areas	16.1, Appendix A
1.a.	Designated or registered national: parks, sites, landmarks, monuments, wilderness	16.1.1, Appendix F
1.b.	Designated or registered state: parks, sites, monuments, archeological sites, natural preserves	16.1.2
1.c.	County parks and recreational areas, municipal parks, parks owned or administered by other governmental subdivisions	16.1.3
1.d.	Areas of critical habitat	16.1.4
1.e.	Areas where unique or rare species would be irreversibly damaged	16.1.5
1.f.	Area within 1,200 feet of an intercontinental ballistic missile (ICBM) facility	16.1.6
1.g.	Areas within 30 feet of direct line of ICBM launch facilities	16.1.7
2	Avoidance Areas	16.2, Appendix A
2.a	Designated or registered national: historic districts; wildlife areas; wild, scenic, or recreational rivers; wildlife refuges; grasslands	16.2.1
2.b.	Designated or registered state: wild, scenic, recreational rivers, game refuges, game management areas, forest management lands, grasslands	16.2.2
2.c	Historical resources which are not specifically designated as exclusion or avoidance areas	16.2.3
2.d.	Areas which are geologically unstable	16.2.4
2.e.	Within 500 feet of a residence, school, or place of business	16.2.5
2.f.	Reservoirs and municipal water supplies	16.2.6

Authority	Description	Section(s)
2.g.	Water sources for organized rural water districts	16.2.7
2.h.	Irrigated land (does not apply to underground transmission facility)	N/A
2.i.	Area of recreational significance but not designated exclusion areas	16.2.8
3	Selection criteria.	16.3, Appendix A
3.a.(1)	Agricultural production	16.3.1
3.a.(2)	Family farms and ranches	16.3.2
3.a.(3)	Land economically suitable for irrigation	16.3.3
3.a.(4)	Surface drainage patterns and groundwater flow patterns	16.3.4
3.b.(1)	Sound sensitive land uses	16.3.5
3.b.(2)	Visual effect on adjacent area	16.3.6
3.b.(3)	Extractive and storage resources	16.3.7
3.b.(4)	Wetlands, woodlands, and wooded areas	16.3.8, Appendix E
3.b.(5)	Radio and TV reception and other communication or electronic facilities	16.3.9
3.b.(6)	Human health and safety	16.3.10
3.b.(7)	Animal health and safety	16.3.11
3.b.(8)	Plant life	16.3.12
4	Policy criteria	16.4
4.a.	Location and design	16.4.1
4.b.	Training and utilization of instate labor	16.4.2
4.c.	Economies of construction and operation	16.4.3
4.d.	Use of citizen coordinating committees	16.4.4
4.e.	Commitment of portion of transmitted product for use in state	16.4.5
4.f.	Labor relations	16.4.6
4.g.	Coordination of facilities	16.4.7
4.h.	Monitoring of impacts	16.4.8
4.i	Using existing or proposed rights-of-ways and corridors	16.4.9
4.j.	Using existing or proposed transmission facilities	16.4.10

Introduction

Thunder Butte Pipeline, LLC (TBPL) proposes the Thunder Butte Pipeline Project (the Project) to transport crude oil from the existing Thunder Butte Petroleum Services, Inc. (TBPS) Crude Storage and Loading Facility (TBPS Facility) within the Fort Berthold Indian Reservation (FBIR), approximately 2.6 miles northwest of Makoti, North Dakota, to the existing Enbridge Stanley Pump Station and Terminal (Enbridge Storage Facility) in Stanley, North Dakota (**Figure 1** in **Appendix A**). The Project is a joint venture between Gap Midstream, LLC (Gap) and the Mandan, Hidatsa, and Arikara Nation (MHA Nation) doing business as TBPS. The MHA Nation/Three Affiliated Tribes (TAT) owns the TBPS Facility, and Enbridge Pipelines North Dakota (EPND) owns the Enbridge Storage Facility.

The Project will consist of two primary components:

- Construction of a new 3.84-mile-long underground pipeline, and
- Conversion of an existing 30.8-mile-long collector (gathering) pipeline to a transmission pipeline.

The new pipeline will commence at the TBPS Facility and terminate at the interconnection with the existing gathering pipeline in Section 2, T152N R88W.The existing pipeline was previously owned by EPND (Line 82-111). From the interconnection point with the existing pipeline approximately 2.1 miles southeast of Plaza, North Dakota, the existing pipeline will transport crude oil to the Enbridge Facility. All but the southern 3.84 miles of the Project is an existing pipeline.

The Project requires approval from North Dakota Public Services Commission (the Commission); therefore, TBPL is submitting a Consolidated Certificate of Corridor Compatibility and Route Permit Application (Consolidated Application) to the Commission requesting a Certificate of Corridor Compatibility and Route Permit for construction and operation of the Project. This Consolidated Application supports TBPL's request for a Certificate of Corridor Compatibility and Route Permit for both the proposed pipeline and conversion of the existing gathering pipeline to a transmission pipeline. This Consolidated Application complies with Chapter 49-22 of the North Dakota Century Code (NDCC) and Chapters 69-06-05 and 69-06-08 of the North Dakota Administrative Code (NDAC).

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1 Facility Type

The Project facilities are comprised of two primary components:

- Construction of a new 3.84-mile-long underground crude oil pipeline, a midline pump station, and two new access roads, and
- Conversion of an existing 30.8-mile-long crude oil collector (gathering) pipeline to a crude oil transmission pipeline.

The Project design will allow unilateral flow of crude oil from the TBPS Facility to the Enbridge Storage Facility (**Figure 1** in **Appendix A**). The Project will provide a maximum flowrate of 24,000 barrels per day (bpd).

1.1 Proposed New Pipeline

The Project includes constructing a new 3.84-mile-long, 6.625-inch outer diameter (OD) carbon steel crude oil pipeline in Ward and Mountrail Counties, North Dakota and converting the recently acquired existing 30.8-mile-long, 6.625-inch OD collector (gathering) pipeline into a transmission pipeline for the transport of crude oil. From new pipeline's interconnection point, the existing pipeline will transport crude oil to the Enbridge Storage Facility in Stanley, North Dakota.

1.2 Conversion of Existing Pipeline

The existing pipeline comprises 6.625-inch OD pipe with a 0.156-inch wall thickness and a maximum allowable operation pressure of 1,400 pounds per square inch (psi) at a maximum operating temperature of 100 degrees Fahrenheit (°F). The steel pipe meets American National Standards Institute (ANSI) 600 specifications. The pipeline flanges, fittings, and valves meet the American Petroleum Institute (API) 5L specification, with PSL-2 and X-52 ratings, and a 0.250-inch wall thickness where the pipeline encounters railway or roadway crossings; natural drainages; ponds, sloughs, or other wetlands; and on each side of aboveground valve stations. Pipe welds were inspected by a qualified weld inspector according to industry standard practice using non-destructive methods. The pipeline was installed at depths varying between 4 and 8 feet below ground surface (bgs).

1.3 Proposed Aboveground Facilities

Associated aboveground facilities will include construction of a new 4.0-acre midline pump station adjacent to the existing pipeline along with two associated permanent access roads (**Figure 1** in **Appendix A**).

1.4 Existing Storage Facilities

The existing storage facilities include the TBPS Facility and the Enbridge Storage Facility. These facilities are owned by third-party entities and are not part of the Project; however, TBPL has leased the 0.65-acre Lot 10 site within the Enbridge Storage Facility and purchased the existing facilities on Lot 10 including eight 400-barrel storage tanks. These facilities are described in Section 9.2.

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2 Location

2.1 Location of Proposed Facilities

The proposed pipeline will be located within the following portions of Ward and Mountrail Counties, North Dakota: Sections 2, 11, 14 of T152N, R88W (**Figure 1** in **Appendix A**). Approximately 3 miles of the proposed pipeline will be within the FBIR, approximately 2.28 miles of which will be constructed abutting the existing Canadian Pacific Railway (CPR) right-of-way (ROW).

The proposed midline pump station will be located on 4.0 acres of land approximately 12 miles northwest of Plaza, North Dakota, in Section 21 of T154N, R89W. Two permanent access roads will be required, each approximately 40-foot long, 30-foot wide.

During construction, several temporary access roads and temporary workspaces/laydown areas may be required.

2.2 Location of Existing Pipeline

The existing pipeline is located within the following portions of Mountrail County, North Dakota (**Figure 1** in **Appendix A**): Sections 2 and 3, T152N R88W, and Sections 36, 35, 26, 27, 22, 21, 16, 17, 8, and 7, T153N R88W, and Sections 12, 1, and 2, T153N R89W, and Sections 35, 34, 27, 28, 21, 20, 17, 8, 7, and 6, T154N R89W, and Sections 1 and 2, T154N R90W, and Sections 35, 26, 27, 22, 21, 20, 17, 18, 7, and 6, T155N R90W, and Sections 1 and 2, T155N R91W, and Sections 35, 26, and 27, T156N R91W.

2.3 Locations of Existing Storage Facilities

The TBPS Facility occupies 190 acres. The land is in the northeast corner of the FBIR in Ward County, North Dakota, south of North Dakota Highway 23, in Sections 19 and 20 of T152N, R87W. The address is 37685 247th Avenue SW, Plaza, North Dakota 58771.

The Enbridge Storage Facility occupies approximately 40 acres and is in the Section 27, T156N, R91W, Mountrail County, North Dakota. The siting of the existing facility was previously approved by the Commission on August 23, 2006, in Docket No. PU-06-317. TBPL has leased the 0.65-acre Lot 10 site within the Enbridge Storage Facility and purchased the existing facilities on Lot 10 including eight 400-barrell storage tanks.

2.4 Project Corridor Study Area and Field Survey Area

The Proposed Preferred Project Corridor (Corridor Study Area) was defined as a 1-mile-wide corridor (0.5 mile on either side of the pipeline centerlines) for both the proposed pipeline and the existing pipeline. The Project Field Survey Area used for the cultural and wetland delineation field surveys was a 200-foot-wide corridor (100 feet on either side of the pipeline centerlines) for both the proposed pipeline and the existing pipeline.

2.5 Preferred Location of Project Corridor and Route

The preferred locations of the Project Corridor and Route are depicted on the maps in **Appendix A**. The preferred location of the Project Corridor is the 1-mile-wide Corridor Study Area for both the proposed pipeline and the existing pipeline. The Preferred Project Route is the centerline of the proposed pipeline and the centerline of the existing pipeline. Approximately 3 miles (78 percent) of the Preferred Route for the proposed pipeline is within the FBIR on agricultural land totaling 29 acres. Approximately 2.28 miles (59.4 percent) of the Preferred Route for the proposed pipeline will be constructed abutting the existing CPR ROW. The remaining portion of the Route is on private agricultural land and is generally collocated with railroads and roads.

Additional discussion of the Route Alternatives and siting criteria considered when selecting the Preferred Corridor and the Route is provided in Section 13.1.5 of this Consolidated Application.

3 Purpose of and Need for the Facility

The purpose of the Project is to provide infrastructure for transportation of crude oil from the TBPS Facility to the Enbridge Storage Facility in Stanley, North Dakota, where it will be safely and efficiently distributed to multiple third-party interconnecting pipelines in Stanley, North Dakota. The proposed Project will result in the conversion of an existing crude oil gathering pipeline to a crude oil transmission pipeline.

The Project will allow crude oil producers in North Dakota's Bakken production region, especially those on the FBIR, to access to major U.S. crude oil markets. The Project will also directly benefit Bakken crude oil producers by allowing for the efficient aggregation of volumes of crude oil from within Ward and Mountrail Counties and adjacent counties for shipment to major U.S. markets, thereby offering producers the potential for better netbacks.

The Project will provide direct benefits to local communities through temporary construction employment, jobs to operate and maintain the pipeline and associated facilities, landowner easement compensation, and additional tax revenues via property and sales taxes from the sale of goods and services during Project construction and operation. Additional indirect benefits will result from Project-related purchases of local goods and services, such as the purchase of local gravel for access roads, purchase of fuel, and restaurant and hotel expenditures by project construction and operations personnel.

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4 Product

4.1 Type of Product to be Transmitted

The Project will transmit light sweet Bakken crude oil.

4.2 Source of Product

The anticipated sources of the Bakken crude oil to be transported by the Project are formations in the Williston Basin region of North Dakota.

4.3 Final Destination of Product

The final destination of the crude oil transported by the Project will be refining markets throughout the U.S.

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5 Technology to be Deployed

The Project will be designed, constructed, maintained, inspected, and operated to meet or exceed the U.S. Department of Transportation (USDOT), Pipeline Hazardous Materials Safety Administration (PHMSA) regulations and in accordance with industry standards and company policies. Technologies used to satisfy these requirements and standards include:

- An external protective coating will be used including abrasive-resistant overlay (ARO) coating on pipe installed via horizontal directional drilling (HDD) and cathodic protection to prevent external pipeline abrasion and/or corrosion.
- Cathodic protection will be required for the pipeline, and TBPL will engineer and install as appropriate to meet all federal and state requirements.
- Pipelines will be subject to regular internal inspection using in-line inspection tools to detect internal anomalies including corrosion or denting.
- Maintenance staff will perform regular aerial and foot patrols of the permanent ROW.
- A supervisory control and data acquisition (SCADA) monitoring and alarm system will be installed that continuously monitors the flow and pressure of the system and triggers alarms for anything outside normal operating conditions.

Construction and installation of the pipeline will employ different techniques (such as HDD) to avoid or minimize impacts to sensitive areas and identified road crossings. These techniques are discussed further in Section 11.0.

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6 Estimated Total Cost for Construction

The estimated total cost for construction is $19.6 million.

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7 Schedule

7.1 Obtaining Certificate of Corridor Compatibility

TBPL requests a Certificate of Corridor Compatibility and Route Permit from the Commission in January 2024.

7.2 Obtaining Route Permit

TBPL requests a Certificate of Corridor Compatibility and Route Permit from the Commission in January 2024.

7.3 Completing Right-of-Way Acquisition

TBPL expects to complete ROW acquisition by the end of December 2023.

7.4 Starting Construction

Construction for the Project is scheduled to begin in February 2024 for the pipeline and April 2024 for the facility.

7.5 Completing Construction

TBPL expects to complete construction of the Project by July 2024.

7.6 Testing Operations

TBPL expects to conduct hydrostatic testing of the pipeline and associated site facilities by June 2024.

7.7 Commencing Operations

The Project is anticipated to be operational no later than July 2024.

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8 Ten-Year Plan

TBPL filed its Ten-Year Plan for 2024 through 2034 with the Commission in December 2023. The proposed Project is consistent with TBPL's Ten-Year Plan (**Appendix B**).

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9 Facility Size and Design

The following provides a description of the project design including the pipeline infrastructure and associated aboveground facilities. The steel pipeline would meet USDOT regulations.

9.1 Pipeline

9.1.1 Width of Rights-of-Way

Construction of the proposed pipeline will require an 80-foot-wide ROW comprising a 30-foot-wide permanent easement and an adjacent 50-foot-wide temporary construction workspace. The Pipeline Construction Sequence Schematic is provided in the Environmental Mitigation Plan (EMP) provided in **Appendix C**.

The existing pipeline was built in the 1960s and has been operational since construction was completed. The existing pipeline is located within a fully vegetated 30-foot-wide permanent easement. No additional permanent ROW will be required for conversion of the existing gathering pipeline to a transmission pipeline.

9.1.2 Length of Pipelines

The proposed pipeline will be approximately 3.84 miles long. The existing pipeline is approximately 30.8 miles long.

9.1.3 Pipe Size

The proposed pipeline will be comprised of a 6.625-inch OD carbon steel mainline pipeline with a nominal wall thickness of 0.188 inch. The pipe material will be API-5L CS X52. At the proposed railroad crossing, approximately 60 feet of 6.625-inch OD, 0.188-inch wall thickness, API 5L CS X52 carrier pipe will be installed using common jack and bore installation methods to avoid having to install casing pipe.

The existing pipeline comprises 6.625-inch OD pipe with a nominal wall thickness of 0.188 inch. The pipeline meets the API 5L specification, with PSL-2 and X-42 carrier pipe ratings, and a 0.250-inch wall thickness where the pipeline encounters railway or roadway crossings; natural drainages; ponds, sloughs, or other wetlands; and on each side of the existing two aboveground block valve stations.

Pipe welds were inspected by a qualified weld inspector according to industry standard practice using non-destructive methods. The pipeline was installed at depths varying between 4 and 8 feet bgs.

9.1.4 Maximum Design Operating Pressure and Temperature

The maximum operating pressure for the proposed pipeline is 1,440 psi gauge (psig) throughout the Project. The new pipeline will be designed to operate at a maximum of 120°F.

The maximum allowable operation pressure for the existing pipeline is 1,400 psig at a maximum operating temperature of 100°F.

9.2 Proposed and Existing Aboveground Facilities

9.2.1 Proposed Midline Pump Station

As part of the Project, a new midline pump station will be constructed adjacent to the existing pipeline. The midline pump station will be located on 4.0 acres of land approximately 12.04 miles northwest of Plaza, North

Dakota, in Section 21 of T154N, R89W as shown on **Figure 1** in **Appendix A**. Site plans for the midline pump station are provided in **Appendix A**.

The proposed midline pump station will include a pig receiver, pump and metering skid, and a pig launcher. Pig traps will be locally operated, and valves will not be motor operated because the largest valve is planned to be 10 inches in diameter.

Cellular communication will be used for communication between the ends of the proposed pipeline and the midline pump station to measure flow and confirm that there is no loss of fluids from point to point.

Electric utility power is readily available at the midline pump station; therefore, no additional aboveground electrical utilities are proposed. Access to the electric power lines and the pipeline ROWs will be from existing roads and the CPR ROW.

9.2.2 Modifications to Existing Storage Facilities

Modifications within the site boundaries of the TBPS Facility and within Lot 10 at the Enbridge Storage Facility will include the installation of additional aboveground facilities.

The TBPS Facility includes two existing crude oil storage tanks with 140,000-barrel capacity each, four truck-to-tank offloading stations, three tank-to-truck loading stations, and a control building. The crude oil storage tanks are equipped with internal floating roofs for control of volatile organic compound (VOC) emissions.

Proposed modifications to the TBPS Facility include installation of one pig launcher and a transfer pump/meter skid (oil transfer skid) with a pump unit and lease acquisition custody transfer (LACT) combined onto one skid. The pump/meter skid will include a valve, a strainer, a custody transfer flow meter, and associated instrumentation, two mainline pumps, a divert valve, and equipment and panels for programmable logic controller (PLC)/open multi-network integration control equipment and SCADA communications. Valves will be a combination of plug, gate, and ball valves and properly rated for service.

TBPL has leased the 0.65-acre Lot 10 at the Enbridge Storage Facility. TBPL purchased the existing facilities within Lot 10 including eight 400-barrel-capacity tanks, a pig receiver, sump tank, control valve manifold, inlet meter station with leak-detection equipment, strainer station, transfer pump station, control building, and an asset custody transfer station. The site also contains the PLC equipment and SCADA communications under a covered roof.

The existing pipeline within Lot 10 at the Enbridge Storage Facility will be modified to route to the connection point with the existing pipeline, where a new pig receiver will be installed before the connection with the existing pipeline. The maximum throughput of the Lot 10 site will be 6,000 bpd during truck unloading operations before the pipeline is flowing. When the pipeline is in operation, 24,000 bpd will flow through the LACT skids, but no crude will be stored in the on-site storage tanks.

9.2.3 Estimated Distance between Surface Structures

The estimated distance between surface structures at each end of the Project is 18.82 miles from the TBPS Facility to the midline pump station and 15.82 miles from the midline pump to the Enbridge Storage Facility. Pipeline markers will also be placed at designated locations along the route (e.g., public road crossings). There are two existing aboveground block valve sets on the existing pipeline.

9.2.4 Maximum Design Flow Rate for Pipeline Facilities

The maximum design flowrate for the Project is 24,000 bpd.

9.2.5 Number and Location for Pumping Stations

One new midline pump station will be constructed for the Project as described in Section 9.2.1. A new transfer pump/meter skid with a pump unit and LACT combined onto one skid will be installed within the existing TBPS Facility as described in Section 9.2.2.

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10 Easement Acquisition

10.1 Informing Landowners of Easement Acquisition

Upon identifying the preliminary route and location of the proposed pipeline and midline pump station, TBPL used publicly available information to identify affected landowners. TBPL then contacted landowners via telephone and/or in person. TBPL's land agents presented proposed route maps for landowner review, and TBPL considered landowner input when developing the route. TBPL will obtain all necessary survey permissions and will complete negotiations for acquisition of option agreements to obtain ROW easements.

10.2 Compensation for Easement

Landowners will be compensated for Project-required interests at or above their fair market values. Compensatory offers for easements and fee acquisitions were based on analysis of comparable property values. All offers were presented to landowners in writing with appropriate legal descriptions and depictions identifying the parameters and locations of the permanent pipeline ROW easement and temporary construction easements. TBPL's land agents are trained and tasked to negotiate respectfully and in good faith with all landowners and governing entities. TBPL stresses to its land agents its preference for all negotiations, when possible, to be conducted with each landowner in person and as often as necessary to reach a mutually beneficial agreement.

TBPL will compensate landowners for permanent easement rights and temporary workspace use. TBPL uses a formula for calculating compensation relating to incidental damages incurred during pipeline construction (such as crop losses). TBPL considers the actual compensation provided to landowners as confidential information.

Anticipated damages, such as crop loss, will be calculated and included in the original compensation amount. If additional damage claims are made, TBPL will address the claims as they arise.

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11 Right-of-Way Preparation, Construction, and Reclamation Procedures

11.1 Description of Right-of-Way Preparation and Construction of New Pipeline

The proposed Project will be designed, constructed, tested, operated, and maintained in accordance with applicable requirements under the USDOT regulations in Title 49 Code of Federal Regulations (CFR) Part 195, U.S. Department of Labor regulations, Occupational Safety and Health Administration (OSHA) requirements, and other applicable federal and state regulations.

Before mobilization, a pre-construction safety and environmental orientation will be held on site. The orientation will review safety compliance; incident reporting; protocols for determining, correcting, and documenting safety non-compliance; and expectations for compliance enforcement. All construction personnel will be briefed and trained on all construction and environmental requirements including laws, rules, and regulations applicable to the work. The construction contractor will provide at least one qualified and experienced safety representative as well as personnel trained in emergency management.

Construction will only take place during daylight hours. Spill prevention measures will be in place to maintain construction personnel safety and to protect the environment. To maintain public and construction personnel safety, access to the ROW will be controlled to allow only authorized vehicles to the extent practicable.

The standard pipeline construction process includes clearing and grading, trenching, pipe stringing, bending, welding, lowering the pipeline, padding, and backfilling, hydrostatic testing, and ROW cleanup and restoration. The following subsections discuss these activities in more detail. The Pipeline Construction Sequence Schematic is provided in **Appendix C**.

11.1.1 Clearing and Grading

Once the limits of the approved work area (the ROW and temporary workspaces), pipeline centerline, access roads, aboveground facilities, and sensitive areas (such as wetland boundaries and cultural sites) have been staked and flagged, the construction area will be cleared and graded. The ROW will be graded to provide a relatively level surface that is wide enough to allow for the passage of heavy construction equipment.

During construction, TBPL will avoid removal of trees and shrubs with, if practicable. If removal of trees and shrubs cannot be avoided, they will be inventoried before removal to record the location, number, and species in accordance with the Commission's Tree and Shrub Mitigation Specifications as described in the EMP (**Appendix C**). Trees and shrubs with DBH of 1 inch or greater will be replaced consistent with the Commission's Tree and Shrub Mitigation Specifications.

To prevent soil mixing, topsoil will be removed and segregated from the underlying subsoil. Topsoil will be removed from both the trench and spoil side for the entire length of the pipeline and stored on the temporary construction ROW on the spoil side of the trench for replacement in the affected area after construction. Construction will be suspended, or adequate protection measures taken, during abnormally wet conditions to prevent excessive rutting or mixing of topsoil with subsurface soils. The Pipeline Construction Sequence Schematic and the Topsoil Salvage Trench and Spoil Side Schematic are provided in **Appendix C**.

Measures will be taken during clearing and grading to maintain continuous access to pastures, grazing units, and livestock facilities. Best management practices (BMPs), such as silt fences, will be installed along the ROW adjacent to wetlands. Temporary erosion controls will be installed before initial disturbance of soils where necessary to minimize erosion. Erosion control BMPs will be maintained during construction. Erosion control measures are discussed further in the EMP provided in **Appendix C**.

11.1.2 Trenching

Trenches will be excavated using a trencher or backhoe to a depth sufficient to provide the minimum cover required by federal, state, and local governments, as well as landowner requirements. If areas of solid rock are encountered, special excavation equipment and/or techniques will be used.

The amount of open trench permitted at any time during the Project will depend on the stability of the trench and weather conditions. Where livestock is confined or in cultivated fields, temporary “plugs” will be installed at regular intervals along the ROW to provide safe access for livestock and farm equipment across the open trench.

11.1.3 Pipe Stringing, Bending, and Welding

Pipe will either be stored at the staging area located at the midline pump station, within the TBPS Facility, or transported directly to the pipeline ROW. Following trenching, pipe will be strung along the ROW. A stringing crew using special trailers will move the pipe along the ROW. Pipe lengths will typically be 40 to 60 feet.

A pipe-bending machine will be used for making slight bends in the pipe to accommodate variations in the pipeline route or to conform to the topography. Using a series of clamps and hydraulic pressure, the bending machine makes a smooth, controlled bend in the pipe. Bending will be in accordance with federal standards to ensure integrity of the bend. Pipes used for sharp bends are bent at the mill. The pipe will be pre-coated with a fusion-bonded epoxy external coating to provide corrosion protection. An ARO coating will also be used on pipe installed via HDD.

The welding process joins the sections of pipe into one continuous length. All welders will be required to pass an approved qualification test; the test will use project-specific weld procedures developed in accordance with federally adopted welding standards. All field welds will be non-destructively tested to ensure structural integrity and compliance with USDOT regulations. Once welds are approved, the joints will be externally coated, and the entire pipeline will be visually and electronically inspected for coating defects, scratches, or other damage. Any damage or defects will be repaired before lowering the pipe into the trench.

11.1.4 Pipeline Installation and Trench Backfilling

Several side-boom tractors will simultaneously lift the welded sections of pipe and lower them into the trench. Non-metallic slings will be used to protect the pipe and coating as it is raised and lowered into position. Sandbags or foam blocks will be placed at the bottom of the trench before laying the pipe in rocky areas to protect the pipe and coating from damage.

As necessary, trench breakers or water stops will be installed adjacent to wetlands and in steep topography to eliminate water migration along the trench. When required, the trench will be dewatered before lowering in the pipe. Dewatering effluent will pass through sediment filters, such as hay bale structures and/or filter base, to ensure compliance with applicable water quality requirements.

Once the pipe is installed, the trench will be backfilled. Soil will be returned to the trench in the reverse order of excavation. The pipeline will be buried with a minimum cover of 72 inches. Subsoil will be returned to the trench

first, followed by the topsoil. The trench line will be compacted with a wheeled roller or other suitable construction equipment. A crown will be left over the trench line to allow for natural subsidence. If the excavated material contains rocks that could damage the pipe and/or coating, a rock shield will be used to protect the pipe. Topsoil will not be used for padding.

11.2 Special Construction Techniques

11.2.1 Horizontal Directional Drilling Method Construction

HDD is a trenchless technique for installing pipelines or other linear utilities to avoid or minimize surface disturbances to sensitive areas and to install pipe where conventional installation techniques are unfavorable. TBPL will use the HDD method at crossing locations where conventional installation techniques are not possible or to avoid existing features such as paved roadways and some wetlands.

The first phase of HDD consists of drilling a directionally controlled pilot hole along a pre-determined path extending from grade at one end to grade at the opposite end. The entry and exit holes for the HDD are designed to be set back from the area of avoidance to allow the geometry of the drill to reach a desired target depth.

The second phase consists of enlarging the pilot hole to a size that will accommodate pulling the pipeline through the enlarged hole; approximately 1.5 to 2.0 times the outer diameter of the pipe. The enlargement of the pilot hole (or reaming) will be accomplished by pulling reaming heads of specific diameters through the hole, in stages, if necessary, to create a wider hole. Each stage involves circulating drilling fluid from equipment on the surface through the drill pipe to a downhole bit or reamer and back to the surface through the annular space between the pipe and the wall of the hole. The circulating fluid primarily consists of bentonite, which is a non-toxic, naturally occurring sedimentary clay composed of weathered and aged volcanic ash. While the hole is being drilled, the pipe is being welded to accommodate the length of the HDD. Once welding is complete, the entire segment of pipe is pressure-tested before installation.

Once the drilled hole is prepared and stable, the welded section of pipeline is pulled through the hole. Generally, the pipe is laid out and welded on the exit side of the drill. The welded section can be assembled in segments instead of as a continuous length; however, pipe pulling operations will cease while the segments are being welded together.

11.2.2 Highway and County Road Crossings

The road and railroad crossings will be constructed according to applicable crossing permits and agreements. TBPL will use the HDD method to install the proposed pipeline at the crossings of Highway 23, two county roads, and paved driveways. The CPR railroad ROW will be crossed using industry standard jack and bore techniques. Typical HDD and bore schematics for the road and railroad crossings are provided in **Appendix C**.

11.2.3 Wetland and Waterbody Crossings

The USACE determined that one perennial stream (East Fork Shell Creek) and two wetlands (W1 and W9) are waters of the United States (WOUS). The Wetland and Waterbody Delineation Report and the United States Army Corps of Engineers (USACE) Approved Jurisdictional Determination (AJD) for the Project are provided in **Appendix D**.

Where the Project crosses the East Fork Shell Creek and wetlands determined to be WOUS by the USACE, TBPL plans to use HDD construction techniques. The Typical HDD schematic for the WOUS crossings is provided in **Appendix C**.

11.3 Restoration Procedures

During construction of the proposed pipeline, topsoil will be removed and stockpiled along one edge of the temporary construction ROW. The centerline of the new pipeline will then be staked and excavated, and that soil will be stockpiled on the opposite side of the ROW relative to the topsoil stockpile. After pipe has been strung, welded, coated, and inspected, it will be lowered into the ditch and the stockpile from excavation will be used for backfilling after sorting and removing the rocks.

Once construction is complete, the pipeline ROW and temporary workspaces will be restored to original contours and conditions to the extent practicable, except that trees and shrubs will be regularly removed from the ROW to facilitate project inspection and maintenance. After the ditch has been backfilled, the topsoil will be replaced, and approximate original contours restored. Wetland edges will be stabilized, and permanent erosion control measures will be installed. Disturbed areas will be restored in accordance with landowner agreements. For areas to be revegetated, seeding will comply with requirements specified by the landowners or the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). All timber riprap, timber mats, prefabricated equipment mats, and other construction debris will be removed. Specific restoration measures are described in the EMP provided in **Appendix C**.

12 Operation and Maintenance

During project operation, pipeline pressure, temperature, and flowrate data will be transmitted via cellular networks to a central SCADA system located at the TBPS Facility. The SCADA system will provide continuous monitoring of measurement data 24 hours a day, 7 days a week. Where changes in the data occur that indicate a potential issue with the pipeline or facilities, alarms will be triggered, notifying the operator of the potential issue. TBPL will develop a pipeline Integrity Management Plan (IMP) for the Project that complies with applicable federal regulations and outlines preventive maintenance, inspection, line patrol, leak detection systems, SCADA, and other pipeline integrity procedures to be implemented to ensure the safe operation of the Project.

TBPL will collaborate with the local emergency response manager in conjunction with Ward and Mountrail Counties to develop an appropriate Emergency Response Plan. TBPL will contract with an experienced emergency response service provider for the Project. Consistent with federal regulations, TBPL is preparing a Spill Prevention, Control, and Countermeasure Plan (SPCC Plan) for the Project, which will outline specific protocols to be implemented in the event of an accidental spill or release. TBPL will work with local emergency responders to ensure implementation of a safe and effective response strategy should an adverse event occur.

During operations, TBPL will use the permanent ROW to conduct inspections and perform maintenance. Maintenance will include making any necessary pipeline and facility repairs and removing any vegetation on the ROW that impacts the safe and reliable inspection and operation of the pipeline. Inspections and maintenance will be performed in compliance with applicable USDOT regulations.

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13 Alternatives Considered

13.1 Project Alternatives

13.1.1 No Action

Under No Action, the proposed Project will not be constructed. Without the Project, a pipeline connection between the TBPS Facility and the existing pipeline, and then to other third-party pipelines, will not be established. The ultimate purpose to provide producers with access to major U.S. markets will not be fulfilled. For these reasons, No Action is not an alternative to the Project.

13.1.2 Other Pipelines

No existing or planned pipeline projects provide a pipeline connection extending between the TBPS Facility near Plaza, North Dakota and the Enbridge Storage Facility in Stanley, North Dakota or between the TBPS Facility and the interconnection point with the existing pipeline near Plaza, North Dakota. As such, no other pipelines meet the purpose of and need for this Project.

13.1.3 Rail

No rail facilities currently exist or are planned that will provide a means to transport crude oil between the TBPS Facility and the Enbridge Storage Facility or between the TBPS Facility and the interconnection point with the existing pipeline near Plaza, North Dakota. Given the lack of existing rail infrastructure between the proposed endpoints, construction of permanent, aboveground rail lateral service lines and ancillary facilities would be required. Such facilities would require permanent conversion of agricultural land to an industrial purpose. Thus, rail facilities would have greater permanent environmental, and landowner impacts than the Project. This alternative would also require participation of a third-party rail operator. This alternative was determined not feasible because of the associated environmental impacts and financial, logistic, and time constraints necessary to acquire land and construct the requisite rail infrastructure. For this reason, the rail transportation alternative was eliminated from consideration.

13.1.4 Trucking

The TBPS Facility's Synthetic Minor New Source Review (SMNSR) air permit (SMNSR-TAT-000781-2021.002) was issued in June 2022. The 2022 permit requires the use of the project pipelines for crude loadout and does not allow crude to be trucked from the site; therefore, construction of the modifications to the existing TBPS Facility for a pipeline connection are required for operation of the existing TBPS Facility.

Under the current air permit for the TBPS Facility, transport of crude oil by truck is not a viable option because emissions would not comply with the permit limits. The trucking alternative was reviewed and eliminated because it does not meet the purpose of and need for the Project.

13.1.5 Route Alternatives

TBPL dedicated a significant amount of work in review of route alternatives to identify the Preferred Route for the proposed pipeline. TBPL obtained and analyzed public and proprietary information to identify sensitive areas and features within the Corridor Study Area, such as exclusion and avoidance areas, populated areas, wetlands, waterbodies, natural resources, areas of cultural significance, and public lands. TBPL also considered ROWs (e.g., existing pipelines, railroads, and roads) to maximize collocation with other utilities.

Once an initial route was selected, TBPL sought input from potentially affected landowners, resource agencies, local governments, and owners of existing infrastructure regarding the proposed route, and the route was further refined based on input received. In addition, TBPL completed civil and environmental field surveys and additional constructability reviews to identify the Preferred Route.

The Preferred Route for the proposed pipeline was selected to minimize the effects of construction on environmentally sensitive areas and to collocate with existing roads, railroads, and pipelines in the area as much as possible from the TBPS Facility to the interconnection point of the existing pipeline near Plaza, North Dakota by using existing ROWs to the maximum extent feasible. Approximately 2.28 miles (59.4 percent) of the Preferred Route for the proposed pipeline is collocated with existing utility corridors. The Preferred Route meets the needs of the Project, complies with the Commission's siting criteria, minimizes impacts to landowners and the environment, and maximizes collocation with existing utility corridors.

There are no route alternatives for conversion of the existing gathering pipeline to a transmission pipeline. The Preferred Route is limited to the centerline of the existing pipeline as depicted on the maps in **Appendix A**. The Preferred Route for the existing pipeline is generally collocated with railroads and roads and traverses agricultural land including cultivated cropland.

14 Environmental Studies

Environmental studies were conducted during the evaluation of the Preferred Route. Studies conducted included both a desktop analysis using available literature and geospatial resources as well as a field survey conducted by qualified environmental scientists. A1-mile-wide corridor (0.5 mile on either side of the pipeline centerlines) was used as the Corridor Study Area for both the proposed pipeline and the existing pipeline.

14.1 Wetland and Waterbody Inventory

Arcadis U.S., Inc. (Arcadis) conducted a pedestrian wetland and waterbody delineation survey for the Project on August 7 and 8, 2018. Arcadis surveyed a 200-foot-wide Field Survey Area (100 feet to each side of the center line) to identify potential wetland areas in the vicinity of the 80-foot construction ROW for the proposed pipeline.

Arcadis identified total of 10 palustrine emergent (PEM) wetlands totaling 8.48 acres (Wetlands W1 to W10) and one waterbody (East Fork Shell Creek) within the Field Survey Area. A detailed description of the survey methods used to identify wetlands is included in **Appendix E**.

The USACE issued an AJD on November 28, 2018. Based on the AJD, East Fork Shell Creek and two wetlands (W1 and W9) are WOUS. The other wetlands (W2, W3, W4, W5, W6, W7, W8, and W10) are considered isolated wetlands and were determined to not be WOUS. TBPL submitted a request for an updated AJD on September 29, 2023. No response has been received to date.

The East Fork Shell Creek crosses through the Field Survey Area, including through wetland W9, heading southwest before connecting with Lake Sakakawea. This waterbody is within a pasture and is subject to grazing pressure from cattle. The HDD method will be used to install the proposed pipeline at the WOUS crossings to avoid disturbances to WOUS during construction.

14.2 Cultural Resource Inventory

Metcalf Archaeological Consultants, Inc. (Metcalf) completed a Class I File Search for the Corridor Study Area for both the proposed pipeline and the existing pipeline. The purpose of the review was to determine if any portion of the Corridor Study Area had been previously surveyed and to identify any previously recorded cultural resources. The results of the Class I File Search are included in **Appendix F**. In total, 136 previously recorded sites were identified, 80 within the area of potential effects (APE) for the proposed project, and an additional 56 within the other portions of the Corridor Study Area. The APE was defined as a 3.84-mile-long, 300-foot-wide corridor (150 feet to each side of the centerline) for the proposed pipeline, the 4.0-acre midline pump station site, two permanent access roads, and several temporary access roads, and workspaces/laydown areas.

On October 2, 2023, Metcalf conducted a Class III Cultural Resource Inventory for the APE. A total of 147 acres were surveyed. During the survey, no cultural resources were identified; therefore, Metcalf recommended a finding of *No Historic Properties Affected* (36 CFR 800.4[d][1]) for this undertaking. The results of the Class III Cultural Resource Inventory are included in **Appendix F**.

14.3 Habitat Assessment

Areas where vegetation will be removed during construction will be restored in accordance with the landowner agreements. For areas to be revegetated, seeding will comply with requirements specified by the landowners or

the NRCS. Except for displacement of vegetation for the midline pump station and associated access roads, there will be no permanent impacts to vegetation.

14.3.1 Tree/Sapling/Shrub Inventory

The vegetation communities within the Corridor Study Area are predominantly cultivated crops. The primary crops cultivated in the area include canola and wheat, with the remaining cultivated land being used for hay.

TBPL will inventory all trees and shrubs anticipated to be cleared, including those that are considered invasive species or noxious weeds before cutting. Trees and shrubs will be replaced consistent with the Commission's Tree and Shrub Mitigation Specifications.

14.3.2 Federally Protected Species

The U.S. Fish and Wildlife Service (USFWS) North Dakota Ecological Services Field Office in Bismarck has primary oversight of federally protected plant and animal species. The USFWS Information for Planning and Consultation (IPaC) report (USFWS 2023) identified five species federally listed as threatened, endangered, or candidate that could potentially occur in the Corridor Study Area for the proposed pipeline as summarized in **Table 1**. No designated critical habitat for federally listed species was identified within the Corridor Study Area. The likelihood of their occurrence within or near the Corridor Study Area is described in the following subsections and **Table 1**.

As result of agricultural activities and other historic disturbances, the Corridor Study Area for the proposed pipeline has little or no suitable habitat for these protected species. There is a potential for the piping plover, red knot, and whooping crane to be present in the vicinity of the East Fork Shell Creek and associated wetlands. During construction of the proposed pipeline, TBPL plans to use the HDD method at the WOUS crossing locations to avoid disturbances to associated wildlife.

Table 1 Potentially Affected Endangered Species

Common and Scientific Name	Status	Comments
Piping Plover (*Charadrius melodus)*	Threatened (T)	There is little or no suitable shoreline habitat for breeding and nesting piping plovers within or near the Corridor Study Area; however, this species may occasionally traverse the Corridor Study Area during their migration. An identification guide will be provided for on-site personnel. If a red knot is observed within 1.0 mile of an active work area, all construction within 1.0 mile of the sighting will be modified or curtailed until the bird(s) have left the area, USFWS will be consulted on how to proceed, and the North Dakota Game and Fish (NDGF) and the TAT Fish and Wildlife Division will be notified. The Project is not likely to affect this species.
Red Knot (*Calidris canutus rufa)*	Threatened	There is little or no suitable nesting habitat within or near the Corridor Study Area; however, this species may occasionally traverse the Project area during migration. An identification guide will be provided for on-site personnel. If a red knot is observed within 1.0 mile of an active work area, all construction within 1.0 mile of the sighting will be modified or curtailed until the bird(s) have left the area, USFWS will be consulted on how to proceed, and the NDGF and the TAT Fish and Wildlife Division will be notified. The Project is not likely to affect this species.

Table 1 Potentially Affected Endangered Species

Common and Scientific Name	Status	Comments
Whooping Crane (*Grus americana)*	Endangered (E)	There is little or no suitable nesting habitat within or near the Corridor Study Area; however, this species may occasionally traverse the Project area during migration. An identification guide will be provided for on-site personnel. If a whooping crane is observed within 1.0 mile of an active work area, all construction within 1.0 mile of the sighting will be modified or curtailed until the bird(s) have left the area, USFWS will be consulted on how to proceed, and the NDGF and the TAT Fish and Wildlife Division will be notified. The Project is not likely to affect this species.
Dakota Skipper (*Hesperia dacotae)*	Threatened	The proposed construction disturbances will primarily occur on cultivated cropland. Dakota skippers do not typically thrive in heavily grazed or cultivated cropland; therefore, this species is not anticipated to be present during construction. An identification guide will be provided for on-site personnel. If Dakota skippers are identified within or near an active work area, on-site personnel will avoid disturbing them. The Project is not likely to affect this species.
Monarch Butterfly (*Danaus plexippus)*	Candidate	The monarch butterfly is unlikely to be present because no milkweed or other nectar plants occur within or near the Project area; however, this species may occasionally traverse the Project area during migration. An identification guide will be provided for on-site personnel. If monarchs are identified within or near an active work area, on-site personnel will avoid disturbing them. The Project is not likely to affect this species.

USFWS developed the avoidance and minimization measures described in the Programmatic Biological Assessment and Biological Evaluation (BABE) for the FBIR Oil and Gas Development (Cardno Limited 2014) and subsequent Revised Addendum to Programmatic BABE for the Fort Berthold Indian Reservation Oil and Gas Development (Trihydro Corporation 2015). TBPL is committed to the integration of and adherence with relevant avoidance and minimization measures identified by the USFWS for the federally listed species potentially present within or near the Corridor Study Area or crossed by the Route as summarized in Table 1 in the EMP. However, these commitments primarily pertain to drilling and production.

In an email from Ms. Sandra Johnson dated November 29, 2023, Ms. Johnson stated that there are no known bighorn sheep or prairie dog colonies within or near the Project. Based on review of the NDGF's database, no eagle nests were identified within or near the Corridor Study Area for the proposed pipeline or the existing pipeline.

If construction will occur between February 1 and July 15, an aerial raptor surveys will be performed extending 0.5 mile from the construction ROW before construction begins. During construction, a ½ mile buffer will be implemented around active eagle nest sites (known occupied within the past 5 years).

Disturbed areas will be reclaimed to pre-project conditions. With implementation of these measures, the Project is not anticipated to have significant adverse effects on wildlife or wildlife habitat.

14.3.2.1 Piping Plover (*Charadrius melodus*)

The piping plover is a small shorebird that nests in large wetlands. Critical habitat for this species has been designated by USFWS. Based on the IPaC report (USFWS 2023), there is no designated critical habitat for this species within the Corridor Study Area.

More than 75 percent of plover in North Dakota nest on prairie alkali lakes, with the remainder using the Missouri River system. Suitable shoreline habitat for breeding and nesting plovers does not occur within or near the Corridor Study Area; however, it is possible that migrating plovers may traverse the Corridor Study Area during their migration. The Project is not likely to affect this species.

14.3.2.2 Red Knot (*Calidris canutus rufa*)

Red knot are small birds that nest in a scrape on the ground lined with leaves, lichens, and moss, usually near water. This species may pass through North Dakota as part of their annual migration. Critical habitat for this species has been proposed by USFWS, and no proposed critical habitat for this species has been identified within the Corridor Study Area (USFWS 2023).

Red knots will likely avoid the construction areas. An identification guide will be provided for on-site personnel. If a red knot is observed within 1.0 mile of an active work area, all construction within 1.0 mile of the sighting will be modified or curtailed until the bird(s) have left the area, USFWS will be consulted on how to proceed, and the NDGF and the TAT Fish and Wildlife Division will be notified. With implementation of these guidelines, the Project is not likely to affect this species.

14.3.2.3 Whooping Crane (*Grus americana*)

North Dakota provides important stopover habitat for whooping cranes as they migrate during the spring (April through May) and the fall (September through October). Critical habitat for this species has been designated by USFWS, and no designated critical habitat for this species has been identified within the Corridor Study Area (USFWS 2023).

During migration, whooping cranes primarily use wetlands and cropland ponds for roosting, feeding, or both. Large, shallow wetlands are used for roosting and smaller wetlands for foraging. Wetlands within the Corridor Sturdy Area may serve as possible roost or foraging areas during migration; however, migrating cranes will likely avoid the construction areas and use adjacent croplands. Roosting and foraging stops are unlikely to occur within the Corridor Study Area during migration.

An identification guide will be provided for on-site personnel. Per USFWS recommendations, if a whooping crane is observed within 1.0 mile of an active work area, all construction within 1.0 mile of the sighting will be modified or curtailed until the bird(s) have left the area, USFWS will be consulted on how to proceed, and the NDGF and the TAT Fish and Wildlife Division will be notified. With implementation of these guidelines, the proposed Project is not likely to adversely affect whooping cranes or result in fatalities.

14.3.2.4 Dakota Skipper (*Hesperia dacotae*)

Suitable habitat for Dakota skipper butterflies includes high-quality prairie ranging from wet-mesic tallgrass prairie to dry-mesic mixed-grass prairie dominated by little bluestem, big bluestem, prairie sandreed, or other preferred habitat species. Critical habitat for this species has been designated by USFWS, and no designated critical habitat for this species has been identified within the Corridor Study Area (USFWS 2023).

Dakota skippers do not typically thrive in heavily grazed or cultivated cropland. Most of proposed construction disturbances will occur on reclaimed ground or agricultural fields primarily used as cultivated cropland; therefore, the Project is not likely to affect this species.

14.3.2.5 Monarch Butterfly (*Danaus plexippus*)

The monarch butterfly is a candidate insect species with the potential to occur within or near the Project (USFWS 2023). No critical habitat has been designated for this species (USFWS 2023).

The monarch butterfly's migratory pathway crosses North Dakota. During the breeding season, monarchs lay their eggs on their obligate milkweed host plant (primarily *Asclepias spp.*), and larvae feed on milkweed. No milkweed or other nectar plants were identified within or near the Corridor Study Area; however, this species may occasionally traverse the Project area during migration. An identification guide will be provided for on-site personnel. If monarchs are identified an active work area on-site personnel will avoid disturbing them. The Project is not likely to affect this species.

14.3.3 Migratory Bird Treaty Act

The Project is located within potential migratory corridors for piping plover, red knot, and whooping crane; therefore, there is a potential for incidental interactions during the migration season. In North Dakota, species protected under the Migratory Bird Treaty Act (MBTA) are present throughout the year; however, most of these protected species are seasonally present in North Dakota and typically nest from February 1 through July 15 annually. During the nesting period, birds are more vulnerable to human activities.

Construction of the proposed pipeline and midline pump station are scheduled to commence in the second quarter of 2024 and will take approximately 3 months to reach completion. Except for construction of the midline pump station within previously disturbed areas, conversion of the existing pipeline will not require ground-disturbing activities.

No direct disturbances to nesting or breeding birds are anticipated; however, if nesting or breeding birds are observed within 1.0 mile of an active work area, all construction within 1.0 mile of the sighting will be modified or curtailed until the bird(s) have left the area, USFWS will be consulted on how to proceed, and the NDGF and the TAT Fish and Wildlife Division will be notified. With implementation of these guidelines, the proposed Project is not likely to adversely affect migratory species or result in fatalities including piping plover, red knot, or whooping crane.

14.3.4 Bald and Golden Eagle Protection Act Consultation

The Bald and Golden Eagle Protection Act (BGEPA) prohibits anyone without a permit from taking a bald or golden eagle including their parts, nests, or eggs. The BGEPA defines "take" as to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb and includes impacts resulting from human-induced alterations near previously used nesting sites.

Based on review of the NDGF's database, no eagle nests were identified occurs within the Corridor Study Area for the proposed pipeline or the existing pipeline; therefore, no direct disturbances to nesting or breeding birds are anticipated. If construction is scheduled occur between February 1 and July 15, an aerial raptor survey will be performed before construction, extending 0.5 mile from the ROW.

Woody vegetation within the Corridor Study Area is primarily limited to the banks of the East Fork Shell Creek, and no previously used nesting sites have been identified. The HDD method will be used to minimize disturbances to the bed or banks of the East Fork Shell Creek.

If eagles are observed within 1.0 mile of an active work area, all construction within 1.0 mile of the sighting will be modified or curtailed until the bird(s) have left the area, USFWS will be consulted on how to proceed, and the NDGF and the TAT Fish and Wildlife Division will be notified. With implementation of these guidelines, the proposed Project is not likely to adversely affect eagles or result in fatalities.

15 Consultations

On behalf of TBPL, Arcadis sent letters to various agencies and officials, including those identified in NDAC § 69-06-01-05, providing information about the Project and requesting input. A summary of the agency notifications is provided in **Table 2**. The responses received to date are summarized in the following subsections. Copies of all correspondence and consultations are provided in **Appendix D**.

Table 2 Agency Consultations

Agency	Communication Media	Date Sent	Studies Provided to Agency	Date of Response	Application Section Number[1]
Energy Infrastructure and Impact Office	Letter	9/29/2023	N/A	N/A	N/A
Grand Forks Air Force Base	Letter	9/29/2023	N/A	N/A	N/A
Job Service of North Dakota	Letter	9/29/2023	N/A	N/A	N/A
Military Aviation and Installation Assurance Siting Clearinghouse	Letter	9/29/2023	N/A	N/A	N/A
Minot Air Force Base	Letter	9/29/2023	N/A	N/A	N/A
Mountrail County Commission	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Aeronautics Commission	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Career and Technical Education	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Department of Agriculture	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Department of Commerce	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Department of Environmental Quality	Letter	9/29/2023	NA	10/18/2023	15.5
North Dakota Department of Health	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Department of Human Services	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Department of Labor and Human Services	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Department of Transportation	Letter	9/29/2023		10/5/2023	15.7
North Dakota Department of Trust Lands	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Department of Vocational Education	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Forest Service	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Game and Fish Department	Letter	9/29/2023	N/A	10/26/2023	15.3
North Dakota Geological Survey	Letter	9/29/2023	N/A	10/6/2023	15.8
North Dakota Indian Affairs Commission	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Industrial Commission	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Office of Attorney General	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Parks and Recreation Department	Letter	9/29/2023	N/A	10/18/2023	15.4
North Dakota Pipeline Authority	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Soil Conservation Committee	Letter	9/29/2023	N/A	N/A	N/A
North Dakota State Water Commission and Western Area Water Supply	Letter	9/29/2023	N/A	10/23/2023	15.6
North Dakota Transmission Authority	Letter	9/29/2023	N/A	N/A	N/A

Table 2 Agency Consultations

Agency	Communication Media	Date Sent	Studies Provided to Agency	Date of Response	Application Section Number[1]
Office of Governor	Letter	9/29/2023	N/A	N/A	N/A
State Historical Society of North Dakota	Letter	11/29/2023	Class I and Class III Cultural Resource Inventory Report	1/2/2024	15.2
MHA Nation/Three Affiliated Tribes Tribal Historic Preservation Office	Letter	11/27/2023	Class I and Class III Cultural Resource Inventory Report	N/A	15.2
Twentieth Air Force Ninety-first Missile Wing	Letter	9/29/2023	N/A	N/A	N/A
U.S. Department of Interior, Bureau of Land Management	Letter	9/29/2023	N/A	N/A	N/A
United Stated Department of Agriculture, North Dakota Natural Resources Conservation Service	Letter	9/29/2023	N/A	N/A	N/A
United States Army Corps of Engineers	Letter	9/29/2023	Wetland Delineation Report	N/A	15.1
United States Department of Defense	Letter	9/29/2023	N/A	N/A	N/A
United States Department of Transportation, Federal Aviation Administration	Letter	9/29/2023	N/A	N/A	N/A
United States Fish and Wildlife Service	Letter	9/29/2023	N/A	N/A	N/A
Ward County Commission	Letter	9/29/2023	N/A	N/A	N/A

Note:
1 Section number within the application which discusses agency response.

15.1 U.S. Army Corps of Engineers

On behalf of TBPL, Arcadis submitted a project consultation letter and a request for an AJD to the USACE on September 29, 2023. No response has been received to date. The Project will not result in disturbances to streams or drainages; therefore, a permit is not required for compliance with Section 10 of the Rivers and Harbors Act; therefore, a USACE permit is not required.

15.2 State Historical Society of North Dakota and Tribal Historic Preservation Office

Metcalf completed a Class I File Search of the Corridor Study Area and a Class III Cultural Resource Inventory of the APE for the proposed Project. The results of these investigations are discussed further in **Appendix F**.

On behalf of TBPL, Arcadis submitted a project consultation letter and a copy of the Metcalf report to the State Historical Society of North Dakota (SHSND) on November 29, 2023, and to the MHA Nation/Three Affiliated Tribes Tribal Historic Preservation Office (THPO) on November 27, 2023, providing opportunity to comment. In a letter dated January 2, 2024, the SHSND stated no significant sites would be affected by the project. No response has been received from THPO to date.

15.3 North Dakota Game and Fish Department

On behalf of TBPL, Arcadis submitted a project consultation letter to the NDGF on September 29, 2023, providing opportunity to comment and requesting an assessment of on wildlife concerns. In a letter dated October 26, 2023, NDGF responded stating the following:

- "The National Wetland Inventory indicates a variety of wetlands within the proposed project corridor. Steps should be taken to protect any wetlands that cannot be avoided, no alterations should be made to existing drainage patterns, and above-ground appurtenances should not be placed in wetland areas. Unavoidable destruction or degradation of wetland acres should be mitigated in kind.
- Aerial surveys should be conducted for raptor nests before construction begins. We recommend that a ½ mile construction buffer be implemented around active eagle nest sites (known occupied within the past 5 years). Ms. Sandra Johnson, Conservation Biologist may be contacted at 701-328-6327 for additional information on golden eagle nest sites in the state."

On behalf of TBPL, Arcadis coordinated with Ms. Johnson to determine whether eagle nests or other raptor nests occur within 1 mile of the project. Based on the agencies' database, no eagle nests were identified within the Corridor Study Area. The closest nest is a bald eagle nest more than 2 miles away. In an email dated November 29, 2023, Ms. Johnson also stated that there are no known prairie dog colonies or bighorn sheep occurrences in the Corridor Study Area.

NDGF concluded that the Project will not have significant adverse effects on wildlife or wildlife habitat provided these recommendations are implemented where appropriate during project construction and disturbed areas are reclaimed to pre-project conditions.

15.4 North Dakota Parks and Recreation Department

The scope of authority and expertise of the North Dakota Parks and Recreation Department (NDPR) covers properties that NDPR owns, leases, or manages; properties protected under Section 6(f) of the Land and Water Conservation Fund (LWCF); rare plants; and ecological communities established through the Natural Heritage Program. On behalf of TBPL, Arcadis submitted a project consultation letter to the NDPR on September 29, 2023. In a response letter dated October 18, 2023, NDPR stated the following:

- "The project does not appear to affect properties NDPR owns, leases, or manages.
- The project does not appear to affect any properties protected under Section 6(f) of the LWCF,

- Based review of the North Dakota Natural Heritage biological conservation database review, no known plant or animal species of concern or significant ecological communities are documented within or immediately adjacent to the project site."

15.5 North Dakota Department of Environmental Quality

On behalf of TBPL, Arcadis submitted a project consultation letter to the North Dakota Department of Environmental Quality (ND DEQ) on September 29, 2023. In a letter dated October 18, 2023, the ND DEQ responded stating the following:

- "All necessary measures must be taken to minimize fugitive dust emissions created during construction activities. Any complaints that may arise are to be dealt with in an efficient and effective manner.
- Care is to be taken during construction activity near any water of the state to minimize adverse effects on a water body. This includes minimal disturbance of stream beds and banks to prevent excess siltation, and the replacement and revegetation of any disturbed area as soon as possible after work has been completed. Caution must also be taken to prevent spills of oil and grease that may reach the receiving water from equipment maintenance and/or the handling of fuels on the site. Guidelines for minimizing degradation to waterways during construction are attached.
- Oil and gas related construction activities located within tribal boundaries within North Dakota may be required to obtain a permit to discharge stormwater runoff from the U.S. Environmental Protection Agency (USEPA). Further information may be obtained from the USEPA website or by calling the USEPA - Region 8 at 303-312-6312. Oil and gas related construction activities outside of tribal boundaries, that disturb one or more acres, and could discharge sediment laden stormwater to waters of the state are required to have a permit to discharge stormwater runoff until the site is stabilized by the re-establishment of vegetation or other permanent cover. Further information on the stormwater permit may be obtained from the department's website or by calling the Division of Water Quality at 70l-328-5210. Also, cities may impose additional requirements and/or specific best management practices for construction affecting their storm drainage system. Check with the local officials to be sure any local stormwater management considerations are addressed.
- The construction project overlies the Hiddenwood Lake surficial aquifer. Care should be taken to avoid spills of any materials that may have an adverse effect on groundwater quality. All spills must be immediately reported to this department and appropriate remedial actions performed.
- The proposed project appears to have the potential to be a source of emissions to the air capable of causing or contributing to air pollution and may be required to have an Air Pollution Control Permit to Construct/Operate as required by Chapter 33.1-15-14 of the North Dakota Air Pollution Control Rules. The applicant should contact the department's Air Pollution Control Program at 701-328-5188 prior to commencing construction.
- All solid waste materials must be managed and transported in accordance with the state's solid and hazardous waste rules. Appropriate efforts to reduce, reuse and/or recycle waste materials are strongly encouraged. As appropriate, segregation of inert waste from non-inert waste can generally reduce the cost of waste management. Further information on waste management and recycling is available from the department's Division of Waste Management at 701-328-5166.
- Projects that involve construction of pipelines should select locations that minimize the potential for impacts to human health and the environment during and after construction by avoiding, when possible,

source water protection areas and sensitive surface and groundwater environments. Additionally, when possible, pipeline routes should select areas with natural barriers to both surface and ground waters. Human health and the environment should be further protected by developing a spill response plan that emphasizes rapid deployment of prepositioned assets necessary to contain spills and subsequent cleanup. Proper surveillance and monitoring for early detection of leaks should be required.

- These comments are based on the information provided about the project in the above-referenced submittal. The U.S. Army Corps of Engineers may require a water quality certification from this department for the project if the project is subject to their Section 404 permitting process. Any additional information which may be required by the U.S. Army Corps of Engineers under the process will be considered by this department in our determination regarding the issuance of such a certification.
- The department owns no land in or adjacent to the proposed improvements, nor does it have any projects scheduled in the area. In addition, we believe the proposed activities are consistent with the State Implementation Plan for the Control of Air Pollution for the State of North Dakota."

The ND DEQ letter included Construction and Environmental Disturbance Requirements as an attachment (see **Appendix D**). These requirements apply to construction disturbances in and near waters of the State of North Dakota. The project will comply with the ND DEQ Construction and Environmental Disturbance Requirements. In addition, the EMP provided in **Appendix C** meets or exceeds all requirements of the ND DEQ Construction and Environmental Disturbance Requirements. TBPL will develop and implement project-specific measures to protect human health and the environment including the SWPPP, SPCC Plan, IMP, and remote monitoring utilizing SCADA.

15.6 North Dakota Department of Water Resources

On behalf of TBPL, Arcadis submitted a project consultation letter to the North Dakota Department of Water Resources (DWR) on September 29, 2023, providing opportunity to comment. In a letter dated October 23, 2023, NDDWR responded stating the following:

- "There are no Federal Emergency Management Administration (FEMA) National Flood Insurance Program (NFIP) floodplains identified or mapped where the proposed project is to take place. No permit relative to the NFIP are likely required based on the current effective Flood Insurance Rate Map and State minimum standards. However, flood risk has been identified through the North Dakota Risk Assessment Map service and Base Level Engineering (BLE) (ndram.dwr.nd.gov). In the absence of FEMA NFIP data, BLE is often considered best available data and is recommended to be considered in the design process. The State of North Dakota has no formal NFIP permitting authority as all NFIP permitting decisions are considered by impacted NFIP participating communities, the community with zoning authority for the area in question. Please work directly with the local floodplain administrators of the zoning authorities impacted.
- The DWR's Engineering and Permitting Section reviewed the project location and determined that it may require a surface drain permit if the project impacts sloughs, ponds, lakes (i.e., wetlands) outside of the right-of-way. Also, the project location may potentially impact two permitted surface drains. The surface drain permits are Taylor Slough Drain (DR-661) and Wild Willow Drain (DR-4495). The DWR requests to be notified if either DR-661 or DR-4495 will be modified.
- Initial review indicates the project does not require a conditional or temporary permit for water appropriation. However, if surface water or groundwater will be diverted for construction of the project, a water permit will be required per North Dakota Century Code 61-04-02. Please consult with the DWR's Water Appropriation Division if you have any questions at (701) 328-2754 or appropinfo@nd.gov.

- The DWR maintains a network of observation wells across the state for monitoring the water levels and quality in glacial and bedrock aquifers. These wells are often installed in road and highway rights-of-way to limit inconvenience to the adjacent landowners. DWR observation wells have a yellow protective casing extending between 1 and 3 feet above ground surface, and their locations are marked with a stake. If an observation well is encountered during project activities and must be removed, please contact the Water Appropriation Division. The DWR hopes to keep all observation wells, but otherwise will ensure the well is properly abandoned."

15.7 North Dakota Department of Transportation

On behalf of TBPL, Arcadis submitted a project consultation letter to the North Dakota Department of Transportation (ND DOT) on September 29, 2023, providing opportunity to comment. In a letter dated October 5, 2023, the ND DOT responded stating the following:

- "The Project should have no adverse effects on the ND DOT highways.
- However, if because of this project any work needs to be done on highway right of way, appropriate permits and risk management documents will need to be obtained from the ND DOT District Engineer, Korby Seward, Minot at 701-857-6907."

A permit will be obtained from the District Engineer for the crossing of State Highway 23. TBPL will comply with all applicable permit requirements.

15.8 North Dakota Geological Survey

On behalf of TBPL, Arcadis submitted a project consultation letter to the North Dakota Geological Survey (NDGS) on September 29, 2023, providing opportunity to comment. In a letter dated October 6, 2023, the NDGS responded stating the following:

- "The NDGS appreciates the notification and opportunity to provide comment on your proposed project work. The September 29, 2023, comment solicitation letter was reviewed by our office on October 6,2023. After a review of the proposed new pipeline route corridor against available geologic and landslide area mapping and contemporary aerial imagery we would not note any geologic concerns with the project at this time."

16 Siting Criteria

16.1 Exclusion Areas

Per NDAC § 69-06-08-02(1), certain geographical areas will be excluded from consideration for a transmission pipeline route. For example, Exclusion Areas may be located within the Corridor, but at no given point may such an area or areas encompass more than 50 percent of the Corridor unless there is no reasonable alternative.

The Exclusion Areas within the Corridor Study Area for both the proposed pipeline and the existing pipeline and crossed by the Route were evaluated, and the results are summarized in **Table 3** and shown on the Exclusion Areas maps in **Appendix A**.

- Proposed pipeline: There are no Exclusion Areas within the Corridor Study Area or crossed by the Route for the proposed pipeline.
- Existing pipeline: The Exclusion Areas within the Corridor Study Area or crossed by the Route are described in the following subsections.

16.1.1 Designated or Registered: National Parks, Memorial Parks, Historic Sites and Landmarks, Natural Landmarks, Monuments, and Wilderness Areas

No designated or registered national parks, memorial parks, historic landmarks, natural landmarks, monuments, or wilderness areas were identified within the Corridor Study Area or crossed by the Route for the proposed pipeline or the existing pipeline.

16.1.2 Designated or Registered: State Parks, Sites, Monuments, Archaeological Sites, and Natural Preserves

No designated or registered state parks, sites, monuments, archeological sites, natural preserves are within the Corridor Study Area or crossed by the Route for the proposed pipeline or the existing pipeline.

16.1.3 County Parks and Recreational Areas, Municipal Parks, and Parks Owned or Administered by Other Governmental Subdivisions

No county parks and recreational areas, municipal parks, or parks owned or administered by other governmental subdivisions are within the Corridor Study Area or crossed by the Route for the proposed pipeline or the existing pipeline.

16.1.4 Areas Critical to the Life Stages of Threatened or Endangered Animal or Plant Species

The USFWS IPaC report (USFWS 2023) identified five species federally listed as threatened, endangered, or candidate that could potentially occur in the Corridor Study Area for the proposed pipeline; however, no designated critical habitat for federally listed species was identified within the Corridor Study Area. No areas critical to the life stages of threatened or endangered animal or plant species have been identified within the Corridor Study Area or crossed by the Route for the proposed pipeline or the existing pipeline.

16.1.5 Areas Where Animal or Plant Species that are Unique or Rare to This State Would be Irreversibly Damaged

In a letter dated October 18, 2023, NDPR stated that no known plant or animal species of concern or significant ecological communities are documented within or immediately adjacent to the project site. No areas where animal or plant species that are unique or rare to North Dakota were identified within the Corridor Study Area or crossed by the Route for the proposed pipeline or the existing pipeline; therefore, no unique or rare animal or plant species are anticipated to be irreversibly damaged from construction or operation of the Project.

16.1.6 Areas within 1,200 Feet of the Geographic Center of an Intercontinental Ballistic Missile Launch or Launch Control Facility

Based on publicly available information, there are no Minot Air Force Base assets located in Ward and Mountrail Counties.

- Proposed Pipeline: The proposed Corridor Study Area and Route are not located within 1,200 feet of the geographic center of an ICBM launch or launch control facility.
- Existing Pipeline: The Corridor Study Area and Route are located within 1,200 feet of the geographic center of two ICBM launch or launch control facilities.

On behalf of TBPL, Arcadis submitted a project consultation letter to Minot Air Force Base on September 29, 2023, providing opportunity to comment and requesting an assessment of on wildlife concerns. No response has been received to date.

16.1.7 Areas within 30 Feet on Either Side of a Direct Line between Intercontinental Ballistic Missile Launch or Launch Control Facility

Based on publicly available information, there are no Minot Air Force Base assets located in Ward and Mountrail Counties.

- Proposed Pipeline: The proposed Corridor Study Area and Route are not located within 30 feet on either side of a direct line between ICBM launch or launch control facility.
- Existing Pipeline: The Corridor Study Area and Route are located within 30 feet on either side of a direct line between several ICBM launch or launch control facilities.

16.1.8 Areas Critical to the Life Stages of Threatened or Endangered Animal or Plant Species

The USFWS IPaC report (USFWS 2023) identified five species federally listed as threatened, endangered, or candidate that could potentially occur in the Corridor Study Area for the proposed pipeline; however, no designated critical habitat for federally listed species was identified within the Corridor Study Area. No areas critical to the life stages of threatened or endangered animal or plant species have been identified within the Corridor Study Area or crossed by the Route for the proposed pipeline or the existing pipeline.

Table 3 Exclusion Areas Summary

Feature	Proposed Pipeline		Existing Pipeline		Description	Section Addressed
	Within Corridor Study Area (Y/N)	Route Crosses (Y/N)	Within Corridor Study Area (Y/N)	Route Crosses (Y/N)		
Designated or registered national parks, memorial parks, historic sites and landmarks, natural landmarks, monuments, and wilderness areas.	N	N	N	N	N/A	16.1.1
Designated or registered state parks, historic sites, monuments, historical markers, archaeological sites, and natural preserves.	N	N	N	N	N/A	16.1.2
County parks and recreational areas, municipal parks, and parks owned or administered by other governmental subdivisions.	N	N	N	N	N/A	16.1.3
Areas critical to the life stages of threatened or endangered animal or plant species.	N	N	N	N	N/A	16.1.4
Areas where animal or plant species that are unique or rare to this state would be irreversibly damaged.	N	N	N	N	N/A	16.1.5
Areas within 1,200 feet of the geographic center of an intercontinental ballistic missile (ICBM) launch or launch control facility.	N	N	Y	Y	• Existing Pipeline: Two within the Corridor Study Area, and one crossed by the Route	16.1.6
Areas within 30 feet on either side of a direct line between ICBM launch or launch control facility.	Y	N	Y	Y	• Proposed Pipeline: One within the Corridor Study Area • Existing Pipeline: Seven within the Corridor Study Area and crossed by the Route	16.1.7

Abbreviations
N/A = Not Applicable

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16.1.9 Areas Where Animal or Plant Species that are Unique or Rare to This State Would be Irreversibly Damaged

In a letter dated October 18, 2023, NDPR stated that no known plant or animal species of concern or significant ecological communities are documented within or immediately adjacent to the project site. No areas where animal or plant species that are unique or rare to North Dakota were identified within the Corridor Study Area or crossed by the Route for the proposed pipeline or the existing pipeline; therefore, no unique or rare animal or plant species are anticipated to be irreversibly damaged from construction or operation of the Project.

16.1.10 Areas within 1,200 Feet of the Geographic Center of an Intercontinental Ballistic Missile Launch or Launch Control Facility

Based on publicly available information, there are no Minot Air Force Base assets located in Ward and Mountrail Counties.

- Proposed Pipeline: The proposed Corridor Study Area and Route are not located within 1,200 feet of the geographic center of an ICBM launch or launch control facility.
- Existing Pipeline: The Corridor Study Area and Route are located within 1,200 feet of the geographic center of two ICBM launch or launch control facilities.

On behalf of TBPL, Arcadis submitted a project consultation letter to Minot Air Force Base on September 29, 2023, providing opportunity to comment and requesting an assessment of on wildlife concerns. No response has been received to date.

16.1.11 Areas within 30 Feet on Either Side of a Direct Line between Intercontinental Ballistic Missile Launch or Launch Control Facility

Based on publicly available information, there are no Minot Air Force Base assets located in Ward and Mountrail Counties.

- Proposed Pipeline: The proposed Corridor Study Area and Route are not located within 30 feet on either side of a direct line between ICBM launch or launch control facility.
- Existing Pipeline: The Corridor Study Area and Route are located within 30 feet on either side of a direct line between several ICBM launch or launch control facilities.

On behalf of TBPL, Arcadis submitted a project consultation letter to Minot Air Force Base on September 29, 2023, providing opportunity to comment and requesting an assessment of on wildlife concerns. No response has been received to date.

16.2 Avoidance Areas

Per NDAC § 69-06-08-02(2), certain geographical areas may not be considered in the routing of a transmission pipeline unless the applicant shows that, under the circumstances, there is no reasonable alternative. In determining whether an Avoidance Area should be designated for a facility, the Commission may consider, among other things, the proposed management of adverse impacts, the orderly siting of facilities, system reliability and integrity, the efficient use of resources, and alternative routes. In addition, a buffer zone will be

implemented around these areas to protect their integrity, unless a distance is specified in the criteria. Avoidance Areas may be located within a Corridor, but at no given point may such an area or areas encompass more than 50 percent of the Corridor unless there is no reasonable alternative.

The Avoidance Areas within the Corridor Study Area for both the proposed pipeline and the existing pipeline and crossed by the Route were evaluated and the results are summarized in **Table 4** and shown on the Avoidance Areas maps in **Appendix A**.

- Proposed Pipeline: There are no Avoidance Areas within the Corridor Study Area or crossed by the Route for the proposed pipeline.
- Existing Pipeline: Avoidance Areas with the Corridor Study Area or crossed by the Route for the existing pipeline are described in the following subsections.

16.2.1 Designated or Registered National Historic Districts; Wildlife Areas; Wild, Scenic, or Recreational Rivers; Wildlife Refuges; and Grasslands

No designated or registered national historic districts; wildlife areas; wild, scenic, or recreational rivers; wildlife refuges; grasslands; scenic outlooks/viewing areas are located within the Corridor Study Area or crossed by the Route for the proposed pipeline or the existing pipeline.

16.2.2 Designated or Registered State Wild, Scenic, Recreational Rivers; Game Refuges; Game Management Areas; Management Areas; Forest; Forest Management Lands; and Grasslands

No state wild, scenic, or recreational rivers; state game refuges or game management areas; state forests or forest management lands; or state grasslands are located within the Corridor Study Area or crossed by the Route for the proposed pipeline or the existing pipeline.

The USFWS manages three types of conservation programs on private land whereby landowners give easements rights to the USFWS: wetland easements, grassland easements, and Waterfowl Production Areas (WPA).

- Proposed Pipeline: When TBPL executed easement agreements with the landowners, none of the landowners of the properties within the Corridor Study Area identified wetland or grassland easements. Based on desktop analysis, there are two USFWS-managed WPA within or near the Corridor Study Area; however, the WPA are not crossed by the Route.
- Existing Pipeline: When TBPL executed the purchase for the existing pipeline, no wetland or grassland easements were identified within the Corridor Study Area. Based on desktop analysis, there are several USFWS-managed WPA within or near the Corridor Study Area and crossed by the Route.

Table 4 Avoidance Areas Summary

Feature	Proposed Pipeline		Existing Pipeline		Description	Section Addressed
	Within Corridor Study Area (Y/N)	Route Crosses (Y/N)	Within Corridor Study Area (Y/N)	Route Crosses (Y/N)		
Designated or registered national historic districts; wildlife areas; wild, scenic, or recreational rivers; wildlife refuges; and grasslands.	N	N	N	N	N/A	16.2.1
Designated or registered state wild, scenic, or recreational rivers; game refuges; game management areas; management areas; forest; forest management lands; and grasslands.	N	N	N	N	N/A	16.2.2
Historical resources which are not specifically designated as exclusion or avoidance areas.	N	N	N	N	N/A	16.2.3
Areas which are geologically unstable.	N	N	Y	N	Existing Pipeline: Two potential landslide areas and 3 abandoned/ inactive coal mines (Speigel, Mormon and one unknown mine) are within the Corridor Study Area; however, none are crossed by the Route.	16.2.4
Within 500 feet of a residence, school, or place of business.	N	N	Y	Y	Existing Pipeline: One occupied residence is within 500 feet of the Route.	16.2.5
Reservoirs and municipal water supplies.	N	N	Y	N	Existing Pipeline: Stanley Reservoir and several municipal wells near Plaza are within the Corridor Study Area; however, none are crossed by the Route.	16.2.6
Water sources for organized rural water districts.	N	N	N	N	N/A	16.2.7
Area of recreational significance which are not designated as exclusion areas.	N	N	Y	Y	Existing Pipeline: One NDPR-designated snowmobile trail is within the Corridor Study Area and crossed by the Route.	16.2.8

Abbreviations:
N/A = Not Applicable

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16.2.3 Historical Resources Not Specifically Designated as Exclusion or Avoidance Areas

Metcalf conducted a Class III cultural resource inventory of the APE. Metcalf surveyed a 3.84-milelong, 300-foot-wide corridor for the proposed new pipeline, a proposed midline pump station (4.0-acre site), two new permanent access roads, and several temporary access roads, workspaces/laydown areas on October 2, 2023. Metcalf surveyed a total of 147 acres.

During the Class III cultural survey, no cultural resources were identified within the Field Survey Area for the proposed pipeline; therefore, Metcalf recommended a finding of *No Historic Properties Affected* (36 CFR 800.4[d][1]) for this undertaking. The Metcalf Class III Cultural Resources Report is provided in **Appendix F**.

16.2.4 Areas which are Geologically Unstable

- Proposed Pipeline: No geologically unstable areas were identified within Corridor Study Area or crossed by the Route.
- Existing Pipeline:
  - Two potential landslide areas were identified within the Corridor Study Area for the existing pipeline. There is low probability of landslides affecting the Project because the Corridor Study Area does not have areas with steep slopes and no new construction activities are proposed near these areas.
  - Three abandoned/inactive coal mines (Speigel Mine, Mormon Mine, and one unknown mine) were identified within the Corridor Study Area for the existing pipeline. Coal mining sometimes results in sinkholes; however, no sinkholes were identified within the Corridor Study Area or crossed by the Route.

16.2.5 Within 500 Feet of a Residence, School, or Place of Business

No residences or other occupied structures will be displaced or removed by the Project. No schools are located within 500 feet of the Route for the proposed pipeline or the existing pipeline.

- Proposed Pipeline: No residences, schools, or places of business were identified within 500 feet of the Corridor Study Area or Route.
- Existing Pipeline: One occupied residence was identified within 500 feet of the Route for the existing pipeline.

16.2.6 Reservoirs and Municipal Water Supplies

- Proposed Pipeline: No reservoirs or municipal water supplies were identified within or near the Corridor Study Area or crossed by the Route. The Hiddenwood-Lake Aquifer is within the Corridor Study Area and crossed by the Route; however, this aquifer is not a municipal water supply.
- Existing Pipeline: Stanley Reservoir is within the Corridor Study Area; however, it is not crossed by the Route. There are several municipal wells within the Corridor Study Area in the Plaza area; however, the wells are not crossed by the Route. Shell Creek-White Lake Aquifer is within the Corridor Study Area and crossed by the Route; however, this aquifer is not a municipal water supply.

16.2.7 Water Sources for Organized Rural Water Districts

No wellhead protection areas or other water sources for organized rural water districts have been identified within the Corridor Study Area or crossed by the Route for the proposed pipeline or the existing pipeline.

16.2.8 Area of Recreational Significance Which Are Not Designated as Exclusion Areas

- Proposed Pipeline: No areas of recreational significance were identified within the Corridor Study Area or crossed by the Route.
- Existing Pipeline: One North Dakota Parks and Recreation-designated snowmobile trail is crossed by the Corridor Study Area and Route of the existing pipeline.

16.3 Selection Criteria Considered

During project design, TBPL selected a Preferred Project Corridor and Route for the proposed pipeline that complies with the Commission's selection criteria to avoid significant adverse effects or to manage and maintain these effects at an acceptable minimum for the resources described in the following subsections.

The Selection Criteria Considered for the Preferred Corridor and Route for both the proposed pipeline and the existing pipeline were evaluated, and the results are shown on the Selection Criteria Considered maps in **Appendix A**.

16.3.1 Agricultural Production

More than 70% of the Corridor Study Area for the proposed pipeline is agricultural land, with cultivated crops and some pastureland used for livestock grazing. The primary crops cultivated in the area include canola and wheat, with the remaining cultivated land being used for hay.

Approximately 4.7 acres of prime farmland and approximately 107.9 acres of farmland of statewide importance may be temporarily affected during construction of the Project (**Table 5**).

Table 5 Farmland in Corridor Study Area

Type of Farmland	Acres in Corridor Study Area	Percent of Total Area in Corridor Study Area (%)	Acres In 30-foot Permanent Right-of-Way	Percent of Total in 30-foot Permanent Right-of-Way (%)
Prime Farmland	225.7	1.0	4.7	1.9
Farmland of Statewide Importance	9,181.0	40.9	107.9	42.3
Not Prime Farmland	12,840.0	57.2	141.6	55.5
Prime Farmland if Drained	219.2	0.98	0.96	0.38
Totals	**22,465.9**	**100.2**	**255.2**	**100.1**

The primary impact will be the loss of standing crops within the construction work area for the growing season. Construction may also result in soil compaction, mixing of topsoil and subsoil including introduction of rocks into the

topsoil from the subsoil, erosion, and the introduction of weeds. These impacts can lower soil productivity and reduce crop yields following construction. There is a potential for diminished crop yields for 1 to 2 years following construction.

The pipeline will be buried deeper than typical tillage depths to allow continued agricultural use of the land in the ROW after construction. On agricultural land, rocks greater than 4 inches in diameter that are exposed on the surface due to construction activity will be removed from the ROW prior to and after topsoil replacement. Following construction, TBPL will restore the ROW to its pre-construction contours and stabilize the ground. Planting and harvesting will be allowed to continue over the permanent ROW.

After construction is completed, the ROW will be restored to its pre-construction land use. Fields are anticipated to return to normal yields within 1 to 2 years after construction is completed. Financial compensation will be provided to the landowners for temporary and permanent effects to agricultural production; therefore, impacts to agricultural production within the Corridor Study Area are anticipated to minor and short-term.

Impacts on agricultural production will be limited to the construction of the proposed new facilities. No impacts are expected for conversion of the existing pipeline. Operation of the Project is not anticipated to result in long-term impacts on agriculture production.

16.3.2 Family Farms and Ranches

Easements will be negotiated with all affected landowners, and sufficient compensation will be provided. The Project will not result in changes of land ownership. The primary impact on family farms would be the loss of standing crops within the work area for the growing seasons during which project-related activities occur, temporary prohibition of livestock grazing in the construction ROW, and restrictions on livestock movement across the construction ROW during construction. The effects of construction on family farms or ranches are anticipated to be minor and short-term.

Post-construction restoration will return the ROW to pre-construction contours, and farming and ranching operations will be allowed to continue over the permanent ROW. Long-term or permanent impacts on family farms and ranches are not anticipated. Impacts on family farms and ranches will be limited to the construction of the new pipeline; no impacts are expected for conversion of the existing pipeline or during the operation of the Project.

16.3.3 Land Economically Suitable for Irrigation

During TBPL's negotiations of the landowner easement agreements, none of the landowners of the properties within the Corridor Study Area stated that they believe their land could be economically suitable for irrigation or that they plan to install an irrigation system. There are no known irrigated lands within the Corridor Study Area or crossed by the Route; therefore, the Project is unlikely to result in temporary or permanent impacts to areas suitable for irrigation.

16.3.4 Surface Drainage Patterns and Groundwater Flow Patterns

16.3.4.1 Surface Water

Construction effects on surface drainage patterns will include temporary localized disturbances to the topography. Where the proposed pipeline crosses the WOUS, the HDD method will be used to minimize potential impacts to flow or future maintenance efforts by landowners or the drainage authority. The HDD method will be used to avoid disturbing the bed or banks of the East Fork Shell Creek; therefore, no changes to surface drainage patterns are anticipated.

Intermittent drainages will be crossed using open-cut construction. These drainages are expected to be dry during construction of the proposed pipeline; therefore, no changes to surface drainage patterns are anticipated. If these drainages are flowing, then the open cut method of construction will not be used and the HDD method will be utilized

instead to avoid disturbance of the flowing drainage. After construction, disturbed areas will be restored to approximate pre-construction contours, allowing drainage patterns to remain unchanged. TBPL will implement the following mitigation measures to minimize the potential for impacts to the intermittent drainages:

- Develop and implement a Stormwater Pollution Prevention Plan (SWPPP) to minimize erosion and potential effects associated with stormwater runoff and sediment transport to surface waters during construction. The SWPPP will include BMPs that will be implemented until final reclamation has been achieved to minimize changes to the existing surface drainage patterns and avoid alteration of existing groundwater flow patterns.
- Implement temporary erosion control BMPs (e.g., slope breakers, sediment barriers, and mulch) to minimize the potential for soil loss due to wind or water erosion during construction.
- Restore the work area to approximate pre-construction contours.

16.3.4.2 Groundwater

Aquifers underlying the Corridor Study Area comprise both bedrock and overlying unconsolidated deposits. Shallow water table conditions (less than 6 feet) are expected to be encountered in various locations (NRCS 2023). The water table is expected to be isolated from underlying bedrock and unconsolidated aquifers in most locations. The Hiddenwood Lake unconsolidated aquifer is present beneath the route of the proposed pipeline. Although the aquifer is expected to be at least 65 feet below the ground surface and confined from the surface in most areas, the crossing location is within a possible recharge zone (Pettyjohn and Hutchinson 1971). Review of drillers logs from the vicinity of the Shell Creek-White Lake aquifer crossing indicate that water-bearing sand and gravel deposits are found at variable depths and most wells exhibit confined conditions (DWR 2023). The Fort Union Formation underlays the project area at depths of 105 to more than 125 feet bgs (Bureau of Indian Affairs [BIA] and USEPA 2009).

Construction activities which may encounter shallow (water table) aquifers, such as trenching, drilling, dewatering, and backfilling, could cause minor fluctuations in groundwater levels and/or increased turbidity within the surficial aquifers. The proposed pipeline will be installed at depths that will not interfere with groundwater flow patterns. Typically, the pipeline trench will be less than 6 feet deep, except where the HDD method is proposed for installation of the pipe, where installation depths will be deeper.

Dewatering, if necessary, is not expected to have a significant effect on regional groundwater flow patterns. Shallow (water table) aquifers will quickly reestablish equilibrium if disturbed, and turbidity levels will rapidly subside. Based on the relatively shallow depth of construction and because the depth of the shallowest groundwater level within the Hiddenwood Lake and Shell Creek-White Lake aquifers is anticipated to be below the deepest point of the proposed pipeline trench, installation of the proposed pipeline will not have a significant effect on regional groundwater flow patterns or quality. Any potential effects on groundwater flow patterns will be limited to surficial aquifers, and impacts will be highly localized and limited to the construction phase of the project. No permanent impacts to groundwater flow patterns are expected.

The project will not affect sloughs, ponds, lakes (i.e., wetlands) outside of the Corridor Study Area; therefore, no surface drain permits are anticipated to be required. In addition, the project will have no direct impacts to surface drain permits Taylor Slough Drain (DR-661) and Wild Willow Drain (DR-4495). In the unlikely event that either DR-661 or DR-4495 will be modified, the DWR will be notified.

The DWR maintains a network of observation wells across the state for monitoring the water levels and quality in glacial and bedrock aquifers. No observation wells were identified within the Corridor Study Area; therefore, no direct impacts to water wells are anticipated. If an observation well is encountered during project activities and

must be removed, the DWR Water Appropriation Division will be notified. If the functionality of a well is impacted, a replacement well(s) will be installed.

Impacts on deeper aquifers (e.g., Fort Union-Hell Creek aquifer) are not anticipated given their depth and separation from surficial materials. Moreover, deeper aquifers are commonly confined and hydraulically insulated from overlying formations.

Surface drainage and groundwater flow patterns will not be significantly altered by construction of proposed pipeline and associated aboveground facilities. Implementation of project SPCC and IPM plans would minimize potential risk of impacts to groundwater during construction and operation. The effects of construction will be minor and short-term; therefore, no mitigation measures to protect groundwater are anticipated to be required.

16.3.5 Sound Sensitive Land Uses

Land use in the vicinity of the Project is primarily agricultural. The Project is in a rural, sparsely populated agricultural area with very few noise-sensitive receptors within or near the Corridor Study Area. Sound-sensitive land uses include residences, places of business, schools, hospitals, churches, or cemeteries. Existing noise sources near the Project include the existing CPR railroad and car/truck traffic traveling on State Highway 23 (typically between 60 and 95 decibels when cars, trucks, and/or trains are traveling on roads/railroads at higher speeds).

- Proposed Pipeline: No residences, places of business, schools, hospitals, churches, cemeteries, or other noise-sensitive land uses were identified within 500 feet of the Route.
- Existing Pipeline: One residence, 3 cemeteries, and 1 place of business were identified within 500 feet of the Route. The cemeteries are near the City of Plaza. No other sound sensitive land uses are located within the Corridor Study Area or crossed by the Route.

Sound-sensitive receptors close to the construction areas will be exposed to temporary increases in noise levels during operation of heavy equipment for construction. Noise generated during construction will be limited to equipment and heavy machinery during normal working hours. The effects of construction noise will be less noticeable for the portion of the proposed pipeline near State Highway 23, where the existing noise levels are elevated from railroad and highway vehicular traffic.

The effects of noise will be diminished with distance from the equipment operations. Nighttime noise levels will normally be unaffected by construction, as most construction is typically restricted to daylight hours on weekdays. Noise generated during pipeline operations and maintenance is expected to be negligible.

16.3.6 Visual Effect on Adjacent Areas

No designated scenic outlooks or viewing areas were identified within the Corridor Study Area or crossed by the Route for the proposed pipeline or the existing pipeline. The proposed pipeline and aboveground facilities will be in a rural area that is sparsely populated and dominated by cropland. Views of the landscape will be limited to residents of homesteads, occasional views from area roadways, and oil and gas personnel; therefore, based on number of viewers and duration of their views, viewer sensitivity is considered low.

Visual impacts during construction will include views of personnel and equipment during the construction period (approximately 3 months). Heavy equipment, open trenches, and spoil piles will change the colors and textures of the landscape. The removal of vegetation will create contrast within the existing landscape with the introduction of distinct lines in the landscape. The new pipeline will be buried, and the associated midline pump station will have a relatively low profile. Following construction, disturbed soils will be re-contoured and re-vegetated to match

original conditions in accordance with landowner agreements. Following successful revegetation, visual impacts will be minimal.

Construction of the proposed midline pump station and associated permanent access roads will result in the long-term conversion of agricultural land to industrial use. The aboveground facilities will be in rural agricultural areas, where very few people will see the facilities, and the visual impact will not significantly alter the aesthetic landscape.

16.3.7 Extractive and Storage Resources

16.3.7.1 Oil and Gas Production

The Corridor Study Area and Route for the proposed pipeline and existing pipeline are located within the Williston Basin, a major oil and gas producing basin in western North Dakota.

Proposed Pipeline: Several oil or gas wells were identified within the Corridor Study Area; however, none are crossed by the Route.

Existing Pipeline: Several oil or gas wells were identified within the Corridor Study Area; however, none are crossed by the Route.

TBPL performed a centerline survey of the Route to identify extractive and storage resources owned by third-party entities. TBPL contacted, or will contact, each entity to obtain its respective crossing and encroachment guidelines and requirements and will continue to work closely with each entity during the construction and operation and maintenance phases to safely construct and operate the Project around existing facilities and minimize the potential for impacts.

Because oil and gas are generally produced from depths of 1,000 feet or more, construction of the proposed pipeline is not expected to affect the ability of existing wells to produce petroleum and/or natural gas. Typically, the pipeline trench will be less than 6 feet deep, except where the HDD method is proposed for installation of the pipe, where installation will be slightly deeper. Potential construction-related damage that could occur will be limited to the near-surface components of the wells and gathering systems. To minimize the potential for impacting near-surface components, TBPS will implement the following mitigation measures:

- Avoid direct impact to any wells located near the construction ROW; and
- Identify any associated underground gathering lines along the Route of the proposed pipeline and take appropriate precautions to protect the integrity of such facilities.

16.3.7.2 Sand and Gravel Mining Operations

- Proposed Pipeline: No sand/gravel mining operations (gravel pits) are within the Corridor Study Area or crossed by the Route.
- Existing Pipeline: Several sand/gravel mining operations are within the Corridor Study Area; however, none are crossed by the Route and no ground disturbances are proposed near these operations; therefore, the Project is not likely to affect these operations.

16.3.8 Wetlands, Woodlands, and Wooded Areas

During construction of the proposed pipeline, clearing of vegetation will result in temporary impacts to wetlands, woodlands, and wooded areas. Trees and wooded areas within the Corridor Study Area are primarily limited to the banks of the East Fork Shell Creek.

TBPL will use the HDD method at the crossing of East Fork Shell Creek and WOUS to avoid impacts to wetlands and riparian vegetation. No wetlands will be permanently displaced by the aboveground facilities. A SWPPP will be developed to minimize erosion and discharge of sediments or pollutants to surface water and wetlands.

To minimize the impacts on trees, the following mitigation measures will be implemented:

- Avoid removal of trees if practicable; and
- For removed trees with DHB >1.0 inches, trees will be replaced consistent with the Commission's Tree and Shrub Mitigation Specifications.

Construction is anticipated to result in minor and short-term effects on wetlands, woodlands, and wooded areas.

16.3.9 Radio and Television Reception and Other Communication or Electronic Facilities

No radio, television, or other communication or electronic facilities were identified within or near the Corridor Study Area or crossed by the Route for the proposed pipeline or existing pipeline. No effects on radio, television, or other communication or electronic facilities are expected as a result of the Project.

16.3.10 Human Health and Safety

The PHMSA administers the national regulatory program to ensure the safe transportation of crude oil and other hazardous materials by pipeline. The PHMSA develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities.

Many of the regulations are written as performance standards that set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve safety. Best practices and engineering controls will be implemented to prevent adverse effects to the environment and human health and safety.

TBPL will collaborate with the local emergency response manager in conjunction with Ward and Mountrail Counties to develop an appropriate Emergency Response Plan. TBPL will work with local emergency responders to ensure implementation of a safe and effective response strategy should an adverse event occur.

16.3.11 Animal Health and Safety

Due to the proximity to Highway 23, existing agricultural activities, and previous ground disturbances, animals within and near Corridor Study Area and Route for the proposed pipeline and existing pipeline are limited to livestock and common wildlife species, such as include squirrels, badgers, deer, pheasant, grouse, partridge, and songbirds. No species of concern are expected to be impacted by the Project.

As a result of the noise and human activity during construction, livestock, and mobile species, such as larger mammals and birds, will likely avoid the construction areas and relocate to adjacent habitat and are not expected to be negatively impacted by project activities. Less mobile or burrowing species may be inadvertently killed during construction. Some individuals may be permanently displaced and perish due to increased competition or other effects of being forced into suboptimal habitat, although suitable habitat within the Corridor Study Area will be available following construction.

BMPs will be implemented during construction to allow for the unhindered movement of local livestock and wildlife. Overall impacts on livestock and wildlife are expected to be temporary and minor.

16.3.12 Plant Life

Existing vegetation, including cultivated crops, weeds, trees, and shrubs will be temporarily cleared within the work area before the start of construction. The disturbed areas will be restored to approximate pre-construction contours and vegetation will be restored in accordance with landowner agreements. For those areas to be revegetated, a native seed mix will be developed in conjunction with the local landowners and NRCS for areas to be seeded.

The North Dakota Department of Agriculture (NDDA) coordinates efforts of county weed boards and state and federal land managers to implement weed management programs as established in North Dakota Law (NDCC Section 4.1-47-02). Each county in North Dakota has a County Weed Control Board, which develops and maintains county-level lists of noxious weeds and implements noxious weed control.

A Weed Control Plan will be developed in conjunction with the Weed Control Boards of Ward and Mountrail Counties. BMPs will be implemented to prevent the spread of noxious weeds and to minimize the risk of importing or transporting any weed species. Equipment and tools will be cleaned of any plant debris before ingress and egress from the project area.

16.4 Policy Criteria

16.4.1 Location and Design

The location and design of the Project takes advantage of existing facilities and utility corridors to the extent practicable. TBPL identified a Preferred Project Corridor and Route for the proposed pipeline that meet the needs of the Project and comply with the Commission's siting policy criteria while minimizing potential impacts to landowners, existing infrastructure, and the environment. The Preferred Project Corridor and Route for the existing pipeline is the centerline of the gathering pipeline to be converted to a transmission pipeline.

No designated Exclusion Areas or Avoidance Areas are within the Corridor Study Area or crossed by the Route for the proposed pipeline. Mitigation measures will be implemented to avoid or minimize potential adverse impacts on Exclusion Areas and Avoidance Areas within the Corridor Study Area for the existing pipeline.

16.4.2 Training and Use of In-State Labor

Both local and out-of-state labor will be used during the construction and operation of the Project. Local construction crews will be used to the maximum extent feasible. All TBPL's assets are in North Dakota, and the Project will be operated by qualified personnel who will reside in state. TBPL will provide environmental training for all project personnel (both contractor and TBPL) before construction.

16.4.3 Economies of Construction and Operation

Development of the Project will result in the investment of approximately $19.6 million.

Construction of the Project will result in beneficial impacts on the state and local economy. During construction, 10 to 50 temporary workers will be required depending on the stage of construction. The workforce needs will result in additional local expenditures for food and lodging. The state and the City of Stanley will benefit from an increase in sales, use, and lodging tax revenue. Based on the estimated retail purchases by temporary workers and current tax rates, the state and local governments will realize additional tax revenue.

During construction, local businesses will benefit from increased demands for goods and services generated by the temporary workforce's need for food and lodging. This economic stimulus could result in a temporary need for local establishments to add staff or increase hours worked by existing staff to accommodate the increases in demand.

In addition to purchases by workers, TBPL will purchase some materials necessary for construction of the Project locally, primarily consumables, fuel, equipment rental, space leasing, and miscellaneous construction-related materials (e.g., office supplies). State and local governments will realize sales tax revenue from these purchases.

Sales or use taxes on pipe and other materials and installed equipment will result in state and local tax revenues. Such purchases are subject to sales tax if the items are manufactured in state or use taxes when purchased outside the state and imported into the state. Typically, project owners and contractors are entitled to a credit for taxes paid in another jurisdiction (e.g., the point of purchase or manufacture), but generally have an option to specify the point of delivery as the location for purposes of taxation.

During operation of the Project, four permanent workers will be required. The permanent workforce will result a minor increase in additional local expenditures for food and lodging. Indirect benefits to the local and state economy will also be realized in the form of tax revenues generated from the labor force. The operation and maintenance costs of the Project are expected to be minimal, and local labor will be used to the maximum extent feasible.

Project will provide a safe and efficient means to transport Bakken crude oil to an existing hub with connections to pipelines and a rail facility that can transport to markets throughout the United States, resulting in economic benefits to North Dakota producers and those with ties to Bakken crude oil production.

Additionally, the Project will provide a wider market for local oil producers, reduce operating and transportation costs, provide a safe and efficient means of product transportation, and increase revenues to local mineral owners.

16.4.4 Use of Citizen Coordinating Committees

TBPL did not engage citizen coordinating committees on this Project. Based on the Project's relatively small size and remote location, a citizen coordinating committee was not anticipated to be necessary.

16.4.5 Commitment of a Portion of Transmitted Product for Use in State

The Project will provide North Dakota producers with wider access to markets for locally produced crude oil. The Project will also facilitate the delivery of crude oil to in-state and out-of-state markets by transporting crude oil to the Enbridge Storage Facility in Stanley, North Dakota, where it will be distributed to multiple third-party interconnecting pipelines. The Project will provide producers with access to major U.S. markets.

The Project will provide an additional outlet for crude oil from the TBPL Facility, thereby removing an existing capacity constraint and enabling additional crude oil barrels to enter the system. As a result, crude oil that would otherwise be transported by truck to a market hub can enter the TPBS Facility and be transported by pipeline. As such, the Project will provide a safer, more reliable, and more efficient means of transporting crude oil.

The Project will also directly benefit Bakken crude oil producers by allowing for the efficient aggregation of volumes of crude oil from within Ward and Mountrail Counties and adjacent counties for shipment to major U.S. markets, thereby offering producers the potential for better netbacks.

16.4.6 Labor Relations

TBPL maintains good relations with the local labor force, and the labor market in the project area is supportive of the oil and gas industry. The Project will have no anticipated effect on labor relations within North Dakota.

16.4.7 Coordination of Facilities

The Project has been designed to coordinate with existing facilities to the maximum extent practicable. The Project will be owned and operated by TBPL. The project pipelines will be used in conjunction with TBPS and Enbridge to optimize market access to North Dakota producers.

16.4.8 Monitoring Impacts

TBPL believes that construction-related impacts will be adequately mitigated during the Project by implementing BMPs, good construction techniques, environmental inspection, and standard engineering practices to monitor the ROW for potential impacts. Before construction, a SWPPP will be developed and implemented to minimize erosion and sediment transport. After construction, areas of disturbance will be restored to pre-construction conditions in accordance with landowner agreements and erosion and sediment controls will be inspected and maintained until final stabilization of the construction work areas.

During construction, communication will be maintained with landowners to minimize potential impacts to the maximum extent feasible. During construction and after restoration of disturbed areas, a Weed Control Plan will be implemented for the ROW to prevent the spread of noxious weeds and to minimize the risk of importing or transporting any weed species. A thorough inspection and environmental monitoring will be performed to ensure the success of restoration efforts; therefore, long-term monitoring of impacts directly related to the Project is not anticipated to be necessary. Contract specifications will incorporate environmental protection and mitigation measures, and contractors will be expected to implement these measures in the field.

During operation, the pipelines will be regularly inspected to search for signs of accidental release and to ensure that mechanical integrity is maintained.

16.4.9 Using Existing and Proposed Rights-of-Way and Corridors

The proposed pipeline Route abuts the existing CPR ROW to the maximum extent feasible. The Route traverses cultivated cropland, and there are no existing or proposed ROWs or utility corridors near the Route. The proposed Route will cross several existing ROWs and utility corridors (aboveground electrical lines and aboveground and underground telephone lines) and other pipeline ROWs. The road and railroad ROWs will be crossed using HDD methods.

The existing pipeline is generally collocated with road and railroad ROWs and primarily traverses cultivated cropland. No new permanent ROW will be required for the existing pipeline easement.

The new pipeline will cross an aboveground pipe within the TBPS facility, overhead power lines when exiting the TBPS facility, overhead powerlines near 66th Street NW and the railroad crossing, existing underground pipelines near 41st NW, and overhead powerlines at 41st NW. Inside the Enbridge Storage Facility, there are several underground pipelines, powerlines, and overhead powerlines that will be crossed with the new additional routing.

16.4.10 Other Existing or Proposed Transmission Facilities

The Project will connect with the existing TBPS Facility and the Enbridge Storage Facility. Existing and planned transmission facilities are described in TBPL's Ten-Year Plan (**Appendix B**). TBPL does not currently have any plans to construct other proposed transmission facilities within the next 5 years.

17 Identification of Potential Permits and Approvals

The Corridor Study Area is in a rural area in central North Dakota within portions of Ward and Mountrail counties. In Ward County, the Corridor Study Area is within Orlien Township. Zoning is the responsibility of Ward County. In Mountrail County, the Corridor Study Area is within Idaho, Purcell, Burke, Austin, Oakland, Shell, Spring Coulie, and Plaza Townships. There are no major cities within or near the Corridor Study Area; however, the small, incorporated cities of Plaza and Stanley occur within near the Corridor Study Area and Route.

The Project will be constructed in compliance with applicable federal, state, and local laws, regulations, or plans. **Table 6** provides a list of potential tribal, federal, state, and local permits and approvals that may be needed for the Project.

Table 6 Potential Permits and Approvals

Agency	Permit/Approval	Status
Tribal		
MHA Nation/Three Affiliated Tribes Tribal Historic Preservation Office (THPO)	Cultural and historic resources consultation and review	Concurrence to be obtained before construction.
Federal		
U.S. Army Corps of Engineers	Section 404 permit for dredge/fill in jurisdictional wetlands and waterbodies	No permit anticipated to be required because TBPL will use HDD method for WOUS crossings to avoid impacts. If needed, authorization under Nationwide Permit 12 will be obtained before crossing WOUS.
U.S. Fish and Wildlife Service	Consultation and review of the proposed Project regarding potential impacts to federally listed species	Project does not require formal or informal consultation, but a letter requesting input regarding the Project was sent to USFWS.
State		
North Dakota Public Service Commission	Certificate of Corridor Compatibility	Application herein.
	Route Permit	Application herein.
North Dakota Department of Health, Water Quality Division	National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction Activity	SWPPP to be prepared and permit obtained before construction.
	NPDES General Permit for Temporary Dewatering/Hydrostatic Testing	Permit to be obtained before discharge.
North Dakota Department of Environmental Quality, Air Pollution Control Program	Permit to Construct	Permit to be obtained before construction begins at Lot 10.
	Permit to Operate	Permit to be obtained before operations begin at Lot 10.

Table 6 Potential Permits and Approvals

Agency	Permit/Approval	Status
North Dakota Division of Water Quality, Water Appropriation Division	Water Appropriation	Initial review indicates the project does not require a conditional or temporary permit for water appropriation. However, if surface water or groundwater will be diverted for construction of the project, a water permit will be required.
North Dakota Division of Water Quality, Engineering and Permitting Section	Surface Drain Permits	No surface drain permits are anticipated to be required.
State Historical Society of North Dakota	Cultural and historic resources consultation and review	Concurrence to be obtained before construction.
North Dakota Department of Transportation	Utility Crossing Permit	To be obtained before crossing State Highway 23.
	Oversize and Overweight Permit	To be obtained by construction contractor as necessary.
Local		
Mountrail County	Conditional Use Permit (CUP)	A CUP will be obtained for the Midline Pump Station before construction.
	Building Permit	Permit to be obtained for the Midline Pump Station before construction.
	Utility Road Crossing Permits	Permit to be obtained before crossing county/township roadways.
	Approach Permits	Permit to be obtained before installing approach if needed.
Ward County	Conditional Use Permit	Not Required.
	Building Permit	Not Required.
	Utility Road Crossing Permits	Permit to be obtained before construction.
	Approach Permits	Permit to be obtained before installing approach if needed.
Other Approvals		
Canadian Pacific Railway	Crossing Agreement	Agreement to be obtained before crossing railroad ROW.

18 Evaluation of NDCC Section 49-22-09 Factors

In selecting the Preferred Corridor and Route for the Project, TBPL evaluated the factors set forth in NDCC Section 49-22-09. A discussion of each factor is provided below.

18.1 Effects on Public Health, Welfare, Natural Resources, and the Environment

Sections 14.0 through 19.0 of this Consolidated Application describe the available research and investigations used to evaluate the potential effects associated with the Route, construction, and operation of the proposed Project on public health and welfare, natural resources, and the environment. As discussed in those sections, the Project is not anticipated to have any significant or long-term negative impacts on public health and welfare, natural resources, or the environment.

18.2 Transmission Technologies and Systems Designed to Minimize Adverse Environmental Effects

The project design is consistent with existing pipeline technologies. Mitigation measures have been or will be used to avoid or minimize any potential impacts to sensitive resources, including the use of the HDD method for the road, railroad, and WOUS crossings. In addition, throughout construction, BMPs will be implemented to reduce any potential impacts to resources from ROW clearing, grading, trenching, and pipe and facility installation. Once constructed, the Project will be monitored remotely 24 hours a day, 7 days a week using a SCADA system.

18.3 Potential for Beneficial Uses of Waste Energy from a Proposed Energy Conversion Facility

The Project does not include any energy conversion facilities; therefore, the potential for beneficial uses of waste energy from a proposed energy conversion facility does not apply.

18.4 Unavoidable Adverse Direct and Indirect Environmental Effects

Except for the 4.0-acre midline pump station and associated access roads, unavoidable adverse direct and indirect environmental effects of the Project will be temporary and minimized wherever practicable using mitigation measures and BMPs. Temporary construction-related unavoidable adverse direct and indirect environmental effects will include clearing of vegetation and loss of standing crops within the construction work area and increased traffic, dust, and noise levels. Wildlife may temporarily avoid the ROW during construction. Construction will be conducted on an accelerated timeline within approximately 3 months; therefore, impacts to wildlife are anticipated to be minimal, and no long-term impacts are anticipated. Noise levels will increase during construction; however, the Project is not anticipated to generate noise while operating. Sections 14.0 through 19.0 provide additional information regarding the Project's potential direct and indirect environmental effects and planned mitigation measures.

18.5 Corridor or Route Alternatives Developed During the Hearing that Minimize Adverse Effects

Section 13.0 of this Consolidated Application describes the Corridor and Route alternatives analyzed for the Project. TBPL has identified a Preferred Project Corridor and Route for the proposed pipeline that meet the needs of the Project and comply with the Commission's siting criteria, while minimizing potential impacts to landowners, existing infrastructure, and the environment. The preferred Project Corridor and Route for the existing pipeline is the centerline of the gathering pipeline to be converted to a transmission pipeline.

If other corridor or route alternatives are developed during the Commission's hearing process, TBPL will analyze those alternatives as necessary.

18.6 Irreversible and Irretrievable Commitments of Natural Resources if Designated

Minimal irreversible or irretrievable commitments of natural resources will result from construction of the new pipeline portion of the Project because land use along the operational ROW will be returned to agricultural use following construction. In some locations, the Project will result in creating a new open corridor in an agricultural area where the permanent ROW will need to be maintained in an herbaceous state free of trees.

The midline pump station and associated access roads will displace approximately 4.0 acres of agricultural land. As a result, the land will be taken out of crop production and converted into industrial land use for operation of the midline pump station. The conversion of approximately 4.0 acres of agricultural land to an industrial use represents a relatively small permanent impact relative to the total acreage of agricultural land in Mountrail County. The Project will result in minor irreversible or irretrievable commitments of natural resources.

Conversion of the existing gathering pipeline to a transmission pipeline will not result in additional commitments of natural resources because the pipeline was previously installed, and no changes are proposed for the existing operational ROW. Conversion of the existing pipeline will result in no irreversible or irretrievable commitments of natural resources.

18.7 Direct and Indirect Economic Impacts of the Facility

The Project's direct and indirect economic impacts are described in Section 16.4.3 and include the following:

- Short-term employment opportunities arising from construction;
- Long-term employment opportunities arising from operation; and
- Increased revenue from project-related local expenditures (such as for gravel, fuel, lodging, and food).

Additionally, the Project will provide a safe and efficient means to transport Bakken crude oil to an existing hub with connections to pipelines and a rail facility that can transport to markets throughout the United States, resulting in benefits to North Dakota producers and those with ties to Bakken crude oil production.

18.8 Existing Plans for Other Developments (State, Local, and Private) in the Vicinity of the Project

TBPL consulted with multiple federal, state, and local governments, landowners, and existing infrastructure owners regarding the Project. TBPL has not identified state or local government or private development plans in the vicinity of the Project. TBPL will obtain all necessary permits and approvals for the Project from federal, state, and local governments and agencies, and will comply with applicable local land use requirements. No potential conflicts with existing or planned developments are anticipated to occur upon implementation of the Project.

18.9 Effects of the Proposed Route on Existing Scenic Areas, Historic Sites and Structures, and Cultural Resources

The Project avoids all known scenic areas, historic sites and structures, and cultural resources; therefore, the Project is not anticipated to impact these resources. For further discussion, please see Sections 14.1, 15.0, 16.0, 17.0, and 18.0 of this Consolidated Application. During the Class III Cultural Resource Inventory, no cultural resources were identified; therefore, Metcalf recommends a finding of *No Historic Properties Affected* (36 CFR 800.4[d][1]) for this undertaking.

18.10 Effects of the Proposed Route on Areas Which are Unique Because of Biological Wealth or Rare and Endangered Species Habitats

No areas that are unique because of biological wealth or because they are habitats for rare and endangered species are located within or near the Corridor Study Area or crossed by the Route; therefore, the Project is not anticipated to impact these resources. For further discussion, please see Sections 14.2, 14.3, 15.0, 16.0, 17.0, and 19.0 of this Consolidated Application.

18.11 Problems Raised by Federal Agencies, other State Agencies, and Local Entities

TBPL consulted with several federal, state, and local agencies to identify environmental resources that may be present within or near the proposed Corridor Study Area or crossed by the Route, and to evaluate the potential environmental impacts of the proposed Project. In addition, field surveys were conducted for several resources to further identify environmental resources and evaluate potential impacts.

Section 15.0 summarizes agency consultations that have occurred to date. TBPL's agency consultations and surveys focused on evaluating biological, cultural, wetland resources. TBPL is actively consulting with federal, state, and local agencies and governments and plans to address any problems or concerns raised.

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19 Other Factors Considered

19.1 Design Construction Limitations

The Project was designed to facilitate transportation of crude oil between the TBPS Facility and the Enbridge Storage Facility. Specific factors considered in the selection of the Corridor and Route, including design and construction limitations, are identified in Sections 2.0 and 13.0 of this Consolidated Application and discussed throughout. Additionally, crossings of existing infrastructure (e.g., road ROWs and CPR railroad ROW) were factored into the project design.

19.2 Economic Considerations

In selecting the Corridor and Route, one of many factors TBPL considered was facilitating construction of the Project in the most economical and efficient manner. The Corridor and Route selection required balancing of multiple factors as discussed specifically in Sections 2.0 and 13.0 of this Consolidated Application.

Other economic considerations associated with the Project include the positive direct and indirect economic benefits that the Project will provide within and beyond North Dakota. As discussed in Section 18.7 of this Consolidated Application, the Project will provide multiple economic benefits including short-term and long-term employment opportunities, increased tax revenue, and increased revenue from project-related local expenditures. Additionally, the Project will provide a safe and efficient means to transport Bakken crude oil to an existing hub with connections to pipelines and rail facilities that can transport to markets throughout the United States, resulting in benefits to North Dakota producers and those with ties to Bakken crude oil production.

19.3 Present and Future Natural Resource Development

Existing oil and gas, coal, and sand and gravel operations have been identified in the area, and TBPL has confirmed they do not conflict with the Route. Future petroleum production development and transport near the Corridor and Route can be expected from multiple entities; however, TBPL has no current plans to expand the crude oil transport pipeline system in the vicinity of the Project.

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20 Applicant's Mitigation Measures and Policies and Commitments to Limit Environmental Impact

The Project has been designed and routed to minimize potential environmental impacts. The Project will be constructed and operated in accordance with all applicable environmental laws, regulations, and industry standards. TBPL will conduct its activities with the objectives of providing a healthful and safe workplace for its employees and preventing accidents and environmental incidents.

Mitigation measures to minimize adverse impacts of the proposed Project are identified throughout this Combined Application. In addition, TBPL has developed an EMP (**Appendix C**) that outlines general construction-related mitigation measures in accordance with applicable industry-wide standards and regulatory requirements to minimize potential environmental impacts during project development. The Project will be monitored remotely 24 hours a day, 7 days a week using a SCADA system.

TBPL is in the process of developing several Project control plans that would be utilized during construction activities to minimize and mitigate impacts to environmental resources. These plans include the following, which would be incorporated into contract documents and implementation will be enforced by TBPL:

- Stormwater Pollution Prevention Plan (SWPPP)

  A SWPPP will be developed and implemented for stormwater management and erosion/sediment control measures.

- Spill Prevention, Control, and Countermeasure (SPCC) Plan

  A SPCC Plan will be developed and implemented for spill prevention measures and BMPs with details on spill response and notification procedures in the event of an inadvertent spill.

- Integrity Management Plan

  An IMP will be developed and implemented to comply with applicable federal regulations and outlines preventive maintenance, inspection, line patrol, leak detection systems, SCADA, and other pipeline integrity procedures to be implemented to ensure the safe operation of the project.

- Unanticipated Discoveries Plan

  An Unanticipated Discoveries Plan will be developed and implemented in the event of a discovery of cultural resources or human remains.

- Weed Control Plan

  A Weed Control Plan will be developed in conjunction with the Weed Control Boards of Ward and Mountrail Counties. BMPs will be implemented to prevent the spread of invasive and noxious weeds and to minimize the risk of importing or transporting any weed species. Equipment and tools will be cleaned of any plant debris before ingress and egress from the project area.

- Dust Control Plan

  A Dust Control Plan will be developed and implemented for measures to minimize and control fugitive dust during construction activities and soil disturbances.

Resource-specific measures will include the use of the HDD and bore methods to avoid impacts at crossings of WOUS, roads, and railroad ROW, and tree replacement if needed. Resource-specific measures are described in the EMP provided in **Appendix C**.

To further comply with permits, plans, obligations, and commitments, TBPL would employ one or more Environmental Inspectors (EIs) during construction of the Project. The EI(s) would be responsible for monitoring construction activities and would provide reports to TBPL.

21 Qualifications of Preparers

ARCADIS U.S., INC.

Kathryn Cloutier, M.S.

Ms. Cloutier has more 35 years of experience in environmental permitting, regulatory compliance, and impact analysis including National Environmental Policy Act (NEPA) environmental assessments and environmental impact statements. She received a Biology Bachelor's Degree in 1975 and received a Master of Science degree in Environmental Science/Natural Resources in 2000. For more than 12 years, she has been working with the MHA Nation and TBPS to obtain environmental permits for the TBPS Facility and for a new greenfield petroleum refinery. Her specific experience includes project management for the MHA Nation and TBPS environmental permitting and regulatory compliance; consultation and coordination with regulatory agencies; knowledge of environmental laws; and writing clear, concise, legally defensible environmental documents. She has identified all required permits and approvals and has prepared comprehensive application packages for a variety of petroleum and natural gas pipelines and transmission line projects including Clean Water Act Section 404 (wetland) permits, Section 402 (process water and storm water discharge) permits, Section 401 Water Quality Certifications, floodplain use permits, hydrostatic test water and trench dewatering permits, and road permits. Additional experience includes preparation of SPCC plans and SWPPPs, fugitive dust control plans, county conditional/special use permits, county drainage/sediment control plans, noxious weed/invasive species control plans, revegetation and rehabilitation plans, and other plans.

Doug Anderson

Mr. Anderson has more than 14 years of experience in the environmental industry, specializing in land use planning, permitting, natural resources management, and regulatory strategy. His project experience has primarily focused on the planning and permitting of facilities and infrastructure in the oil and gas, mining, transportation, and power sectors. Environmental permitting experience includes NEPA analysis for projects, Section 404/401 USACE and state water quality permitting, Federal Energy Regulatory Commission, and multiple consultations with USFWS and state wildlife agencies regarding sensitive ecological resources.

Mr. Stephen W. Chu, PWS

Mr. Stephen W. Chu, PWS (#1770) is a Certified Senior Ecologist and has earned a Master of Science degree in Natural Resources and Environmental Sciences from the University of Illinois at Urbana-Champaign. Mr. Chu has more than 16 years of experience managing and completing complex ecology-related projects. His area of expertise consists of wetland delineations, wetland mitigation design, wetland restoration, wetland and native area monitoring, habitat surveys, tree surveys, and threatened and endangered species surveys. Mr. Chu has extensive experience in field work and permitting throughout the West and Midwest.

The wetland and waterbody delineation were performed and authored by Stephen W. Chu, Professional Wetland Scientist, Senior Environmental Scientist. Mr. Chu was the Lead Wetland Delineator for this Project.

Jason Adams, PG

Mr. Adams (WY-PG #3826) is the Arcadis soils, geology, and paleontology technical lead for environmental impact analyses in western North America and has provided project management for multiple oil and gas development, transportation, and distribution projects. He has a wide range of experience in the field of geological and hydrological sciences in western North America, Central America, and Eastern Europe. His work has commonly involved a variety of disciplines including soil science; hydrology; exploration geology; sedimentology; stratigraphy; paleontology; and geochemistry.

Metcalf Archaeological Consultants, Inc.

Metcalf Archaeological Consultants, Inc. has 40 years of professional experience providing quality cultural resource management services for private sector and government clients.

Liz France, M.S.

Ms. France has been working in the field of archaeology since 1998. She received her bachelor's degree in 2003 and continued to work as an archaeologist in both New York State and in Mesoamerica. She received her Master of Science degree in 2008 and began working in North Dakota the same year. Ms. France has worked in North Dakota, South Dakota, Montana, and Kansas in her role as a Project Director, leading field crews and writing technical reports. She is also a Project Manager for Metcalf and routinely works with clients and agencies. Further, she is the Regional Project Coordinator for the Northern Region at Metcalf, maintains staff levels through hiring, and puts together the schedules for the staff.

Bill Bluemle

Mr. Bluemle has been a professional archaeologist for more than 30 years. Since joining Metcalf in 1999, Mr. Bluemle has supported and supervised numerous projects in North Dakota, South Dakota, Montana, and Wyoming. He has authored many technical reports for federal, state, Tribal, and local government agencies. His duties at Metcalf include conducting field surveys, testing, monitoring, supervising crew, interacting with clients and government agencies, and technical report writing.

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Appendix A

Project Maps

Existing Enbridge Storage Facility

Proposed Midline Pump Station

Existing Block Valves

Existing Block Valves

Existing Plaza Station

Existing TBPS Crude Storage and Loading Facility

Mountrail County

Ward County



Legend

- Existing Enbridge Pipeline
- Proposed New Pipeline
- 1 Mile Buffer
- Fort Berthold Indian Reservation Boundary
- County Boundary

0 2.5 5 Miles

GRAPHIC SCALE

NOTE:
1. USGS 7.5' TOPOGRAPHIC QUADRANGLE(S) STANLEY, STANLEY SE, PALERMO, TAGUS SE, BLAISDELL, TAGUS, SIKES DAM, BELDEN, EPWORTH NW, SHELL LAKE, PLAZA NE, PLAZA NW, BELDEN SW, BELDEN SE, EPWORTH, EPWORTH SE, PLAZA, PLAZA SE, NEW TOWN, SHELL CREEK BAY, PARSHALL, PARSHALL NE, WABEK, MAKOTI, WISCONSIN. OBTAINED FROM ESRI IMAGE SERVICE.

Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 1
PROJECT OVERVIEW MAP
OVERVIEW

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EXISTING STANLEY STORAGE FACILITY

Little Knife River

Stanley Reservoir

T156N R91W

T156N R90W

T155N R91W

T155N R90W

MOUNTRAIL COUNTY

2

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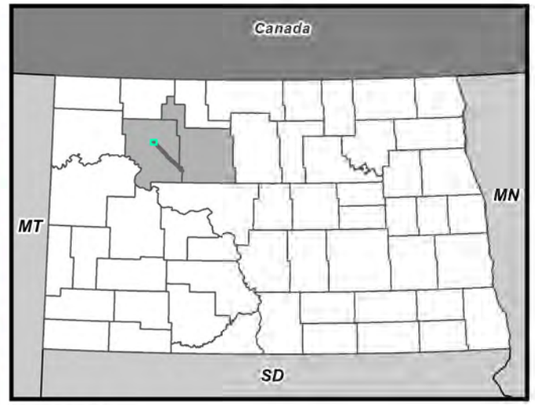
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Legend

- Milepost
- Existing Pipeline Route
- Proposed Pipeline Route
- Proposed Midline Pump Station
- IBCM Exclusion Area (1200ft)
- IBCM Direct Line (30ft)
- Fort Berthold Indian Reservation Boundary
- Corridor Study Area (1mi)
- County Boundary

0 1,000 2,000 3,000 4,000 Feet

GRAPHIC SCALE

NOTE:
1. PLEASE SEE EXCLUSION AREA REFERENCE DETAILS IN TABLE 1.
2. WORLD IMAGERY IS OBTAINED FROM ESRI WORLD IMAGERY SERVICE.
3. PROJECTION IS NAD 1983 STATE PLANE NORTH DAKOTA N FIPS 3301 (US FEET) THE SCALE IS: 1:24,000.

THUNDER BUTTE PIPELINE PROJECT
MOUNTRAIL COUNTY, NORTH DAKOTA

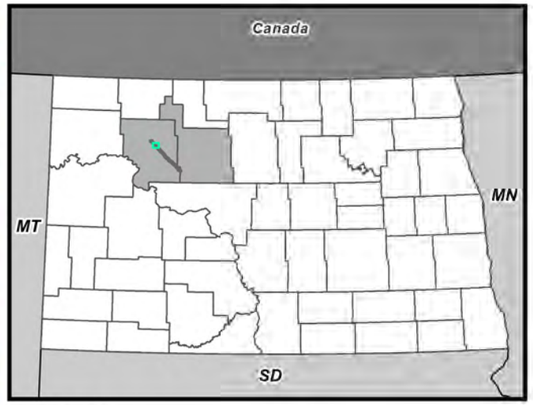
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Legend

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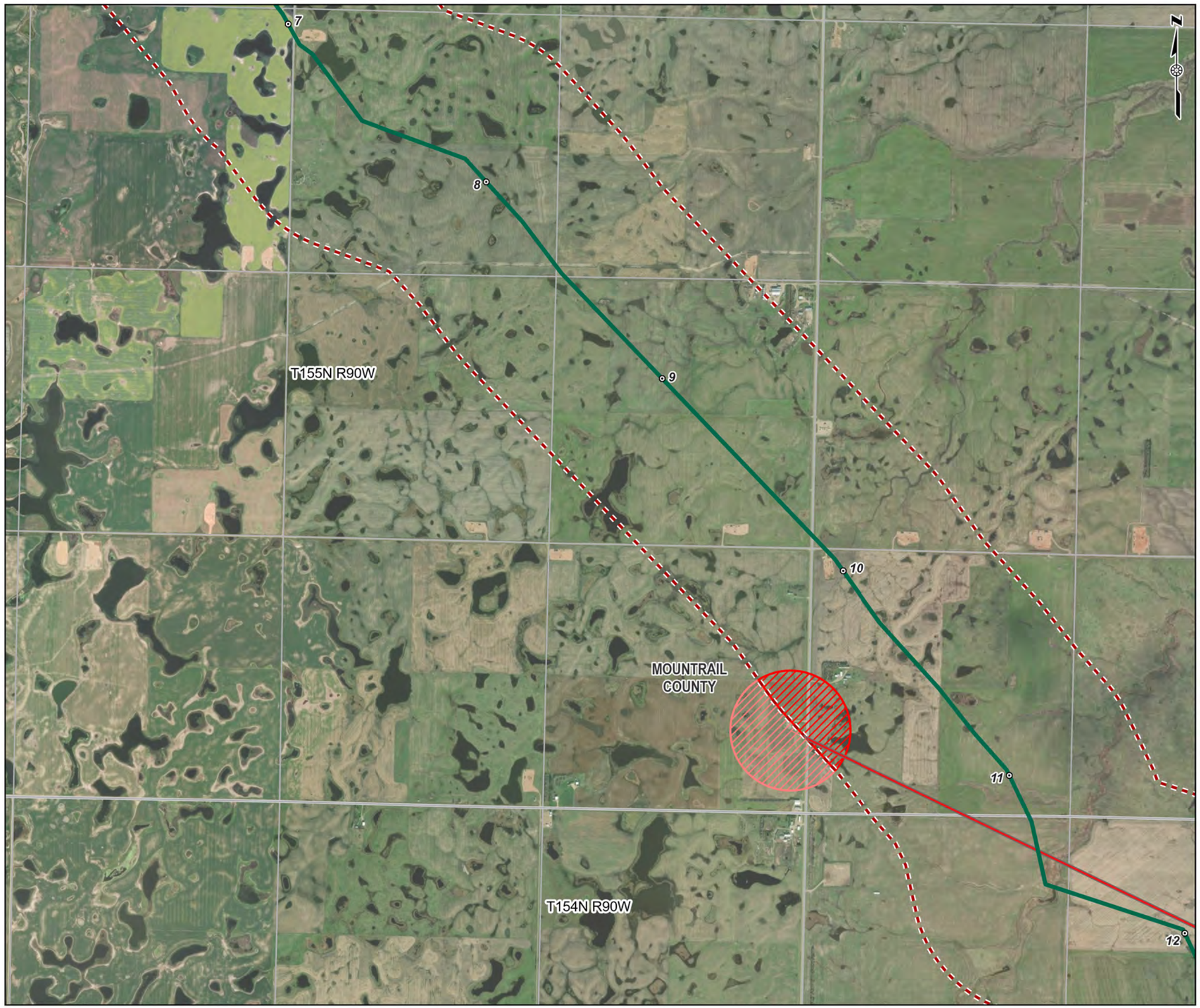
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MOUNTRAIL COUNTY, NORTH DAKOTA

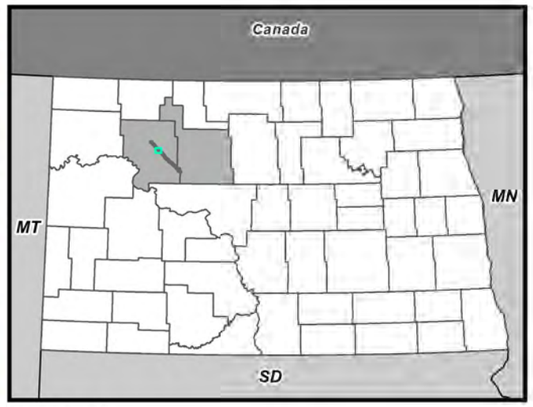
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THUNDER BUTTE PIPELINE PROJECT
MOUNTRAIL COUNTY, NORTH DAKOTA

EXCLUSION AREAS
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MOUNTRAIL COUNTY

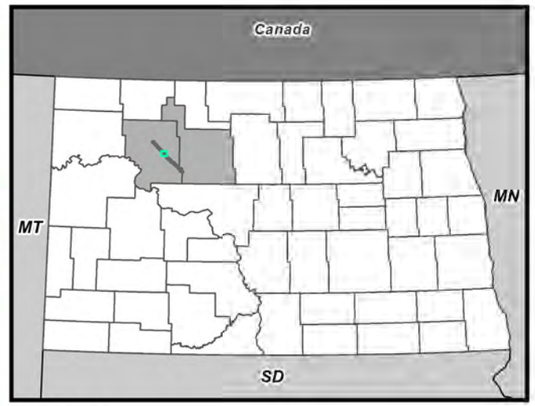
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Legend

- Milepost
- Existing Pipeline Route
- Proposed Pipeline Route
- Proposed Midline Pump Station
- USFWS - National Wildlife Refuge
- IBCM Exclusion Area (1200ft)
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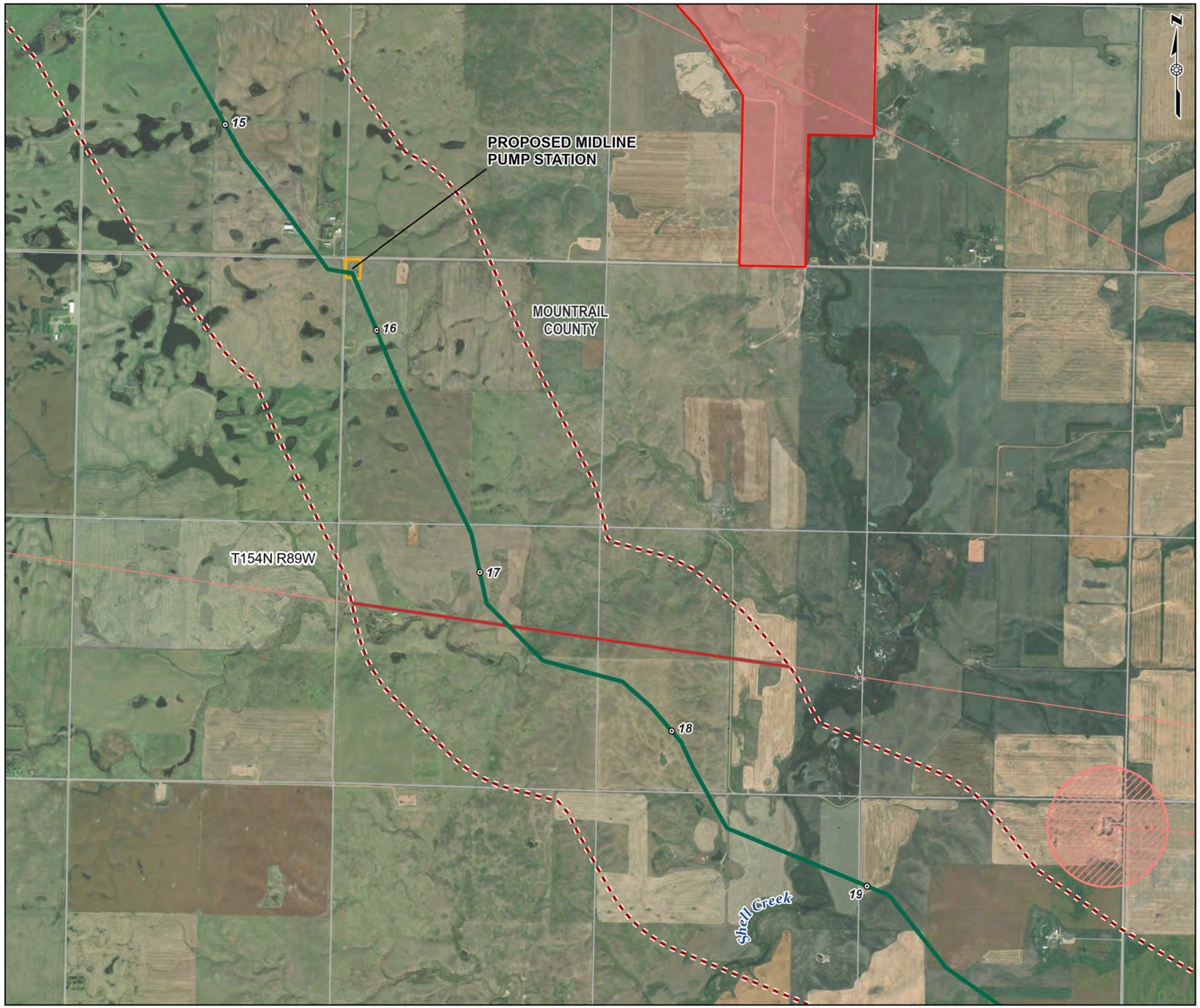
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MOUNTRAIL COUNTY, NORTH DAKOTA

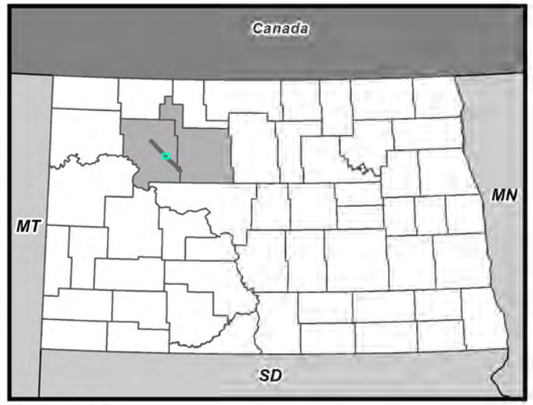
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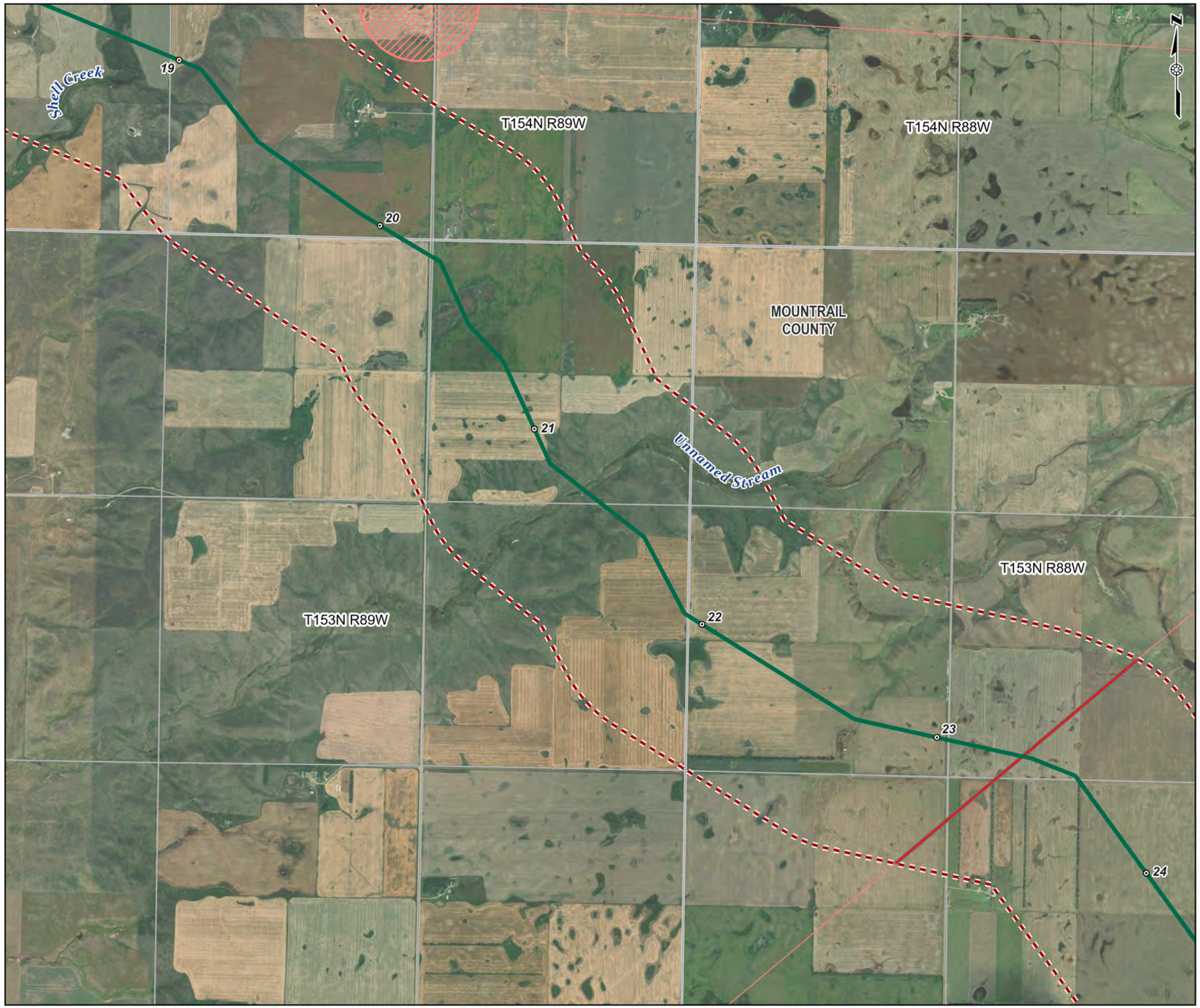
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MOUNTRAIL COUNTY, NORTH DAKOTA

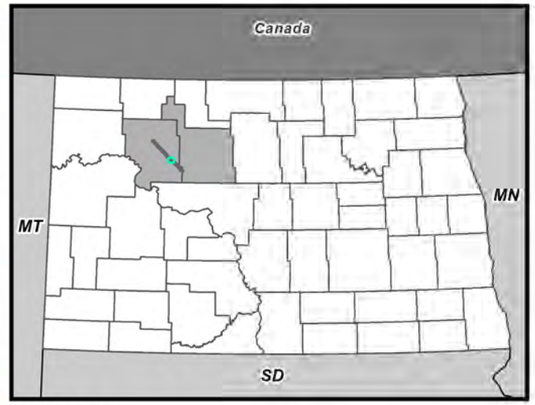
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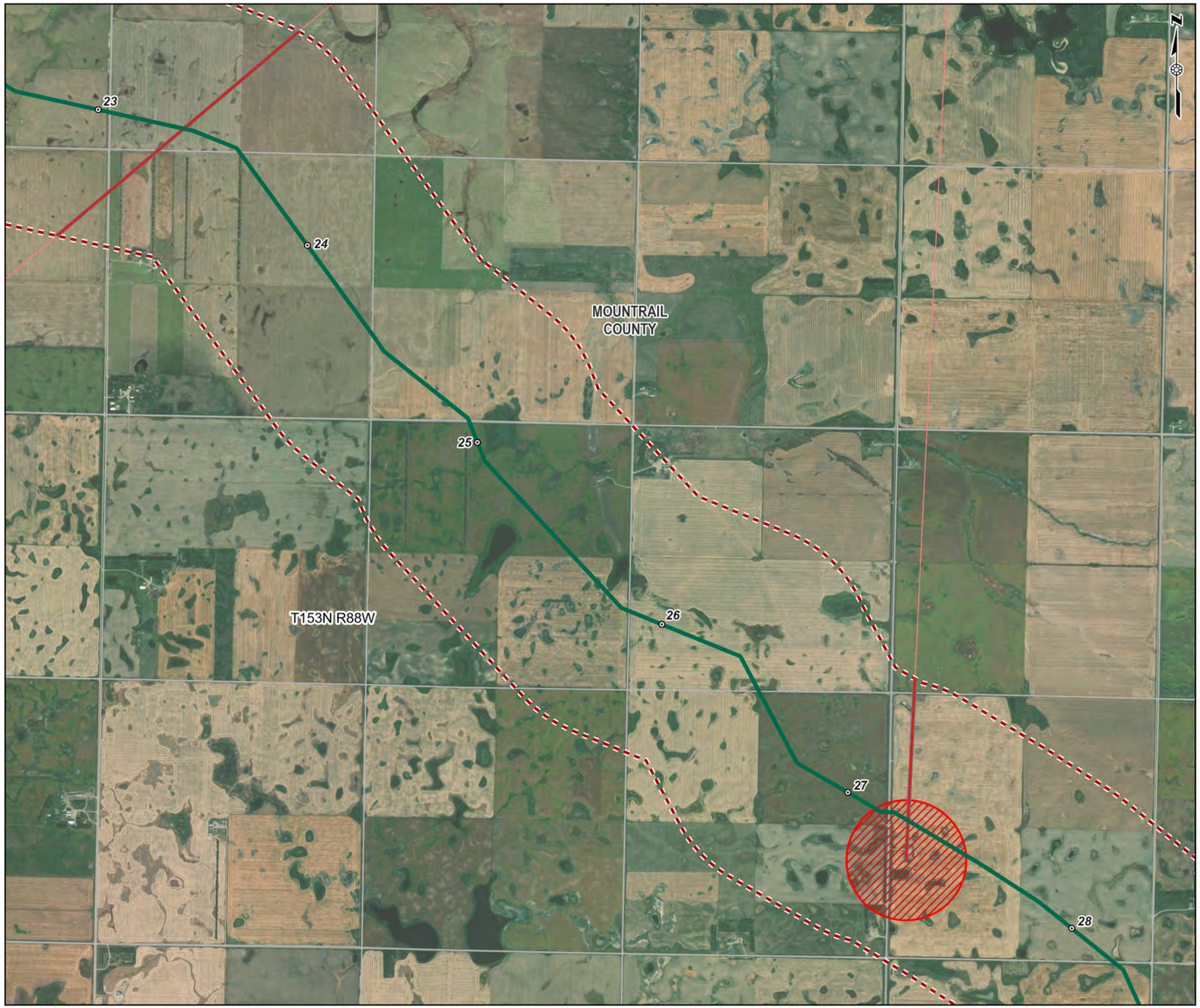
THUNDER BUTTE PIPELINE PROJECT
MOUNTRAIL COUNTY, NORTH DAKOTA

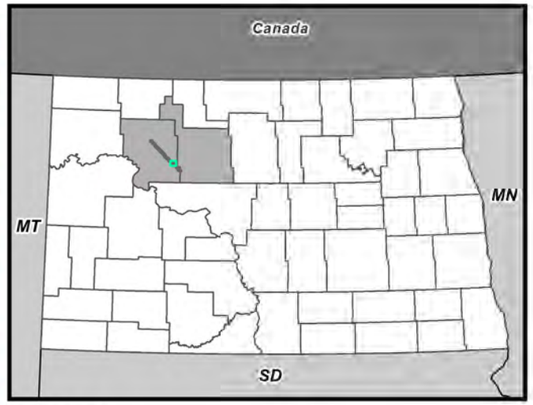
EXCLUSION AREAS
DETAIL SHEET 6 OF 9

PN:CO002338.0001
Date: 12/5/2023

ARCADIS

Date: 12/5/2023 User Name: MNugent
Document Path: T:_EPP\Makoti_pipeline\pro\Makoti_PipelineMakoti_Pipeline_Rev.aprx





Legend

- Milepost
- Existing Pipeline Route
- Proposed Pipeline Route
- Proposed Midline Pump Station
- IBCM Exclusion Area (1200ft)
- IBCM Direct Line (30ft)
- Fort Berthold Indian Reservation Boundary
- Corridor Study Area (1mi)
- County Boundary

0 1,000 2,000 3,000 4,000 Feet

GRAPHIC SCALE

NOTE:
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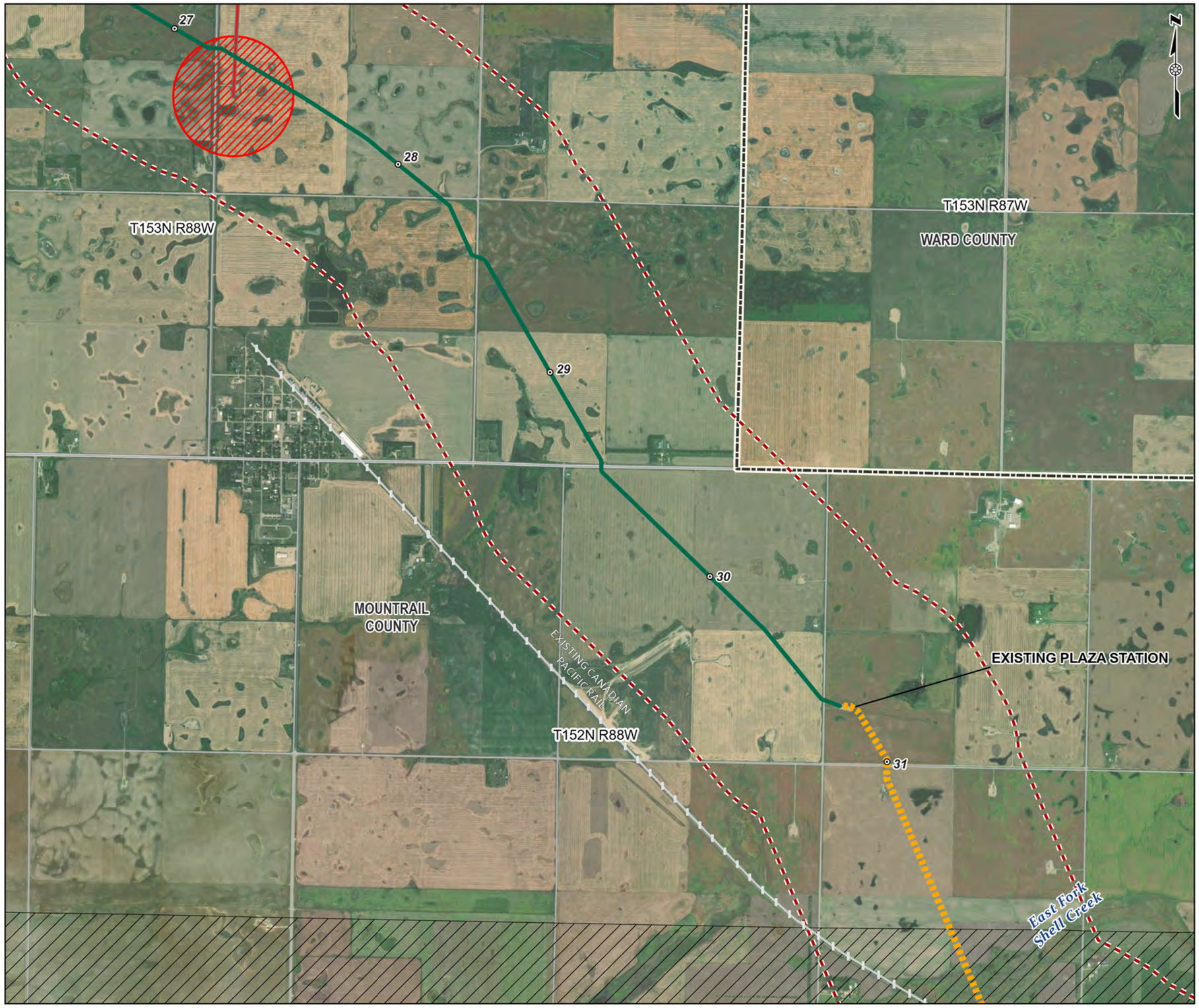
THUNDER BUTTE PIPELINE PROJECT
MOUNTRAIL COUNTY, NORTH DAKOTA

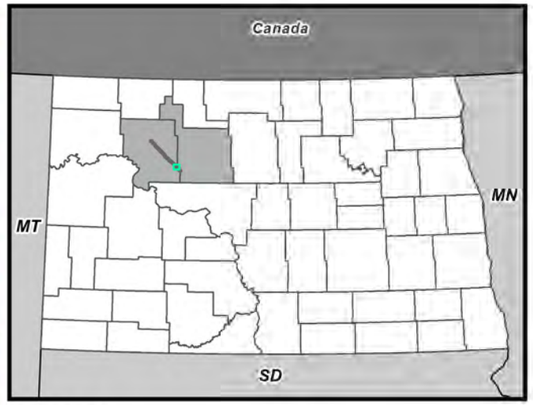
EXCLUSION AREAS
DETAIL SHEET 7 OF 9

PN:CO002338.0001
Date: 12/5/2023

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Legend

- Milepost
- Existing Canadian Pacific Railway
- Existing Pipeline Route
- Proposed Pipeline Route
- Proposed Midline Pump Station
- IBCM Exclusion Area (1200ft)
- IBCM Direct Line (30ft)
- Fort Berthold Indian Reservation Boundary
- Corridor Study Area (1mi)
- County Boundary

0 1,000 2,000 3,000 4,000 Feet

GRAPHIC SCALE

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THUNDER BUTTE PIPELINE PROJECT
MOUNTRAIL AND WARD COUNTY, NORTH DAKOTA

EXCLUSION AREAS
DETAIL SHEET 8 OF 9

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Date: 12/5/2023

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EXISTING PLAZA STATION

31

EXISTING CANADIAN PACIFIC RAIL

T152N R88W

East Fork Shell Creek

T152N R87W

32

33

34

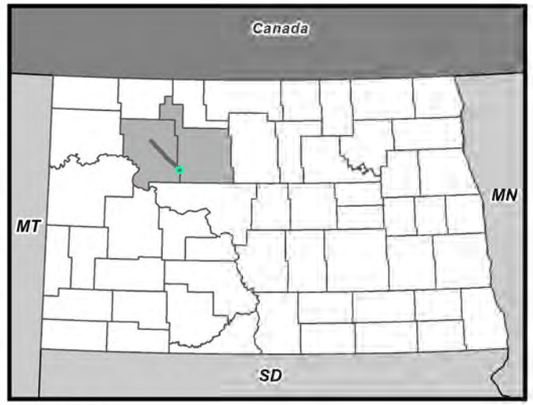
WARD COUNTY

23

MOUNTRAIL COUNTY

EXISTING TBPS FACILITY

N



Legend

- Milepost
- Existing Canadian Pacific Railway
- Existing Pipeline Route
- Proposed Pipeline Route
- Proposed Midline Pump Station
- IBCM Exclusion Area (1200ft)
- IBCM Direct Line (30ft)
- Fort Berthold Indian Reservation Boundary
- Corridor Study Area (1mi)
- County Boundary

0 1,000 2,000 3,000 4,000 Feet

GRAPHIC SCALE

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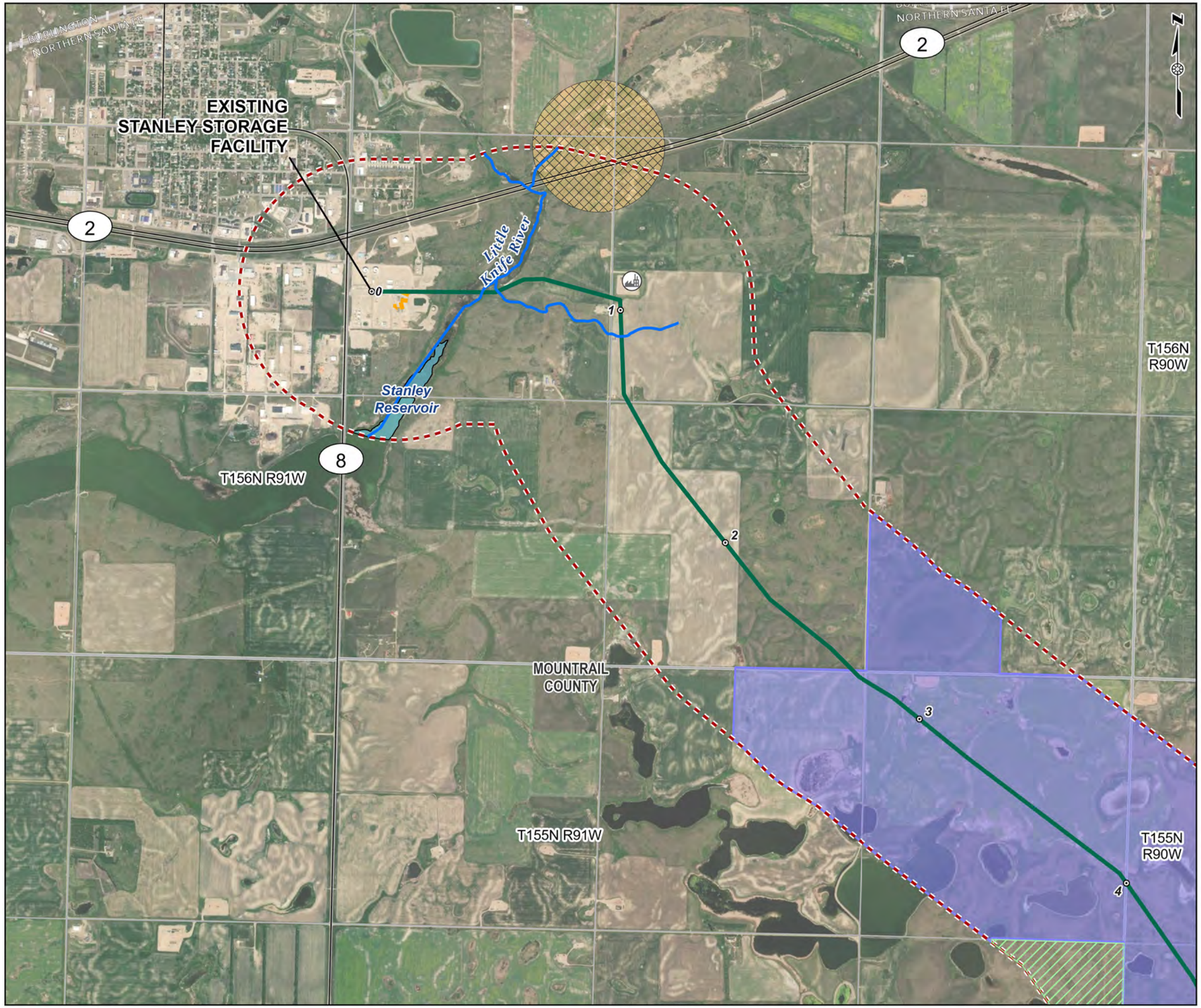
THUNDER BUTTE PIPELINE PROJECT
MOUNTRAIL AND WARD COUNTY, NORTH DAKOTA

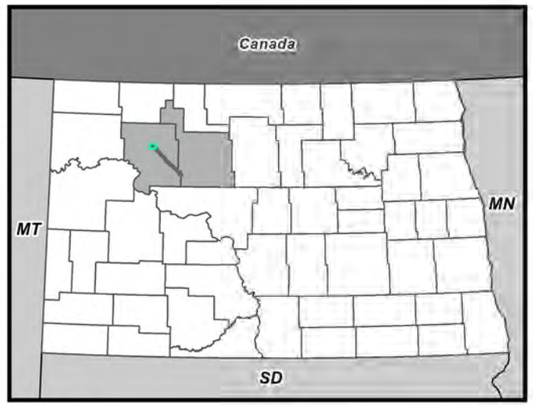
EXCLUSION AREAS
DETAIL SHEET 9 OF 9

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Legend

- Milepost
- Surface Drain Location
- Production Well
- Occupied Residence
- Bald Eagle Nest
- Snowmobile Trail
- NHD Stream
- Existing Canadian Pacific Railway
- Existing Pipeline Route
- Proposed Pipeline Route
- Proposed Midline Pump Station
- USFWS Waterfowl Production Area
- NDGF - PLOTS Land
- NDDTL - School Trust Lands
- Source Water Protection Area - Noncommunity (Inactive)
- Source Water Protection Area - Community (Inactive)
- Potential Landslide Area
- Hiddenwood Lake Aquifer
- Shell Creek-White Lake Aquifer
- Fort Berthold Indian Reservation Boundary
- Corridor Study Area (1mi)
- County Boundary

0 1,000 2,000 3,000 4,000 Feet

GRAPHIC SCALE

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THUNDER BUTTE PIPELINE PROJECT
MOUNTRAIL COUNTY, NORTH DAKOTA

AVOIDANCE AREAS
DETAIL SHEET 1 OF 9

PN:CO002338.0001
Date: 12/13/2023

ARCADIS

Date: 12/13/2023 User Name: MNugent
Document Path: T:_EPP\Makoti_pipeline\pro\Makoti_Pipeline\Makoti_Pipeline_Rev.aprx

T156N R91W

T156N R90W

MOUNTRAIL COUNTY

T155N R91W

T155N R90W

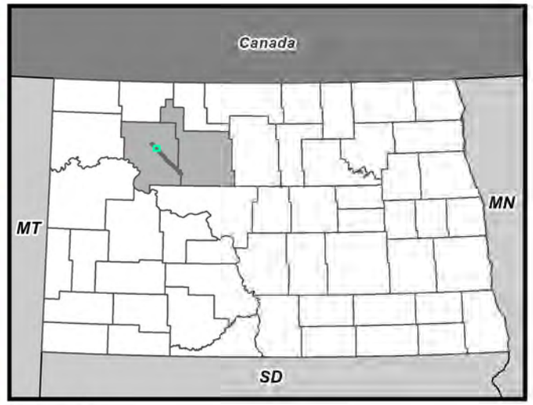
3

4

5

6

7



Legend

- Milepost
- Surface Drain Location
- Occupied Residence
- Bald Eagle Nest
- Snowmobile Trail
- NHD Stream
- Existing Canadian Pacific Railway
- Existing Pipeline Route
- Proposed Pipeline Route
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- County Boundary

0 1,000 2,000 3,000 4,000 Feet

GRAPHIC SCALE

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THUNDER BUTTE PIPELINE PROJECT
MOUNTRAIL COUNTY, NORTH DAKOTA

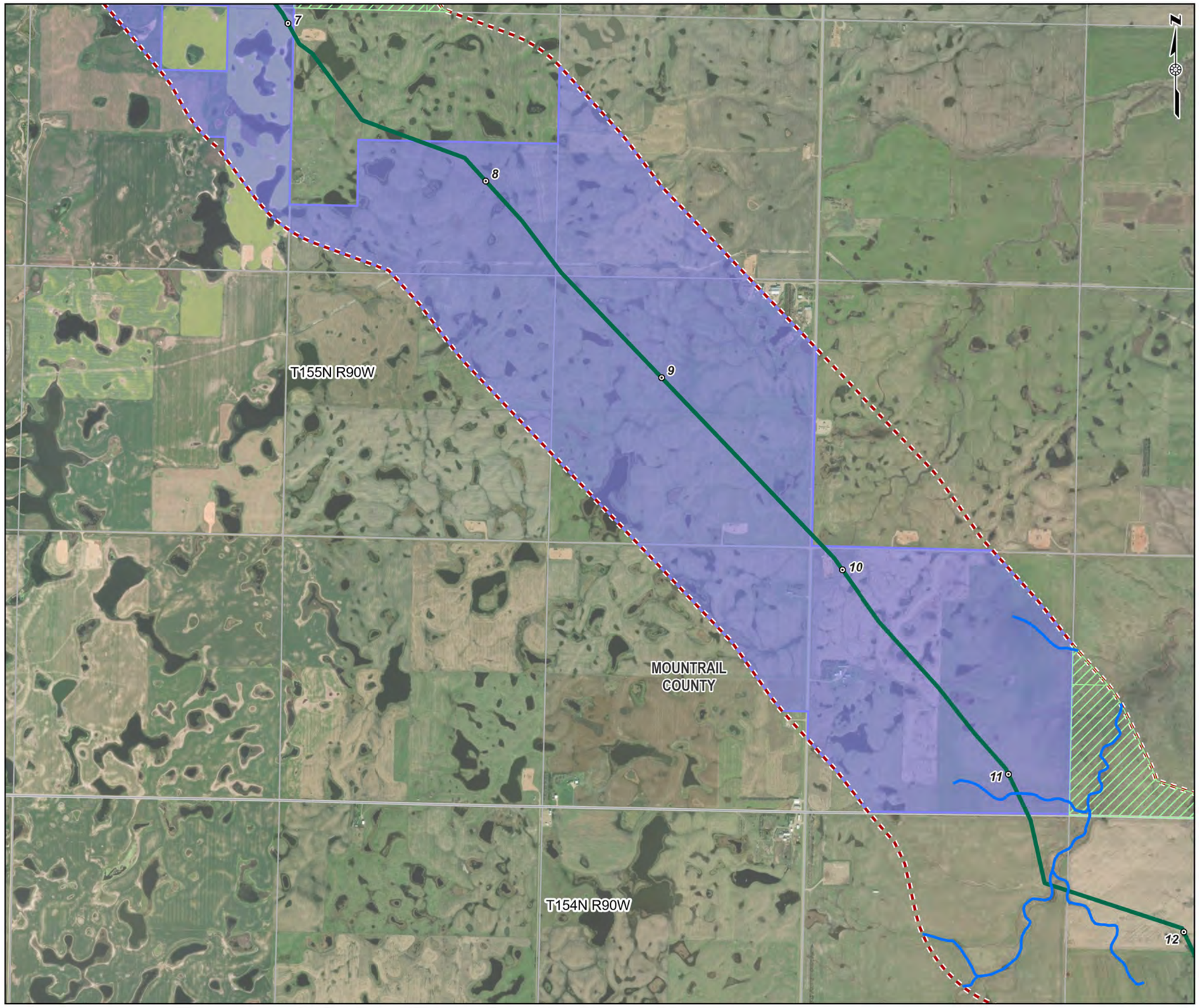
AVOIDANCE AREAS
DETAIL SHEET 2 OF 9

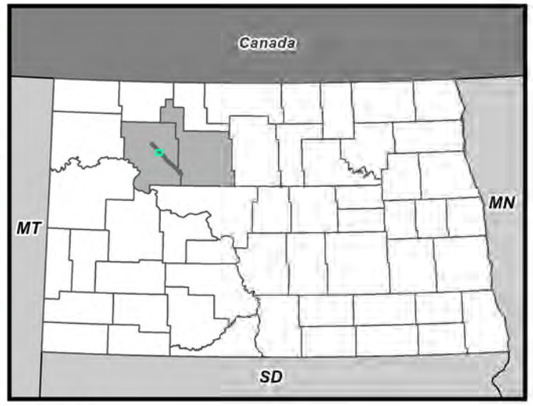
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Legend

- Milepost
- Surface Drain Location
- Occupied Residence
- Bald Eagle Nest
- Snowmobile Trail
- NHD Stream
- Existing Canadian Pacific Railway
- Existing Pipeline Route
- Proposed Pipeline Route
- Proposed Midline Pump Station
- USFWS Waterfowl Production Area
- NDGF - PLOTS Land
- NDDTL - School Trust Lands
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- Hiddenwood Lake Aquifer
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- Corridor Study Area (1mi)
- County Boundary

0 1,000 2,000 3,000 4,000 Feet

GRAPHIC SCALE

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THUNDER BUTTE PIPELINE PROJECT
MOUNTRAIL COUNTY, NORTH DAKOTA

AVOIDANCE AREAS
DETAIL SHEET 3 OF 9

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T155N R90W

T155N R89W

T154N R89W

T154N R90W

MOUNTRAIL COUNTY

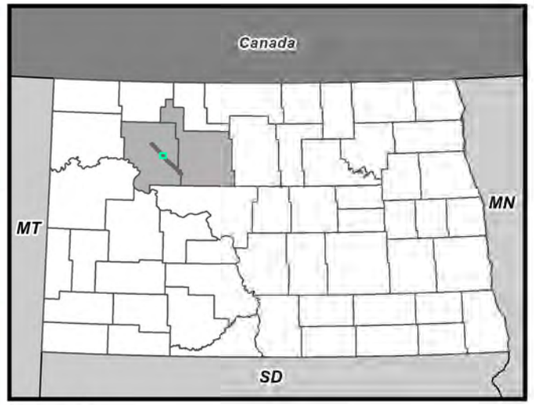
11

12

13

14

15



Legend

- Milepost
- Surface Drain Location
- Occupied Residence
- Bald Eagle Nest
- Snowmobile Trail
- NHD Stream
- Existing Canadian Pacific Railway
- Existing Pipeline Route
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0 1,000 2,000 3,000 4,000 Feet

GRAPHIC SCALE

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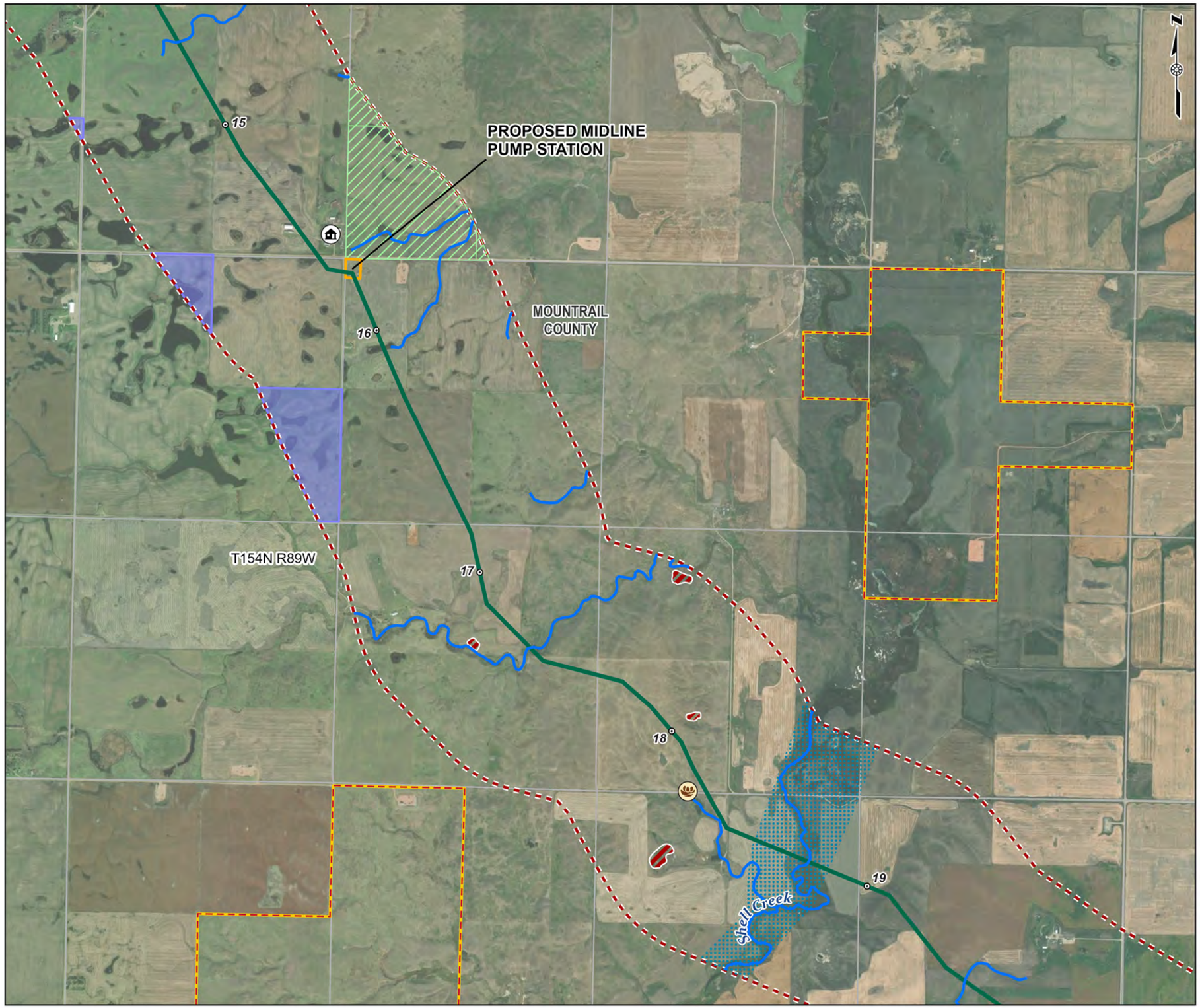
THUNDER BUTTE PIPELINE PROJECT
MOUNTRAIL COUNTY, NORTH DAKOTA

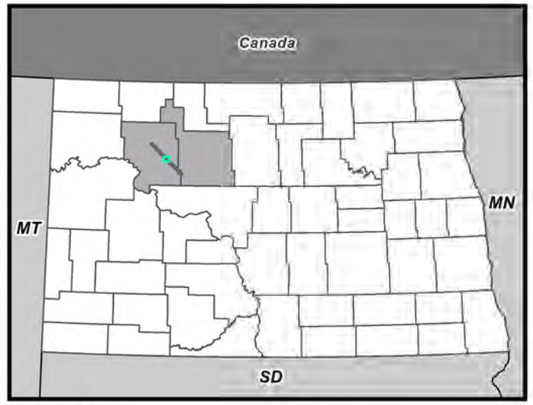
AVOIDANCE AREAS
DETAIL SHEET 4 OF 9

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Legend

- Milepost
- Surface Drain Location
- Occupied Residence
- Bald Eagle Nest
- Snowmobile Trail
- NHD Stream
- Existing Canadian Pacific Railway
- Existing Pipeline Route
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- County Boundary

0 1,000 2,000 3,000 4,000 Feet

GRAPHIC SCALE

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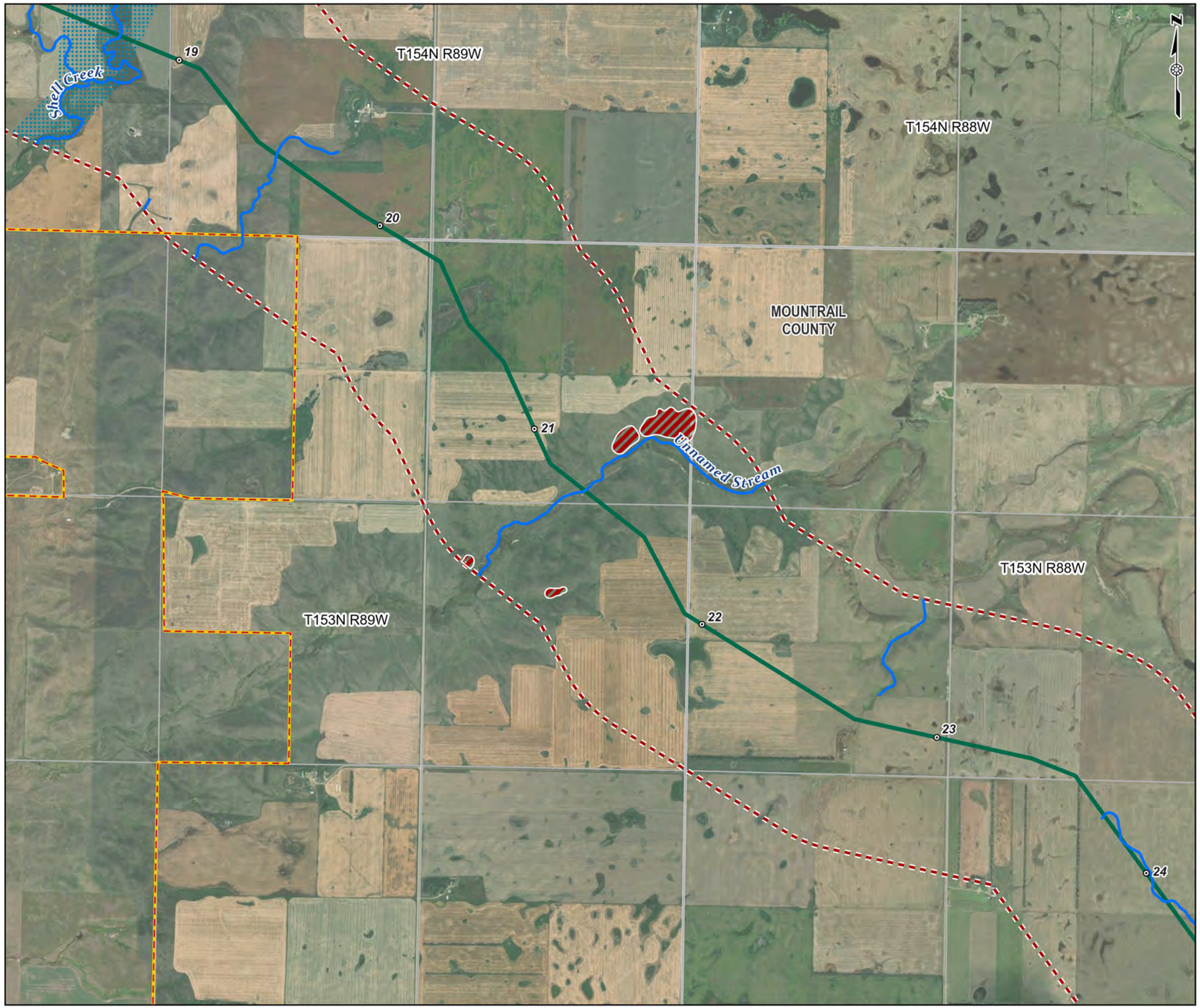
THUNDER BUTTE PIPELINE PROJECT
MOUNTRAIL COUNTY, NORTH DAKOTA

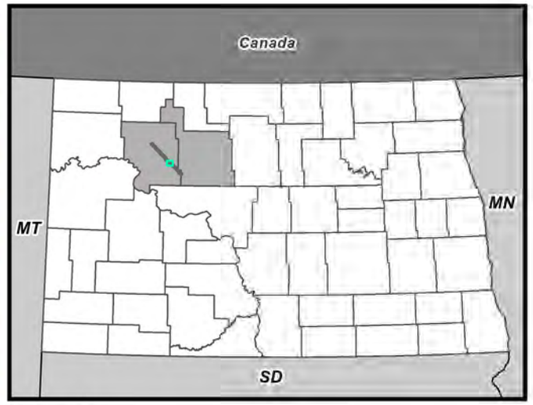
AVOIDANCE AREAS
DETAIL SHEET 5 OF 9

PN:CO002338.0001
Date: 12/13/2023

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Legend

- Milepost
- Surface Drain Location
- Occupied Residence
- Bald Eagle Nest
- Snowmobile Trail
- NHD Stream
- Existing Canadian Pacific Railway
- Existing Pipeline Route
- Proposed Pipeline Route
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- Corridor Study Area (1mi)
- County Boundary

0 1,000 2,000 3,000 4,000 Feet

GRAPHIC SCALE

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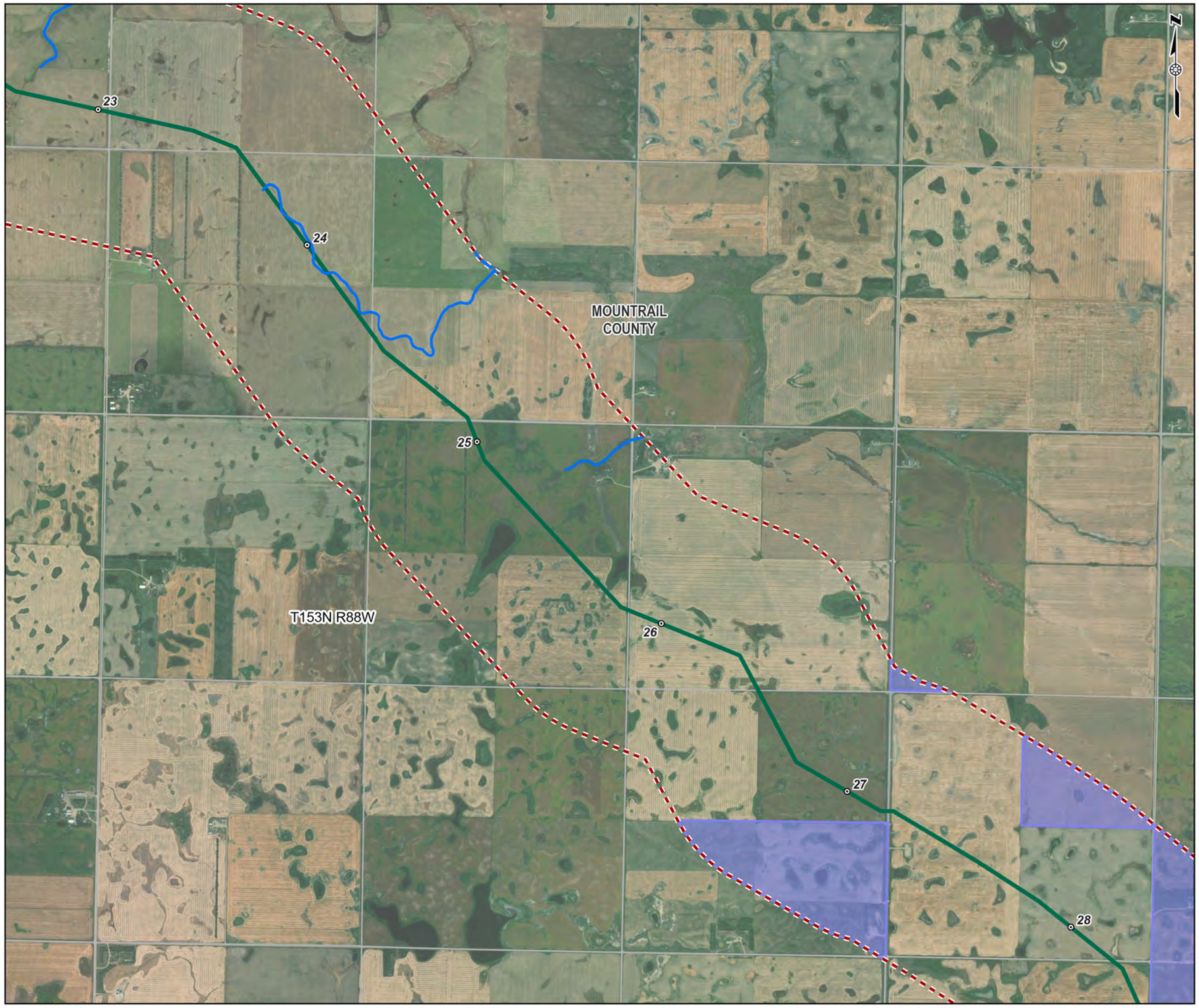
THUNDER BUTTE PIPELINE PROJECT
MOUNTRAIL COUNTY, NORTH DAKOTA

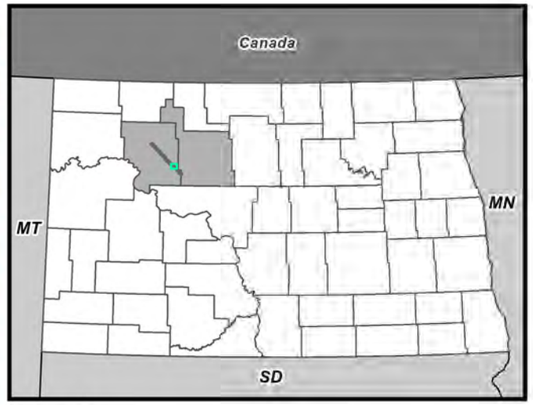
AVOIDANCE AREAS
DETAIL SHEET 6 OF 9

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Legend

- Milepost
- Surface Drain Location
- Occupied Residence
- Bald Eagle Nest
- Snowmobile Trail
- NHD Stream
- Existing Canadian Pacific Railway
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0 1,000 2,000 3,000 4,000 Feet

GRAPHIC SCALE

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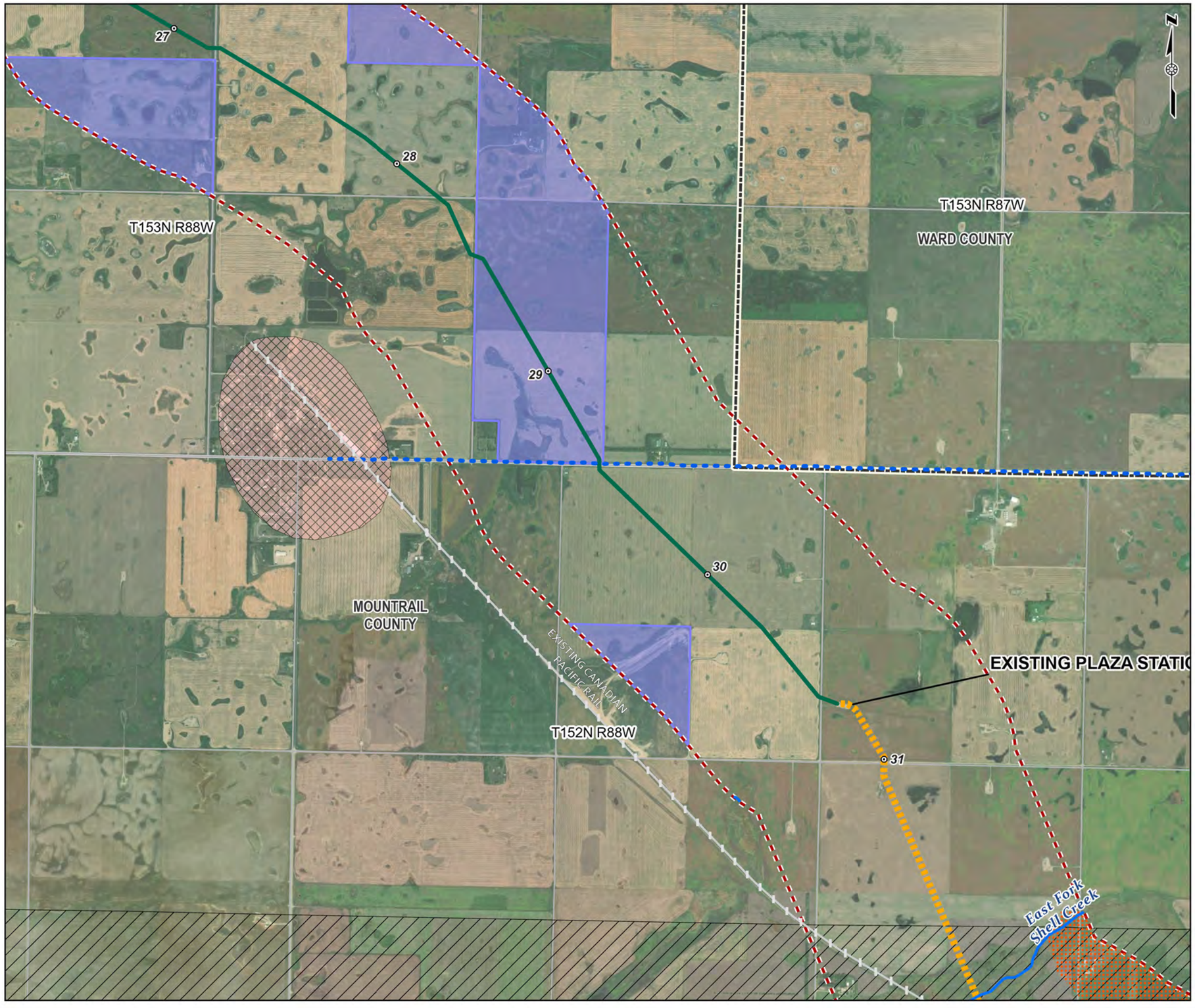
THUNDER BUTTE PIPELINE PROJECT
MOUNTRAIL COUNTY, NORTH DAKOTA

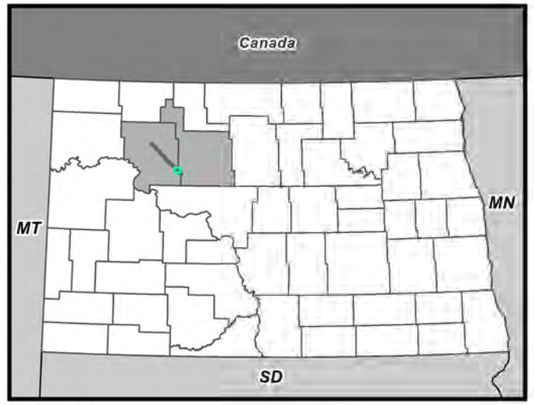
AVOIDANCE AREAS
DETAIL SHEET 7 OF 9

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Legend

- Milepost
- Surface Drain Location
- Occupied Residence
- Bald Eagle Nest
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0 1,000 2,000 3,000 4,000 Feet

GRAPHIC SCALE

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THUNDER BUTTE PIPELINE PROJECT
MOUNTRAIL AND WARD COUNTY, NORTH DAKOTA

AVOIDANCE AREAS
DETAIL SHEET 8 OF 9

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EXISTING PLAZA STATION

31

EXISTING CANADIAN PACIFIC RAIL

T152N R88W

East Fork Shell Creek

32

Wild Willow Drain (DR-4495)

T152N R87W

Taylor Slough Drain (DR-661)

WARD COUNTY

33

MOUNTRAIL COUNTY

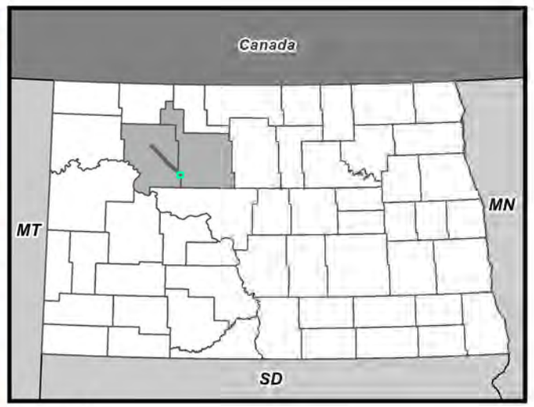
23

34

35

EXISTING TBPS FACILITY

N



Legend

- Milepost
- Surface Drain Location
- Occupied Residence
- Bald Eagle Nest
- Snowmobile Trail
- NHD Stream
- Existing Canadian Pacific Railway
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0 1,000 2,000 3,000 4,000 Feet

GRAPHIC SCALE

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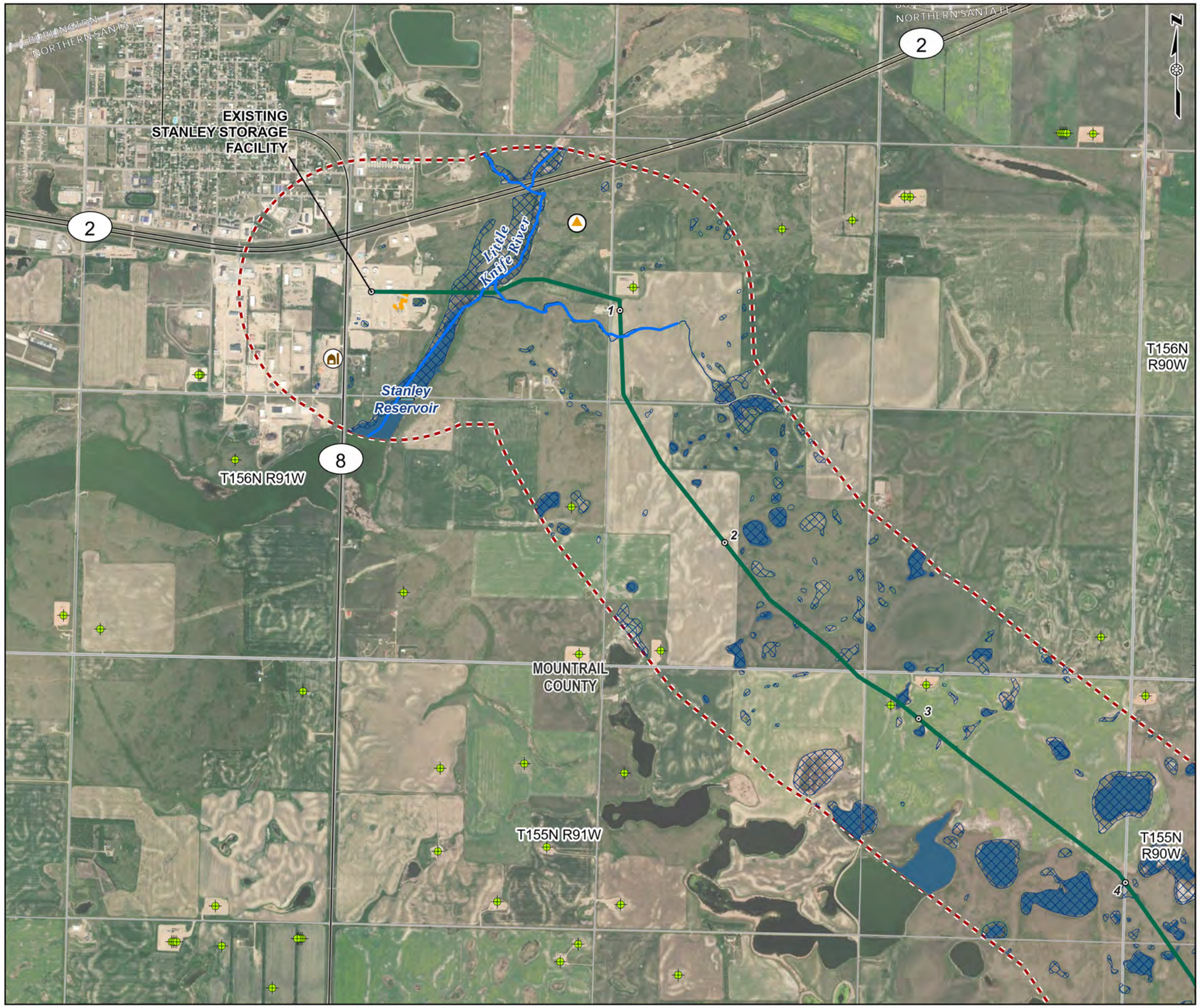
THUNDER BUTTE PIPELINE PROJECT
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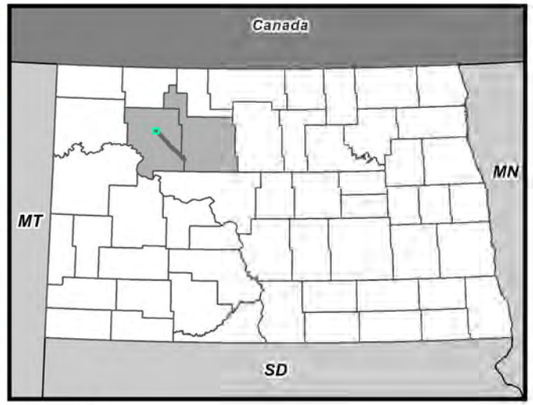
AVOIDANCE AREAS
DETAIL SHEET 9 OF 9

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ARCADIS

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Legend

- Milepost
- Oil and Gas Well
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- Fort Berthold Indian Reservation Boundary
- Corridor Study Area (1mi)
- County Boundary

0 1,000 2,000 3,000 4,000 Feet

GRAPHIC SCALE

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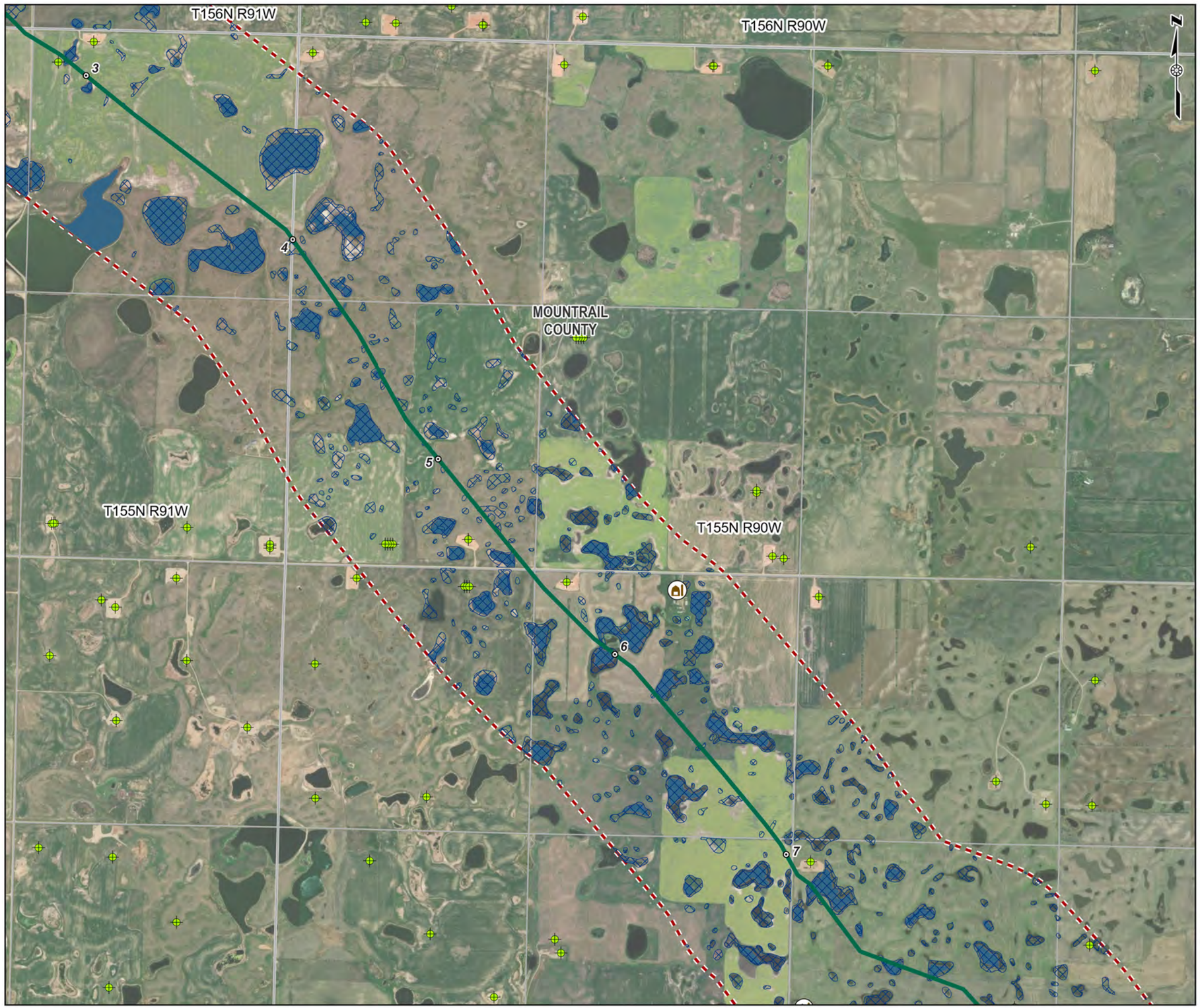
THUNDER BUTTE PIPELINE PROJECT
MOUNTRAIL COUNTY, NORTH DAKOTA

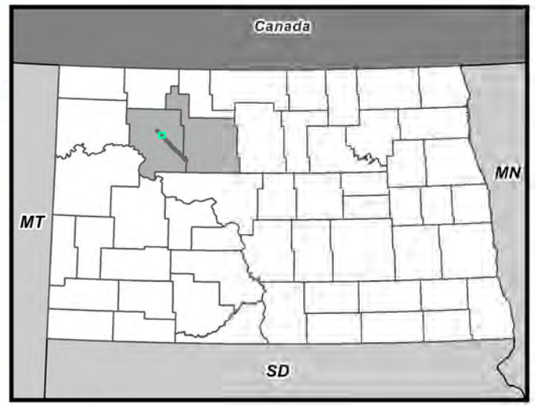
ROUTE SELECTION CRITERIA CONSIDERED
DETAIL SHEET 1 OF 9

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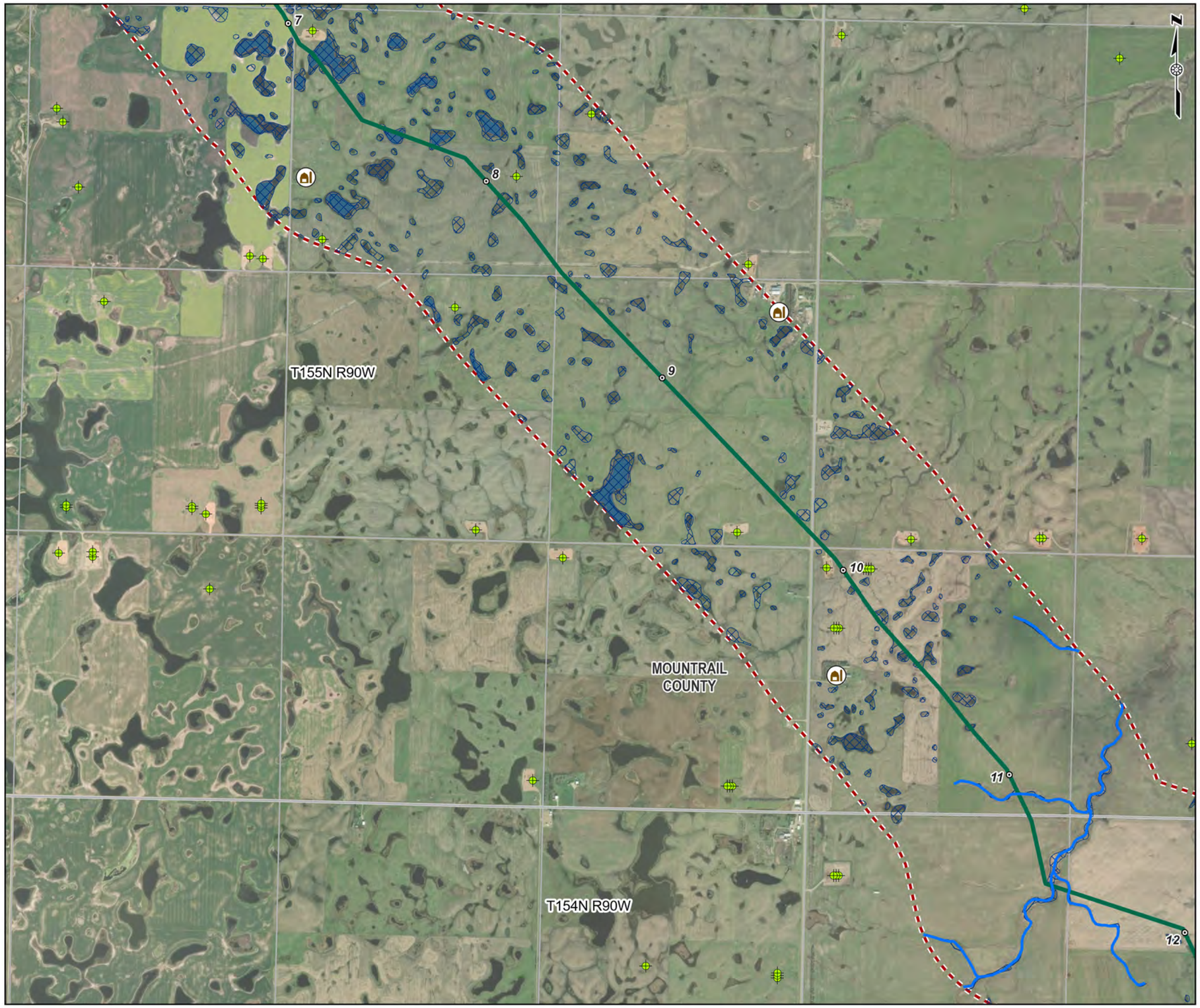
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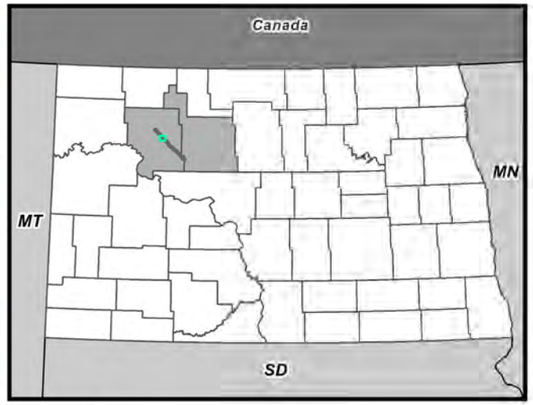
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MOUNTRAIL COUNTY, NORTH DAKOTA

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T155N R90W

T155N R89W

T154N R89W

T154N R90W

MOUNTRAIL COUNTY

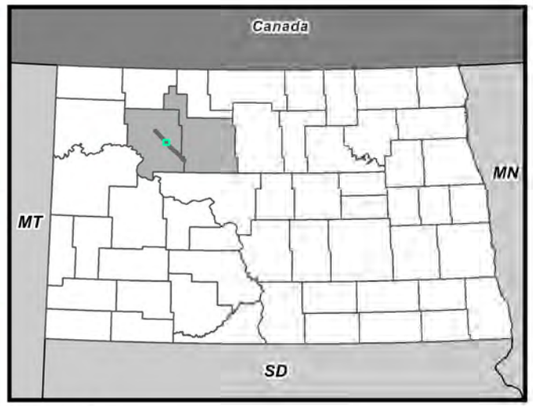
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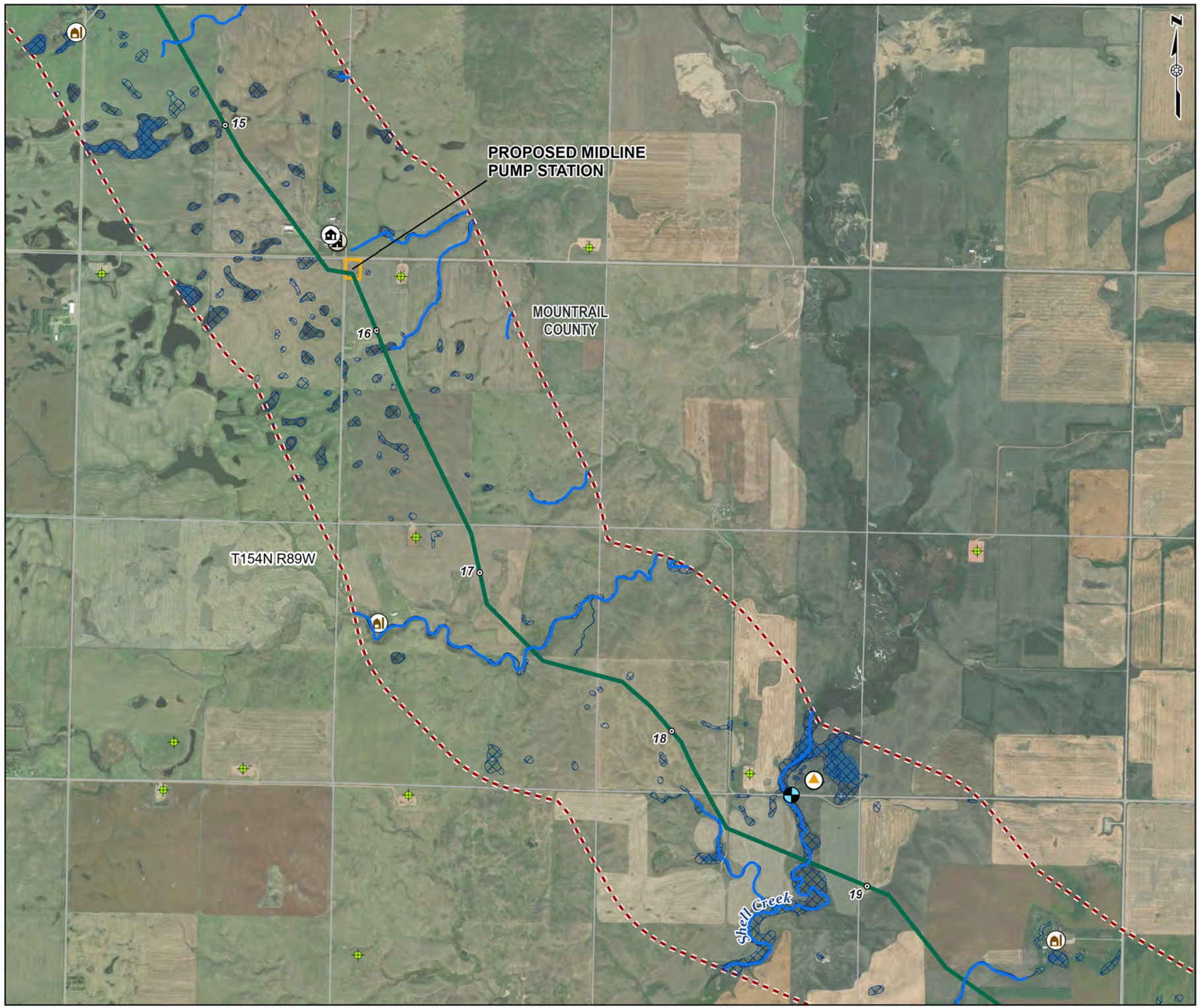
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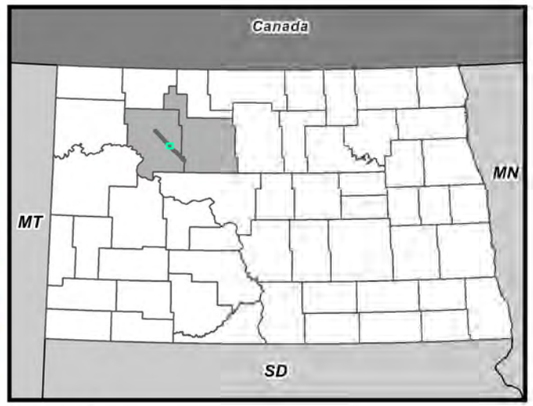
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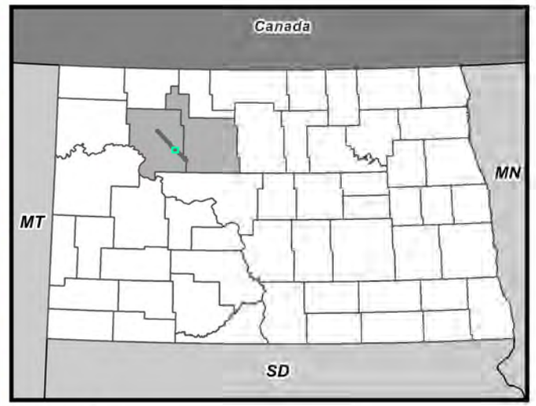
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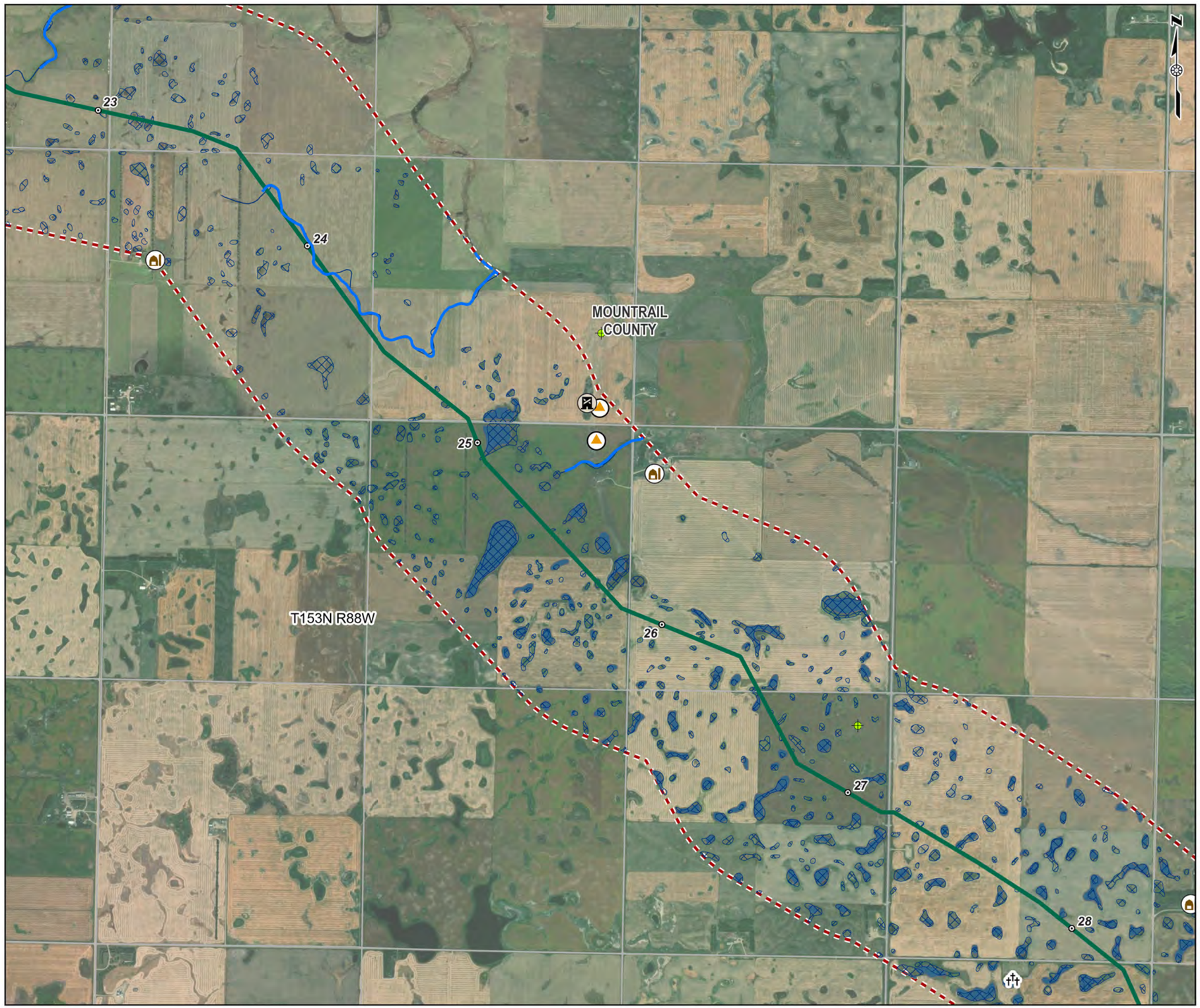
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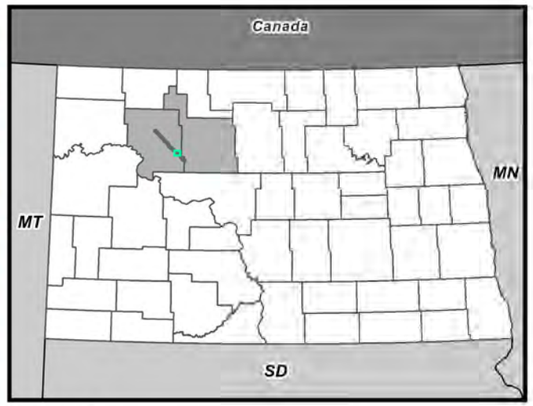
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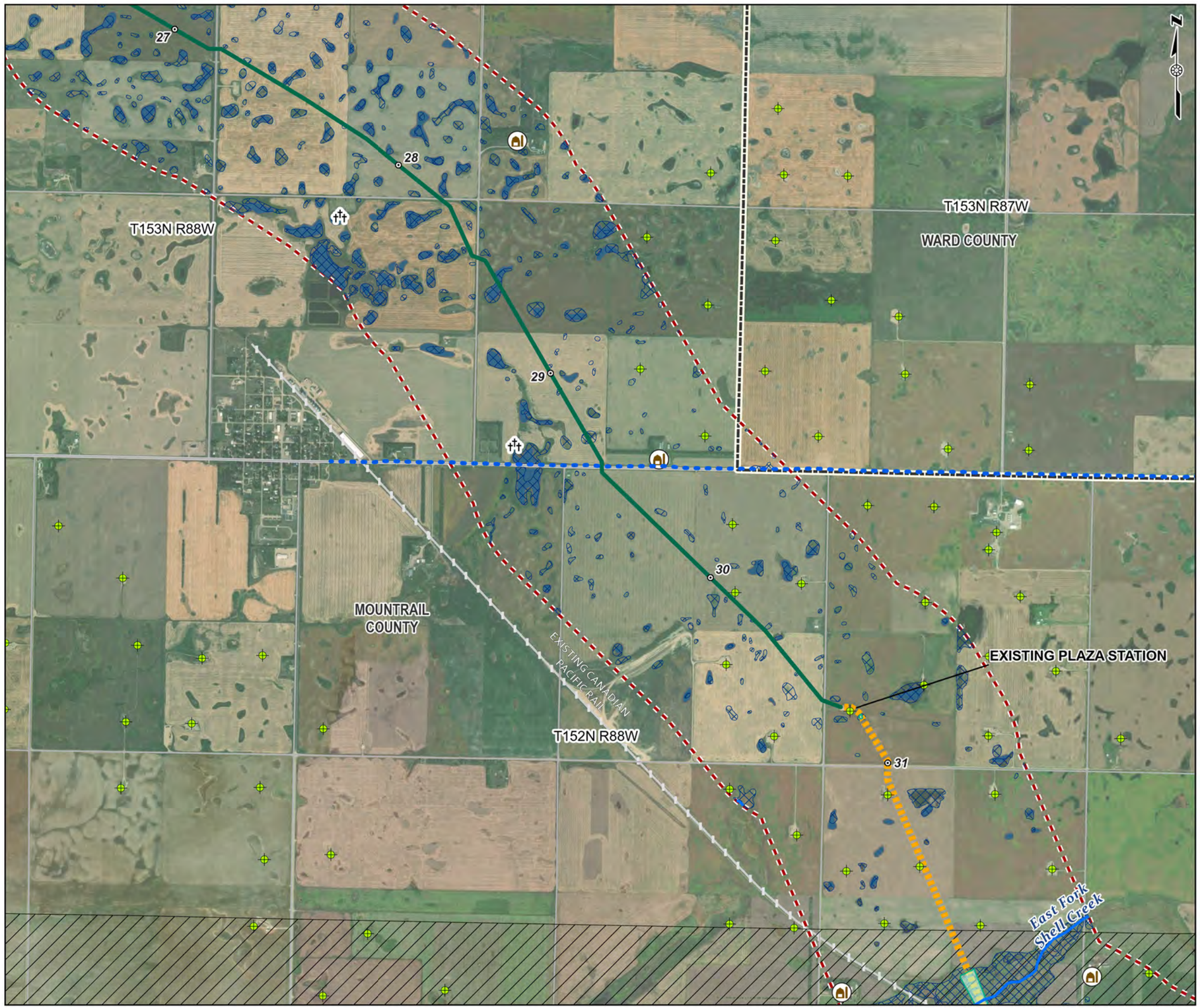
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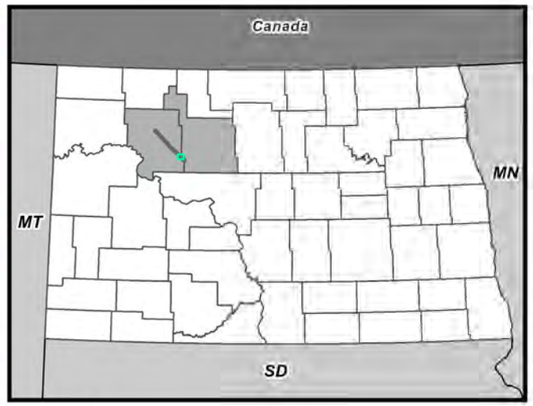
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EXISTING PLAZA STATION

31

EXISTING CANADIAN PACIFIC RAIL

T152N R88W

East Fork Shell Creek

32

T152N R87W

33

WARD COUNTY

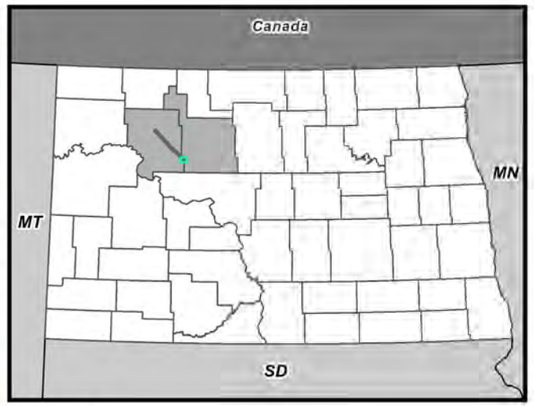
MOUNTRAIL COUNTY

23

34

EXISTING TBPS FACILITY

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Legend

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Appendix B

Ten Year Plan

Thunder Butte Pipeline Project

Ten-Year Plan: 2024-2034

Per North Dakota Public Service Commission Chapter 49-22, NDCC

Revision: 0

December 11, 2023

In accordance with North Dakota Public Service Commission (Commission), Energy Conversion and Transmission Facility Siting Act Section 49-22-04 and the North Dakota Administrative Code (NDAC) Chapter 6906-02, Thunder Butte Pipeline, LLC (TBPL) submits the following Ten-Year Plan for years 2024 through 2034.

1. A description of the general location, size, and type of all facilities to be owned or operated by the utility during the ensuing ten years, as well as those facilities to be removed from service during the ten-year period.
    a. TBPL currently does not own or operate any transmission facilities in North Dakota.
    b. TBPL is submitting a Consolidated Certificate of Corridor Compatibility and Route Permit Application (Consolidated Application) to the Commission requesting a Certificate of Corridor Compatibility and Route Permit for construction and operation of the Thunder Butte Pipeline Project (Project). The Consolidated Application supports TBPL's request to construct and operate the proposed Project to transport crude oil from the existing Thunder Butte Petroleum Services (TBPS) Crude Storage and Loading Facility (TBPS Facility) within the Fort Berthold Indian Reservation (FBIR) near Makoti, North Dakota, to the existing Enbridge Stanley Pump Station and Terminal (Enbridge Storage Facility) located in Stanley, North Dakota. The proposed project consisting of two primary components:
        i. Construction of a new 3.84-mile-long crude oil pipeline in Ward and Mountrail Counties, and
        ii. Conversion of an existing 30.8-mile-long gathering pipeline to a crude oil transmission pipeline in Mountrail County.
    c. TBPL is requesting permission from the Commission to construct and operate a new 3.84-mile-long, 6.625-inch outer diameter (OD) underground carbon steel crude oil pipeline; to construct a new pump skid located at the TBPS Facility, and to construct a new 4.0-acre midline pump station located in T154N R89W S34 NENW. The new midline pump station will be located on an existing 30.8-mile-long existing crude oil pipeline.
    d. TBPL is also requesting permission from the Commission to convert the existing 30.8-mile-long, 6.625-inch OD gathering pipeline that TBPL recently purchased from Enbridge to a transmission pipeline and to operate the existing pipeline in conjunction with the new 3.84-mile-long pipeline for transmission of crude oil as mentioned above.
    e. TBPL does not currently own or operate any facilities that it plans to remove from service during the next ten years.
    f. TBPL does not plan to remove from service in the next ten years any of the planned facilities that will be purchased from Enbridge as a part of the Commission permission to operate request.

2. An identification of the location of the tentative preferred site for all energy conversion facilities and tentative location of all transmission facilities on which construction is intended to be commenced within the ensuing five years and such other information as may by required by the commission. The site and corridor identification shall be made in compliance with the criteria published by the commission pursuant to section 49-22-05.1.

    a. TBPL does not currently have any plans of constructing any energy conversion facilities within the next five years.

    b. As mentioned above in Section 1, TBPL proposes to construct and operate a new 3.84-mile-long crude oil pipeline in Ward and Mountrail Counties. The proposed pipeline will start at the TBPS Facility in T152N R87W S19 NWNE and will traverse northwest toward Plaza, ND where it will connect into the existing crude oil pipeline at T152N R88W S2 SWSW. From that connection point, the existing pipeline traverses northwest 30.8 miles to the Enbridge Storage Facility in Stanley, ND in T156N R91W S27 NESW. TBPL proposes to construct and operate one proposed midline pump station at a 4.0-acre site located in T154N R89W S34 NENW.

3. A description of the efforts by the utility to coordinate the plan with other utilities so as to provide a coordinated regional plan for meeting the utility needs of the region.

    a. TBPL performed research of the area and determined that there was insufficient infrastructure to connect the TBPS facility to existing markets except for the existing Enbridge crude oil pipeline, which is why TBPL has coordinated with Enbridge to acquire the existing pipeline and then build a new 3.84-mile-long pipeline to connect the TBPS facility to the existing pipeline. The project will transport crude oil from the TBPS Facility to the Enbridge Facility in Stanley in order to get the oil to markets across the United States.

    b. In the development of the Project, TBPL has performed centerline surveys of the route and the midline pump station and has identified all third-party utilities that would be crossed or encroached upon. TBPL will reach out to those utilities and establish communication with them in order to obtain crossing or encroachment requirements during construction and operation. Those respective requirements will be incorporated into the design, construction, and operation of the Project and TBPL will work with each utility during construction, operation, and maintenance phases of the Project to ensure the Project is safely constructed and operated around those respective utilities.

4. A description of the efforts to involved environmental protection and land-use planning agencies in the planning process, as well as other efforts to identify and minimize environmental problem at the earliest possible stage in the planning process.

a. TBPL has engaged a qualified environmental consulting firm to conduct studies of avoidance and exclusion areas within the Project's respective study areas that would prevent project development in accordance with Commission 49-22 and NDAC 6906. Thus far, no environmental areas or siting concerns have been identified within the Project boundaries that would prevent the further development of the project. If any areas are identified as the studies continue, then TBPL will work diligently with the environmental consultant, state and local agencies, and any other planning authority in the are of concern to mitigate the effects of the pipeline on the respective area of concern.

b. TBPL is diligently working to protect the environment through proper planning, development, construction, operation, and maintenance of the Project through collaboration with qualified environmental consultants and state and local agencies and planning authorities.

5. A statement of the projected demand for the service rendered by the utility for the ensuing ten years and the underlying assumption for the projection, with that information being as geographically specific as possible, and a description of the manner and extent to which the utility will meet the projected demands.

a. The major constraint in transporting crude oil from this area of North Dakota to other markets across the country is the lack of pipeline infrastructure. While several projects have been developed recently and more are planned for the future, the infrastructure is still behind to connect to all the facilities in the area which then leads the oil to be transported by rail or truck. TBPL's project will connect the TBPS Facility utilizing a short new pipeline connected to an existing pipeline to transport the crude oil to market with less of a public safety hazard that would occur with rail or truck transportation.

b. The development of hydrocarbon production in the Williston Basin has increased significantly in recent years due to advancements in deep horizontal directional drilling techniques and subsequent oil extraction in the Bakken and Three Forks shale formations. The total recoverable amount of Bakken and Three Forks oil reserves is subject to interpretation and speculation. Studies conducted by the North Dakota Department of Mineral Resources (NDDMR) and the North Dakota Geological Survey (NDGS) in 2008 on the Bakken formation[1] and the Three Forks formation[2] in 2010 indicate that 4.0 to 6.3 billion barrels of oil still undiscovered in the Bakken and Three Forks formations. The most recent US Geological Survey (USGS) information estimated there may be 7.4 billion barrels of undiscovered recoverable oil in the entire Bakken and Three Forks formations, spanning, Montana, North Dakota, and South Dakota[3]. Statistics from the NDDMR indicate that oil production has increased dramatically over the past five years from an average of nearly 664,000 barrels per day (BPD) in 2012 to an

average of over 1,079,000 BPD in 2017[4]. Production is expected to continue to increase dramatically over the next 15 years[5].

c. Sources

[1] Bohrer, M., Fried, S., Helms, L. Hicks, B. Juenker, B., McCusker, D., Anderson, F. LeFever, J. Murphy, E., and Nordeng, S. North Dakota Department of Mineral Resources. State of North Dakota Resources Study Project 23 (2008).

[2] Helms, L. and Nordeng, S. North Dakota Department of Mineral Resources. Bakken Source System, Three Forks Formation Assessment (2010).

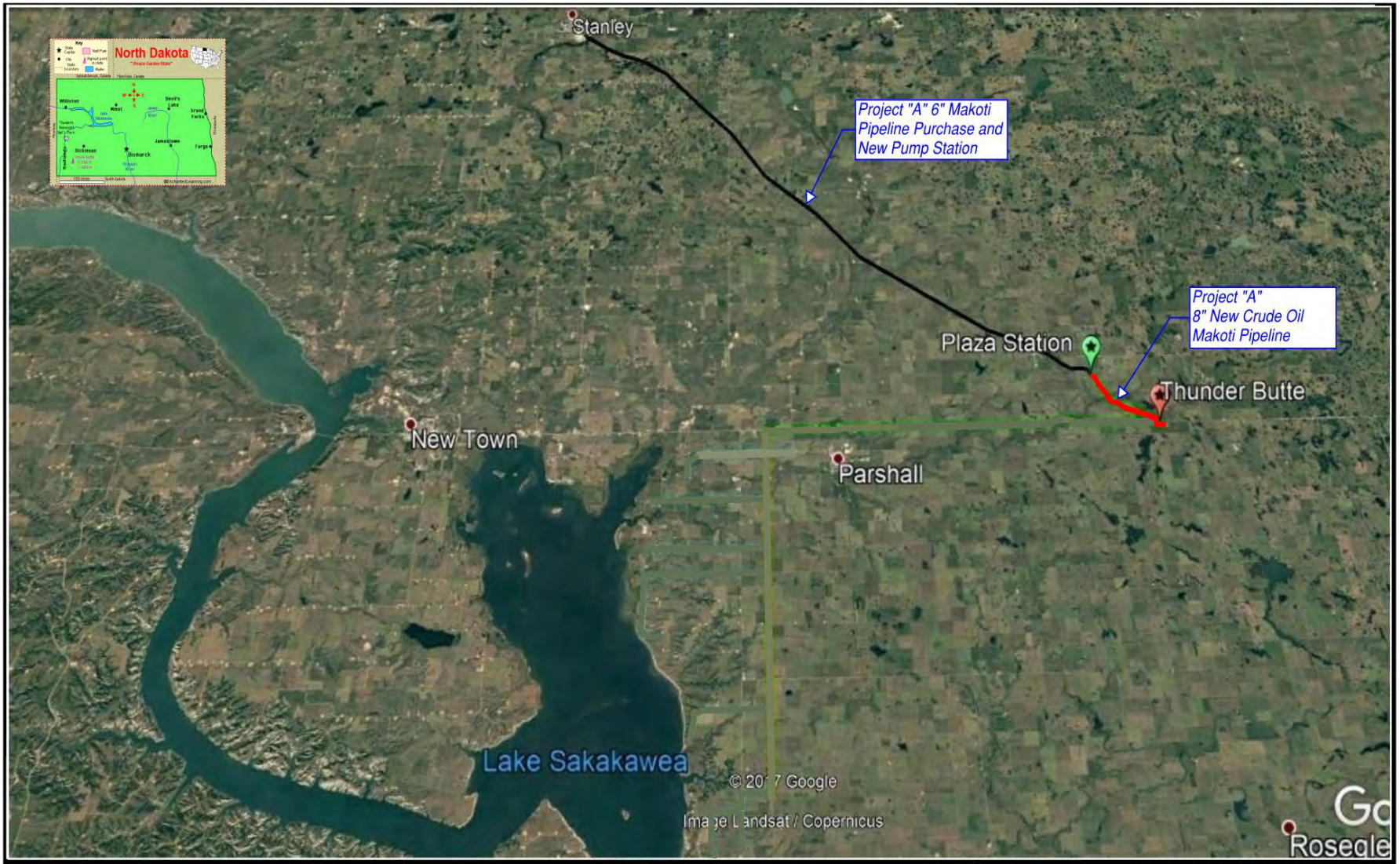
[3] United States Geological Survey, Assessment of Undiscovered Oil Resources in the Bakken and Three Forks Formations, Williston Basin Province, Montana, North Dakota, and South Dakota (2013). Web Access in August 2018 at http://pubs.usgs.gov/fs/2013/3013/.

[4] North Dakota Department of Mineral Resources. North Dakota Monthly Oil Production Statistics. Web access in August 2018 at https://www.dmr.nd.gov/oilgas/stats/historicaloilprodstats.pdf

[5] North Dakota Department of Mineral Resources. Information Center. Recent Presentations. Web access in August 2018 at https://www.dmr.nd.gov/oilgas/presentations/WBPC052418_2400.pdf

6. Any other relevant information as many be requested by the commission. Upon receipt of the ten-year plan the commission shall proceed to assess the impact to the development proposed within the state to ensure that energy conversion facilities and transmission facilities will be sited in an orderly manner compatible with environmental preservation and efficient use of resources.

    a. TBPL is looking forward to working with the Commission on this Project and will provide any additional requested information as timely as possible.



						GAP MIDSTREAM	GAP MIDSTREAM SOUTH PARSHALL GATHERING FIELD PIPELINE PROJECT "A"
						DRAWN BY / DATE	A.F.E. NO. / DWG. DESC:
						CHK. BY / SCALE	PRINT ISSUED / DWG. NO.
NO.	REVISION	BY	CHK.	DATE	DESIGNED BY	APPR. BY	

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Appendix C

Environmental Mitigation Plan and Engineering Schematic Drawings

Thunder Butte Pipeline Project

ENVIRONMENTAL MITIGATION PLAN

North Dakota Public Service Commission

Case No. PU-24 -___

Januarry 2024

Table of Contents

1.0 INTRODUCTION 1
2.0 GENERAL MITIGATION MEASURES 3
2.1 Contractor 3
2.2 List and Permits 3
2.3 Environmental Inspector 3
2.4 Rights-Of-Way 3
2.5 Dust Control 3
2.6 Undesirable Species Control 4
2.7 Non-Hazardous Wastes 4
2.8 Hazardous Wastes 4
2.9 Burning and Fire Prevention 5
2.10 Wet Weather 5
3.0 SPILL PREVENTION 6
3.1 General 6
3.2 Storage 6
3.3 Refueling 6
3.4 Cleanup and Emergency Notification 7
4.0 TEMPORARY EROSION AND SEDIMENT CONTROL 8
4.1 General 8
4.2 Sediment Barriers 8
4.3 Temporary Slope Breakers 9
4.4 Temporary Mulching 9
5.0 ROAD AND RAILROAD CROSSINGS 10
6.0 PIPELINE CONSTRUCTION PROCEDURES 11
6.1 Clearing 11
6.2 Grading 11
6.3 Topsoil Removal and Storage 12
6.4 Trenching 12
6.5 Pipe Preparation and Installation 13
6.6 Trench Backfilling 14
6.7 Cleanup 14

6.8 Permanent Erosion and Sediment Control 14
6.8.1 Permanent Slope Breakers 14
6.9 Reclamation and Revegetation 15
6.9.1 Soil Compaction 15
6.9.2 Rock Removal 15
6.9.3 Seeding and Mulching 16
6.9.4 Tree and Shrub Mitigation 17
6.9.5 Fences, ROW and Pipeline Markers 17
7.0 WETLAND CROSSINGS 18
7.1 General 18
7.2 Easement and Workspace 18
7.3 Wetland Crossing Methods 18
7.4 Restoration and Reclamation 20
8.0 SURFACE WATER AND GROUNDWATER DRAINAGE 21
9.0 HYDROSTATIC TESTING 23
9.1 General 23
9.2 Test Water Source 23
9.3 Water Discharge 23
10.0 AGRICULTURAL PRODUCTION, FAMILY FARMS, AND RANCHES 25
11.0 VEGETATION, WILDLIFE, AND LIVESTOCK 26
12.0 CULTURAL RESOURCES 29
13.0 REFERENCES 30

Appendices

Appendix A Construction Schematics

1.0 INTRODUCTION

Thunder Butte Pipeline, LLC (TBPL) has prepared this Environmental Mitigation Plan (EMP) for the Thunder Butte Pipeline Project (Project). The Project will include construction of a proposed new pipeline and conversion of an existing Enbridge crude oil gathering pipeline to a crude oil transmission pipeline. The proposed new pipeline will commence at the TBPS Facility and terminate at the interconnection with the existing Enbridge pipeline approximately 2.1 miles southeast of Plaza, North Dakota. From the interconnection point, crude oil will be transported in the existing Enbridge pipeline to the termination point at the existing Enbridge storage facility in Stanley, ND.

This EMP outlines general construction-related mitigation measures that will be implemented during construction of the Project to minimize potential environmental impacts. TBPL and its construction contractor (Contractor) will comply with applicable industry-wide standards and regulatory requirements. Specific conditions associated with agency permits are not addressed herein.

TBPL is in the process of developing several Project control plans that would be utilized during construction activities to minimize and mitigate impacts to environmental resources. These plans include the following, which would be incorporated into contract documents and implementation will be enforced by TBPL:

- Stormwater Pollution Prevention Plan (SWPPP)
- Construction stormwater management and erosion/sediment control measures.
- Spill Prevention, Control, and Countermeasure (SPCC) Plan
- Spill prevention measures and BMPs with details on spill response and notification procedures in the event of an inadvertent spill.
- Unanticipated Discoveries Plan

  Response measures to be implemented in the event of a discovery of cultural resources or human remains.
- Noxious Weed Plan
- A Weed Control Plan will be developed in conjunction with the Weed Control Boards of Ward and Mountrail Counties. BMPs will be implemented to prevent the spread of invasive and noxious weeds and to minimize the risk of importing or transporting any weed species. Equipment and tools will be cleaned of any plant debris before ingress and egress from the project area.
- Dust Control Plan

  Measures to minimize and control fugitive dust during construction activities and soil disturbances.
- Integrity Management Plan

- Measures to be implemented to comply with applicable federal regulations and outlines preventive maintenance, inspection, line patrol, leak detection systems, SCADA, and other pipeline integrity procedures to be implemented to ensure the safe operation of the project. During operations, the Project will be monitored remotely 24 hours a day, 7 days a week using a SCADA system.

Resource-specific measures will include the use of the horizontal directional drilling (HDD) method and bore methods will be used to avoid impacts at crossings of WOUS, roads, and railroad ROW, if needed. Additional resource-specific measures are described in the following subsections.

This EMP was prepared in accordance with the U.S. Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) for Stormwater Discharges from Construction Activities, Indian country within the State of North Dakota (NDR10I000), the North Dakota Department of Environmental Quality, Division of Water Quality, NPDES General Permit for Stormwater Discharges Associated with Construction Activity (NDR11-0000).

2.0 GENERAL MITIGATION MEASURES

2.1 Contractor

The requirements of this EMP and applicable environmental permits will be contractual obligations for the Contractor. The Contractor will ensure that persons engaged in construction of the Project are informed of these construction requirements.

2.2 List and Permits

TBPL will provide the Contractor with a construction list that describes special requirements, as agreed upon with private landowners and as required through agency permitting processes (e.g., road crossing permits).

2.3 Environmental Inspector

TBPL will provide construction oversight to confirm Contractor compliance with the measures of this EMP and any landowner agreements as well as applicable federal, state, and local environmental permits. TBPL will retain one or more third-party inspectors ("Environmental Inspector") who are knowledgeable of the environmental mitigation requirements for this Project. The Environmental Inspector will have the authority to stop construction activities and order corrective mitigation for actions that are not in compliance with this EMP, any landowner agreements, or environmental permit requirements. The Environmental Inspector will maintain appropriate records to document compliance with these and other applicable environmental permit conditions. At the end of each week, the Environmental Inspector will summarize daily reports into a weekly report that will be submitted to TBPL. In turn, the weekly reports will be summarized in a monthly report submitted to the North Dakota Public Service Commission (NDPSC).

2.4 Rights-Of-Way

Access to the pipeline construction ROW will be from public roadways and private landowner-approved access roads. The Contractor will mark access routes with signs to clearly identify approved access roads.

All construction equipment and vehicles will be confined to approved access roads, the permitted pipeline construction ROW, and additional temporary workspaces.

2.5 Dust Control

Dust control related to construction activities will be accomplished through physical and administrative means.

All construction-related vehicles will adhere to posted speed limits on public roadways and as designated in landowner agreements on private lands. Work hours near residential areas may be limited.

The Contractor may use multiple methods to wet the ROW to control airborne dust, including water trucks and sprinklers, or additional measures as appropriate, based on site-specific conditions.

2.6 Undesirable Species Control

BMPs will be implemented to prevent the spread of noxious weeds and to minimize the risk of importing or transporting weed species. A weed control plan will be developed in conjunction with the Weed Control Boards of Ward and Mountrail counties.

For equipment known to have passed through a weed-infested area, the undercarriage will be cleaned thoroughly with high-pressure washing equipment prior to ingress and egress from the Project area.

For areas to be revegetated, seeding will be conducted in accordance with landowner agreements or as specified by the Natural Resources Conservation Service (NRCS). Only certified weed free vegetative components (e.g., mulch, straw/hay bales, seed mixes) will be used on the Project.

2.7 Non-Hazardous Wastes

The Contractor will handle and dispose of human wastes by use of portable, self-contained toilets. Wastes from these units will be collected by a licensed contractor for disposal only at licensed and approved facilities.

The Contractor will remove all trash from the construction ROW on a daily basis unless otherwise approved or directed by TBPL.

The Contractor will dispose of HDD cuttings and drilling mud. Disposal options may include spreading over the construction ROW in an upland location approved by the landowner or hauling to an approved licensed landfill. If the HDD mud is disposed on landowner-approved lands, testing of the HDD mud may be required by the landowner or state agency prior to disposal. All waste will be properly disposed of per regulatory agency requirements.

2.8 Hazardous Wastes

The Contractor will ensure that all hazardous and potentially hazardous materials are transported, stored, and handled in accordance with all applicable regulations. Workers exposed to or required to handle hazardous materials will have received proper training in use of those materials, in accordance with the applicable regulations and the manufacturer's recommendations. Hazardous wastes will be transported to licensed waste disposal facilities for disposal.

If toxic or hazardous waste materials or containers are encountered during construction, the Contractor will stop work immediately and notify TBPL. The Contractor will not restart work until clearance is granted by TBPL.

2.9 Burning and Fire Prevention

The Contractor will comply with all federal, state, county, and local fire regulations regarding prevention of uncontrolled fires.

The Contractor will maintain a contact list and information of jurisdictional fire authorities. Fire control equipment, including water and chemical fire extinguishers, will be available at construction sites and construction personnel will be properly trained in the use of such equipment.

Flammable materials kept on a construction site will be stored in approved containers away from ignition sources. All flammable wastes will be removed from construction sites on a regular basis.

Smoking will be prohibited at construction sites, except in designated areas away from flammable materials.

2.10 Wet Weather

Construction activities will be suspended, or adequate protection measures taken, during abnormally wet conditions to minimize rutting, soil compaction, and mixing of topsoil with subsurface soils. Activities may be suspended based on the following conditions:

- type of equipment and nature of construction activity planned for that day;
- potential that rutting may cause mixing of topsoil with subsoil layers;
- extent of surface ponding; and
- the potential for excessive soil compaction.

Construction work will be suspended if these conditions exist unless adequate protection measures are taken to avoid irreparable damage to roads or land, such as through equipment rerouting or the use of construction mats.

3.0 SPILL PREVENTION

3.1 General

The Contractor will ensure that all equipment is free of leaks prior to use on the construction ROW and access roads. Throughout the period of construction, the Contractor will conduct regular maintenance and inspections of the equipment to reduce the potential for spills or leaks.

All equipment parked overnight will be at least 100 feet from a watercourse or wetland, unless otherwise approved by the Environmental Inspector.

Stationary equipment will be placed within a secondary containment if it will be operated or require refueling within 100 feet of a wetland or waterbody boundary.

3.2 Storage

Fuels and lubricants will be stored only at designated staging areas. Storage of fuel and lubricants will be at least 100 feet away from the edge of any perennial watercourse, wetland, storm drain, or any high consequence area.

No bulk fuel or storage tanks will be placed in the construction ROW. Bulk fuel storage at temporary work or construction staging areas will be located in a lined, earthen-berm secondary containment structure.

3.3 Refueling

Refueling and lubrication of equipment will be restricted to upland areas at least 100 feet away from any perennial watercourse, wetland, storm drain, or any high consequence area, except where equipment is required to be within 100 feet of a waterbody (e.g., trench dewatering pump).

Rubber-tired vehicles (e.g., pickup trucks) normally will refuel at the construction staging areas or commercial gas stations. Tracked machinery (e.g., backhoes, bulldozers) will be refueled and lubricated on the construction ROW. Equipment maintenance will be conducted in staging areas when practical. When necessary and with Environmental Inspector approval, equipment repairs may be made on the construction ROW.

Each fuel truck that transports and dispenses fuel to construction equipment or Project vehicles along the construction ROW or within equipment staging areas will carry oil spill response equipment and materials onboard at all times. Truck drivers and construction crew personnel will be trained on proper use of this equipment and materials.

3.4 Cleanup and Emergency Notification

Construction activities will be conducted to allow for prompt and effective cleanup of spills of fuel and other hazardous materials. Each construction crew will have sufficient tools and material to stop leaks and supplies of absorbent and barrier materials to allow rapid containment and recovery of spilled materials. Crew members must know and follow the procedure for reporting spills.

Emergency notification procedures between the Contractor and TBPL will be established in the planning stages of construction. In the event of a spill meeting agency reporting criteria, the Contractor will immediately notify TBPL who will then promptly notify the appropriate regulatory agency.

4.0 TEMPORARY EROSION AND SEDIMENT CONTROL

4.1 General

As detailed in the Stormwater Pollution Prevention Plan (SWPPP) for this Project, temporary erosion and sediment control measures will be installed prior to initial disturbance of the soil, maintained throughout construction, and reinstalled as necessary until replaced by permanent erosion control structures or restoration of the construction ROW is complete.

The Contractor will inspect all temporary erosion control measures within 24 hours of each significant rainfall event of 0.25 inches or greater. The Contractor will repair or replace all ineffective temporary erosion control measures as expediently as practicable, but prior to the next anticipated rainfall event or within 24 hours of discovery (whichever comes first) or as soon as field conditions allow.

4.2 Sediment Barriers

Sediment barriers will be constructed of silt fence, staked hay or straw bales, fiber rolls, compacted earth (e.g., drivable berms across travel lanes), sandbags, or other appropriate materials.

Sediment barriers will be installed below disturbed areas where there is hazard of offsite sedimentation. Areas where temporary sediment barriers will be placed include: the base of sloped approaches to roadways, flowing streams, and wetlands; along the edge of the construction ROW, as needed to prevent downslope siltation of adjacent waterbodies and wetlands; and as required along trench or test water discharge locations.

Sections of temporary sediment barriers may be designed to allow passage of construction equipment. Sediment barriers will be reinstalled to their original specifications when equipment passage is no longer required, heavy precipitation is imminent, or at the end of the workday, whichever is sooner.

The Contractor will maintain hay or straw bale/wattle and silt fence sediment barriers by removing collected sediment when it reaches one-half the height of the barrier and replacing the damaged control. If bale filters cannot be replaced due to access problems, the Contractor will place a new row of sediment barriers upslope.

The Contractor will use hay or straw bales that are free of noxious weeds.

The Contractor will remove sediment barriers, except those needed for permanent erosion and sediment control, during cleanup of the construction ROW.

4.3 Temporary Slope Breakers

Temporary slope breakers will be installed to minimize concentrated or sheet flow runoff in disturbed areas at the following recommended spacing:

Slope (%)	Spacing
1	300 feet
2	200 feet
3-5	150 feet
>5	100 feet

Temporary slope breakers will be constructed of earthen material, silt fence, staked hay or straw bales, fiber rolls, sandbags, or similar materials.

When earthen berms are constructed, they will be constructed of subsoil material, when practical, and have a two to eight percent slope with a 4-foot base and 1.5- foot height, or as site conditions require.

Temporary slope breakers will direct outfall to a stable, well-vegetated area or an appropriate energy-dissipating device (e.g., silt fence, hay or straw bales/wattles) at the end of the slope breaker and off the construction ROW. The outfall of each temporary slope breaker will be installed to prevent sediment discharge into wetlands, waterbodies, or other sensitive resources.

A hard plug will be left in place where a slope breaker crosses an open trench.

Temporary slope breakers will not be installed on cultivated land except by landowner request.

4.4 Temporary Mulching

If a disturbed construction work area is inactive for one month or is expected to be inactive for one month or more, the Contractor will apply temporary seed and/or mulch to reduce risk of erosion. The Contractor will not apply temporary mulch in cultivated areas unless specifically requested by the landowner. The Contractor will not apply mulch within wetland boundaries.

Temporary mulch of straw or equivalent applied on slopes will be spread uniformly to cover at least 75 percent of the ground surface at an approximate rate of 2 tons per acre of straw or its equivalent. Mulch application on slopes within 100 feet of waterbodies and wetlands will be increased to an approximate rate of 3 tons per acre.

5.0 ROAD AND RAILROAD CROSSINGS

Construction across paved roads and railroads will be in accordance with the requirements of the road crossing permits and approvals obtained by TBPL. TBPL will use the HDD method to install the proposed pipeline at the crossings of Highway 23, two county roads, and paved driveways. The CPR railroad ROW will be crossed using industry standard jack and bore techniques. Typical HDD and bore schematics for the road and railroad crossings are provided in **Appendix A**.

Unimproved roads, generally minor roads with minimal traffic and natural earth material surfaces, will be crossed using the open cut method. The open cut method may require temporary road closures, reducing traffic to one lane, and traffic detours.

Temporary closures and/or detours will be conducted in accordance with applicable permits and in coordination with local road authorities and landowners. The Contractor will take measures, such as posting signs along detour routes, to ensure safety and minimize traffic disruptions.

6.0 PIPELINE CONSTRUCTION PROCEDURES

The standard pipeline construction process includes clearing and grading, trenching, pipe stringing, bending, welding, lowering the pipeline, padding and backfilling, hydrostatic testing, and ROW cleanup and restoration. Each of these activities is discussed in more detail below.

6.1 Clearing

The initial stage of construction will involve clearing the approved work area (construction ROW and temporary workspaces) to allow for a safe operating environment. Cultivated crops and noxious weeds currently growing within the construction ROW will be removed prior to the start of construction activities.

The maximum width of tree and shrub removal is 50 feet, unless otherwise approved by the Commission. Clearing of trees, brush, and other vegetation from the ROW may be accomplished with hand-held chainsaws, brush hogs, and hydraulic tree-cutting equipment. Woody material will be chipped or mulched onsite or hauled off to an appropriate disposal location, or as otherwise directed by the landowner. No burning will be conducted as part of this Project.

Once the limits of the approved work areas, pipeline centerline, access roads, aboveground facilities, and sensitive areas, such as wetland boundaries and cultural sites, have been staked and flagged, the construction area will be cleared and graded.

During construction, TBPL will avoid removal of trees and shrubs with, if practicable. If removal of trees and shrubs cannot be avoided, they will be inventoried before removal to record the location, number, and species in accordance with the Commission's Tree and Shrub Mitigation Specifications:

- Trees with a diameter at breast height of 1 inch or greater (DBH >1 inch) will be inventoried to record the location, number, and species.
- Shrubs and all coniferous trees of any diameter will be inventoried to record the location, number, and species.

Trees and shrubs with DBH of 1 inch or greater will be replaced consistent with the Commission's Tree and Shrub Mitigation Specifications.

Measures will be taken during construction to maintain continuous access to pastures, grazing units, and livestock facilities. Best Management Practices (BMPs) such as silt fences will be installed along the ROW adjacent to wetlands. Temporary erosion controls will be installed prior to initial disturbance of soils, where necessary, to minimize erosion. Erosion control BMPs will be maintained throughout construction.

6.2 Grading

After clearing, the construction ROW will be graded to provide a relatively level surface that is wide enough to allow for the passage of heavy construction equipment and to

provide a safe working surface for equipment and meets the bending limitations of the pipe. All grading will be undertaken with the understanding that original contours and drainage patterns will be re-established to the extent practicable. All work will be conducted in accordance with applicable permits, regulations, or guidelines.

6.3 Topsoil Removal and Storage

Measures will be taken to preserve the physical and chemical property integrity of topsoil so it may be used during final reclamation of the construction ROW. Generally, these measures will segregate the topsoil from underlying subsoil layers to prevent mixing during construction and to allow for easy retrieval during reclamation. Up to a max of 12 inches of topsoil will be removed and segregated from the underlying subsoil. Topsoil will be removed from both the trench and spoil side for the entire length of the pipeline and stored on the temporary construction ROW on the spoil side of the trench for replacement in the affected area after construction. Construction will be suspended, or adequate protection measures taken, during abnormally wet conditions to prevent excessive rutting or mixing of topsoil with subsurface soils. Topsoil will not be used for construction of earthen berms, trench breakers, to fill low areas, or to backfill the trench.

After pipe has been strung, welded, coated and inspected, it will be lowered into the ditch and the dirt stockpile from excavation will be used for backfilling after sorting out and removing the rocks. After the ditch has been backfilled, the topsoil will be replaced and approximate original contours restored. Wetland edges will be stabilized and permanent erosion control measures will be installed. All timber riprap, timber mats, and prefabricated equipment mats and other construction debris will be removed.

Once construction is complete, the pipeline ROW and temporary workspace will be restored to its original contour and condition to the extent practicable, except that trees and shrubs will be regularly removed from the permanent ROW to facilitate Project inspection and maintenance.

6.4 Trenching

Trenches will be excavated using a trencher or backhoe to a depth sufficient to provide the minimum cover required by federal, state, and local governments, as well as landowner requirements. If areas of solid rock are encountered, special excavation equipment and/or techniques will be used.

The amount of open trench permitted at any time during the Project will be dependent on the stability of the trench and weather conditions. In areas where livestock is confined or in cultivated fields, temporary “plugs” will be installed at regular intervals along the ROW to provide safe access for livestock and farm equipment across the open trench.

The trench will be excavated to a depth that will enable the pipeline to be buried with a minimum cover of 72 inches. Excavated material will be side cast within the construction ROW with consideration for topsoil segregation, as noted in Section 6.3. Excavated material will be stored in a manner to minimize erosion and sedimentation.

TBPLs will be left in the ROW lateral spoil piles that coincide with breaks in the strung pipe to facilitate natural drainage patterns and to allow the passage of livestock or wildlife.

Trenching operations will be followed as closely as practicable by lower-in and backfill operations to minimize the length of time the ditch is open.

When pumping captured stormwater from the trench, the Contractor will ensure that adequate pumping capacity and sufficient hose is available. The discharge of pumped water will be through filter bags or other method detailed in the SWPPP and in accordance with the environmental mitigation measures outlined throughout this EMP. If shallow groundwater is encountered during trenching that requires more extensive dewatering, a separate dewatering discharge permit will be obtained. Energy dissipation devices will be used for dewatering discharges to minimize erosion.

If drain tile is encountered during construction, the Contractor will repair and/or replace the drain tile. Additionally, if any culverts are disturbed during construction the Contractor will repair and/or replace the culverts.

6.5 Pipe Preparation and Installation

Pipe will either be stored at the staging area located at the midline pump station, within the TBPS Facility, or transported directly to the pipeline ROW. Following trenching, pipe will be strung along the ROW. A stringing crew using special trailers will move the pipe along the ROW. Pipe lengths will typically be 40 to 60 feet long.

A pipe-bending machine will be used for making slight bends in the pipe to accommodate variations in the pipeline route or to conform to the topography. Using a series of clamps and hydraulic pressure, the bending machine is used to make a smooth, controlled bend in the pipe. Bending will be in accordance with federal standards to ensure integrity of the bend. Pipe used for sharp bends are bent at the mill. The pipe will be pre-coated with a fusion-bonded epoxy external coating to provide corrosion protection. An ARO coating will also be used on pipe installed via HDD or bore.

The welding process joins the sections of pipe into one continuous length. All welders will be required to pass an approved qualification test; the test will use Project-specific weld procedures developed in accordance with federally adopted welding standards. All field welds will be nondestructively tested to ensure structural integrity and compliance with USDOT regulations. Once welds are approved, the joints will be externally coated and the entire pipeline will be visually and electronically inspected for coating defects, scratches or other damage. Any damage or defects will be repaired before lowering the pipe into the trench.

Prior to lowering into the trench, the coated and welded pipeline will be inspected to ensure it is free of defects. Several side-boom tractors will simultaneously lift the welded sections of pipe and lower them into the trench. Non-metallic slings will be used to protect the pipe and coating as it is raised and lowered into position. Sandbags or foam blocks will be placed at the bottom of the trench prior to laying the pipe in rocky areas to protect the pipe and coating from damage.

As necessary, trench breakers or water stops will be installed adjacent to wetlands and in steep topography to eliminate water migration along the trench. When required, the trench will be dewatered prior to lowering in the pipe. Dewatering effluent will pass through sediment filters, such as hay bale structures and/or filter base, to ensure compliance with applicable water quality requirements.

6.6 Trench Backfilling

Once the pipe is installed, the trench will be backfilled. Soil will be returned to the trench in the reverse order of excavation. The pipeline will be buried with a minimum cover of 72 inches. Subsoil will be returned to the trench first, followed by the topsoil. The trench line will be compacted with a wheeled-roller or other suitable construction equipment. A crown will be left over the trench line to allow for natural subsidence. If the excavated material contains rocks that could damage the pipe and/or coating, a rock shield will be used to protect the pipe. Topsoil will not be used for padding.

6.7 Cleanup

Cleanup activities to restore the ROW and other disturbed areas to the approximate pre-construction conditions will be conducted immediately following backfilling operations, as weather conditions permit. All non-hazardous and hazardous materials will be disposed of in accordance with measures outlined in Section 2.7 and Section 2.8.

The ROW will be re-contoured with spoil material to approximate pre-construction contours and surface drainage patterns. Loading of slopes with unconsolidated spoil material will be avoided during slope re-contouring. Topsoil will be replaced after re-contouring of the grade with subsoil. The topsoil will be replaced on the subsoil storage area and over the trench so that after settling occurs, the topsoil's approximate original depth and contour (with an allowance for settling) will be achieved. Subsoil will not be placed on top of topsoil.

Temporary sediment barriers will be removed and accumulated sediment will be re-contoured with the rest of the ROW. As needed, permanent erosion controls will be installed.

6.8 Permanent Erosion and Sediment Control

After final grading and contouring of upland areas, sloped areas will be stabilized with permanent erosion control structures.

6.8.1 Permanent Slope Breakers

Permanent slope breakers will be installed to minimize concentrated or sheet flow runoff in disturbed areas. Permanent slope breakers will be constructed of earthen material. Slope breakers will divert surface runoff to adjacent stable vegetated areas or to energy-dissipating devices. In general, permanent slope breakers should be installed immediately downslope of all trench breakers. Permanent slope breakers will be installed as specified on the construction drawings or generally with a minimum spacing as shown on the following table:

Slope (%)	Spacing
<5	125 feet
5-10	100 feet
10-20	75 feet
20-30	50 feet
>30	25 feet

The gradient (fall) for each slope breaker will be two to eight percent unless otherwise modified as required by site-specific conditions.

6.9 Reclamation and Revegetation

Reclamation and revegetation activities are designed to return disturbed areas to approximately pre-construction use and capability in accordance with landowner agreements. The following mitigation measures will be utilized, unless otherwise modified to address site specific conditions or circumstances.

Once construction is complete, the pipeline ROW and temporary workspaces will be restored to its original contour and condition to the extent practicable, with the exception of trees and shrubs that must be removed from the ROW to facilitate Project inspection and maintenance. After the ditch has been backfilled, the topsoil will be replaced and approximate original contours restored. Wetland edges will be stabilized and permanent erosion control measures will be installed. For areas to be revegetated, seeding will be conducted in accordance with landowner agreements or as specified by the NRCS. All timber riprap, timber mats, and prefabricated equipment mats and other construction debris will be removed.

6.9.1 Soil Compaction

Compacted cultivated land and any other severely compacted or rutted areas within the construction ROW will be tilled or chiseled to loosen compacted soils. If mechanical relief of compaction is unsuccessful, plowing under of organic matter, including wood chips and manure, or planting of a green crop such as alfalfa, will be considered to decrease soil bulk density and improve soil structure.

6.9.2 Rock Removal

On agricultural land, rocks greater than 4 inches in diameter that are exposed on the surface due to construction activity will be removed from the ROW prior to and after topsoil replacement.

Clearing of rocks may be conducted with a mechanical rock picker or by manual means, provided that preservation of topsoil is assured. Rock removed from the ROW will be hauled off the landowner’s premises or disposed of on the landowner’s premises at a location that is mutually acceptable to the landowner and to TBPL.

6.9.3 Seeding and Mulching

Revegetation will be implemented in accordance with landowner agreements. For areas to be seeded, the final seed mixture will be based on recommendations from the local NRCS or otherwise specified by the landowner.

Certificates of seed analysis are required for all seed mixes to restrict the introduction of noxious weeds. Seed will be used within 12 months of testing.

Seeding will follow cleanup, re-grading, and topsoil replacement as closely as possible. Seed will be applied to all disturbed surfaces, except cultivated fields unless requested by the landowner.

If mulch was applied for temporary erosion control during construction activities, the Contractor will remove and dispose of the excess mulch prior to seedbed preparation to ensure that seedbed preparation equipment and seed drills do not become plugged with mulch. After seeding, the Contractor may evenly re-apply and anchor (straw crimp) the removed temporary mulch on the construction ROW.

Seeding will be completed at a rate appropriate for the region and stability of the reclaimed surface. Seeding rates will be based on pure live seed specifications for the seed mix. The Contractor will plant seed at depths consistent with the local or regional agricultural practices.

The Contractor will use a drill seeder equipped with a cultipacker designed and equipped to apply grass and grass-legume seed mixtures. Equipment will include mechanisms (e.g., seed box agitator) to allow even distribution of all species in each seed mix, an adjustable metering mechanism to accurately deliver the specified seeding rate, and with a mechanism (e.g., depth bands) to accurately place the seed at the specified depth.

Broadcast or hydro seeding, used in lieu of drilling, will require double the recommended seeding rates. Where seed is broadcast, a cultipacker or other equipment will be used immediately following broadcasting to incorporate the seed to the specified depth and to firm the seedbed. Areas that are too steep or otherwise cannot be safely harrowed or cultipacked will be hand-raked in order to incorporate the broadcast seed to the specified depth.

Immediately after seeding, the Contractor will apply certified weed free mulch on all areas with high erosion potential and on slopes greater than 5 percent. The Contractor will spread mulch uniformly over the area to cover at least 75 percent of the ground surface at an approximate rate of 2 tons per acre of hay or straw or their equivalent. The Contractor will not apply mulch in cultivated areas unless requested by the landowner.

If a mulch blower is used, the majority of strands of the mulching material will not be shredded to less than 8 inches in length to allow anchoring. The Contractor will anchor mulch immediately after application to minimize loss by wind and water. Depending upon the length of straw mulch, a soil tackifier may be applied to the soil before the mulch is blown onto help anchor the mulch.

When anchoring (straw crimping) by mechanical means, the Contractor will ensure that

the straw stalks are a minimum of 12 inches in length and will use a tool specifically designed for mulch anchoring with flat, notched disks to properly crimp the mulch to a depth of 2 to 3 inches.

6.9.4 Tree and Shrub Mitigation

TBPL will address mitigation, reclamation and remediation measures with individual landowners and comply with any applicable state requirements, including the Commission's Tree and Shrub Mitigation Specifications.

TBPL will inventory all trees and shrubs anticipated to be cleared, including those that are considered invasive species or noxious weeds before cutting. The inventory will record the location, number, and species of trees and shrubs.

Except in the case of invasive or noxious species, trees and shrubs will be replaced by the same species or similar species, suitable for North Dakota growing conditions, as recommended by the local office of the Natural Resource Conservation Service (NRCS). Invasive or noxious species will be replaced by similar non-invasive or non-noxious species suitable for North Dakota growing conditions as recommended by the NRCS.

Trees and shrubs will be replaced consistent with the Commission's Tree and Shrub Mitigation Specifications. Two 2-year-old saplings will be planted for every one tree removed. Two shrubs (stem cuttings) will be planted for every one shrub removed.

Landowners will be given the option of having replacement trees and shrubs planted on the landowner's property either on or off the ROW. The landowner will also be given the opportunity to waive those options, in writing, to have replacement trees and shrubs planted off the landowner's property.

To facilitate visual inspections of the ROW in accordance with USDOT safety regulations, tree and shrub replacement will not be conducted within the pipeline ROW.

6.9.5 Fences, ROW and Pipeline Markers

Upon completion of all backfilling, cleanup, and restoration, including mulching and seeding of the construction ROW, permanent repairs will be made to all fences by using either the original material or good quality new material similar to existing fences.

Historic fences will be carefully reassembled by hand from the original material. Where the original material has deteriorated to a state that makes it unsalvageable, replacement material similar to the original will be used if possible.

Upon completion of all cleanup and restoration activities and during the time when the Contractor is making permanent repairs to fences, the Contractor will install pipeline markers on each side of all roads, section line crossings, fence lines, and other areas where the pipeline markers do not conflict with intended land use.

7.0 WETLAND CROSSINGS

7.1 General

United States Army Corps of Engineers (USACE) issued an Approved Jurisdictional Determination (AJD) identifying WOUS within the Corridor Study Area. The HDD method will be used for WOUS crossings to avoid impact or disturbance to the streams and jurisdictional wetlands. WOUS and the boundaries of jurisdictional wetlands will be clearly marked in the field with signs and/or highly visible flagging during construction. Typical HDD schematics for the WOUS crossings are provided in **Appendix A**. Any unanticipated impacts to wetlands that may occur will be authorized under Untied States Army Corps of Engineers (USACE) Nationwide Permit 12.

Conventional construction methods will be used to cross wetlands identified as not WOUS per the USACE AJD. Where conventional construction methods are used, and as applicable where the HDD method is used, the general mitigation procedures of this section of the EMP will be followed by the Contractor. The Contractor will comply with requirements of all permits issued for the wetland crossings by federal, state or local agencies. Any unanticipated impacts to WOUS will be authorized under USACE Nationwide Permit 12.

7.2 Easement and Workspace

The Contractor will maintain wetland boundary markers during construction in all areas and until permanent seeding is complete in non-cultivated areas.

The Contractor will locate extra work areas (such as staging areas and additional spoil storage areas) at least 100 feet away from wetland boundaries, where topographic conditions permit.

The Contractor will limit clearing of vegetation between extra work areas and the edge of the wetland to the construction ROW and limit the size of extra work areas to the minimum needed to construct the wetland crossing.

7.3 Wetland Crossing Methods

The following general mitigation procedures will be followed by the Contractor in all wetland areas, unless otherwise approved or directed by TBPL, based on site-specific conditions. All work will be conducted in accordance with applicable permits.

- limit the duration of construction-related disturbance within wetlands to the extent practicable;
- use no more than two layers of timber riprap to stabilize the construction ROW;
- cut vegetation off at ground level leaving existing root systems in place and remove it from the wetland for disposal;
- limit pulling of tree stumps and grading activities to directly over the trench line unless safety concerns require the removal of stumps from the working-side of the construction ROW;

- segregate a maximum of 12 inches of topsoil from the area disturbed by trenching in dry wetlands, where practicable;
- restore topsoil to its approximate original stratum, after backfilling is complete;
- dewater the trench in a manner to prevent erosion and heavily silt-laden flowing directly into any wetland or waterbody;
- remove all timber riprap and prefabricated equipment mats upon completion of construction;
- locate hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable;
- prohibit storing hazardous materials, chemicals, fuels, lubricating oils, or perform concrete coating activities in a wetland, or within 100 feet of any wetland boundary;
- perform all equipment maintenance and repairs upland locations at least 100 feet from waterbodies and wetlands;
- avoid parking equipment overnight within 100 feet of a watercourse or wetland;
- prohibit washing equipment in streams or wetlands;
- install trench breakers and/or seal the trench to maintain the original wetland hydrology, where the pipeline trench may drain a wetland;
- attempt to refuel all construction equipment in an upland area at least 100 feet from a wetland boundary (otherwise follow the procedures outlined in Section 3); and,
- avoid sand blasting in wetlands to the extent practicable. If sandblasting is performed within a wetland, the Contractor shall place a tarp or suitable material in such a way as to collect as much waste shot as possible and dispose of the collected waste. The Contractor shall clean up all visible deposits of wastes and dispose of the waste at an approved disposal facility.

Specific procedures for each type of wetland crossing method are listed below and shall be designated on the construction drawings but may be modified depending on site conditions at the time of construction. All work shall be conducted in accordance with applicable permits.

7.3.1.1 Dry Wetland Crossing Method

Topsoil shall be segregated. Pipe stringing and fabrication may occur within the wetland adjacent to the trench line or adjacent to the wetland in a designated extra workspace.

The dry wetland crossing procedure shall be used where this type of wetland is identified on the construction drawings. The following are exceptions to standard wetland crossing methods:

- the width of the construction ROW for upland construction is maintained through the wetland.

- where extra work areas (such as staging areas and additional spoil storage areas) are designated on the construction drawings, they may be placed no closer than 100 feet from the wetland's edge.
- if the wetland is cultivated, the topsoil shall be stripped using the trench and spoil side method at the same depth as the adjacent upland areas.
- seeding requirements for agricultural lands shall be applied to farmed wetlands.

7.3.1.2 Standard Wetland Crossing Method

Topsoil stripping is impracticable due to the saturated nature of the soil. Pipe stringing and fabrication may occur within the wetland adjacent to the trench line or adjacent to the wetland in a designated extra workspace. Based upon the length of a standard wetland crossing and presence of sufficient water to float the pipe, the Contractor may elect to install a standard wetland crossing utilizing the “push/pull” method.

The standard wetland crossing procedure shall be used where this type of wetland is identified on the construction drawings. Procedures unique to standard wetlands include:

- limiting construction ROW width to a maximum of 75 feet unless site conditions warrant a wider width;
- utilizing low-ground-pressure construction equipment or support equipment on timber riprap or timber mats; and,
- installing sediment barriers across the entire ROW where the ROW enters and exits the wetland.

7.4 Restoration and Reclamation

All timber riprap, timber mats, and prefabricated equipment mats and other construction debris shall be removed upon completion of construction. As much as is feasible, the Contractor shall replace topsoil and restore original contours with no crown over the trench. Any excess spoil shall be removed from the wetland. The Contractor shall stabilize wetland edges and adjacent upland areas by establishing permanent erosion control measures and revegetation, as applicable, during final clean up.

In the absence of detailed revegetation plans or until the appropriate seeding season for permanent wetland vegetation in standard wetlands, the Contractor shall apply a temporary cover crop on the construction ROW at a rate adequate for germination and ground cover unless standing water is present. The Contractor shall apply the temporary cover crop during final cleanup. For farmed wetlands, the Contractor shall apply seeding requirements for agricultural lands or as required by the landowner.

The Contractor shall not use fertilizer, lime, or mulch in wetlands unless required in writing by the appropriate land management agency.

8.0 SURFACE WATER AND GROUNDWATER DRAINAGE

The WOUS within the construction ROW have been identified by the USACE including one perennial stream (East Fork Shell Creek). To minimize disturbances to surface water during construction, the HDD method will be used at the crossings of East Fork Shell Creek and wetlands determined by the USACE to be WOUS. Typical HDD schematics for the WOUS crossings are provided in **Appendix A**.

Intermittent drainages will be crossed using open-cut construction. These drainages are expected to be dry during construction of the proposed pipeline; therefore, no changes to surface drainage patterns are anticipated. If these drainages are flowing, then the open cut method of construction will not be used and the HDD method will be utilized instead to avoid disturbance of the flowing drainage. After construction, disturbed areas will be restored to approximate pre-construction contours, allowing drainage patterns to remain unchanged.

TBPL will implement the following mitigation measures to minimize the potential for impacts to surface water and drainages:

- Develop and implement a Project-specific Stormwater Pollution Prevention Plan (SWPPP) to minimize erosion and potential effects associated with stormwater runoff and sediment transport to surface waters during construction. The SWPPP will include BMPs that will be implemented until final reclamation has been achieved to minimize changes to the existing surface drainage patterns and avoid alteration of existing groundwater flow patterns.
- Implement temporary erosion control BMPs (e.g., slope breakers, sediment barriers, and mulch) to minimize the potential for soil loss due to wind or water erosion during construction.
- Restore the work area to approximate pre-construction contours.
- A Project-specific SPCC Plan will be prepared for the Project if oil storage will exceed 1,320 gallons. The SWPPP and SPCC Plan will describe response, containment, reporting, and cleanup procedures. TBPL will implement measures to prevent accidental discharges of fuels or other hazardous substances as outlined in the SPCC Plan including specific storage and handling requirements.

The project will not affect sloughs, ponds, lakes (i.e., wetlands) outside of the Corridor Study Area; therefore, no surface drain permits are anticipated to be required. In addition, the project will have no direct impacts to surface drain permits Taylor Slough Drain (DR-661) and Wild Willow Drain (DR-4495). In the unlikely event that either DR-661 or DR-4495 will be modified, the DWR will be notified.

No North Dakota Department of Water Resources (DWR) observation wells were identified within the Corridor Study Area; therefore, no direct impacts to water wells are anticipated. If an observation well is encountered during project activities and must be

removed, the DWR Water Appropriation Division will be notified. If the functionality of a well is impacted, a replacement well(s) will be installed.

With the implementation of these protection measures, no adverse effects on surface water or groundwater are anticipated. No additional mitigation measures to protect surface water and groundwater are anticipated to be required.

9.0 HYDROSTATIC TESTING

9.1 General

The Contractor will provide for the safety of all pipeline construction personnel and the general public during hydrostatic test operations by placing warning signs in populated areas.

Staging and work areas for filling the pipeline with water will be located a minimum of 100 feet from a waterbody or wetland boundary if topographic conditions permit.

The Contractor will locate hydrostatic test manifolds 100 feet outside wetlands and riparian areas to the extent practicable.

9.2 Test Water Source

TBPL will provide the Contractor with a copy of the appropriate withdrawal/discharge permits for hydrostatic test water. The Contractor will keep water withdrawal/discharge permits on site at all times during testing operations. No chemicals will be used in the test water.

In some instances, sufficient quantities of water may not be available from the permitted water sources at the time of testing. Withdrawal rates may be limited as stated by the permit. If the quantity of water from the permitted source is insufficient to allow for hydrostatic testing of the pipeline, an alternative source will be identified, and permit authorization sought by TBPL.

The Contractor will be responsible for obtaining any required water analyses from each source to be used in sufficient time to have a lab analysis performed prior to any filling operations. The analysis will determine the pH value and total suspended solids and other parameters that may be required by the North Dakota Department of Health, Division of Water Quality.

9.3 Water Discharge

The Contractor will comply with state issued NPDES permits for discharging test water.

The Contractor will not discharge any water containing oil or other substances that are in sufficient amounts as to create a visible color film (“sheen”) on the surface of the receiving water.

The Contractor will not discharge into state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate federal, state, and local permitting agencies grant written permission. To avoid impacts from introduced species, no inter-basin transfers (discharge) of hydrostatic test water will occur.

Discharge operations will be monitored, and water samples will be collected and analyzed prior to the beginning of the discharge to ensure that it complies with the Project and permit requirements. If required by state permits, additional water quality testing will

be conducted during discharge, in accordance with permit conditions.

The Contractor will regulate the hydrostatic discharge velocity rate (3,000 gallons per minute maximum), use energy dissipation devices, and install sediment barriers, as necessary, to prevent erosion, streambed scour, suspension of sediments, or excessive stream flow. Water must be disposed of using good engineering judgment so that all federal, state, and local environmental standards are met. Dewatering lines will be of sufficient strength and be securely supported and tied down at the discharge end to prevent whipping during this operation.

Selected road crossing pipe sections may be specified to be pre-tested for a minimum of 4 hours. The water for pre-testing of any road and railroad crossings will be hauled by a tanker truck from an approved water source. Since the volume of water utilized in these pre-tests will be relatively small, the water will be discharged overland along the construction ROW and allowed to soak into the ground utilizing erosion and sediment control measures.

10.0 AGRICULTURAL PRODUCTION, FAMILY FARMS, AND RANCHES

TBPL will implement the following mitigation measures to minimize potential impacts to agriculture productivity, family farms, and ranches:

- Bury the pipeline with a minimum cover of 72 inches.
- Suspend construction or implement adequate protection measures during periods of prolonged, heavy rainfall, and abnormally wet conditions to prevent excessive rutting or mixing of topsoil with subsurface soils, and to minimize the potential for soil compaction and reduced soil productivity.
- Alleviate soil compaction caused by construction by deep tilling or chisel-plowing soils (or by using other methods approved by the landowner) where compaction has been shown to have been caused by construction.
- To prevent soil mixing, topsoil will be stripped down to a maximum depth of 12 inches, segregated from the underlying subsoil, and topsoil and subsoil will be stored in a manner that prevents mixing to allow topsoil to be returns to its original horizon during backfilling.
- Rocks greater than 4 inches in diameter that are exposed on the surface due to construction activity will be removed from the ROW prior to and after topsoil replacement.
- Implement temporary erosion control BMPs (e.g., slope breakers, sediment barriers, and mulch) to minimize the potential for soil loss due to wind or water erosion during construction.
- Following construction, topsoil will be replaced, original contours restored to approximate pre-construction contours, and farming and ranching operations will be allowed to resume within the permanent ROW.
- Compensate landowners for crop losses during construction.
- Coordinate with landowners to assess crop productivity following construction and provide compensation where crop yields show decline.
- Compensate landowners for a permanent easement on their property.

11.0 VEGETATION, WILDLIFE, AND LIVESTOCK

Trees and woody vegetation within the Corridor Study Area are primarily limited to the banks of East Fork Shell Creek. During construction of the proposed pipeline and aboveground facilities, TBPL will avoid removal of trees and shrubs, if practicable. If removal of trees and shrubs cannot be avoided, they will be enumerated by direct count per the Commission's Tree and Shrub Mitigation Specifications as previously described in Section 6.1. Trees and shrubs will be replaced consistent with the Commission's Tree and Shrub Mitigation Specifications.

A Weed Control Plan will be developed in conjunction with the Ward and Mountrail Counties' Weed Control Boards. BMPs will be implemented to prevent the spread of noxious weeds and to minimize the risk of importing, transporting, or spreading of noxious weeds during construction. Areas with noxious weeds within the Corridor Study Area will be identified, and additional measures will be taken during construction in these areas to prevent the spread of seeds including cleaning all equipment before leaving the site and treating all disturbed soils with herbicides as approved by the landowner(s) of the participating properties.

To allow the movement of livestock and wildlife, temporary access routes will be maintained across the ROW. Trenches will also be regularly sloped to allow any trapped wildlife to escape.

Disturbed areas will be restored in accordance with the landowner agreements. For those areas to be reseeded, a native weed-free seed mix will be used as approved by the landowner(s).

No threatened or endangered species or critical habitat were identified as present within the Corridor Study Area or crossed by the Route for the proposed pipeline or existing pipeline. Several sensitive wildlife habitats were identified in the vicinity of the Corridor Study Area, primarily in the vicinity of stream crossings and associated jurisdictional wetlands or WOUS. Disturbances to WOUS within the proposed pipeline corridor will be avoided by using the HDD method.

The U.S. Fish and Wildlife Service (USFWS) developed the avoidance and minimization measures as described in the Programmatic Biological Assessment and Biological Evaluation (BABE) for Fort Berthold Indian Reservation (FBIR) Oil and Gas Development (Cardno 2014) and subsequent Revised Addendum to Programmatic Biological Assessment and Biological Evaluation (BABE Addendum) for Fort Berthold Indian Reservation Oil and Gas Development (Trihydro Corporation 2015). The avoidance and minimization measures identified by the USFWS for the potentially affected threatened and endangered species within the project area are listed in **Table 1.**

Table 1 Conservation Measures for Potentially Affected Endangered Species

Common Name	Scientific Name	Status		Conservation Measure(s)
Whooping crane	*Grus americana*	Endangered	1	If whooping cranes are sighted within 1-mile (2 km) radius of any work site, all construction activities would be modified or curtailed until the bird(s) have left the area, USFWS would be contacted on how to proceed, and the TAT Fish and Wildlife Division would be notified. The Bureau of Indian Affairs (BIA) will provide an identification guide for on-site personnel.
			2	The operator, with BIA oversight, will establish a three-year post-construction monitoring program for whooping cranes in both spring and fall migration seasons (spring: April 1 to May 15; fall: September 10 to October 31) to identify habitat use. Four locations will be established, at the discretion of the USFWS discretion.
Piping plover	*Charadrius melodus*	Threatened	1	No drilling or production activities within the first 1,000 feet (305 meters) from Lake Sakakawea high high-water mark (HHWM; 1,854 feet [565 meters] above mean sea level [MSL]). If a physical topographic barrier does not exist from the site selected to 1,000 feet (305 meters) from the HHWM, the site surveys to ensure species' absence would be conducted, if the location is within 0.5 mile (0.8 km) of HHWM.
			2	No drilling or production activities within (excluding pipelines and transportation/utility corridors) within 150 feet (46 meters) from wetlands, perennial, and intermittent streams (as identified at the onsite meeting).
			3	Closed loop drilling systems would be implemented on the FBIR boundary lands over which BIA has jurisdiction.
Red knot	*Calidris canutus rufa*	Threatened	1	No drilling or production activities within the first 1,000 feet (305 meters) from the Lake Sakakawea HHWM (1,854 feet [565 meters] above MSL).
			2	No drilling or production activities (excluding pipelines and transportation/utility corridors) within 150 feet (46 meters) from wetlands, perennial, and intermittent streams (as identified at the onsite meeting).
			3	Closed loop drilling systems would be implemented on the FBIR boundary lands over which BIA has jurisdiction.
Dakota skipper	*Hesperia dacotae*	Threatened	1	Possible high-quality habitat identified from the Habitat Suitability Model (HSM) will be verified via field quantitative vegetation surveys[1] per requirements in Figure 5 and Appendix A of the Addendum BABE. Field verified high quality habitat would not be modified or disturbed unless Dakota skipper occupancy surveys result in no detections, per USFWS (2015b) requirements. Detailed field habitat survey requirements are included in Appendix A of the Addendum BABE.
			2	Possible quality habitat identified from the HSM will be verified via qualitative field ecological system surveys[2] per requirements in Figure 5 and Appendix A of the Addendum BABE. Follow-up quantitative vegetation surveys, if necessary, would be conducted and field verified high quality habitat would only be modified or developed if Dakota skipper occupancy surveys result in no detections, per USFWS

Table 1 Conservation Measures for Potentially Affected Endangered Species

Common Name	Scientific Name	Status		Conservation Measure(s)
				(2015b) requirements. Detailed field habitat survey requirements are included in Appendix A of the Addendum BABE.
			3	Habitat that is possibly disturbed, not likely or not present identified from the HSM will be verified via qualitative field ecological system surveys[3] per requirements in Figure 5 and Appendix A. Follow-up quantitative vegetation surveys, if necessary, would be conducted and field verified high quality habitat would only be modified or disturbed if Dakota skipper occupancy surveys results in no detections, per USFWS (2015b) requirements. Detailed field habitat survey requirements are included in Appendix A of the Addendum BABE.
Northern long-eared bat	*Myotis septentrionalis*	Threatened	1	If forested upland habitat is identified during the onsite meeting, generally BIA would require operators to leave the habitat intact to the greatest extent possible. If any tree (with a diameter of greater than 2 to 3 inches) removal activities cannot be avoided between April and September, then northern long-eared bat occupancy surveys would be conducted.
			2	If any suitable roost sites, possible hibernacula, or the species are observed during the onsite meeting, then any steps taken to avoid and minimize disturbance of this habitat would be documented.

Notes

1 If less than 0.25 acre within direct disturbance and not within 0.62 mile of a larger complex, then third-party representative can complete Dakota skipper documentation to comply with the Addendum BABE, per BIA requirements, for proposed development.

2 If adjacent habitat is inaccessible to confirm whether its prairie habitat, and HSM indicates adjacent prairie possible habitat, and the project area cannot be moved to reduce direct impacts to prairie habitat less than 25 percent, then additional survey permissions must be obtained for adjacent areas and subsequent surveys must be completed.

3 If survey permissions cannot be obtained, then confirmation will be limited to the area of possible direct impacts. The use of the HSM and line of sight observations for potential prairie patches and unsuitable habitat are acceptable.

TBPS is committed to the integration of and adherence to the conservation measures, avoidance and minimization measures to ensure the activities associated with oil and gas development comply with the Endangered Species Act (ESA). TBPS will implement all relevant conservation measures applicable to each potentially affected species within the project area as summarized in **Table 1**; however, these measures primarily apply to drilling or production activities. In addition, as result of historic disturbance, there is little or no suitable habitat for these protected species within or near the Corridor Study Area for the proposed pipeline.

12.0 CULTURAL RESOURCES

During the Metcalf Class III Cultural Resource Inventory, no cultural resources were identified within the Field Survey Area; however, there is always the possibility of inadvertent discoveries of archaeological and cultural resources during the construction phase of the project.

In the event that undiscovered, unreported cultural resource or human remains are found during construction, TBPL will implement the following measures:

- Stop all work in the immediate area of the find,
- Immediately notify SHSND, BIA, and THPO,
- Work cannot commence near the find until the NRHP eligibility of the discovery has been determined and the effects of the undertaking mitigated if appropriate, and
- All sensitive sites will be marked for avoidance.

If the discovery involves human remains, the Native American Graves Protection and Repatriation Act (25 United States Code [USC] Ch. 32) and its implementing regulations at 43 CFR Part 10 will apply. With implementation of these measures, no impacts to these sites are anticipated as a result of the Project.

13.0 REFERENCES

Cardno. 2014. Programmatic Biological Assessment and Biological Evaluation for Fort Berthold Indian Reservation Oil and Gas Development. Bureau of Indiana Affairs. Aberdeen, SD.

Trihydro Corporation. 2015. Revised Addendum to Programmatic Biological Assessment and Biological Evaluation for Fort Berthold Indian Reservation Oil and Gas Development, May 2014 and August 2015. Bureau of Indiana Affairs. Aberdeen, SD.

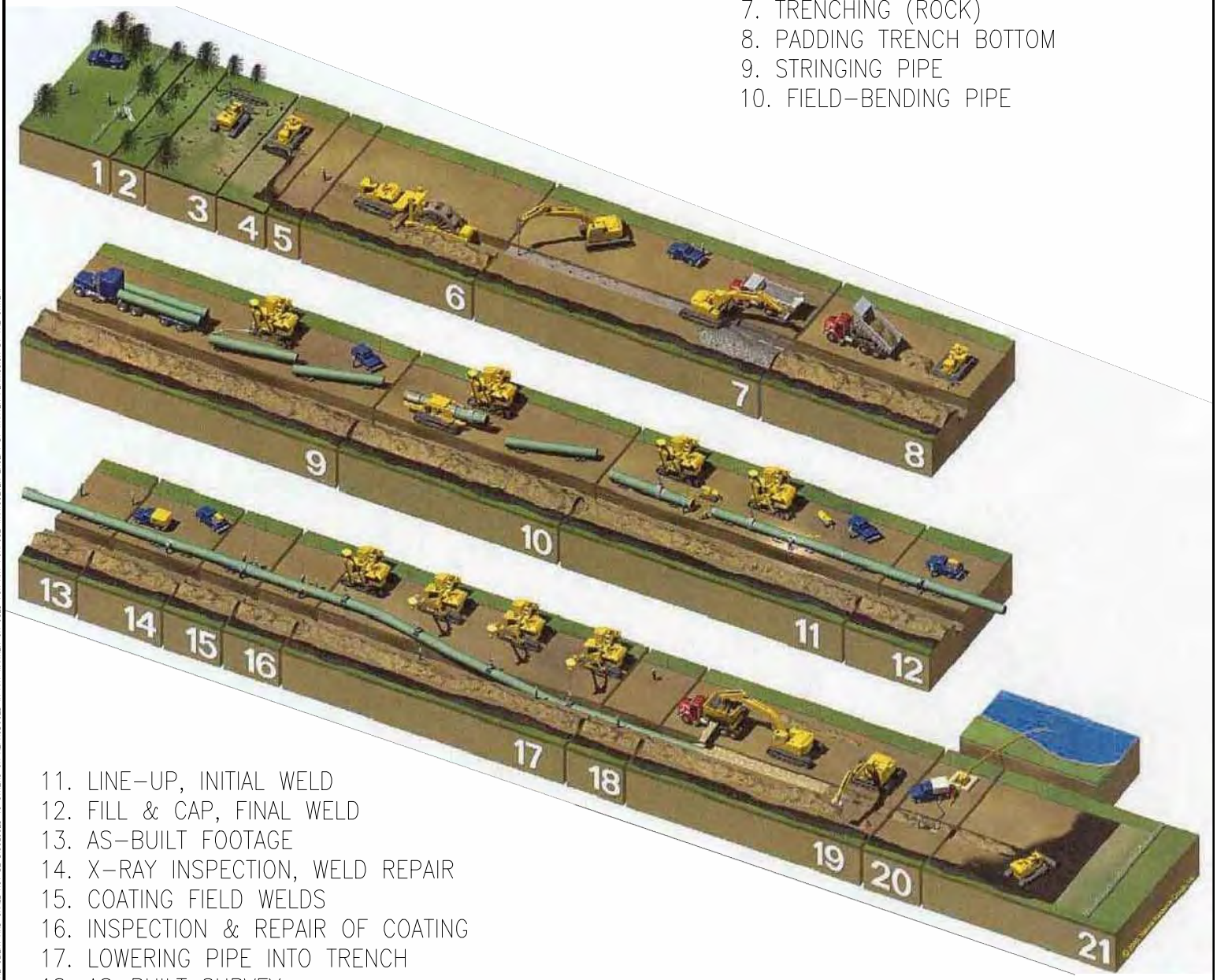
USFWS. 2011. Response to Request for Scoping Comments, Programmatic Biological Assessment. North Dakota Ecological Services Field Office. Bismarck, ND.

USFWS. 2014. Letter of Concurrence, Programmatic Biological Assessment and Biological Evaluation for Fort Berthold Indian Reservation Oil and Gas Development. North Dakota Ecological Services Field Office. Bismarck, ND.

USFWS. 2015. Letter of Concurrence for Amended MHA Oil and Gas Programmatic Biological Assessment and Biological Evaluation. North Dakota Ecological Services Field Office. Bismarck, ND.

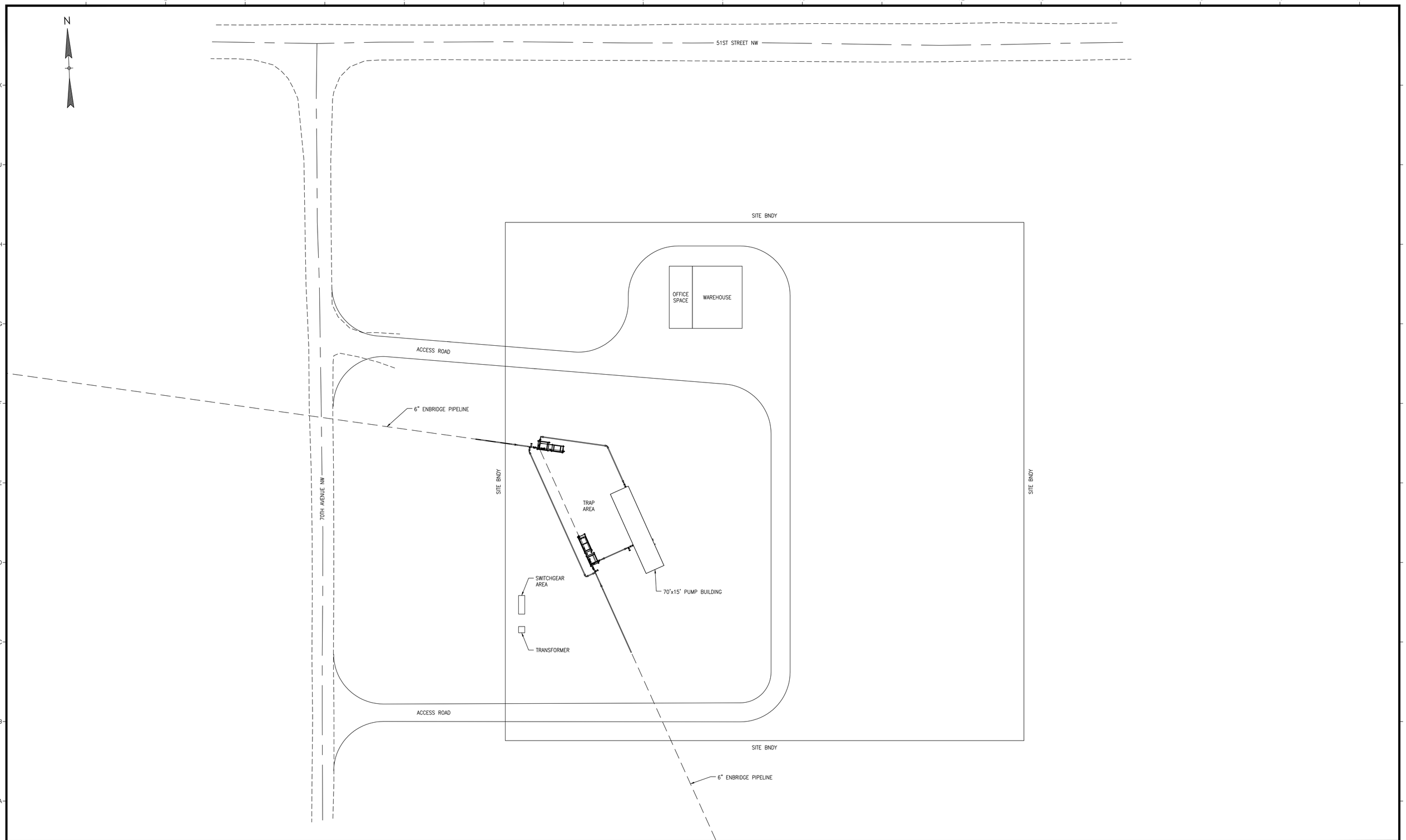
APPENDIX A
Construction Schematics

1. SURVEY AND STAKING
2. CLEARING
3. FRONT-END GRADING
4. ROW TOPSOIL STRIPPING
5. RE-STAKING CENTERLINE OF TRENCH
6. TRENCHING (WHEEL DITCHER)
7. TRENCHING (ROCK)
8. PADDING TRENCH BOTTOM
9. STRINGING PIPE
10. FIELD-BENDING PIPE



11. LINE-UP, INITIAL WELD
12. FILL & CAP, FINAL WELD
13. AS-BUILT FOOTAGE
14. X-RAY INSPECTION, WELD REPAIR
15. COATING FIELD WELDS
16. INSPECTION & REPAIR OF COATING
17. LOWERING PIPE INTO TRENCH
18. AS-BUILT SURVEY
19. PAD, BACKFILL, ROUGH GRADE
20. HYDROSTATIC TESTING, FINAL TIE-IN
21. REPLACE TOPSOIL, FINAL CLEANUP, FULL RESTORATION

THIS DRAWING AND THE DESIGN IT COVERS ARE CONFIDENTIAL AND REMAIN THE PROPERTY OF THE CLIENT AND SHALL NOT BE DISCLOSED TO OTHERS OR REPRODUCED IN ANY MANNER OR USED FOR ANY PURPOSE WHATSOEVER EXCEPT BY WRITTEN PERMISSION BY THE OWNER.



:Reference Drawings

:Facility Name

No.	Revision Description	Project ID	Date
A	ISSUED FOR REVIEW	AFE#	12/01/2023

Notes:

THUNDER BUTTE PIPELINE
MIDLINE PUMP STATION
GENERAL ARRANGEMENT

Status: ISSUED FOR REVIEW

State: NORTH DAKOTA	PIN No:
County: MOUNTRAIL	Scale: 1/32"=1'-0"
Category:	
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Drawing No: TBPL-2023-MPS-GA-002	Rev A

Nov 30, 2023 - 9:53AM

PLOT STYLE: PSI-PIPING.ctb

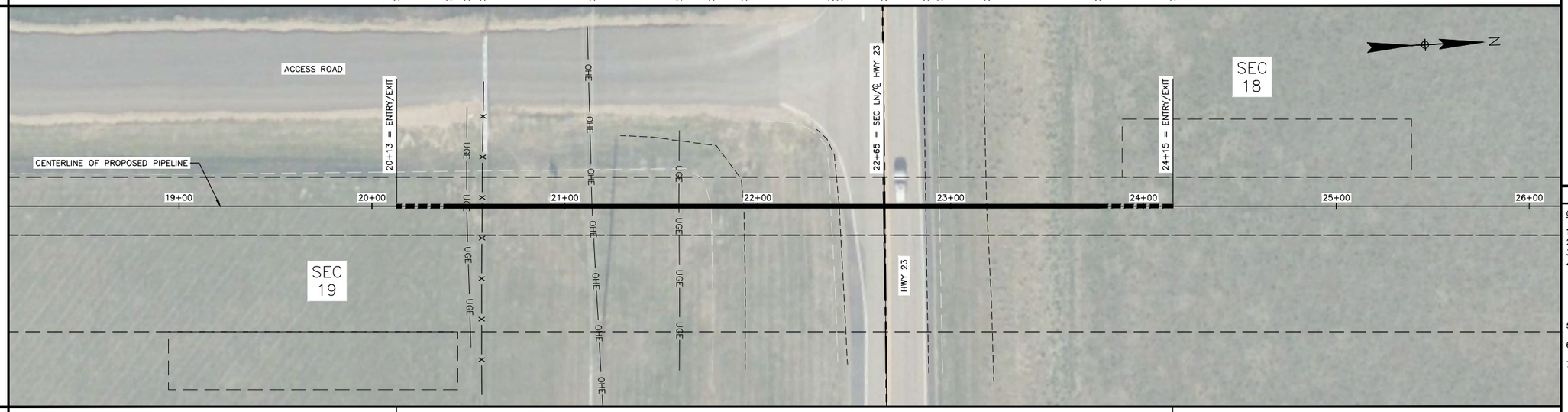
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OWNERS	T.A.T. TRUST – 252'	SOO LINE RAILROAD COMPANY – 150'

PIPELINE STATIONS AT ALIGNMENT ℄

20+13 = ENTRY/EXIT
20+40 = PIPELINE TIE-IN
20+49 = EX. UGE*
20+57 = EX. FENCE
21+14 = EX. OHE
21+59 = EX. UGE*
21+76 = TOP OF BANK
21+93 = TOE OF BANK
22+38 = TOP OF BANK
22+42 = EDGE OF ASPHALT
22+65 = SEC LN/℄ HWY 23
22+87 = EDGE OF ASPHALT
22+94 = TOP OF BANK
23+19 = TOE OF BANK
23+77 = PIPELINE TIE-IN
24+15 = ENTRY/EXIT

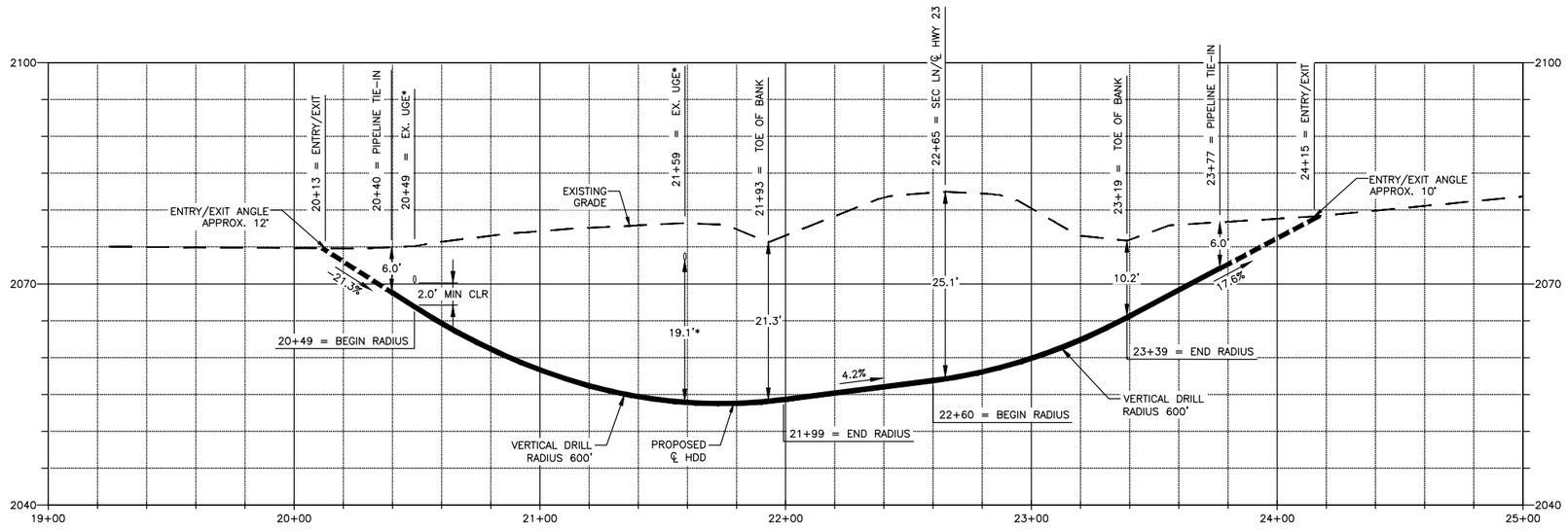
ALIGNMENT STRIP MAP



6" OIL
MAWP = 1400 PSIG

LONGITUDINAL LENGTH: 402' 6.625" OD x 0.188" WT X-52
EQUIVALENT LENGTH: 406' 6.625" OD x 0.188" WT X-52

PROFILE
PROFILE VERTICAL SCALE: 1" = 10'



PROFILE HORIZONTAL SCALE: 1" = 30'

BILL OF MATERIALS

PIPE QUANTITIES – THIS DRAWING

SERVICE	OD	WT	GR	LF	MFR
OIL	6.625"	0.188"	X-52	402'	TBD

MATERIAL QUANTITIES – THIS DRAWING

DESCRIPTION	QUANTITY
PIPELINE MARKER	2

PRELIMINARY

FIELD NOTES

CONSTRUCTION:

1. ALL STATIONING IS TO CENTERLINE OF ALIGNMENT.
2. TEST: SEE TEST FORM
3. RADIOGRAPH: PER THUNDER BUTTE PIPELINE STANDARDS
4. CODES: THIS PIPELINE(S) INSTALLED UNDER THE FOLLOWING:
   - A. 49 CFR 195 (LIQUID)
   - B. ASME 31.4 (LIQUID)
   - C. ALL APPLICABLE PERMITS
   - D. COMPANY STANDARDS
5. IMPRESSED CURRENT CATHODIC PROTECTION TO BE INSTALLED PER COMPANY STANDARDS.
6. PIPELINE MARKERS WILL BE INSTALLED AT EVERY ROAD CROSSING, R.O.W. BOUNDARY AND PIs.
7. A REPRESENTATIVE BORE SAMPLE WAS TAKEN AT THE NEARBY THUNDER BUTTE FACILITY (APPROX. 1/4-MILE FROM BORE SITE). GROUNDWATER WAS NOT DISCOVERED TO A DEPTH OF 25'.

COATINGS:

1. PIPE COATING: 14-16 MIL FBE, 30 MIL ARO
2. JOINT COATING: 30-40 MILS POWERCRETE TYPE J OR EQUIVALENT

SCALE & PROJECTION

0 30' 60'
SCALE: 1"=30'

LOCATION: SECTIONS 18 & 19, T152N, R87W

PROJECTION: UTM WITH NAD83 DATUM, ZONE 14, US FOOT

LEGEND

- ℄ OF PROPOSED HDD
- EXISTING PIPELINE
- GAS GAS EXISTING GAS LINE
- W EXISTING WATER LINE
- PIPELINE R.O.W. OR EASEMENT
- SECTION LINE
- ROAD R.O.W.
- ROAD
- X X FENCE
- DITCH
- UGE UNDERGROUND ELECTRIC (UGE)
- OHE OVERHEAD ELECTRIC (OHE)
- RAILROAD

NOTES:

DESIGN:
1. DESIGN PRESSURE:
   A. LIQUID – 1440 PSIG
2. DESIGN FACTOR: 0.72 (LIQUID)
3. TYPICAL DRAWINGS – SHALL APPLY AS NECESSARY
   A. PIPELINE: SEE COMPANY STANDARDS
   B. CATHODIC PROTECTION: SEE COMPANY STANDARDS

CONTRACTOR SHALL SUBMIT AS-BUILT DRAWINGS AND DATA UPON HDD COMPLETION.

* DEPTH OF EX. UTILITY/PIPELINE UNKNOWN. CONTRACTOR TO FIELD VERIFY.

REFERENCE DRAWINGS

DWG NO.	TITLE
–	–

REVISIONS

REV	DESCRIPTION	BY	DATE	CHK BY	CHK DATE	APR BY	APR DATE
A	ISSUED FOR REVIEW	DRA	10/25/23	SNL	10/27/23	–	–

APPROVALS

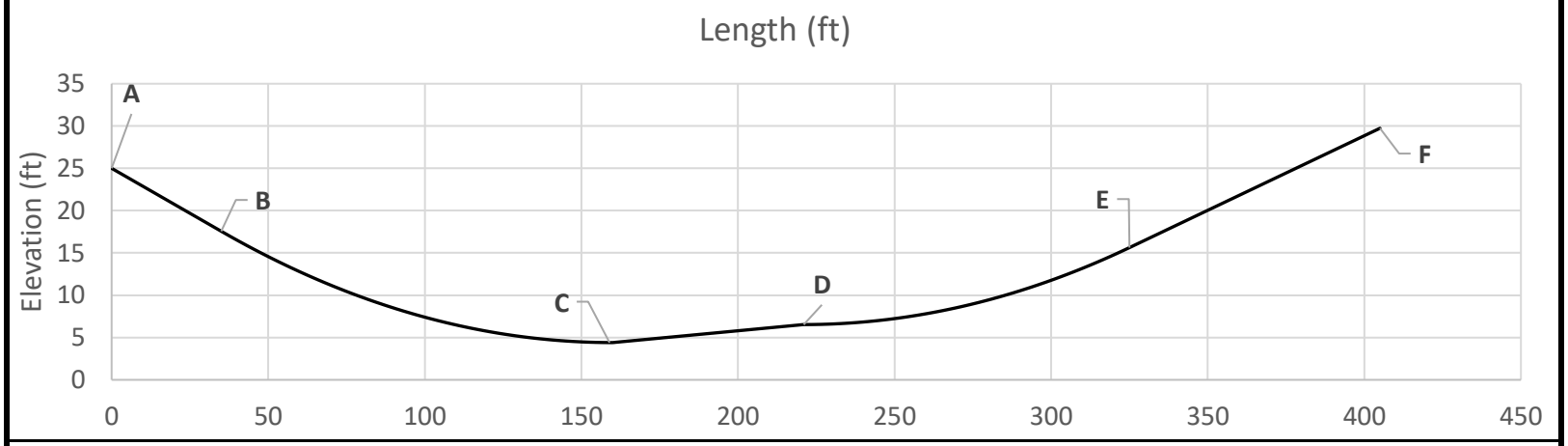
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CHECKED	–	–
APPROVED	–	–

THUNDER BUTTE PIPELINE, LLC

THUNDER BUTTE PIPELINE
MOUNTRAIL COUNTY, NORTH DAKOTA
HORIZONTAL DIRECTIONAL DRILL
HWY 23 CROSSING

SCALE:	DRAWING NO.	REV.
AS NOTED	TBPL-HDD-001	A

Project	Revision
Thunder Butte Pipleline	2
Location	**Date**
ND	11/3/2023



HDD - Pull Force and Installation Stress Analysis

PIPE AND PROFILE DATA:

Pipe Outside Diameter [in]	6.625
Pipe Wall Thickness [in]	0.188
Specified Minimum Yield Strength [psi]	52,000
Young's Modulus [ksi]	29,000
Poissons Ratio	0.30
Mud Weight [lbs/ft^3]	86.03
Soil Friction Coefficient	0.30
Fluid Drag Coefficient [psi]	0.05
Water Density [lbs/ft^3]	62.40
Pipe Filled With Water	No
Effective Weight of Pipe [lbs/ft]	-7.68
Straight Section "A-B" Downslope	
Measured Length [ft]	36.0
Angle of Inclination [degree]	12.0
Straight Section "C-D"	
Measured Length [ft]	61.0
Angle of Inclination [degree]	2.0
Straight Section "E-F" Upslope	
Measured Length [ft]	81.5
Angle of Inclination [degree]	10.0
Pipe Safety Factors	
Design Factor (Class Location)	0.7
Factor of Safety	1.2
Maxium Load Factor	0.9

RESULTS OF CALCULATION:

Total Pull Force [lbs]	**6,978**
Allowable Pull Force [lbs]	**97,491**
	PASS
Total Tensile Stress [psi]	**1,835**
Allowable Tensile Stress [psi]	**46,800**
	PASS
Total Shear Stress [psi]	**269**
Allowable Shear Stress [psi]	**23,400**
	PASS
Curved Section "B-C" Downslope	
Measured Length [ft]	125.7
Bend Angle [degree]	12.0
Radius of Curvature [ft]	600.0
Curved Section "D-E" Upslope	
Measured Length [ft]	104.7
Bend Angle [degree]	10.0
Radius of Curvature [ft]	600.0
Bore Length "A-F" Totals	
Measured Borepath Length [ft]	408.9
Measured Horizontal Length [ft]	405.0
Measured Vertical Depth [ft]	6.5

Prepared By:	Approved By:
Kyle Van Hoesen	Shane Holecek

Office: 719.520.9279 | Fax: 719.520.9867 | 110 S. Sierra Madre St. | Colorado Springs, CO 80903 | psi-llc.com

Project	**Revision**
Thunder Butte Pipleline	2
Location	**Date**
ND	11/3/2023

HDD - Installation Stress Analysis

Point: "B"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	169	46,815	PASS
Bending Stress [psi]	15	37,963	PASS
External Hoop Stress [psi]	95	13,700	PASS
Unity Check: Tensile & Bending Stress	0.0040	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.0001	1.000	PASS

Point: "C"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	787	46,815	PASS
Bending Stress [psi]	13,357	37,963	PASS
External Hoop Stress [psi]	231	13,700	PASS
Unity Check: Tensile & Bending Stress	0.369	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.117	1.000	PASS

Point: "D"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	1,020	46,815	PASS
Bending Stress [psi]	15	37,963	PASS
External Hoop Stress [psi]	209	13,700	PASS
Unity Check: Tensile & Bending Stress	0.022	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.001	1.000	PASS

Point: "E"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	1,562	46,815	PASS
Bending Stress [psi]	13,357	37,963	PASS
External Hoop Stress [psi]	164	13,700	PASS
Unity Check: Tensile & Bending Stress	0.385	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.130	1.000	PASS

Point: "F"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	1,835	46,815	PASS
Bending Stress [psi]	15	37,963	PASS
External Hoop Stress [psi]	15	13,700	PASS
Unity Check: Tensile & Bending Stress	0.040	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.002	1.000	PASS

Notes:

Prepared By:	Approved By:
Kyle Van Hoesen	Shane Holecek

Office: 719.520.9279 | Fax: 719.520.9867 | 110 S. Sierra Madre St. | Colorado Springs, CO 80903 | psi-llc.com

PLOT STYLE: PSI-PIPING.ctb

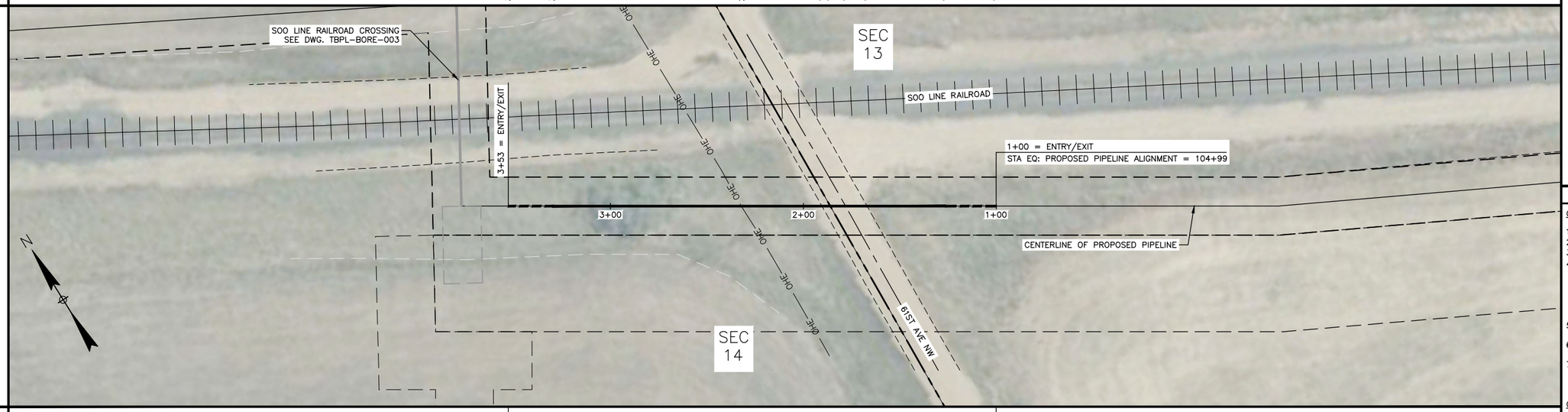
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OWNERS		ROGER A. & BONNIE LYNNE – 167'	STEVEN & AMY GRAY – 86'	

PIPELINE STATIONS AT ALIGNMENT ℄

3+53 = ENTRY/EXIT
3+30 = PIPELINE TIE-IN
2+32 = OHE
1+90 = EDGE OF ROAD
1+86 = SEC LN/PROP LN
1+78 = ℄ 61ST AVE NW
1+67 = EDGE OF ROAD
1+26 = PIPELINE TIE-IN
1+00 = ENTRY/EXIT

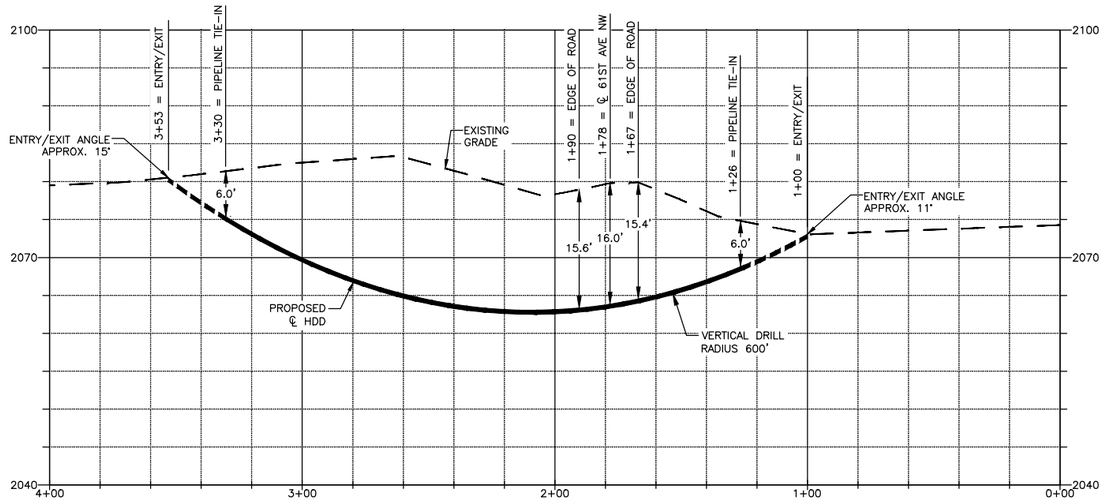
ALIGNMENT STRIP MAP



6" OIL
MAWP = 1400 PSIG

LONGITUDINAL LENGTH: 253' 6.625" OD x 0.188" WT X-52
EQUIVALENT LENGTH: 375' 6.625" OD x 0.188" WT X-52

PROFILE
PROFILE VERTICAL SCALE: 1" = 10'



PROFILE HORIZONTAL SCALE: 1" = 30'

BILL OF MATERIALS

PIPE QUANTITIES – THIS DRAWING

SERVICE	OD	WT	GR	LF	MFR
LIQUID	6.625"	0.188"	X-52	253'	TBD

MATERIAL QUANTITIES – THIS DRAWING

DESCRIPTION	QUANTITY
PIPELINE MARKER	3

PRELIMINARY

FIELD NOTES

CONSTRUCTION:

1. ALL STATIONING IS TO CENTERLINE OF ALIGNMENT.
2. TEST: SEE TEST FORM
3. RADIOGRAPH: PER THUNDER BUTTE PIPELINE STANDARDS
4. CODES: THIS PIPELINE(S) INSTALLED UNDER THE FOLLOWING:
   A. 49 CFR 195 (LIQUID)
   B. ASME 31.4 (LIQUID)
   C. ALL APPLICABLE PERMITS
   D. COMPANY STANDARDS
5. IMPRESSED CURRENT CATHODIC PROTECTION TO BE INSTALLED PER COMPANY STANDARDS.
6. PIPELINE MARKERS WILL BE INSTALLED AT EVERY ROAD CROSSING, R.O.W. BOUNDARY AND PIs.
7. THE GEOTECHNICAL BORE SAMPLE TAKEN AT THIS LOCATION DID NOT ENCOUNTER A WATER TABLE. THE SAMPLE WAS TAKEN TO A DEPTH OF 21'.

COATINGS:

1. PIPE COATING: 14-16 MIL FBE, 30 MIL ARO
2. JOINT COATING: 30-40 MILS POWERCRETE TYPE J OR EQUIVALENT

SCALE & PROJECTION

0 30' 60'
SCALE: 1"=30'

LOCATION: SECTIONS 13 & 14, T152N, R88W

PROJECTION: UTM WITH NAD83 DATUM, ZONE 14, US FOOT

LEGEND

- ℄ OF PROPOSED HDD
- EXISTING PIPELINE
- GAS GAS EXISTING GAS LINE
- W EXISTING WATER LINE
- PIPELINE R.O.W. OR EASEMENT
- SECTION LINE
- ROAD R.O.W.
- ROAD
- X X FENCE
- DITCH
- UGE UNDERGROUND ELECTRIC (UGE)
- OHE OVERHEAD ELECTRIC (OHE)
- RAILROAD

NOTES:
DESIGN:
1. DESIGN PRESSURE:
   A. LIQUID – 1440 PSIG
2. DESIGN FACTOR: 0.72 (LIQUID)
3. TYPICAL DRAWINGS – SHALL APPLY AS NECESSARY
   A. PIPELINE: SEE COMPANY STANDARDS
   B. CATHODIC PROTECTION: SEE COMPANY STANDARDS

CONTRACTOR SHALL SUBMIT AS-BUILT DRAWINGS AND DATA UPON HDD COMPLETION.

REFERENCE DRAWINGS

DWG NO.	TITLE
TBPL-BORE-003	SLICK BORE – SOO LINE RAILROAD CROSSING

REVISIONS

REV	DESCRIPTION	BY	DATE	CHK BY	CHK DATE	APR BY	APR DATE
A	ISSUED FOR REVIEW	DRA	10/25/23	SNL	10/27/23	–	–

APPROVALS

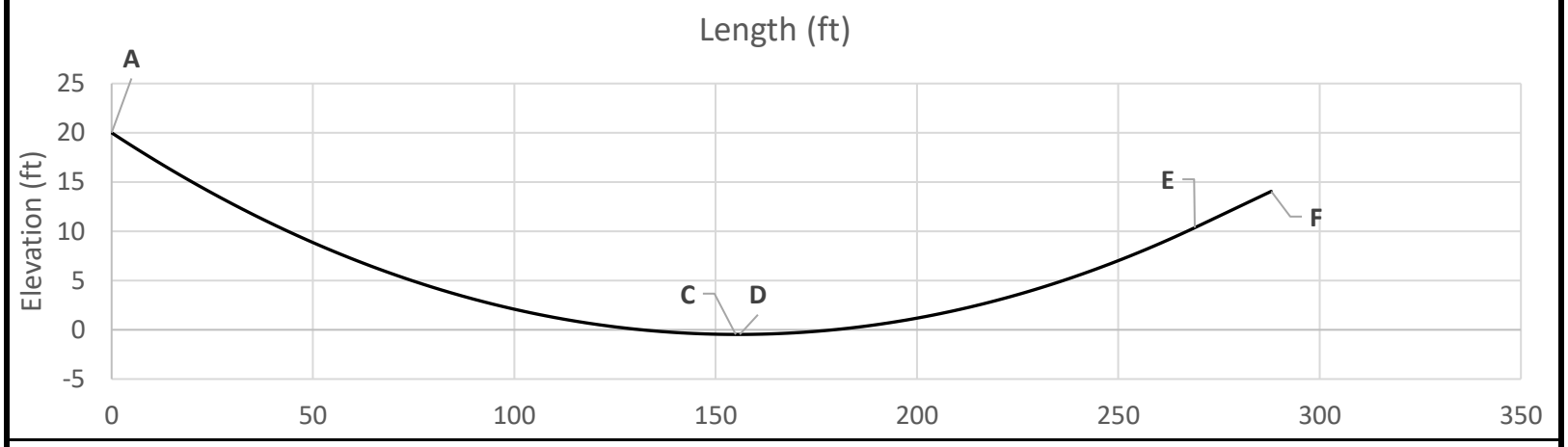
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CHECKED	–	–
APPROVED	–	–

THUNDER BUTTE PIPELINE, LLC

THUNDER BUTTE PIPELINE
MOUNTRAIL COUNTY, NORTH DAKOTA
HORIZONTAL DIRECTIONAL DRILL
61ST AVE NW CROSSING

SCALE:	DRAWING NO.	REV.
AS NOTED	TBPL-HDD-002	A

Project	Revision
Thunder Butte Pipleline	2
Location	**Date**
ND	11/3/2023



HDD - Pull Force and Installation Stress Analysis

PIPE AND PROFILE DATA:

Pipe Outside Diameter [in]	6.625
Pipe Wall Thickness [in]	0.188
Specified Minimum Yield Strength [psi]	52,000
Young's Modulus [ksi]	29,000
Poissons Ratio	0.30
Mud Weight [lbs/ft^3]	86.03
Soil Friction Coefficient	0.30
Fluid Drag Coefficient [psi]	0.05
Water Density [lbs/ft^3]	62.40
Pipe Filled With Water	No
Effective Weight of Pipe [lbs/ft]	-7.68
Straight Section "A-B" Downslope	
Measured Length [ft]	0.1
Angle of Inclination [degree]	15.0
Straight Section "C-D"	
Measured Length [ft]	0.1
Angle of Inclination [degree]	0.0
Straight Section "E-F" Upslope	
Measured Length [ft]	19.0
Angle of Inclination [degree]	11.0
Pipe Safety Factors	
Design Factor (Class Location)	0.7
Factor of Safety	1.2
Maxium Load Factor	0.9

RESULTS OF CALCULATION:

Total Pull Force [lbs]	**5,257**
Allowable Pull Force [lbs]	**97,491**
	PASS
Total Tensile Stress [psi]	**1,383**
Allowable Tensile Stress [psi]	**46,800**
	PASS
Total Shear Stress [psi]	**270**
Allowable Shear Stress [psi]	**23,400**
	PASS
Curved Section "B-C" Downslope	
Measured Length [ft]	157.1
Bend Angle [degree]	15.0
Radius of Curvature [ft]	600.0
Curved Section "D-E" Upslope	
Measured Length [ft]	115.2
Bend Angle [degree]	11.0
Radius of Curvature [ft]	600.0
Bore Length "A-F" Totals	
Measured Borepath Length [ft]	291.4
Measured Horizontal Length [ft]	288.0
Measured Vertical Depth [ft]	0.5

Prepared By:	Approved By:
Kyle Van Hoesen	Shane Holecek

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Project	Revision
Thunder Butte Pipleline	2
Location	**Date**
ND	11/3/2023

HDD - Installation Stress Analysis

Point: "B"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	15	46,815	PASS
Bending Stress [psi]	15	37,963	PASS
External Hoop Stress [psi]	18	13,700	PASS
Unity Check: Tensile & Bending Stress	0.0007	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.0000	1.000	PASS

Point: "C"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	764	46,815	PASS
Bending Stress [psi]	13,357	37,963	PASS
External Hoop Stress [psi]	230	13,700	PASS
Unity Check: Tensile & Bending Stress	0.368	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.117	1.000	PASS

Point: "D"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	765	46,815	PASS
Bending Stress [psi]	15	37,963	PASS
External Hoop Stress [psi]	230	13,700	PASS
Unity Check: Tensile & Bending Stress	0.017	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.001	1.000	PASS

Point: "E"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	1,331	46,815	PASS
Bending Stress [psi]	13,357	37,963	PASS
External Hoop Stress [psi]	30	13,700	PASS
Unity Check: Tensile & Bending Stress	0.380	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.125	1.000	PASS

Point: "F"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	1,383	46,815	PASS
Bending Stress [psi]	15	37,963	PASS
External Hoop Stress [psi]	15	13,700	PASS
Unity Check: Tensile & Bending Stress	0.030	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.001	1.000	PASS

Notes:

Prepared By:	Approved By:
Kyle Van Hoesen	Shane Holecek

Office: 719.520.9279 | Fax: 719.520.9867 | 110 S. Sierra Madre St. | Colorado Springs, CO 80903 | psi-llc.com

PLOT STYLE: PSI-PIPING.ctb

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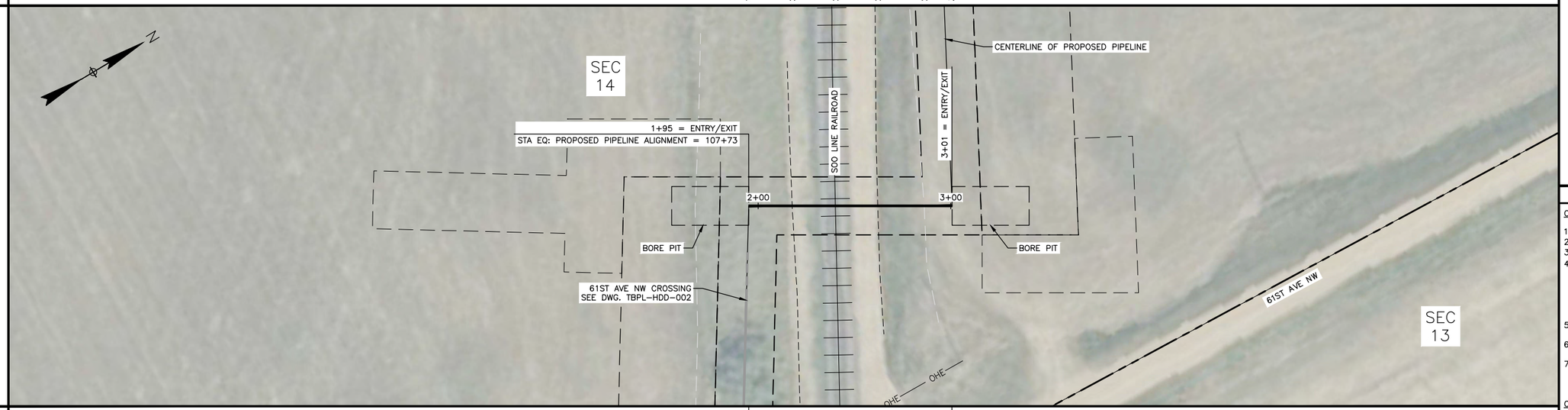
OWNERS

ROGER A & BONNIE LYNNE – 106'

PIPELINE STATIONS AT ALIGNMENT ℄

1+95 = ENTRY/EXIT | 2+18 = TOE OF BANK | 2+40 = ℄ SOO LINE RAILROAD | 2+62 = TOE OF BANK | 2+86 = TOP OF BANK | 3+01 = ENTRY/EXIT

ALIGNMENT STRIP MAP

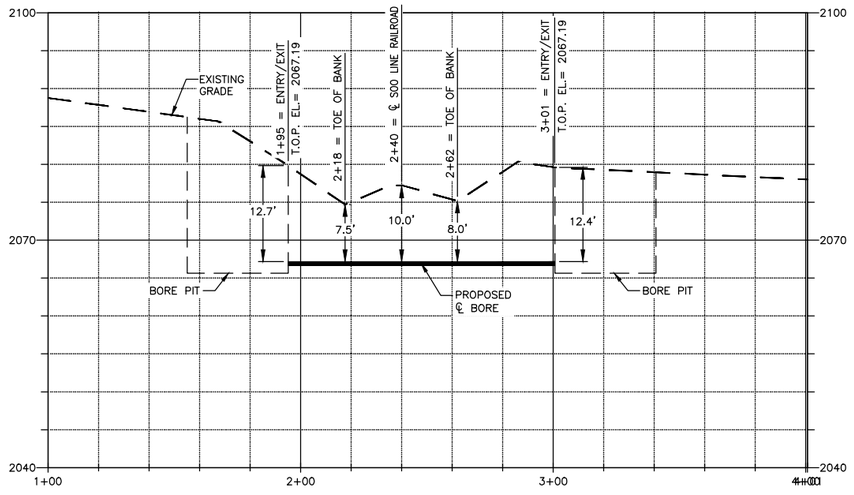


6" OIL
MAWP = 1400 PSIG

106' 6.625" OD x 0.188" WT X-52

PROFILE

PROFILE VERTICAL SCALE: 1" = 10'



PROFILE HORIZONTAL SCALE: 1" = 30'

BILL OF MATERIALS

PIPE QUANTITIES – THIS DRAWING

SERVICE	OD	WT	GR	LF	MFR
LIQUID	6.625"	0.188"	X-52	106'	TBD

MATERIAL QUANTITIES – THIS DRAWING

DESCRIPTION	QUANTITY
PIPELINE MARKER	4

PRELIMINARY

FIELD NOTES

CONSTRUCTION:

1. ALL STATIONING IS TO CENTERLINE OF ALIGNMENT.
2. TEST: SEE TEST FORM
3. RADIOGRAPH: PER THUNDER BUTTE PIPELINE STANDARDS
4. CODES: THIS PIPELINE(S) INSTALLED UNDER THE FOLLOWING:
   - A. 49 CFR 195 (LIQUID)
   - B. ASME 31.4 (LIQUID)
   - C. ALL APPLICABLE PERMITS
   - D. COMPANY STANDARDS
5. IMPRESSED CURRENT CATHODIC PROTECTION TO BE INSTALLED PER COMPANY STANDARDS.
6. PIPELINE MARKERS WILL BE INSTALLED AT EVERY ROAD CROSSING, R.O.W. BOUNDARY AND PIs.
7. THE GEOTECHNICAL BORE SAMPLE TAKEN AT THIS LOCATION DID NOT ENCOUNTER A WATER TABLE. THE SAMPLE WAS TAKEN TO A DEPTH OF 21'.

COATINGS:

1. PIPE COATING: 14-16 MIL FBE, 30 MIL ARO
2. JOINT COATING: 30-40 MILS POWERCRETE TYPE J OR EQUIVALENT

SCALE & PROJECTION

0 30' 60'

SCALE: 1"=30'

LOCATION: SECTION 14, T152N, R88W

PROJECTION: UTM WITH NAD83 DATUM, ZONE 14, US FOOT

LEGEND

- ℄ OF PROPOSED BORE
- EXISTING PIPELINE
- GAS GAS EXISTING GAS LINE
- W EXISTING WATER LINE
- PIPELINE R.O.W. OR EASEMENT
- SECTION LINE
- ROAD R.O.W.
- ROAD
- X X FENCE
- DITCH
- UGE UNDERGROUND ELECTRIC (UGE)
- OHE OVERHEAD ELECTRIC (OHE)
- RAILROAD

NOTES:

DESIGN:
1. DESIGN PRESSURE:
   - A. LIQUID – 1440 PSIG
2. DESIGN FACTOR: 0.72 (LIQUID)
3. TYPICAL DRAWINGS – SHALL APPLY AS NECESSARY
   - A. PIPELINE: SEE COMPANY STANDARDS
   - B. CATHODIC PROTECTION: SEE COMPANY STANDARDS

CONTRACTOR SHALL SUBMIT AS-BUILT DRAWINGS AND DATA UPON HDD COMPLETION.

REFERENCE DRAWINGS

DWG NO.	TITLE
TBPL-HDD-003	HORIZONTAL DIRECTIONAL DRILL – 61ST AVE NW CROSSING

REVISIONS

REV	DESCRIPTION	BY	DATE	CHK BY	CHK DATE	APR BY	APR DATE
A	ISSUED FOR REVIEW	DRA	10/26/23	SNL	10/27/23	–	–

APPROVALS

	SIGNATURE	DATE
DRAWN	–	–
CHECKED	–	–
APPROVED	–	–

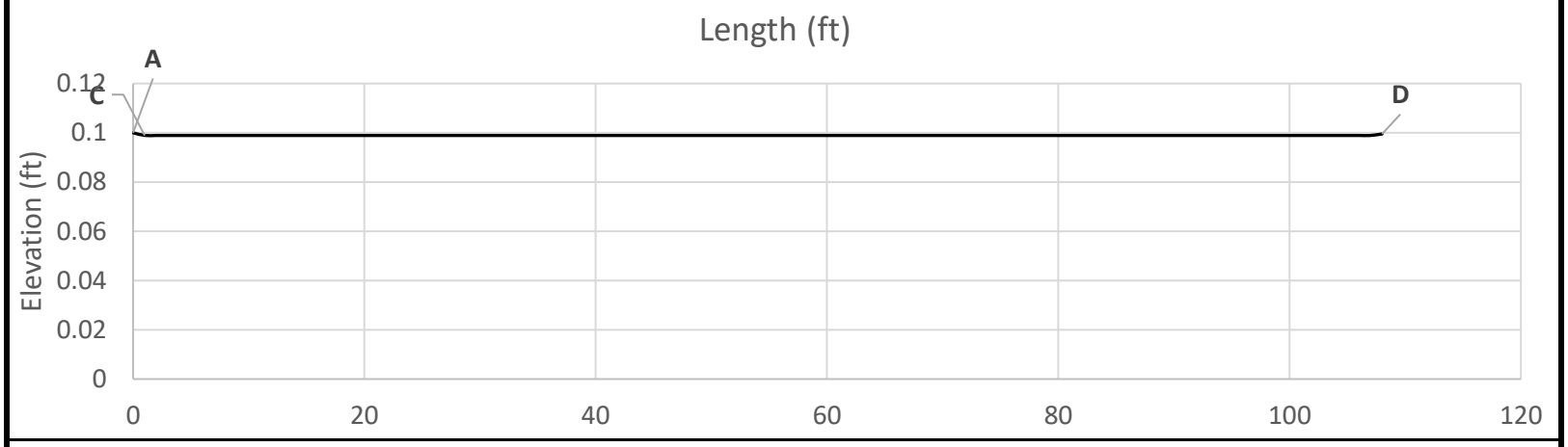
PSI

THUNDER BUTTE PIPELINE, LLC

THUNDER BUTTE PIPELINE
MOUNTRAIL COUNTY, NORTH DAKOTA
SLICK BORE
SOO LINE RAILROAD CROSSING

SCALE:	DRAWING NO.	REV.
AS NOTED	TBPL-BORE-003	A

Project	Revision
Thunder Butte Pipleline	2
Location	**Date**
ND	11/3/2023



HDD - Pull Force and Installation Stress Analysis

PIPE AND PROFILE DATA:

Pipe Outside Diameter [in]	6.625
Pipe Wall Thickness [in]	0.188
Specified Minimum Yield Strength [psi]	52,000
Young's Modulus [ksi]	29,000
Poissons Ratio	0.30
Mud Weight [lbs/ft^3]	86.03
Soil Friction Coefficient	0.30
Fluid Drag Coefficient [psi]	0.05
Water Density [lbs/ft^3]	62.40
Pipe Filled With Water	No
Effective Weight of Pipe [lbs/ft]	-7.68
Straight Section "A-B" Downslope	
Measured Length [ft]	0.1
Angle of Inclination [degree]	0.1
Straight Section "C-D"	
Measured Length [ft]	106.0
Angle of Inclination [degree]	0.0
Straight Section "E-F" Upslope	
Measured Length [ft]	0.1
Angle of Inclination [degree]	0.1
Pipe Safety Factors	
Design Factor (Class Location)	0.7
Factor of Safety	1.2
Maxium Load Factor	0.9

RESULTS OF CALCULATION:

Total Pull Force [lbs]	**47,075**
Allowable Pull Force [lbs]	**97,491**
	PASS
Total Tensile Stress [psi]	**12,382**
Allowable Tensile Stress [psi]	**46,800**
	PASS
Total Shear Stress [psi]	**324**
Allowable Shear Stress [psi]	**23,400**
	PASS
Curved Section "B-C" Downslope	
Measured Length [ft]	1.0
Bend Angle [degree]	0.1
Radius of Curvature [ft]	600.0
Curved Section "D-E" Upslope	
Measured Length [ft]	1.0
Bend Angle [degree]	0.1
Radius of Curvature [ft]	600.0
Bore Length "A-F" Totals	
Measured Borepath Length [ft]	108.3
Measured Horizontal Length [ft]	#N/A
Measured Vertical Depth [ft]	0.1

Prepared By:	Approved By:
Kyle Van Hoesen	Shane Holecek

Office: 719.520.9279 | Fax: 719.520.9867 | 110 S. Sierra Madre St. | Colorado Springs, CO 80903 | psi-llc.com

Project	**Revision**
Thunder Butte Pipleline	2
Location	**Date**
ND	11/3/2023

HDD - Installation Stress Analysis

Point: "B"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	15	46,815	PASS
Bending Stress [psi]	15	37,963	PASS
External Hoop Stress [psi]	15	13,700	PASS
Unity Check: Tensile & Bending Stress	0.0007	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.0000	1.000	PASS

Point: "C"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	5,998	46,815	PASS
Bending Stress [psi]	13,357	37,963	PASS
External Hoop Stress [psi]	15	13,700	PASS
Unity Check: Tensile & Bending Stress	0.480	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.217	1.000	PASS

Point: "D"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	6,410	46,815	PASS
Bending Stress [psi]	15	37,963	PASS
External Hoop Stress [psi]	15	13,700	PASS
Unity Check: Tensile & Bending Stress	0.137	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.024	1.000	PASS

Point: "E"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	12,396	46,815	PASS
Bending Stress [psi]	13,357	37,963	PASS
External Hoop Stress [psi]	#N/A	13,700	#N/A
Unity Check: Tensile & Bending Stress	0.617	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	#N/A	1.000	#N/A

Point: "F"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	12,382	46,815	PASS
Bending Stress [psi]	15	37,963	PASS
External Hoop Stress [psi]	15	13,700	PASS
Unity Check: Tensile & Bending Stress	0.265	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.089	1.000	PASS

Notes:

Prepared By:	Approved By:
Kyle Van Hoesen	Shane Holecek

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PLOT STYLE: PSI-PIPING.ctb

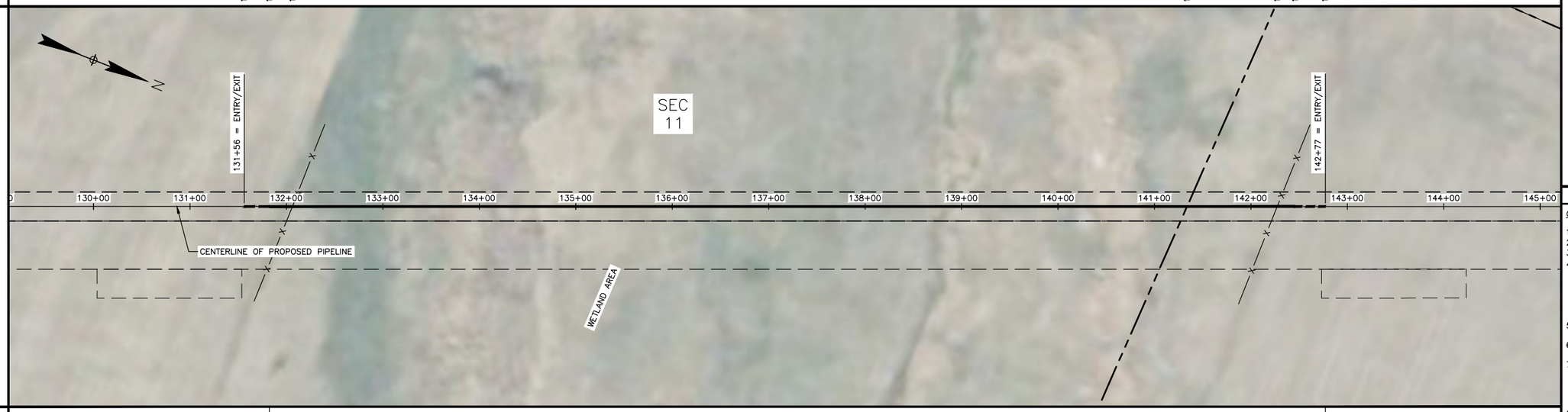
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OWNERS: ARNI I. TOBI L. LYNNE – 1121'

PIPELINE STATIONS AT ALIGNMENT ℄

131+56 = ENTRY/EXIT
131+82 = PIPELINE TIE-IN
132+06 = EX. FENCE
141+34 = LOT LINE
142+27 = EX. FENCE
142+46 = PIPELINE TIE-IN
142+77 = ENTRY/EXIT

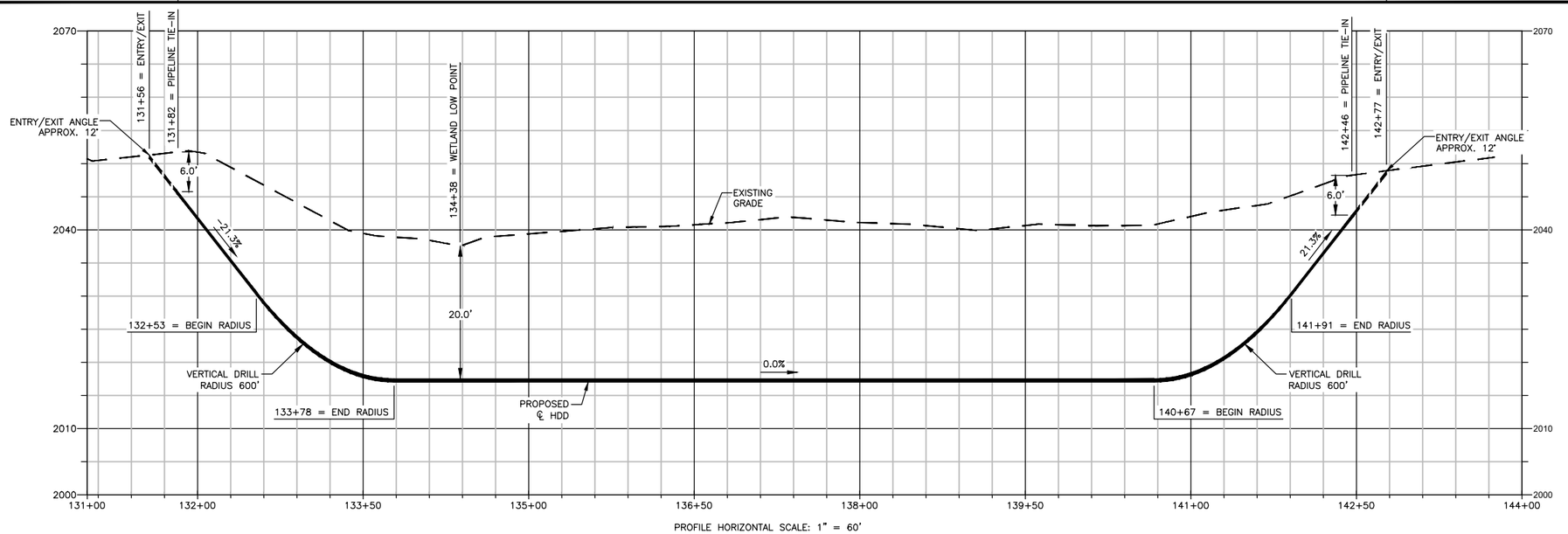
ALIGNMENT STRIP MAP



6" OIL
MAWP = 1400 PSIG

LONGITUDINAL LENGTH: 1121' 6.625" OD x 0.188" WT X-52
EQUIVALENT LENGTH: 1127' 6.625" OD x 0.188" WT X-52

PROFILE
PROFILE VERTICAL SCALE: 1" = 10'



PROFILE HORIZONTAL SCALE: 1" = 60'

BILL OF MATERIALS

PIPE QUANTITIES – THIS DRAWING

SERVICE	OD	WT	GR	LF	MFR
LIQUID	6.625"	0.188"	X-52	1121'	TBD

MATERIAL QUANTITIES – THIS DRAWING

DESCRIPTION	QUANTITY
PIPELINE MARKER	2

PRELIMINARY

FIELD NOTES

CONSTRUCTION:

1. ALL STATIONING IS TO CENTERLINE OF ALIGNMENT.
2. TEST: SEE TEST FORM
3. RADIOGRAPH: PER THUNDER BUTTE PIPELINE STANDARDS
4. CODES: THIS PIPELINE(S) INSTALLED UNDER THE FOLLOWING:
   A. 49 CFR 195 (LIQUID)
   B. ASME 31.4 (LIQUID)
   C. ALL APPLICABLE PERMITS
   D. COMPANY STANDARDS
5. IMPRESSED CURRENT CATHODIC PROTECTION TO BE INSTALLED PER COMPANY STANDARDS.
6. PIPELINE MARKERS WILL BE INSTALLED AT EVERY ROAD CROSSING, R.O.W. BOUNDARY AND PIs.
7. THE GEOTECHNICAL BORE SAMPLE ENCOUNTERED WATER AT A DEPTH OF 19.5' ON THE SOUTH SIDE OF THE WETLAND CROSSING. THE BORE ON THE NORTH SIDE OF THE WETLAND DID NOT ENCOUNTER WATER.

COATINGS:

1. PIPE COATING: 14-16 MIL FBE, 30 MIL ARO
2. JOINT COATING: 30-40 MILS POWERCRETE TYPE J OR EQUIVALENT

SCALE & PROJECTION

0 60' 120'
SCALE: 1"=60'

LOCATION: SECTION 11, T152N, R88W

PROJECTION: UTM WITH NAD83 DATUM, ZONE 14, US FOOT

LEGEND

- ℄ OF PROPOSED HDD
- EXISTING PIPELINE
- GAS GAS EXISTING GAS LINE
- W EXISTING WATER LINE
- PIPELINE R.O.W. OR EASEMENT
- SECTION LINE
- ROAD R.O.W.
- ROAD
- X X FENCE
- DITCH
- UGE UNDERGROUND ELECTRIC (UGE)
- OHE OVERHEAD ELECTRIC (OHE)
- RAILROAD

NOTES:
DESIGN:
1. DESIGN PRESSURE:
   A. LIQUID – 1440 PSIG
2. DESIGN FACTOR: 0.72 (LIQUID)
3. TYPICAL DRAWINGS – SHALL APPLY AS NECESSARY
   A. PIPELINE: SEE COMPANY STANDARDS
   B. CATHODIC PROTECTION: SEE COMPANY STANDARDS

CONTRACTOR SHALL SUBMIT AS-BUILT DRAWINGS AND DATA UPON HDD COMPLETION.

REFERENCE DRAWINGS

DWG NO.	TITLE
–	–

REVISIONS

REV	DESCRIPTION	DRA BY	DATE	SNL CHK BY	CHK DATE	APR BY	APR DATE
A	ISSUED FOR REVIEW	DRA	10/26/23	SNL	10/27/23	–	–

APPROVALS

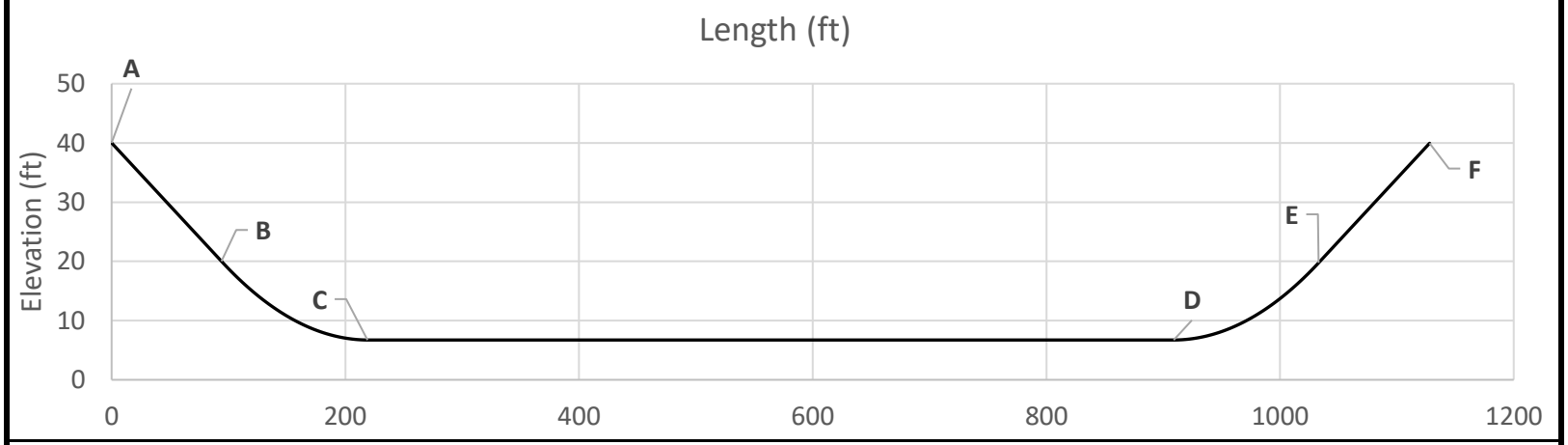
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DRAWN	–	–
CHECKED	–	–
APPROVED	–	–

THUNDER BUTTE PIPELINE, LLC

THUNDER BUTTE PIPELINE
MOUNTRAIL COUNTY, NORTH DAKOTA
HORIZONTAL DIRECTIONAL DRILL
WETLAND CROSSING

SCALE:	DRAWING NO.	REV.
AS NOTED	TBPL-HDD-004	A

Project	Revision
Thunder Butte Pipleline	2
Location	**Date**
ND	11/3/2023



HDD - Pull Force and Installation Stress Analysis

PIPE AND PROFILE DATA:

Pipe Outside Diameter [in]	6.625
Pipe Wall Thickness [in]	0.188
Specified Minimum Yield Strength [psi]	52,000
Young's Modulus [ksi]	29,000
Poissons Ratio	0.30
Mud Weight [lbs/ft^3]	86.03
Soil Friction Coefficient	0.30
Fluid Drag Coefficient [psi]	0.05
Water Density [lbs/ft^3]	62.40
Pipe Filled With Water	No
Effective Weight of Pipe [lbs/ft]	-7.68
Straight Section "A-B" Downslope	
Measured Length [ft]	97.0
Angle of Inclination [degree]	12.0
Straight Section "C-D"	
Measured Length [ft]	689.0
Angle of Inclination [degree]	0.0
Straight Section "E-F" Upslope	
Measured Length [ft]	97.0
Angle of Inclination [degree]	12.0
Pipe Safety Factors	
Design Factor (Class Location)	0.7
Factor of Safety	1.2
Maxium Load Factor	0.9

RESULTS OF CALCULATION:

Total Pull Force [lbs]	**18,606**
Allowable Pull Force [lbs]	**97,491**
	PASS
Total Tensile Stress [psi]	**4,894**
Allowable Tensile Stress [psi]	**46,800**
	PASS
Total Shear Stress [psi]	**235**
Allowable Shear Stress [psi]	**23,400**
	PASS
Curved Section "B-C" Downslope	
Measured Length [ft]	125.7
Bend Angle [degree]	12.0
Radius of Curvature [ft]	600.0
Curved Section "D-E" Upslope	
Measured Length [ft]	125.7
Bend Angle [degree]	12.0
Radius of Curvature [ft]	600.0
Bore Length "A-F" Totals	
Measured Borepath Length [ft]	1,134.3
Measured Horizontal Length [ft]	1,128.0
Measured Vertical Depth [ft]	6.7

Prepared By:	Approved By:
Kyle Van Hoesen	Shane Holecek

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Project	Revision
Thunder Butte Pipleline	2
Location	**Date**
ND	11/3/2023

HDD - Installation Stress Analysis

Point: "B"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	432	46,815	PASS
Bending Stress [psi]	15	37,963	PASS
External Hoop Stress [psi]	227	13,700	PASS
Unity Check: Tensile & Bending Stress	0.0096	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.0008	1.000	PASS

Point: "C"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	1,069	46,815	PASS
Bending Stress [psi]	13,357	37,963	PASS
External Hoop Stress [psi]	365	13,700	PASS
Unity Check: Tensile & Bending Stress	0.375	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.123	1.000	PASS

Point: "D"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	3,750	46,815	PASS
Bending Stress [psi]	15	37,963	PASS
External Hoop Stress [psi]	365	13,700	PASS
Unity Check: Tensile & Bending Stress	0.081	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.010	1.000	PASS

Point: "E"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	4,573	46,815	PASS
Bending Stress [psi]	13,357	37,963	PASS
External Hoop Stress [psi]	226	13,700	PASS
Unity Check: Tensile & Bending Stress	0.450	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.188	1.000	PASS

Point: "F"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	4,894	46,815	PASS
Bending Stress [psi]	15	37,963	PASS
External Hoop Stress [psi]	15	13,700	PASS
Unity Check: Tensile & Bending Stress	0.105	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.014	1.000	PASS

Notes:

Prepared By:	Approved By:
Kyle Van Hoesen	Shane Holecek

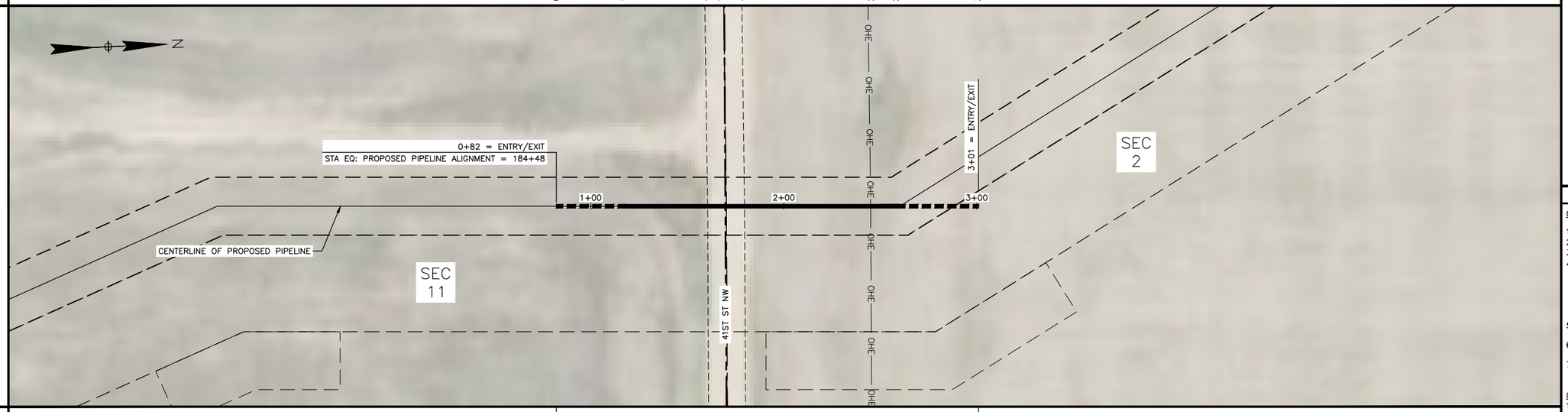
Office: 719.520.9279 | Fax: 719.520.9867 | 110 S. Sierra Madre St. | Colorado Springs, CO 80903 | psi-llc.com

PLOT STYLE: PSI-PIPING.ctb

FILE PATH: P:\ENGINEERING\PROJECTS\GAP MIDSTREAM\2023 THUNDER BUTTE PIPELINE FACILITIES DESIGN\09 PROJECT DRAWINGS\02 ALIGNMENT SHEETS\TBPL-HDD-005.DWG BY:DARYLE DATE:Nov 02, 2023 3:23pm

OWNERS			
PIPELINE STATIONS AT ALIGNMENT ℄	GRACE T. WURTZ, AS TRUSTEE OF THE JUDY BINKLEY TRUST – 88'		SHANE R. & JENNIFER L. ERICKSON – 131'
	0+82 = ENTRY/EXIT	1+17 = PIPELINE TIE-IN	1+61 = EDGE OF ROAD 1+70 = SEC LN/℄ 41ST ST NW 1+80 = EDGE OF ROAD 2+45 = EX. OHE 2+60 = PIPELINE TIE-IN/ALIGNMENT PI 3+01 = ENTRY/EXIT

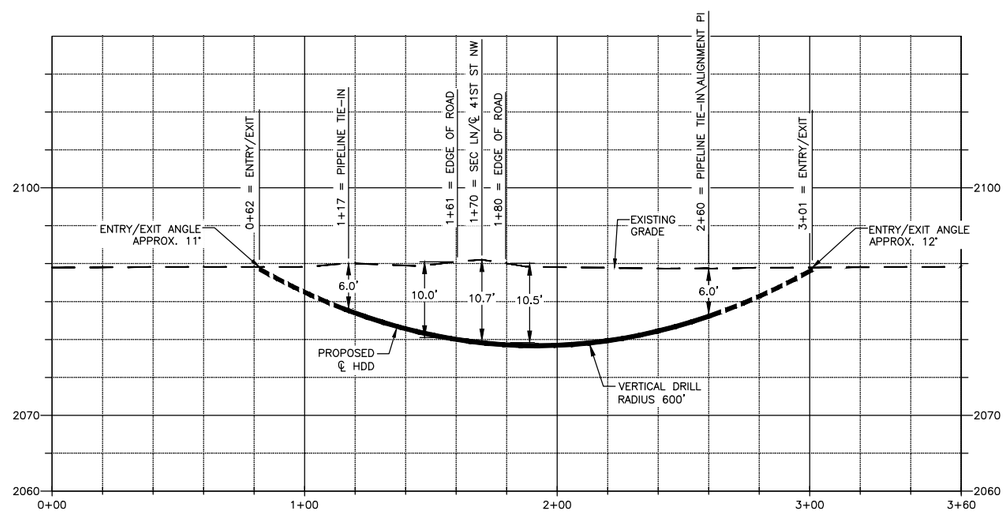
ALIGNMENT STRIP MAP



6" OIL MAWP = 1400 PSIG	LONGITUDINAL LENGTH: 219' 6.625" OD x 0.188" WT X-52 EQUIVALENT LENGTH: 220' 6.625" OD x 0.188" WT X-52	

PROFILE

PROFILE VERTICAL SCALE: 1" = 10'



PROFILE HORIZONTAL SCALE: 1" = 30'

BILL OF MATERIALS

PIPE QUANTITIES – THIS DRAWING

SERVICE	OD	WT	GR	LF	MFR
LIQUID	6.625"	0.188"	X-52	219'	TBD

MATERIAL QUANTITIES – THIS DRAWING

DESCRIPTION	QUANTITY
PIPELINE MARKER	3

PRELIMINARY

FIELD NOTES

CONSTRUCTION:

1. ALL STATIONING IS TO CENTERLINE OF ALIGNMENT.
2. TEST: SEE TEST FORM
3. RADIOGRAPH: PER THUNDER BUTTE PIPELINE STANDARDS
4. CODES: THIS PIPELINE(S) INSTALLED UNDER THE FOLLOWING:
   - A. 49 CFR 195 (LIQUID)
   - B. ASME 31.4 (LIQUID)
   - C. ALL APPLICABLE PERMITS
   - D. COMPANY STANDARDS
5. IMPRESSED CURRENT CATHODIC PROTECTION TO BE INSTALLED PER COMPANY STANDARDS.
6. PIPELINE MARKERS WILL BE INSTALLED AT EVERY ROAD CROSSING, R.O.W. BOUNDARY AND PIs.
7. THE GEOTECHNICAL BORE TAKEN FOR THIS CROSSING DID NOT ENCOUNTER WATER TO A DEPTH OF 30'.

COATINGS:

1. PIPE COATING: 14-16 MIL FBE, 30 MIL ARO
2. JOINT COATING: 30-40 MILS POWERCRETE TYPE J OR EQUIVALENT

SCALE & PROJECTION

0 30' 60'

SCALE: 1"=30'

LOCATION: SECTIONS 2 & 11, T152N, R88W

PROJECTION: UTM WITH NAD83 DATUM, ZONE 14, US FOOT

LEGEND

- ℄ OF PROPOSED HDD
- EXISTING PIPELINE
- GAS GAS EXISTING GAS LINE
- W EXISTING WATER LINE
- PIPELINE R.O.W. OR EASEMENT
- SECTION LINE
- ROAD R.O.W.
- ROAD
- X X FENCE
- DITCH
- UGE UNDERGROUND ELECTRIC (UGE)
- OHE OVERHEAD ELECTRIC (OHE)
- RAILROAD

NOTES:

DESIGN:

1. DESIGN PRESSURE:
   - A. LIQUID – 1440 PSIG
2. DESIGN FACTOR: 0.72 (LIQUID)
3. TYPICAL DRAWINGS – SHALL APPLY AS NECESSARY
   - A. PIPELINE: SEE COMPANY STANDARDS
   - B. CATHODIC PROTECTION: SEE COMPANY STANDARDS

CONTRACTOR SHALL SUBMIT AS-BUILT DRAWINGS AND DATA UPON HDD COMPLETION.

REFERENCE DRAWINGS

DWG NO.	TITLE
–	–

REVISIONS

REV	DESCRIPTION	DRA BY	DATE	CHK BY	CHK DATE	APR BY	APR DATE
A	ISSUED FOR REVIEW	DRA	10/26/23	SNL	10/27/23	–	–

APPROVALS

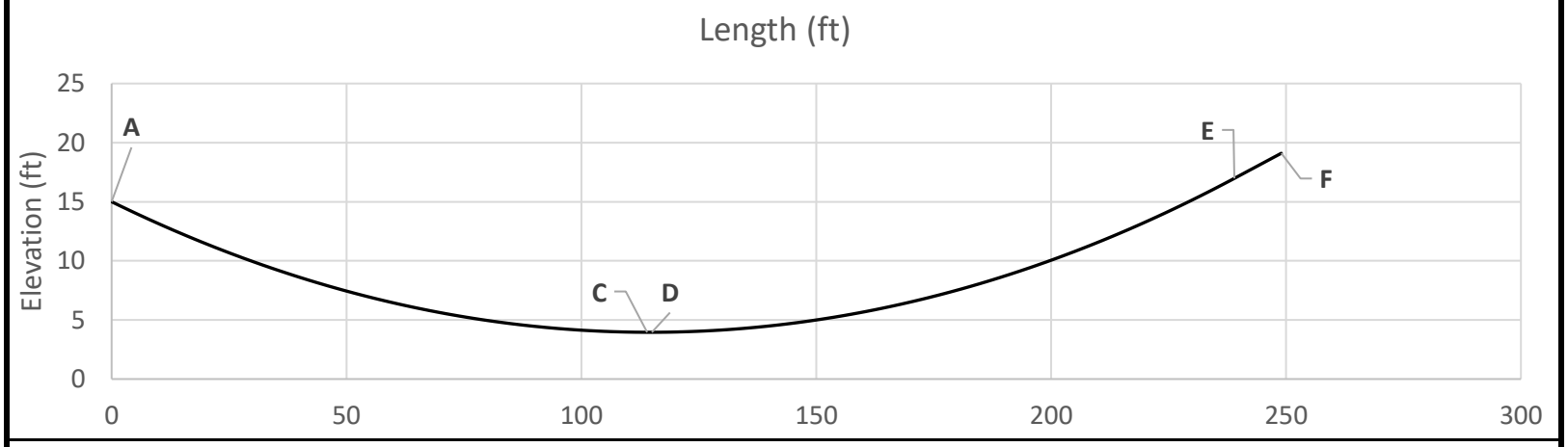
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CHECKED	–	–
APPROVED	–	–

THUNDER BUTTE PIPELINE, LLC

THUNDER BUTTE PIPELINE
MOUNTRAIL COUNTY, NORTH DAKOTA
HORIZONTAL DIRECTIONAL DRILL
41ST STREET NW CROSSING

SCALE:	DRAWING NO.	REV.
AS NOTED	TBPL-HDD-005	A

Project	Revision
Thunder Butte Pipleline	2
Location	**Date**
ND	11/3/2023



HDD - Pull Force and Installation Stress Analysis

PIPE AND PROFILE DATA:

Pipe Outside Diameter [in]	6.625
Pipe Wall Thickness [in]	0.188
Specified Minimum Yield Strength [psi]	52,000
Young's Modulus [ksi]	29,000
Poissons Ratio	0.30
Mud Weight [lbs/ft^3]	86.03
Soil Friction Coefficient	0.30
Fluid Drag Coefficient [psi]	0.05
Water Density [lbs/ft^3]	62.40
Pipe Filled With Water	No
Effective Weight of Pipe [lbs/ft]	-7.68
Straight Section "A-B" Downslope	
Measured Length [ft]	0.1
Angle of Inclination [degree]	11.0
Straight Section "C-D"	
Measured Length [ft]	0.1
Angle of Inclination [degree]	0.0
Straight Section "E-F" Upslope	
Measured Length [ft]	9.9
Angle of Inclination [degree]	12.0
Pipe Safety Factors	
Design Factor (Class Location)	0.7
Factor of Safety	1.2
Maxium Load Factor	0.9

RESULTS OF CALCULATION:

Total Pull Force [lbs]	**4,521**
Allowable Pull Force [lbs]	**97,491**
	PASS
Total Tensile Stress [psi]	**1,189**
Allowable Tensile Stress [psi]	**46,800**
	PASS
Total Shear Stress [psi]	**295**
Allowable Shear Stress [psi]	**23,400**
	PASS
Curved Section "B-C" Downslope	
Measured Length [ft]	115.2
Bend Angle [degree]	11.0
Radius of Curvature [ft]	600.0
Curved Section "D-E" Upslope	
Measured Length [ft]	125.7
Bend Angle [degree]	12.0
Radius of Curvature [ft]	600.0
Bore Length "A-F" Totals	
Measured Borepath Length [ft]	251.0
Measured Horizontal Length [ft]	249.0
Measured Vertical Depth [ft]	4.0

Prepared By:	Approved By:
Kyle Van Hoesen	Shane Holecek

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Project	**Revision**
Thunder Butte Pipleline	2
Location	**Date**
ND	11/3/2023

HDD - Installation Stress Analysis

Point: "B"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	15	46,815	PASS
Bending Stress [psi]	15	37,963	PASS
External Hoop Stress [psi]	17	13,700	PASS
Unity Check: Tensile & Bending Stress	0.0007	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.0000	1.000	PASS

Point: "C"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	576	46,815	PASS
Bending Stress [psi]	13,357	37,963	PASS
External Hoop Stress [psi]	131	13,700	PASS
Unity Check: Tensile & Bending Stress	0.364	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.113	1.000	PASS

Point: "D"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	576	46,815	PASS
Bending Stress [psi]	15	37,963	PASS
External Hoop Stress [psi]	131	13,700	PASS
Unity Check: Tensile & Bending Stress	0.013	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.000	1.000	PASS

Point: "E"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	1,170	46,815	PASS
Bending Stress [psi]	13,357	37,963	PASS
External Hoop Stress [psi]	-8	13,700	PASS
Unity Check: Tensile & Bending Stress	0.377	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.122	1.000	PASS

Point: "F"	This Project	Allowable	PASS/FAIL
Tensile Stress [psi]	1,189	46,815	PASS
Bending Stress [psi]	15	37,963	PASS
External Hoop Stress [psi]	15	13,700	PASS
Unity Check: Tensile & Bending Stress	0.026	1.000	PASS
Unity Check: Tensile, Bending & Hoop Stress	0.001	1.000	PASS

Notes:

Prepared By:	Approved By:
Kyle Van Hoesen	Shane Holecek

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LEGEND

PROPOSED PIPING

EXISTING PIPING

:Reference Drawings

:Facility Name

No.	Revision Description	Project ID	Date
A	ISSUED FOR REVIEW	AFE#	12/01/2023

Notes:

PST

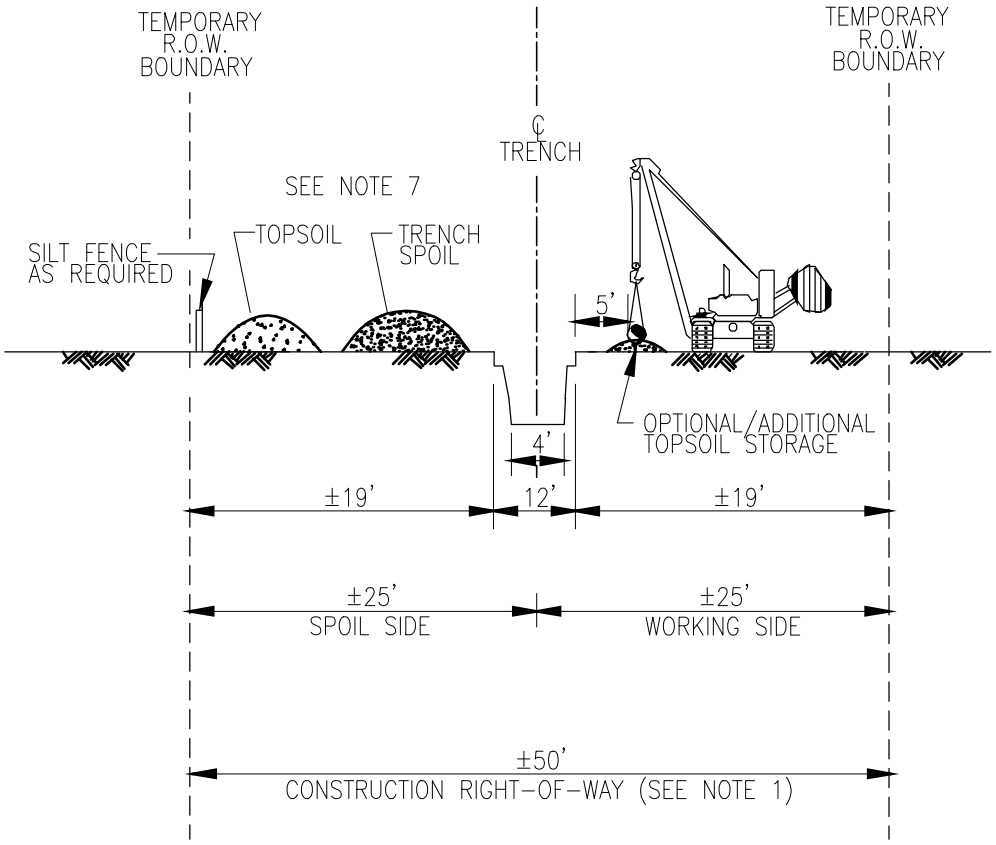
THUNDER BUTTE PIPELINE, LLC

THUNDER BUTTE PIPELINE
ENBRIDGE FACILITY – LOT 10
PLOT PLAN

Status: ISSUED FOR REVIEW

State: NORTH DAKOTA	PIN No:
County: MOUNTRAIL	Scale: 1/16" = 1'-0"
Category:	
File Name: TBPL-2023-EB10-PIP-001.DWG	
Drawing No: TBPL-2023-EB10-PIP-001	Rev A

Nov 30, 2023 - 8:53AM



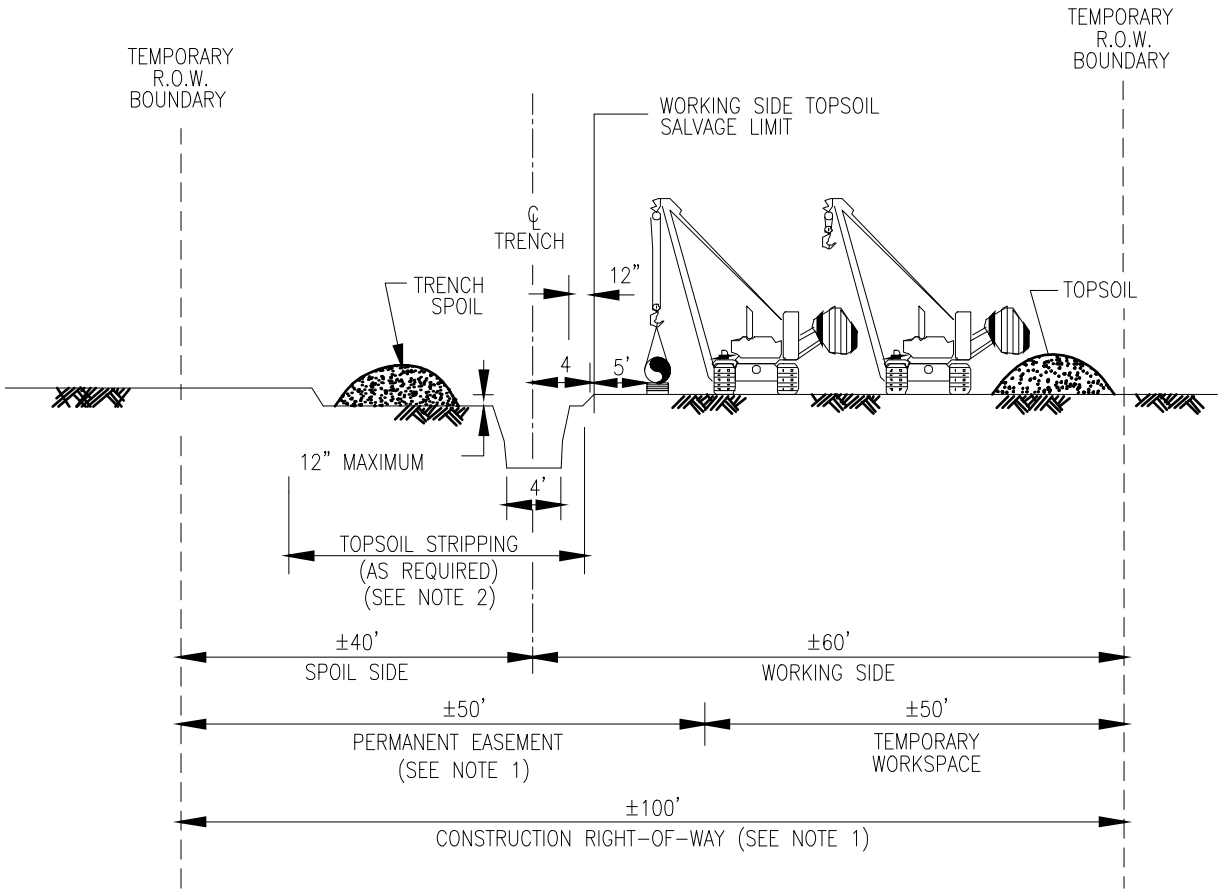
TYPICAL PROFILE

NOTES:

1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 100 FEET WIDE CONSISTING OF 50 FEET OF PERMANENT EASEMENT AND 50 FEET OF TEMPORARY WORKSPACE. EXTRA TEMPORARY WORK SPACE WILL BE NECESSARY AT MAJOR ROAD, RAIL AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. UTILIZE THE "BLADE WIDTH" TOPSOIL SALVAGE METHOD AT LOCATIONS SUCH AS RIPARIAN AREAS OR UNMANAGED WOODLANDS, WHERE IDENTIFIED ON THE CONSTRUCTION DRAWINGS, OR AS DIRECTED BY THE COMPANY'S INSPECTOR. THE BLADE WIDTH METHOD IS NOT TO BE USED IN AGRICULTURAL LANDS, EXCEPT AS DIRECTED BY THE COMPANY'S INSPECTOR (PER LANDOWNER REQUEST.) FOR BLADE WIDTH STRIPPING, THE STRIPPED AREA SHALL BE WIDE ENOUGH TO ACCOMMODATE TRENCHING EQUIPMENT.
3. STOCKPILE TOPSOIL AS SHOWN OR IN ANY CONFIGURATION APPROVED BY THE COMPANY'S INSPECTOR. KEEP TOPSOIL CLEAN OF ALL CONSTRUCTION DEBRIS. MAINTAIN SEPARATION BETWEEN TOPSOIL AND SUBSOIL PILES.
4. LEAVE GAPS IN TOPSOIL AND SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH TOPSOIL INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING.
5. TEMPORARILY SUSPEND TOPSOIL HANDLING DURING INORDINATELY WINDY CONDITIONS UNTIL MITIGATIVE MEASURES TO MINIMIZE WIND EROSION CAN BE IMPLEMENTED.
6. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING SPOIL AND TOPSOIL PILES.
7. TOPSOIL AND TRENCH SPOIL RELATIVE POSITIONS CAN, AS DIRECTED BY THE COMPANY'S REPRESENTATIVE, BE REVERSED.

DRAWING DEPICTED IS SUPERSEDED BY WRITTEN STANDARD, SCOPE OF WORK OR LINE LIST.

THIS DRAWING AND THE DESIGN IT COVERS ARE CONFIDENTIAL AND REMAIN THE PROPERTY OF THE CLIENT AND SHALL NOT BE DISCLOSED TO OTHERS OR REPRODUCED IN ANY MANNER OR USED FOR ANY PURPOSE WHATSOEVER EXCEPT BY WRITTEN PERMISSION BY THE OWNER.



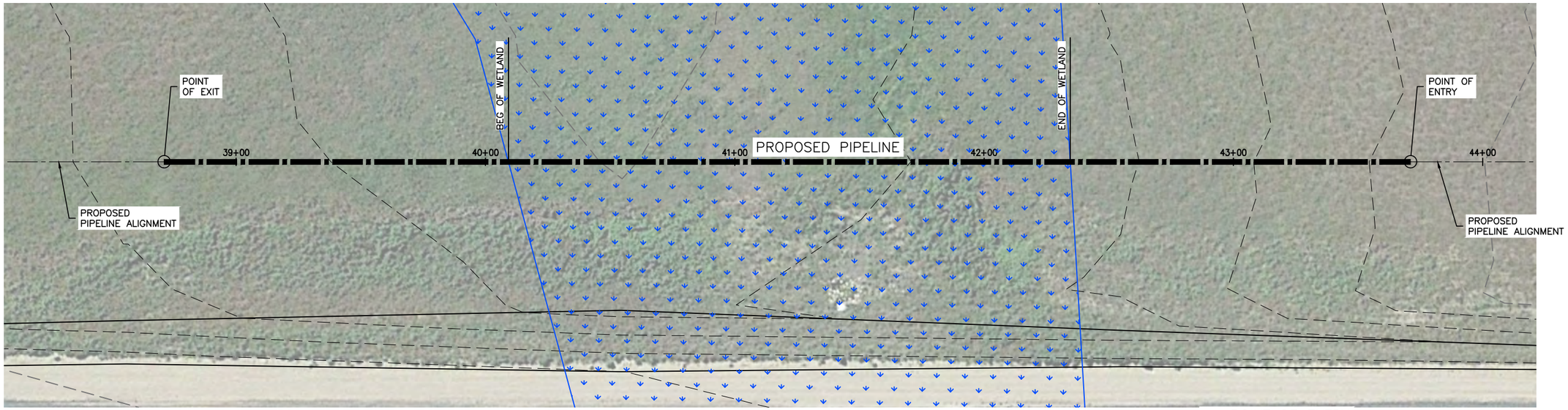
TYPICAL PROFILE

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1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 100 FEET WIDE CONSISTING OF 50 FEET OF PERMANENT EASEMENT AND 50 FEET OF TEMPORARY WORKSPACE. EXTRA TEMPORARY WORK SPACE WILL BE NECESSARY AT MAJOR ROAD, RAIL AND RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. THIS DRAWING REFLECTS "TRENCH AND SPOIL SIDE" TOPSOIL STRIPPING PROCEDURE. SALVAGE TOPSOIL OVER TRENCH AND UNDER THE SPOIL PILE AT LOCATIONS IDENTIFIED ON THE CONSTRUCTION ALIGNMENT SHEETS, OR AS DIRECTED BY THE COMPANY'S REPRESENTATIVE. MINIMUM WIDTH OF TOPSOIL STRIPPING ON THE WORKING SIDE OF TRENCH IS 12 INCHES.
3. STOCKPILE TOPSOIL AS SHOWN OR IN ANY CONFIGURATION APPROVED BY THE COMPANY'S INSPECTOR. KEEP TOPSOIL CLEAN OF ALL CONSTRUCTION DEBRIS.
4. LEAVE GAPS IN TOPSOIL AND SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH TOPSOIL INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING TOPSOIL PILE.
5. TEMPORARILY SUSPEND TOPSOIL HANDLING OPERATIONS DURING INORDINATELY WINDY CONDITIONS UNTIL MITIGATIVE MEASURES TO MINIMIZE WIND EROSION CAN BE IMPLEMENTED.

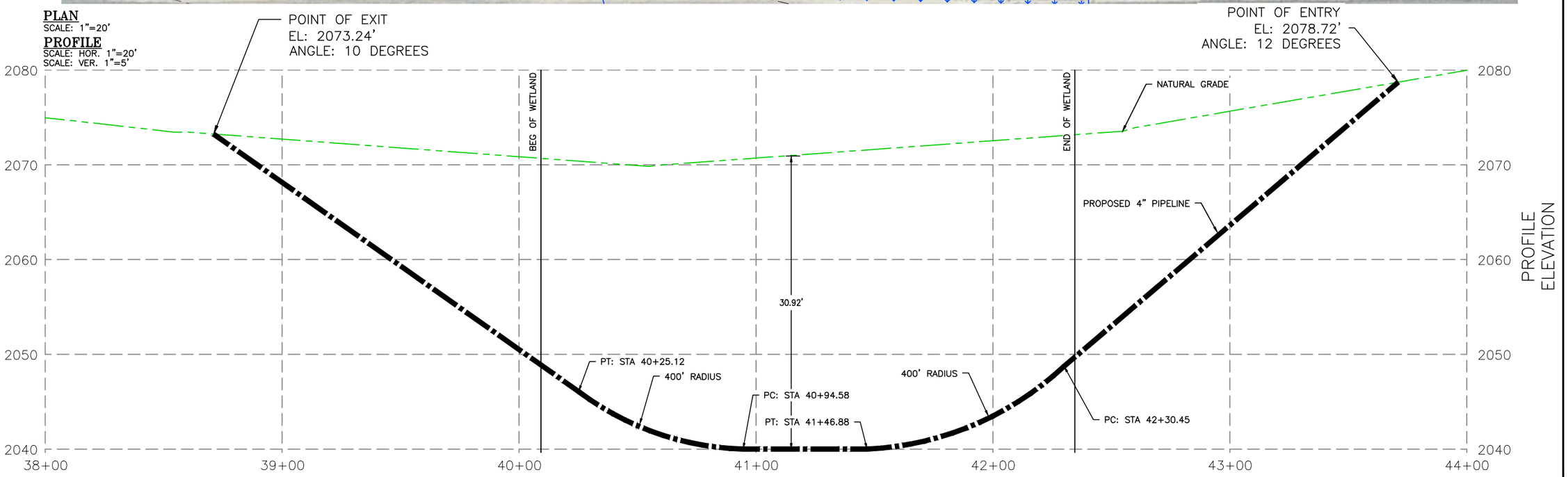
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PLAN
SCALE: 1"=20'

PROFILE
SCALE: HOR. 1"=20'
SCALE: VER. 1"=5'



NOTES

REFERENCE

NO.	DATE	DESCRIPTION	BY	CHK	APPD

TEXAS REGISTERED ENGINEERING FIRM F-4000
WWW.MHES.COM

SCALE: AS SHOWN | PROJ. NO. XXMHXXX

PROJECT TYPICAL

PIPELINE
WETLANDS HDD CROSSING

DRAWING NO. EL7-9202 | REVISION NO. A

Appendix D

Agency Correspondence and Consultations

Agency Consultations

Agency	Communication Media	Date Sent	Studies Provided to Agency	Date of Response	Application Section Number[1]
Energy Infrastructure and Impact Office	Letter	9/29/2023	N/A	N/A	N/A
Grand Forks Air Force Base	Letter	9/29/2023	N/A	N/A	N/A
Job Service of North Dakota	Letter	9/29/2023	N/A	N/A	N/A
Military Aviation and Installation Assurance Siting Clearinghouse	Letter	9/29/2023	N/A	N/A	N/A
Minot Air Force Base	Letter	9/29/2023	N/A	N/A	N/A
Mountrail County Commission	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Aeronautics Commission	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Career and Technical Education	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Department of Agriculture	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Department of Commerce	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Department of Environmental Quality	Letter	9/29/2023		10/18/2023	15.5
North Dakota Department of Health	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Department of Human Services	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Department of Labor and Human Services	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Department of Transportation	Letter	9/29/2023		10/5/2023	15.7
North Dakota Department of Trust Lands	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Department of Vocational Education	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Forest Service	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Game and Fish Department	Letter	9/29/2023		10/26/2023	15.3
North Dakota Geological Survey	Letter	9/29/2023		10/6/2023	15.8
North Dakota Indian Affairs Commission	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Industrial Commission	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Office of Attorney General	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Parks and Recreation Department	Letter	9/29/2023		10/18/2023	15.4
North Dakota Pipeline Authority	Letter	9/29/2023	N/A	N/A	N/A
North Dakota Soil Conservation Committee	Letter	9/29/2023	N/A	N/A	N/A
North Dakota State Water Commission and Western Area Water Supply	Letter	9/29/2023		10/23/2023	15.6
North Dakota Transmission Authority	Letter	9/29/2023	N/A	N/A	N/A
Office of Governor	Letter	9/29/2023	N/A	N/A	N/A

Agency Consultations

Agency	Communication Media	Date Sent	Studies Provided to Agency	Date of Response	Application Section Number[1]
State Historical Society of North Dakota	Letter	11/27/2023	Class I and Class III Cultural Resource Inventory Report	1/2/2024	15.2
MHA Nation/Three Affiliated Tribes Tribal Historic Preservation Office	Letter	11/27/2023	Class I and Class III Cultural Resource Inventory Report	N/A	15.2
Twentieth Air Force Ninety-first Missile Wing	Letter	9/29/2023	N/A	N/A	N/A
U.S. Department of Interior, Bureau of Land Management	Letter	9/29/2023	N/A	N/A	N/A
United Stated Department of Agriculture, North Dakota Natural Resources Conservation Service	Letter	9/29/2023	N/A	N/A	N/A
United States Army Corps of Engineers	Letter	9/29/2023	Wetland Delineation Report	N/A	15.1
United States Department of Defense	Letter	9/29/2023	N/A	N/A	N/A
United States Department of Transportation, Federal Aviation Administration	Letter	9/29/2023	N/A	N/A	N/A
United States Fish and Wildlife Service	Letter	9/29/2023	N/A	N/A	N/A
Ward County Commission	Letter	9/29/2023	N/A	N/A	N/A

Note:
1 Section number within the application which discusses agency response.

Energy Infrastructure and Impact Office
North Dakota Department of Trust Land
1707 North 9th Street
PO Box 5523
Bismarck ND 58506

Arcadis U.S., Inc.
630 Plaza Drive
Suite 200
Highlands Ranch
Colorado 80129
Phone: 720 344 3500
Fax: 720 344 3535
www.arcadis.com

Date: September 29, 2023
Our Ref: 30192665
Subject: Thunder Butte Pipeline, LLC: Thunder Butte Pipeline Project, Ward and Mountrail Counties, North Dakota

To Whom it may Concern,

Thunder Butte Pipeline, LLC (TBPL) is proposing the Thunder Butte Pipeline Project (Project) for transport of crude oil from the existing Thunder Butte Petroleum Services, Inc. (TBPS) Crude Storage and Loading Facility (TBPS Facility) within the Fort Berthold Indian Reservation (FBIR), near Plaza, North Dakota to an existing Enbridge crude terminal in Stanley, North Dakota (**Figure 1**). The TBPS Facility is owned by the Mandan, Hidatsa, and Arikara Nation/ Three Affiliated Tribes (MHA Nation/ TAT) doing business as TBPS and the Enbridge storage facility is owned by Enbridge Pipelines North Dakota. These two facilities are not part of the TBPL Project because they are owned by third-party entities.

The Project will consist of construction of a new underground pipeline and conversion of the existing Enbridge collector (gathering) pipeline to a transmission pipeline, along with an above ground midline pump station and a permanent access roads in Ward and Mountrail counties.

TBPL is submitting a Consolidated Certificate of Corridor Compatibility and Route Permit Application (Consolidated Permit Application) to the North Dakota Public Service Commission (Commission) requesting a Certificate of Corridor Compatibility and Route Permit for construction and operation of the Project. On behalf of TBPL, Arcadis, U.S., Inc. is submitting this letter to inform your agency of the proposed Project and to request any comments or input. Any information received will be taken into consideration during the permitting and development process in conjunction with the Consolidated Permit Application process.

The project will include installation of a proposed 3.84-mile-long underground carbon steel pipeline with a 6.625-inch outer diameter (OD) originating at the existing TBPS Facility approximately 2.6 miles northwest of Makoti, North Dakota and terminating at the interconnection with the existing 30.8-mile-long Enbridge pipeline approximately 2.1 miles southeast of Plaza, North Dakota. The Project will also include conversion of the existing Enbridge 6.625-inch OD collector pipeline to a transmission pipeline within the existing 30-foot-wide permanent easement. From the interconnect point of the new pipeline, the existing Enbridge pipeline will transport crude oil to the existing Enbridge storage facility in Stanley, North Dakota. Associated aboveground facilities will include a proposed 4.0-acre midline pump station adjacent to the existing Enbridge pipeline along with two associated permanent access roads, each 40-foot long, 30-foot wide (**Figure 1**).

The Project is located within the following portions of Ward and Mountrail Counties, North Dakota:

- Proposed new pipeline: Sections 18 and 19, Township (T) 152 North (N), Range (R) 87 West (W), and Sections 13, 14, 11, and 2, T152N R88W
- Midline Pump Station and two permanent access roads: Section 21, T154 N R89W

- Existing Enbridge pipeline: Sections 2 and 3, T152N R88W, and Sections 36, 35, 26, 27, 22, 21, 16, 17, 8, and 7, T153N R88W, and Sections 12, 1, and 2, T153N R89W, and Sections 35, 34, 27, 28, 21, 20, 17, 8, 7, and 6, T154N R89W, and Sections 1 and 2, T154N R90W, and Sections 35, 26, 27, 22, 21, 20, 17, 18, 7, and 6, T155N R90W, and Sections 1 and 2, T155N R91W, and Sections 35, 26, and 27, T156N R91W

The Project is scheduled to begin construction in the spring of 2024. The proposed pipeline will be installed using an 80-foot-wide construction right-of way (ROW), consisting of a 30-foot-wide permanent easement and an adjacent 50-foot-wide temporary construction workspace. Approximately three miles of the proposed pipeline will be within the FBIR, approximately 2.3 miles of which will be constructed abutting the existing Canadian Pacific Railway ROW. Construction of the proposed pipeline will temporarily disturb a total of approximately 40 acres on privately-owned agricultural land. During construction, several temporary access roads and additional temporary workspaces may be required.

Following construction, the new pipeline will be buried with a minimum cover of 72 inches. TBPL will maintain a 30-foot-wide permanent easement for the new pipeline. This permanent easement along with the associated aboveground facilities will encompass a total of approximately 17 acres. The existing Enbridge pipeline is located within an existing 30-foot-wide permanent easement. *With the exception of a midline pump station and associated permanent access roads, no aboveground disturbances are anticipated to be required for conversion of the Enbridge pipeline.* Lands within and adjacent to both the proposed pipeline, midline pump station, and the existing Enbridge pipeline are previously disturbed agricultural land.

Please direct any questions or correspondence concerning the Project to me at 303-471-3410 or Doug Anderson at 303-471-3484.

Sincerely,

Arcadis U.S., Inc.



Kathryn Cloutier
Project Manager

Email: Kathryn.Cloutier@arcadis.com
Office: 303-471-3410

Enclosures:
Figure

Existing Enbridge Storage Facility

Proposed Midline Pump Station

Existing Block Valves

Existing Block Valves

Existing Plaza Station

Existing TBPS Crude Storage and Loading Facility

Mountrail County

Ward County



Legend

- Existing Enbridge Pipeline
- Proposed New Pipeline
- 1 Mile Buffer
- Fort Berthold Indian Reservation Boundary
- County Boundary

0 2.5 5 Miles

GRAPHIC SCALE

NOTE:
1. USGS 7.5' TOPOGRAPHIC QUADRANGLE(S) STANLEY, STANLEY SE, PALERMO, TAGUS SE, BLAISDELL, TAGUS, SIKES DAM, BELDEN, EPWORTH NW, SHELL LAKE, PLAZA NE, PLAZA NW, BELDEN SW, BELDEN SE, EPWORTH, EPWORTH SE, PLAZA, PLAZA SE, NEW TOWN, SHELL CREEK BAY, PARSHALL, PARSHALL NE, WABEK, MAKOTI, WISCONSIN. OBTAINED FROM ESRI IMAGE SERVICE.

Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 1
PROJECT OVERVIEW MAP
OVERVIEW

PN:CO002338.0001

Date: 11/21/2023

ARCADIS

Date: 11/21/2023 User Name: MNugent
Document Path: T:_EPP\Makoti_pipeline\pro\Makoti_Pipeline\Makoti_Pipeline_Rev.aprx

Grand Forks Air Force Base
344 Tuskegee Airmen Boulevard
Grand Forks Air Force Base ND 58205

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Kathryn Cloutier
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Email: Kathryn.Cloutier@arcadis.com
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Proposed Midline Pump Station

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Existing Plaza Station

Existing TBPS Crude Storage and Loading Facility

Mountrail County

Ward County



Legend

- Existing Enbridge Pipeline
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- Fort Berthold Indian Reservation Boundary
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0 2.5 5 Miles

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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 1
PROJECT OVERVIEW MAP
OVERVIEW

PN:CO002338.0001

Date: 11/21/2023

ARCADIS

Date: 11/21/2023 User Name: MNugent
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Military Aviation and Installation Assurance Siting Clearinghouse
400 Defense Pentagon
Room 5C646
Washington DC 20301-3400

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Subject: Thunder Butte Pipeline, LLC: Thunder Butte Pipeline Project, Ward and Mountrail Counties, North Dakota

To Whom it may Concern,

Thunder Butte Pipeline, LLC (TBPL) is proposing the Thunder Butte Pipeline Project (Project) for transport of crude oil from the existing Thunder Butte Petroleum Services, Inc. (TBPS) Crude Storage and Loading Facility (TBPS Facility) within the Fort Berthold Indian Reservation (FBIR), near Plaza, North Dakota to an existing Enbridge crude terminal in Stanley, North Dakota (**Figure 1**). The TBPS Facility is owned by the Mandan, Hidatsa, and Arikara Nation/ Three Affiliated Tribes (MHA Nation/ TAT) doing business as TBPS and the Enbridge storage facility is owned by Enbridge Pipelines North Dakota. These two facilities are not part of the TBPL Project because they are owned by third-party entities.

The Project will consist of construction of a new underground pipeline and conversion of the existing Enbridge collector (gathering) pipeline to a transmission pipeline, along with an above ground midline pump station and a permanent access roads in Ward and Mountrail counties.

TBPL is submitting a Consolidated Certificate of Corridor Compatibility and Route Permit Application (Consolidated Permit Application) to the North Dakota Public Service Commission (Commission) requesting a Certificate of Corridor Compatibility and Route Permit for construction and operation of the Project. On behalf of TBPL, Arcadis, U.S., Inc. is submitting this letter to inform your agency of the proposed Project and to request any comments or input. Any information received will be taken into consideration during the permitting and development process in conjunction with the Consolidated Permit Application process.

The project will include installation of a proposed 3.84-mile-long underground carbon steel pipeline with a 6.625-inch outer diameter (OD) originating at the existing TBPS Facility approximately 2.6 miles northwest of Makoti, North Dakota and terminating at the interconnection with the existing 30.8-mile-long Enbridge pipeline approximately 2.1 miles southeast of Plaza, North Dakota. The Project will also include conversion of the existing Enbridge 6.625-inch OD collector pipeline to a transmission pipeline within the existing 30-foot-wide permanent easement. From the interconnect point of the new pipeline, the existing Enbridge pipeline will transport crude oil to the existing Enbridge storage facility in Stanley, North Dakota. Associated aboveground facilities will include a proposed 4.0-acre midline pump station adjacent to the existing Enbridge pipeline along with two associated permanent access roads, each 40-foot long, 30-foot wide (**Figure 1**).

The Project is located within the following portions of Ward and Mountrail Counties, North Dakota:

- Proposed new pipeline: Sections 18 and 19, Township (T) 152 North (N), Range (R) 87 West (W), and Sections 13, 14, 11, and 2, T152N R88W
- Midline Pump Station and two permanent access roads: Section 21, T154 N R89W

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The Project is scheduled to begin construction in the spring of 2024. The proposed pipeline will be installed using an 80-foot-wide construction right-of way (ROW), consisting of a 30-foot-wide permanent easement and an adjacent 50-foot-wide temporary construction workspace. Approximately three miles of the proposed pipeline will be within the FBIR, approximately 2.3 miles of which will be constructed abutting the existing Canadian Pacific Railway ROW. Construction of the proposed pipeline will temporarily disturb a total of approximately 40 acres on privately-owned agricultural land. During construction, several temporary access roads and additional temporary workspaces may be required.

Following construction, the new pipeline will be buried with a minimum cover of 72 inches. TBPL will maintain a 30-foot-wide permanent easement for the new pipeline. This permanent easement along with the associated aboveground facilities will encompass a total of approximately 17 acres. The existing Enbridge pipeline is located within an existing 30-foot-wide permanent easement. *With the exception of a midline pump station and associated permanent access roads, no aboveground disturbances are anticipated to be required for conversion of the Enbridge pipeline.* Lands within and adjacent to both the proposed pipeline, midline pump station, and the existing Enbridge pipeline are previously disturbed agricultural land.

Please direct any questions or correspondence concerning the Project to me at 303-471-3410 or Doug Anderson at 303-471-3484.

Sincerely,

Arcadis U.S., Inc.



Kathryn Cloutier
Project Manager

Email: Kathryn.Cloutier@arcadis.com
Office: 303-471-3410

Enclosures:
Figure

Existing Enbridge Storage Facility

Proposed Midline Pump Station

Existing Block Valves

Existing Block Valves

Existing Plaza Station

Existing TBPS Crude Storage and Loading Facility

Mountrail County

Ward County



Legend

- Existing Enbridge Pipeline
- Proposed New Pipeline
- 1 Mile Buffer
- Fort Berthold Indian Reservation Boundary
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GRAPHIC SCALE

NOTE:
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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 1
PROJECT OVERVIEW MAP
OVERVIEW

PN:CO002338.0001

Date: 11/21/2023

ARCADIS

Date: 11/21/2023 User Name: MNugent
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Minot Air Force Base
362 Missile Avenue
Minot Air Force Base ND 58705

Date: September 29, 2023
Our Ref: 30192665
Subject: Thunder Butte Pipeline, LLC: Thunder Butte Pipeline Project, Ward and Mountrail Counties, North Dakota

Arcadis U.S., Inc.
630 Plaza Drive
Suite 200
Highlands Ranch
Colorado 80129
Phone: 720 344 3500
Fax: 720 344 3535
www.arcadis.com

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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

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Mountrail County Commission
c/o Stephanie Pappa, Mountrail County Auditor
PO Box 69
Stanley ND 58784

Arcadis U.S., Inc.
630 Plaza Drive
Suite 200
Highlands Ranch
Colorado 80129
Phone: 720 344 3500
Fax: 720 344 3535
www.arcadis.com

Date: September 29, 2023
Our Ref: 30192665
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Ward County



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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

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North Dakota Aeronautics Commission
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Bismarck ND 58502

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Colorado 80129
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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 1
PROJECT OVERVIEW MAP
OVERVIEW

PN:CO002338.0001

Date: 11/21/2023

ARCADIS

Date: 11/21/2023 User Name: MNugent
Document Path: T:_EPP\Makoti_pipeline\pro\Makoti_Pipeline\Makoti_Pipeline_Rev.aprx

North Dakota Department of Agriculture
600 East Boulevard Avenue
Department 602
Bismarck ND 58505

Arcadis U.S., Inc.
630 Plaza Drive
Suite 200
Highlands Ranch
Colorado 80129
Phone: 720 344 3500
Fax: 720 344 3535
www.arcadis.com

Date: September 29, 2023
Our Ref: 30192665
Subject: Thunder Butte Pipeline, LLC: Thunder Butte Pipeline Project, Ward and Mountrail Counties, North Dakota

To Whom it may Concern,

Thunder Butte Pipeline, LLC (TBPL) is proposing the Thunder Butte Pipeline Project (Project) for transport of crude oil from the existing Thunder Butte Petroleum Services, Inc. (TBPS) Crude Storage and Loading Facility (TBPS Facility) within the Fort Berthold Indian Reservation (FBIR), near Plaza, North Dakota to an existing Enbridge crude terminal in Stanley, North Dakota (**Figure 1**). The TBPS Facility is owned by the Mandan, Hidatsa, and Arikara Nation/ Three Affiliated Tribes (MHA Nation/ TAT) doing business as TBPS and the Enbridge storage facility is owned by Enbridge Pipelines North Dakota. These two facilities are not part of the TBPL Project because they are owned by third-party entities.

The Project will consist of construction of a new underground pipeline and conversion of the existing Enbridge collector (gathering) pipeline to a transmission pipeline, along with an above ground midline pump station and a permanent access roads in Ward and Mountrail counties.

TBPL is submitting a Consolidated Certificate of Corridor Compatibility and Route Permit Application (Consolidated Permit Application) to the North Dakota Public Service Commission (Commission) requesting a Certificate of Corridor Compatibility and Route Permit for construction and operation of the Project. On behalf of TBPL, Arcadis, U.S., Inc. is submitting this letter to inform your agency of the proposed Project and to request any comments or input. Any information received will be taken into consideration during the permitting and development process in conjunction with the Consolidated Permit Application process.

The project will include installation of a proposed 3.84-mile-long underground carbon steel pipeline with a 6.625-inch outer diameter (OD) originating at the existing TBPS Facility approximately 2.6 miles northwest of Makoti, North Dakota and terminating at the interconnection with the existing 30.8-mile-long Enbridge pipeline approximately 2.1 miles southeast of Plaza, North Dakota. The Project will also include conversion of the existing Enbridge 6.625-inch OD collector pipeline to a transmission pipeline within the existing 30-foot-wide permanent easement. From the interconnect point of the new pipeline, the existing Enbridge pipeline will transport crude oil to the existing Enbridge storage facility in Stanley, North Dakota. Associated aboveground facilities will include a proposed 4.0-acre midline pump station adjacent to the existing Enbridge pipeline along with two associated permanent access roads, each 40-foot long, 30-foot wide (**Figure 1**).

The Project is located within the following portions of Ward and Mountrail Counties, North Dakota:

- Proposed new pipeline: Sections 18 and 19, Township (T) 152 North (N), Range (R) 87 West (W), and Sections 13, 14, 11, and 2, T152N R88W
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The Project is scheduled to begin construction in the spring of 2024. The proposed pipeline will be installed using an 80-foot-wide construction right-of way (ROW), consisting of a 30-foot-wide permanent easement and an adjacent 50-foot-wide temporary construction workspace. Approximately three miles of the proposed pipeline will be within the FBIR, approximately 2.3 miles of which will be constructed abutting the existing Canadian Pacific Railway ROW. Construction of the proposed pipeline will temporarily disturb a total of approximately 40 acres on privately-owned agricultural land. During construction, several temporary access roads and additional temporary workspaces may be required.

Following construction, the new pipeline will be buried with a minimum cover of 72 inches. TBPL will maintain a 30-foot-wide permanent easement for the new pipeline. This permanent easement along with the associated aboveground facilities will encompass a total of approximately 17 acres. The existing Enbridge pipeline is located within an existing 30-foot-wide permanent easement. *With the exception of a midline pump station and associated permanent access roads, no aboveground disturbances are anticipated to be required for conversion of the Enbridge pipeline.* Lands within and adjacent to both the proposed pipeline, midline pump station, and the existing Enbridge pipeline are previously disturbed agricultural land.

Please direct any questions or correspondence concerning the Project to me at 303-471-3410 or Doug Anderson at 303-471-3484.

Sincerely,

Arcadis U.S., Inc.



Kathryn Cloutier
Project Manager

Email: Kathryn.Cloutier@arcadis.com
Office: 303-471-3410

Enclosures:
Figure

Existing Enbridge Storage Facility

Proposed Midline Pump Station

Existing Block Valves

Existing Block Valves

Existing Plaza Station

Existing TBPS Crude Storage and Loading Facility

Mountrail County

Ward County



Legend

- Existing Enbridge Pipeline
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October 18, 2023

Kathryn Cloutier
Project Manager
Arcadis U.S., Inc.
630 Plaza Drive, Suite 200
Highlands Ranch, CO 80129

Re: Thunder Butte Pipeline Project in Mountrail and Ward Counties

Dear Ms. Cloutier:

The North Dakota Department of Environmental Quality has reviewed the information concerning the above-referenced project received at the department on October 2, 2023, with respect to possible environmental impacts.

1. All necessary measures must be taken to minimize fugitive dust emissions created during construction activities. Any complaints that may arise are to be dealt with in an efficient and effective manner.

2. Care is to be taken during construction activity near any water of the state to minimize adverse effects on a water body. This includes minimal disturbance of stream beds and banks to prevent excess siltation, and the replacement and revegetation of any disturbed area as soon as possible after work has been completed. Caution must also be taken to prevent spills of oil and grease that may reach the receiving water from equipment maintenance and/or the handling of fuels on the site. Guidelines for minimizing degradation to waterways during construction are attached.

3. Oil and gas related construction activities located within tribal boundaries within North Dakota may be required to obtain a permit to discharge stormwater runoff from the U.S. Environmental Protection Agency (USEPA). Further information may be obtained from the USEPA website or by calling the USEPA – Region 8 at 303-312-6312. Oil and gas related construction activities outside of tribal boundaries, that disturb one or more acres, and have the ability to discharge sediment laden stormwater to waters of the state are required to have a permit to discharge stormwater runoff until the site is stabilized by the re-establishment of vegetation or other permanent cover. Further information on the stormwater permit may be obtained from the department's website or by calling the Division of Water Quality at 701-328-5210. Also, cities may impose additional requirements and/or specific best management practices for construction affecting their storm drainage system. Check with the local officials to be sure any local stormwater management considerations are addressed.

4. The construction project overlies the Hiddenwood Lake surficial aquifer. Care should be taken to avoid spills of any materials that may have an adverse effect on groundwater quality. All spills must be immediately reported to this department and appropriate remedial actions performed.

5. The proposed project appears to have the potential to be a source of emissions to the air capable of causing or contributing to air pollution and may be required to have an Air Pollution Control Permit to Construct/Operate as required by Chapter 33.1-15-14 of the North Dakota Air Pollution Control Rules. The applicant should contact the department's Air Pollution Control Program at 701-328-5188 prior to commencing construction.

6. All solid waste materials must be managed and transported in accordance with the state's solid and hazardous waste rules. Appropriate efforts to reduce, reuse and/or recycle waste materials are strongly encouraged. As appropriate, segregation of inert waste from non-inert waste can generally reduce the cost of waste management. Further information on waste management and recycling is available from the department's Division of Waste Management at 701-328-5166.

7. Projects that involve construction of pipelines should select locations that minimize the potential for impacts to human health and the environment during and after construction by avoiding, when possible, source water protection areas and sensitive surface and groundwater environments. Additionally, when possible, pipeline routes should select areas with natural barriers to both surface and ground waters. Human health and the environment should be further protected by developing a spill response plan that emphasizes rapid deployment of prepositioned assets necessary to contain spills and subsequent cleanup. Proper surveillance and monitoring for early detection of leaks should be required.

These comments are based on the information provided about the project in the above-referenced submittal. The U.S. Army Corps of Engineers may require a water quality certification from this department for the project if the project is subject to their Section 404 permitting process. Any additional information which may be required by the U.S. Army Corps of Engineers under the process will be considered by this department in our determination regarding the issuance of such a certification.

The department owns no land in or adjacent to the proposed improvements, nor does it have any projects scheduled in the area. In addition, we believe the proposed activities are consistent with the State Implementation Plan for the Control of Air Pollution for the State of North Dakota.

If you have any questions regarding our comments, please feel free to contact this office.

Sincerely,



L. David Glatt, P.E., Director
North Dakota Department of Environmental Quality

LDG:ll
Attach.

Construction and Environmental Disturbance Requirements

The following are the minimum requirements of the North Dakota Department of Environmental Quality for projects that involve construction and environmental disturbance in or near waters of the State of North Dakota. They ensure that minimal environmental degradation occurs as a result of construction or related work which has the potential to affect waters of the state. All projects must be constructed to minimize the loss of soil, vegetative cover, and pollutants (chemical or biological) from a site.

Soils

Prevent the erosion and sediment loss using erosion and sediment controls. Fragile and sensitive areas such as wetlands, riparian zones, delicate flora, and land resources must be prohibited against compaction, vegetation loss and unnecessary damage.

Surface Waters

All construction must be managed to minimize impacts to aquatic systems. Follow safe storage and handling procedures to prevent the contamination of water from fuel spills, lubricants, and chemicals. Stream bank and stream bed disturbances must be contained to minimize silt movement, nutrient upsurges, plant dislocations, and any physical chemicals, or biological disruption. The use of pesticides or herbicides in or near surface waters is allowed under the department's pesticide application permit with notification to the department.

Fill Material

Any fill material placed below the ordinary high-water mark must be free of topsoil, decomposable materials, and persistent synthetic organic compounds, including, but not limited to, asphalt, tires, treated lumber, and construction debris. The department may require testing of fill material. All temporary fills must be removed. Debris and solid waste must be properly disposed or recycled. Impacted areas must be restored to near original condition.

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1. USGS 7.5' TOPOGRAPHIC QUADRANGLE(S) STANLEY, STANLEY SE, PALERMO, TAGUS SE, BLAISDELL, TAGUS, SIKES DAM, BELDEN, EPWORTH NW, SHELL LAKE, PLAZA NE, PLAZA NW, BELDEN SW, BELDEN SE, EPWORTH, EPWORTH SE, PLAZA, PLAZA SE, NEW TOWN, SHELL CREEK BAY, PARSHALL, PARSHALL NE, WABEK, MAKOTI, WISCONSIN. OBTAINED FROM ESRI IMAGE SERVICE.

Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 1
PROJECT OVERVIEW MAP
OVERVIEW

PN:CO002338.0001

Date: 11/21/2023

ARCADIS

Date: 11/21/2023 User Name: MNugent
Document Path: T:_EPP\Makoti_pipeline\pro\Makoti_Pipeline\Makoti_Pipeline_Rev.aprx

North Dakota Department of Human Services
600 East Boulevard Avenue
Department 325
Bismarck ND 58505

Arcadis U.S., Inc.
630 Plaza Drive
Suite 200
Highlands Ranch
Colorado 80129
Phone: 720 344 3500
Fax: 720 344 3535
www.arcadis.com

Date: September 29, 2023
Our Ref: 30192665
Subject: Thunder Butte Pipeline, LLC: Thunder Butte Pipeline Project, Ward and Mountrail Counties, North Dakota

To Whom it may Concern,

Thunder Butte Pipeline, LLC (TBPL) is proposing the Thunder Butte Pipeline Project (Project) for transport of crude oil from the existing Thunder Butte Petroleum Services, Inc. (TBPS) Crude Storage and Loading Facility (TBPS Facility) within the Fort Berthold Indian Reservation (FBIR), near Plaza, North Dakota to an existing Enbridge crude terminal in Stanley, North Dakota (**Figure 1**). The TBPS Facility is owned by the Mandan, Hidatsa, and Arikara Nation/ Three Affiliated Tribes (MHA Nation/ TAT) doing business as TBPS and the Enbridge storage facility is owned by Enbridge Pipelines North Dakota. These two facilities are not part of the TBPL Project because they are owned by third-party entities.

The Project will consist of construction of a new underground pipeline and conversion of the existing Enbridge collector (gathering) pipeline to a transmission pipeline, along with an above ground midline pump station and a permanent access roads in Ward and Mountrail counties.

TBPL is submitting a Consolidated Certificate of Corridor Compatibility and Route Permit Application (Consolidated Permit Application) to the North Dakota Public Service Commission (Commission) requesting a Certificate of Corridor Compatibility and Route Permit for construction and operation of the Project. On behalf of TBPL, Arcadis, U.S., Inc. is submitting this letter to inform your agency of the proposed Project and to request any comments or input. Any information received will be taken into consideration during the permitting and development process in conjunction with the Consolidated Permit Application process.

The project will include installation of a proposed 3.84-mile-long underground carbon steel pipeline with a 6.625-inch outer diameter (OD) originating at the existing TBPS Facility approximately 2.6 miles northwest of Makoti, North Dakota and terminating at the interconnection with the existing 30.8-mile-long Enbridge pipeline approximately 2.1 miles southeast of Plaza, North Dakota. The Project will also include conversion of the existing Enbridge 6.625-inch OD collector pipeline to a transmission pipeline within the existing 30-foot-wide permanent easement. From the interconnect point of the new pipeline, the existing Enbridge pipeline will transport crude oil to the existing Enbridge storage facility in Stanley, North Dakota. Associated aboveground facilities will include a proposed 4.0-acre midline pump station adjacent to the existing Enbridge pipeline along with two associated permanent access roads, each 40-foot long, 30-foot wide (**Figure 1**).

The Project is located within the following portions of Ward and Mountrail Counties, North Dakota:

- Proposed new pipeline: Sections 18 and 19, Township (T) 152 North (N), Range (R) 87 West (W), and Sections 13, 14, 11, and 2, T152N R88W
- Midline Pump Station and two permanent access roads: Section 21, T154 N R89W

- Existing Enbridge pipeline: Sections 2 and 3, T152N R88W, and Sections 36, 35, 26, 27, 22, 21, 16, 17, 8, and 7, T153N R88W, and Sections 12, 1, and 2, T153N R89W, and Sections 35, 34, 27, 28, 21, 20, 17, 8, 7, and 6, T154N R89W, and Sections 1 and 2, T154N R90W, and Sections 35, 26, 27, 22, 21, 20, 17, 18, 7, and 6, T155N R90W, and Sections 1 and 2, T155N R91W, and Sections 35, 26, and 27, T156N R91W

The Project is scheduled to begin construction in the spring of 2024. The proposed pipeline will be installed using an 80-foot-wide construction right-of way (ROW), consisting of a 30-foot-wide permanent easement and an adjacent 50-foot-wide temporary construction workspace. Approximately three miles of the proposed pipeline will be within the FBIR, approximately 2.3 miles of which will be constructed abutting the existing Canadian Pacific Railway ROW. Construction of the proposed pipeline will temporarily disturb a total of approximately 40 acres on privately-owned agricultural land. During construction, several temporary access roads and additional temporary workspaces may be required.

Following construction, the new pipeline will be buried with a minimum cover of 72 inches. TBPL will maintain a 30-foot-wide permanent easement for the new pipeline. This permanent easement along with the associated aboveground facilities will encompass a total of approximately 17 acres. The existing Enbridge pipeline is located within an existing 30-foot-wide permanent easement. *With the exception of a midline pump station and associated permanent access roads, no aboveground disturbances are anticipated to be required for conversion of the Enbridge pipeline.* Lands within and adjacent to both the proposed pipeline, midline pump station, and the existing Enbridge pipeline are previously disturbed agricultural land.

Please direct any questions or correspondence concerning the Project to me at 303-471-3410 or Doug Anderson at 303-471-3484.

Sincerely,

Arcadis U.S., Inc.



Kathryn Cloutier
Project Manager

Email: Kathryn.Cloutier@arcadis.com
Office: 303-471-3410

Enclosures:
Figure

Existing Enbridge Storage Facility

Proposed Midline Pump Station

Existing Block Valves

Existing Block Valves

Existing Plaza Station

Existing TBPS Crude Storage and Loading Facility

Mountrail County

Ward County



Legend

- Existing Enbridge Pipeline
- Proposed New Pipeline
- 1 Mile Buffer
- Fort Berthold Indian Reservation Boundary
- County Boundary

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Following construction, the new pipeline will be buried with a minimum cover of 72 inches. TBPL will maintain a 30-foot-wide permanent easement for the new pipeline. This permanent easement along with the associated aboveground facilities will encompass a total of approximately 17 acres. The existing Enbridge pipeline is located within an existing 30-foot-wide permanent easement. *With the exception of a midline pump station and associated permanent access roads, no aboveground disturbances are anticipated to be required for conversion of the Enbridge pipeline.* Lands within and adjacent to both the proposed pipeline, midline pump station, and the existing Enbridge pipeline are previously disturbed agricultural land.

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Kathryn Cloutier
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Email: Kathryn.Cloutier@arcadis.com
Office: 303-471-3410

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Mountrail County

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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

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Kathryn Cloutier
Project Manager

Email: Kathryn.Cloutier@arcadis.com
Office: 303-471-3410

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Mountrail County

Ward County



Legend

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GRAPHIC SCALE

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Thunder Butte Pipeline Project
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NORTH Dakota | Transportation
Be Legendary.

October 5, 2023

Kathy Cloutier
Project Manager
Arcadis U.S., Inc
630 Plaza Drive, Suite 200
Highlands Ranch, CO 80129

THUNDER BUTTE PIPELINE PROJECT FOR TRANSPORT OF CRUDE OIL FROM EXISTING THUNDER BUTTE PETROLEUM SERVICES, WARD AND MOUNTRAIL COUNTIES, NORTH DAKOTA

We have reviewed your September 29, 2023, letter.

This project should have no adverse effect on the North Dakota Department of Transportation highways.

However, if because of this project any work needs to be done on highway right of way, appropriate permits and risk management documents will need to be obtained from the Department of Transportation District Engineer, Korby Seward, Minot at 701-857-6907.

JON KETTERLING, P.E., DIRECTOR – OFFICE OF PROJECT DEVELOPMENT

57/jk/js

c: Korby Seward, Minot District Engineer

NORTH Dakota | Mineral Resources
Be Legendary.™

October 6, 2023

Kathryn Cloutier, Project Manager
ARCADIS U.S., Inc.
630 Plaza Drive, Suite 200
Highlands Ranch, CO 80129

Re: Thunder Butte Pipeline, LLC: Thunder Butte Pipeline Project, Ward & Mountrail Counties

The North Dakota Geological Survey (NDGS) appreciates the notification and opportunity to provide comment on your proposed project work. The September 29, 2023, comment solicitation letter was reviewed by our office on October 6, 2023. After a review of the proposed new pipeline route corridor against available geologic and landslide area mapping and contemporary aerial imagery we would not note any geologic concerns with the project at this time.

All of our geologic mapping products and data sets are available on our website at: https://www.dmr.nd.gov/ndgs/landslides/

Please feel free to contact our offices at any time at (701) 328-8000 or via email at fjanderson@nd.gov if there are any additional questions or comments.

Sincerely,

North Dakota Geological Survey:

Fred Anderson

Fred J. Anderson,
Geologist

FJA

North Dakota Department of Trust Lands
1707 North 9th Street
Bismarck ND 58506

Arcadis U.S., Inc.
630 Plaza Drive
Suite 200
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State Capitol - 15th Floor
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Following construction, the new pipeline will be buried with a minimum cover of 72 inches. TBPL will maintain a 30-foot-wide permanent easement for the new pipeline. This permanent easement along with the associated aboveground facilities will encompass a total of approximately 17 acres. The existing Enbridge pipeline is located within an existing 30-foot-wide permanent easement. *With the exception of a midline pump station and associated permanent access roads, no aboveground disturbances are anticipated to be required for conversion of the Enbridge pipeline.* Lands within and adjacent to both the proposed pipeline, midline pump station, and the existing Enbridge pipeline are previously disturbed agricultural land.

Please direct any questions or correspondence concerning the Project to me at 303-471-3410 or Doug Anderson at 303-471-3484.

Sincerely,

Arcadis U.S., Inc.



Kathryn Cloutier
Project Manager

Email: Kathryn.Cloutier@arcadis.com
Office: 303-471-3410

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Figure

Existing Enbridge Storage Facility

Proposed Midline Pump Station

Existing Block Valves

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Existing Plaza Station

Existing TBPS Crude Storage and Loading Facility

Mountrail County

Ward County



Legend

- Existing Enbridge Pipeline
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- 1 Mile Buffer
- Fort Berthold Indian Reservation Boundary
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0 2.5 5 Miles

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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 1
PROJECT OVERVIEW MAP
OVERVIEW

PN:CO002338.0001

Date: 11/21/2023

ARCADIS

Date: 11/21/2023 User Name: MNugent
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Bottineau ND 58318

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Colorado 80129
Phone: 720 344 3500
Fax: 720 344 3535
www.arcadis.com

Date: September 29, 2023
Our Ref: 30192665
Subject: Thunder Butte Pipeline, LLC: Thunder Butte Pipeline Project, Ward and Mountrail Counties, North Dakota

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Kathryn Cloutier
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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

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North Dakota Geological Survey
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Bismarck ND 58505-0840

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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

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NORTH Dakota | Mineral Resources
Be Legendary.™

October 6, 2023

Kathryn Cloutier, Project Manager
ARCADIS U.S., Inc.
630 Plaza Drive, Suite 200
Highlands Ranch, CO 80129

Re: Thunder Butte Pipeline, LLC: Thunder Butte Pipeline Project, Ward & Mountrail Counties

The North Dakota Geological Survey (NDGS) appreciates the notification and opportunity to provide comment on your proposed project work. The September 29, 2023, comment solicitation letter was reviewed by our office on October 6, 2023. After a review of the proposed new pipeline route corridor against available geologic and landslide area mapping and contemporary aerial imagery we would not note any geologic concerns with the project at this time.

All of our geologic mapping products and data sets are available on our website at: https://www.dmr.nd.gov/ndgs/landslides/

Please feel free to contact our offices at any time at (701) 328-8000 or via email at fjanderson@nd.gov if there are any additional questions or comments.

Sincerely,

North Dakota Geological Survey:

Fred Anderson

Fred J. Anderson,
Geologist

FJA

North Dakota Indian Affairs Commission
State Capitol Building
600 East Boulevard Avenue
1st Floor, Judicial Wing - Room 117
Bismarck ND 58505

Arcadis U.S., Inc.
630 Plaza Drive
Suite 200
Highlands Ranch
Colorado 80129
Phone: 720 344 3500
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www.arcadis.com

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North Dakota Industrial Commission
State Capitol - 14th Floor
600 East Boulevard Avenue, Department 405
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1. USGS 7.5' TOPOGRAPHIC QUADRANGLE(S) STANLEY, STANLEY SE, PALERMO, TAGUS SE, BLAISDELL, TAGUS, SIKES DAM, BELDEN, EPWORTH NW, SHELL LAKE, PLAZA NE, PLAZA NW, BELDEN SW, BELDEN SE, EPWORTH, EPWORTH SE, PLAZA, PLAZA SE, NEW TOWN, SHELL CREEK BAY, PARSHALL, PARSHALL NE, WABEK, MAKOTI, WISCONSIN. OBTAINED FROM ESRI IMAGE SERVICE.

Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 1
PROJECT OVERVIEW MAP
OVERVIEW

PN:CO002338.0001

Date: 11/21/2023

ARCADIS

Date: 11/21/2023 User Name: MNugent
Document Path: T:_EPP\Makoti_pipeline\pro\Makoti_Pipeline\Makoti_Pipeline_Rev.aprx

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600 East Boulevard Avenue
Department 125
Bismarck ND 58505

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Colorado 80129
Phone: 720 344 3500
Fax: 720 344 3535
www.arcadis.com

Date: September 29, 2023
Our Ref: 30192665
Subject: Thunder Butte Pipeline, LLC: Thunder Butte Pipeline Project, Ward and Mountrail Counties, North Dakota

To Whom it may Concern,

Thunder Butte Pipeline, LLC (TBPL) is proposing the Thunder Butte Pipeline Project (Project) for transport of crude oil from the existing Thunder Butte Petroleum Services, Inc. (TBPS) Crude Storage and Loading Facility (TBPS Facility) within the Fort Berthold Indian Reservation (FBIR), near Plaza, North Dakota to an existing Enbridge crude terminal in Stanley, North Dakota (**Figure 1**). The TBPS Facility is owned by the Mandan, Hidatsa, and Arikara Nation/ Three Affiliated Tribes (MHA Nation/ TAT) doing business as TBPS and the Enbridge storage facility is owned by Enbridge Pipelines North Dakota. These two facilities are not part of the TBPL Project because they are owned by third-party entities.

The Project will consist of construction of a new underground pipeline and conversion of the existing Enbridge collector (gathering) pipeline to a transmission pipeline, along with an above ground midline pump station and a permanent access roads in Ward and Mountrail counties.

TBPL is submitting a Consolidated Certificate of Corridor Compatibility and Route Permit Application (Consolidated Permit Application) to the North Dakota Public Service Commission (Commission) requesting a Certificate of Corridor Compatibility and Route Permit for construction and operation of the Project. On behalf of TBPL, Arcadis, U.S., Inc. is submitting this letter to inform your agency of the proposed Project and to request any comments or input. Any information received will be taken into consideration during the permitting and development process in conjunction with the Consolidated Permit Application process.

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The Project is located within the following portions of Ward and Mountrail Counties, North Dakota:

- Proposed new pipeline: Sections 18 and 19, Township (T) 152 North (N), Range (R) 87 West (W), and Sections 13, 14, 11, and 2, T152N R88W
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The Project is scheduled to begin construction in the spring of 2024. The proposed pipeline will be installed using an 80-foot-wide construction right-of way (ROW), consisting of a 30-foot-wide permanent easement and an adjacent 50-foot-wide temporary construction workspace. Approximately three miles of the proposed pipeline will be within the FBIR, approximately 2.3 miles of which will be constructed abutting the existing Canadian Pacific Railway ROW. Construction of the proposed pipeline will temporarily disturb a total of approximately 40 acres on privately-owned agricultural land. During construction, several temporary access roads and additional temporary workspaces may be required.

Following construction, the new pipeline will be buried with a minimum cover of 72 inches. TBPL will maintain a 30-foot-wide permanent easement for the new pipeline. This permanent easement along with the associated aboveground facilities will encompass a total of approximately 17 acres. The existing Enbridge pipeline is located within an existing 30-foot-wide permanent easement. *With the exception of a midline pump station and associated permanent access roads, no aboveground disturbances are anticipated to be required for conversion of the Enbridge pipeline.* Lands within and adjacent to both the proposed pipeline, midline pump station, and the existing Enbridge pipeline are previously disturbed agricultural land.

Please direct any questions or correspondence concerning the Project to me at 303-471-3410 or Doug Anderson at 303-471-3484.

Sincerely,

Arcadis U.S., Inc.



Kathryn Cloutier
Project Manager

Email: Kathryn.Cloutier@arcadis.com
Office: 303-471-3410

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Proposed Midline Pump Station

Existing Block Valves

Existing Block Valves

Existing Plaza Station

Existing TBPS Crude Storage and Loading Facility

Mountrail County

Ward County



Legend

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Kathryn Cloutier
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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

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NORTH Dakota | Parks & Recreation
Be Legendary.™

October 18, 2023

Arcadis
Kathryn Cloutier
630 Plaza Drive, Suite 200
Highlands Ranch, Colorado 80129

Re: Thunder Butte Pipeline, LLC Thunder Butte Pipeline Project

Dear Kathyrn,

The North Dakota Parks and Recreation Department (NDPRD) has reviewed the above-referenced Thunder Butte Pipeline, LLC Thunder Butte Pipeline Project in Ward and Mountrail Counties, North Dakota.

NDPRD's scope of authority and expertise covers properties that NDPRD owns, leases, or manages; properties protected under Section 6(f) of the Land and Water Conservation Fund (LWCF); rare plants; and ecological communities established through the Natural Heritage Program.

The project does not appear to affect properties NDPRD owns, leases, or manages.
The project does not appear to affect any properties protected under Section 6(f) of the LWCF.

A North Dakota Natural Heritage biological conservation database query determines if any current or historical plant or animal species of concern or other significant ecological communities are known to occur within an approximate one-mile radius of the project area. Based on this review, no known plant or animal species of concern or significant ecological communities are documented within or immediately adjacent to the project site.

We appreciate your commitment to rare plant, animal, and ecological community conservation, management, and inter-agency cooperation. For additional information, please contact me at 701-328-5370, 701-220-3377 (cell), or kgduttenhefner@nd.gov.

Thank you for the opportunity to comment on the proposed project.

Sincerely,

Kathy Duttenhefner

Kathy Duttenhefner, Chief Natural Resources Division

604 E Boulevard Ave Dept. 750 | Bismarck, ND 58505
PHONE: 701-328-5357 | FAX: 701-328-5363 | EMAIL: parkrec@nd.gov | WEBSITE: www.parkrec.nd.gov

North Dakota Pipeline Authority
c/o North Dakota Industrial Commission
State Capitol - 14th Floor
600 East Boulevard Avenue, Department 405
Bismarck ND 58505

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Mountrail County

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North Dakota Soil Conservation Committee
c/o North DakotaSU Department 7390
PO Box 6050
Fargo ND 58108

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North Dakota State Water Commission and Western Area Water Supply
c/o Bank of North Dakota Building
1200 Memorial Highway
Bismarck ND 58504

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Following construction, the new pipeline will be buried with a minimum cover of 72 inches. TBPL will maintain a 30-foot-wide permanent easement for the new pipeline. This permanent easement along with the associated aboveground facilities will encompass a total of approximately 17 acres. The existing Enbridge pipeline is located within an existing 30-foot-wide permanent easement. *With the exception of a midline pump station and associated permanent access roads, no aboveground disturbances are anticipated to be required for conversion of the Enbridge pipeline.* Lands within and adjacent to both the proposed pipeline, midline pump station, and the existing Enbridge pipeline are previously disturbed agricultural land.

Please direct any questions or correspondence concerning the Project to me at 303-471-3410 or Doug Anderson at 303-471-3484.

Sincerely,

Arcadis U.S., Inc.



Kathryn Cloutier
Project Manager

Email: Kathryn.Cloutier@arcadis.com
Office: 303-471-3410

Enclosures:
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Proposed Midline Pump Station

Existing Block Valves

Existing Block Valves

Existing Plaza Station

Existing TBPS Crude Storage and Loading Facility

Mountrail County

Ward County



Legend

- Existing Enbridge Pipeline
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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 1
PROJECT OVERVIEW MAP
OVERVIEW

PN:CO002338.0001

Date: 11/21/2023

ARCADIS

Date: 11/21/2023 User Name: MNugent
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NORTH Dakota | Water Resources

Be Legendary.

October 23, 2023

Kathryn Cloutier
Project Manager
Arcadis US Inc.
630 Plaza Drive, STE 200
Highlands Ranch, CO 80129

Dear Ms. Cloutier:

This is in response to your request for a review of the environmental impacts associated the Thunder Butte Pipeline, LLC: Thunder Butte Pipeline Project located in Ward and Mountrail Counties.

The proposed project has been reviewed by Department of Water Resources, and the following comments are provided:

- There are no FEMA National Flood Insurance Program (NFIP) floodplains identified or mapped where the proposed project is to take place. No permit relative to the NFIP are likely required based on the current effective Flood Insurance Rate Map and State minimum standards. However, flood risk has been identified through the North Dakota Risk Assessment Mapservice and Base Level Engineering (BLE) (ndram.dwr.nd.gov). In the absence of FEMA NFIP data, BLE is often considered best available data and is recommended to be considered in the design process. The State of North Dakota has no formal NFIP permitting authority as all NFIP permitting decisions are considered by impacted NFIP participating communities, the community with zoning authority for the area in question. Please work directly with the local floodplain administrators of the zoning authorities impacted.

- The Department of Water Resources' (DWR) Engineering and Permitting Section reviewed the project location and determined that it may require a surface drain permit if the project impacts sloughs, ponds, lakes (i.e., wetlands) outside of the right-of-way. Also, the project location may potentially impact two permitted surface drains. The surface drain permits are Taylor Slough Drain (DR-661) and Wild Willow Drain (DR-4495). The DWR requests to be notified if either DR-661 or DR-4495 will be modified. Maps of the surface drains are attached. For more information on these requirements, please visit the Regulation & Appropriation tab on the DWR's website (dwr.nd.gov) or contact the DWR's Regulatory Division at (701) 328-4956 or dwrregpermits@nd.gov.

- Initial review indicates the project does not require a conditional or temporary permit for water appropriation. However, if surface water or groundwater will be diverted for construction of the project, a water permit will be required per North Dakota Century Code § 61-04-02. Please consult with the Department of Water Resources Water Appropriation Division if you have any questions at (701) 328-2754 or appropinfo@nd.gov.

- The Department of Water Resources maintains a network of observation wells across the state for monitoring the water levels and quality in glacial and bedrock aquifers. These wells are often installed in road and highway rights-of-way to limit inconvenience to the adjacent landowners. Department of Water Resources observation wells have a yellow protective casing extending between 1 and 3 feet above ground surface, and their locations are marked with a stake. If an observation well is encountered during project activities and must be removed, please contact the Water Appropriation Division. The Department of Water Resources hopes to keep all observation wells, but otherwise will ensure the well is properly abandoned.

Thank you for the opportunity to provide review comments. Should you have further questions, please contact me at (701) 328-4967 or cjdrevecky@nd.gov.

Sincerely,

Cory Drevecky
Planner IV

CD:dm/1570

North Dakota Transmission Authority
c/o North Dakota Industrial Commission
State Capitol - 14th Floor
600 East Boulevard Avenue, Department 405
Bismarck ND 58505

Arcadis U.S., Inc.
630 Plaza Drive
Suite 200
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Colorado 80129
Phone: 720 344 3500
Fax: 720 344 3535
www.arcadis.com

Date: September 29, 2023
Our Ref: 30192665
Subject: Thunder Butte Pipeline, LLC: Thunder Butte Pipeline Project, Ward and Mountrail Counties, North Dakota

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The Project will consist of construction of a new underground pipeline and conversion of the existing Enbridge collector (gathering) pipeline to a transmission pipeline, along with an above ground midline pump station and a permanent access roads in Ward and Mountrail counties.

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Kathryn Cloutier
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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

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Office of Governor Doug Burgum
State of North Dakota
600 East Boulevard Avenue
Bismarck ND 58505

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Kathryn Cloutier
Project Manager

Email: Kathryn.Cloutier@arcadis.com
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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

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Orlien Township, Ward County
Ward County Township Officers Association
6900 93rd Ave SW
Minot ND 58701

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Twentieth Air Force Ninety-first Missile Wing
Minot Air Force Base
362 Missile Avenue
Minot Air Force Base ND 58705

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The Project is scheduled to begin construction in the spring of 2024. The proposed pipeline will be installed using an 80-foot-wide construction right-of way (ROW), consisting of a 30-foot-wide permanent easement and an adjacent 50-foot-wide temporary construction workspace. Approximately three miles of the proposed pipeline will be within the FBIR, approximately 2.3 miles of which will be constructed abutting the existing Canadian Pacific Railway ROW. Construction of the proposed pipeline will temporarily disturb a total of approximately 40 acres on privately-owned agricultural land. During construction, several temporary access roads and additional temporary workspaces may be required.

Following construction, the new pipeline will be buried with a minimum cover of 72 inches. TBPL will maintain a 30-foot-wide permanent easement for the new pipeline. This permanent easement along with the associated aboveground facilities will encompass a total of approximately 17 acres. The existing Enbridge pipeline is located within an existing 30-foot-wide permanent easement. *With the exception of a midline pump station and associated permanent access roads, no aboveground disturbances are anticipated to be required for conversion of the Enbridge pipeline.* Lands within and adjacent to both the proposed pipeline, midline pump station, and the existing Enbridge pipeline are previously disturbed agricultural land.

Please direct any questions or correspondence concerning the Project to me at 303-471-3410 or Doug Anderson at 303-471-3484.

Sincerely,

Arcadis U.S., Inc.



Kathryn Cloutier
Project Manager

Email: Kathryn.Cloutier@arcadis.com
Office: 303-471-3410

Enclosures:
Figure

Existing Enbridge Storage Facility

Proposed Midline Pump Station

Existing Block Valves

Existing Block Valves

Existing Plaza Station

Existing TBPS Crude Storage and Loading Facility

Mountrail County

Ward County



Legend

- Existing Enbridge Pipeline
- Proposed New Pipeline
- 1 Mile Buffer
- Fort Berthold Indian Reservation Boundary
- County Boundary

0 2.5 5 Miles

GRAPHIC SCALE

NOTE:
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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 1
PROJECT OVERVIEW MAP
OVERVIEW

PN:CO002338.0001

Date: 11/21/2023

ARCADIS

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U.S. Department of Interior
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North Dakota Field Office
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Dickinson ND 58601

Arcadis U.S., Inc.
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Suite 200
Highlands Ranch
Colorado 80129
Phone: 720 344 3500
Fax: 720 344 3535
www.arcadis.com

Date: September 29, 2023
Our Ref: 30192665
Subject: Thunder Butte Pipeline, LLC: Thunder Butte Pipeline Project, Ward and Mountrail Counties, North Dakota

To Whom it may Concern,

Thunder Butte Pipeline, LLC (TBPL) is proposing the Thunder Butte Pipeline Project (Project) for transport of crude oil from the existing Thunder Butte Petroleum Services, Inc. (TBPS) Crude Storage and Loading Facility (TBPS Facility) within the Fort Berthold Indian Reservation (FBIR), near Plaza, North Dakota to an existing Enbridge crude terminal in Stanley, North Dakota (**Figure 1**). The TBPS Facility is owned by the Mandan, Hidatsa, and Arikara Nation/ Three Affiliated Tribes (MHA Nation/ TAT) doing business as TBPS and the Enbridge storage facility is owned by Enbridge Pipelines North Dakota. These two facilities are not part of the TBPL Project because they are owned by third-party entities.

The Project will consist of construction of a new underground pipeline and conversion of the existing Enbridge collector (gathering) pipeline to a transmission pipeline, along with an above ground midline pump station and a permanent access roads in Ward and Mountrail counties.

TBPL is submitting a Consolidated Certificate of Corridor Compatibility and Route Permit Application (Consolidated Permit Application) to the North Dakota Public Service Commission (Commission) requesting a Certificate of Corridor Compatibility and Route Permit for construction and operation of the Project. On behalf of TBPL, Arcadis, U.S., Inc. is submitting this letter to inform your agency of the proposed Project and to request any comments or input. Any information received will be taken into consideration during the permitting and development process in conjunction with the Consolidated Permit Application process.

The project will include installation of a proposed 3.84-mile-long underground carbon steel pipeline with a 6.625-inch outer diameter (OD) originating at the existing TBPS Facility approximately 2.6 miles northwest of Makoti, North Dakota and terminating at the interconnection with the existing 30.8-mile-long Enbridge pipeline approximately 2.1 miles southeast of Plaza, North Dakota. The Project will also include conversion of the existing Enbridge 6.625-inch OD collector pipeline to a transmission pipeline within the existing 30-foot-wide permanent easement. From the interconnect point of the new pipeline, the existing Enbridge pipeline will transport crude oil to the existing Enbridge storage facility in Stanley, North Dakota. Associated aboveground facilities will include a proposed 4.0-acre midline pump station adjacent to the existing Enbridge pipeline along with two associated permanent access roads, each 40-foot long, 30-foot wide (**Figure 1**).

The Project is located within the following portions of Ward and Mountrail Counties, North Dakota:

- Proposed new pipeline: Sections 18 and 19, Township (T) 152 North (N), Range (R) 87 West (W), and Sections 13, 14, 11, and 2, T152N R88W
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Thunder Butte Pipeline Project
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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

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DOD Public Affairs
1400 Defense Pentagon
Washington DC 20301

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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

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Ward County Commission
c/o Marisa Haman, Ward County Auditor/Treasurer
225 3rd Street SE
2nd Floor
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- Proposed new pipeline: Sections 18 and 19, Township (T) 152 North (N), Range (R) 87 West (W), and Sections 13, 14, 11, and 2, T152N R88W
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The Project is scheduled to begin construction in the spring of 2024. The proposed pipeline will be installed using an 80-foot-wide construction right-of way (ROW), consisting of a 30-foot-wide permanent easement and an adjacent 50-foot-wide temporary construction workspace. Approximately three miles of the proposed pipeline will be within the FBIR, approximately 2.3 miles of which will be constructed abutting the existing Canadian Pacific Railway ROW. Construction of the proposed pipeline will temporarily disturb a total of approximately 40 acres on privately-owned agricultural land. During construction, several temporary access roads and additional temporary workspaces may be required.

Following construction, the new pipeline will be buried with a minimum cover of 72 inches. TBPL will maintain a 30-foot-wide permanent easement for the new pipeline. This permanent easement along with the associated aboveground facilities will encompass a total of approximately 17 acres. The existing Enbridge pipeline is located within an existing 30-foot-wide permanent easement. *With the exception of a midline pump station and associated permanent access roads, no aboveground disturbances are anticipated to be required for conversion of the Enbridge pipeline.* Lands within and adjacent to both the proposed pipeline, midline pump station, and the existing Enbridge pipeline are previously disturbed agricultural land.

Please direct any questions or correspondence concerning the Project to me at 303-471-3410 or Doug Anderson at 303-471-3484.

Sincerely,

Arcadis U.S., Inc.



Kathryn Cloutier
Project Manager

Email: Kathryn.Cloutier@arcadis.com
Office: 303-471-3410

Enclosures:
Figure

Existing Enbridge Storage Facility

Proposed Midline Pump Station

Existing Block Valves

Existing Block Valves

Existing Plaza Station

Existing TBPS Crude Storage and Loading Facility

Mountrail County

Ward County



Legend

- Existing Enbridge Pipeline
- Proposed New Pipeline
- 1 Mile Buffer
- Fort Berthold Indian Reservation Boundary
- County Boundary

0 2.5 5 Miles

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NOTE:
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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 1
PROJECT OVERVIEW MAP
OVERVIEW

PN:CO002338.0001

Date: 11/21/2023

ARCADIS

Date: 11/21/2023 User Name: MNugent
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Ward County Commission
c/o John Fjeldahl, Ward County Chairman
225 3rd Street SE
2nd Floor
Minot ND 58701

Arcadis U.S., Inc.
630 Plaza Drive
Suite 200
Highlands Ranch
Colorado 80129
Phone: 720 344 3500
Fax: 720 344 3535
www.arcadis.com

Date: September 29, 2023
Our Ref: 30192665
Subject: Thunder Butte Pipeline, LLC: Thunder Butte Pipeline Project, Ward and Mountrail Counties, North Dakota

To Whom it may Concern,

Thunder Butte Pipeline, LLC (TBPL) is proposing the Thunder Butte Pipeline Project (Project) for transport of crude oil from the existing Thunder Butte Petroleum Services, Inc. (TBPS) Crude Storage and Loading Facility (TBPS Facility) within the Fort Berthold Indian Reservation (FBIR), near Plaza, North Dakota to an existing Enbridge crude terminal in Stanley, North Dakota (**Figure 1**). The TBPS Facility is owned by the Mandan, Hidatsa, and Arikara Nation/ Three Affiliated Tribes (MHA Nation/ TAT) doing business as TBPS and the Enbridge storage facility is owned by Enbridge Pipelines North Dakota. These two facilities are not part of the TBPL Project because they are owned by third-party entities.

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Kathryn Cloutier
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Thunder Butte Pipeline Project
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North Dakota Game and Fish Department
100 North Bismarck Expressway
Bismarck, North Dakota 58501

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To aid in your review of the project, the following background information is provided.

Lands within and adjacent to the ROWs for both the proposed pipeline and the existing Enbridge pipeline and the midline pump station site are previously disturbed agricultural land. No native prairie is present within the Project area. No active raptor nests have been identified within a ½-mile buffer of the construction ROW. Disturbances to streams and jurisdictional wetlands or Waters of the United States within the proposed pipeline corridor will be avoided by using horizontal directional drilling during construction.

Please direct any questions or correspondence concerning the Project to me at 303-471-3410 or Doug Anderson at 303-471-3484.

Sincerely,

Arcadis U.S., Inc.



Kathryn Cloutier
Project Manager

Email: Kathryn.Cloutier@arcadis.com
Office: 303-471-3410

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Ward County



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Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

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NORTH Dakota | Water Resources

Be Legendary.

October 23, 2023

Kathryn Cloutier
Project Manager
Arcadis US Inc.
630 Plaza Drive, STE 200
Highlands Ranch, CO 80129

Dear Ms. Cloutier:

This is in response to your request for a review of the environmental impacts associated the Thunder Butte Pipeline, LLC: Thunder Butte Pipeline Project located in Ward and Mountrail Counties.

The proposed project has been reviewed by Department of Water Resources, and the following comments are provided:

- There are no FEMA National Flood Insurance Program (NFIP) floodplains identified or mapped where the proposed project is to take place. No permit relative to the NFIP are likely required based on the current effective Flood Insurance Rate Map and State minimum standards. However, flood risk has been identified through the North Dakota Risk Assessment Mapservice and Base Level Engineering (BLE) (ndram.dwr.nd.gov). In the absence of FEMA NFIP data, BLE is often considered best available data and is recommended to be considered in the design process. The State of North Dakota has no formal NFIP permitting authority as all NFIP permitting decisions are considered by impacted NFIP participating communities, the community with zoning authority for the area in question. Please work directly with the local floodplain administrators of the zoning authorities impacted.

- The Department of Water Resources' (DWR) Engineering and Permitting Section reviewed the project location and determined that it may require a surface drain permit if the project impacts sloughs, ponds, lakes (i.e., wetlands) outside of the right-of-way. Also, the project location may potentially impact two permitted surface drains. The surface drain permits are Taylor Slough Drain (DR-661) and Wild Willow Drain (DR-4495). The DWR requests to be notified if either DR-661 or DR-4495 will be modified. Maps of the surface drains are attached. For more information on these requirements, please visit the Regulation & Appropriation tab on the DWR's website (dwr.nd.gov) or contact the DWR's Regulatory Division at (701) 328-4956 or dwrregpermits@nd.gov.

- Initial review indicates the project does not require a conditional or temporary permit for water appropriation. However, if surface water or groundwater will be diverted for construction of the project, a water permit will be required per North Dakota Century Code § 61-04-02. Please consult with the Department of Water Resources Water Appropriation Division if you have any questions at (701) 328-2754 or appropinfo@nd.gov.

- The Department of Water Resources maintains a network of observation wells across the state for monitoring the water levels and quality in glacial and bedrock aquifers. These wells are often installed in road and highway rights-of-way to limit inconvenience to the adjacent landowners. Department of Water Resources observation wells have a yellow protective casing extending between 1 and 3 feet above ground surface, and their locations are marked with a stake. If an observation well is encountered during project activities and must be removed, please contact the Water Appropriation Division. The Department of Water Resources hopes to keep all observation wells, but otherwise will ensure the well is properly abandoned.

Thank you for the opportunity to provide review comments. Should you have further questions, please contact me at (701) 328-4967 or cjdrevecky@nd.gov.

Sincerely,

Cory Drevecky
Planner IV

CD:dm/1570

NORTH Dakota | Game and Fish
Be Legendary.™

October 26, 2023

Kathryn Cloutier
Project Manager
Arcadis U.S., Inc.
630 Plaza Drive – Suite 200
Highlands Ranch, CO 80129

Dear Ms. Cloutier:

RE: Thunder Butte Pipeline Project
Ward and Mountrail Counties, North Dakota

Thunder Butte Pipeline, LLC is proposing to construct approximately 3.84 miles of new steel pipeline to connect with the existing 30.8-mile-long Enbridge pipeline near Plaza, North Dakota, and conversion of the system to a transmission pipeline to transport crude oil to the existing Enbridge storage facility in Stanley, North Dakota. The North Dakota Game and Fish Department (NDGF) has reviewed this project for wildlife concerns.

The National Wetland Inventory indicates a variety of wetlands within the proposed project corridor. Steps should be taken to protect any wetlands that cannot be avoided, no alterations should be made to existing drainage patterns, and above-ground appurtenances should not be placed in wetland areas. Unavoidable destruction or degradation of wetland acres should be mitigated in kind.

Aerial surveys should be conducted for raptor nests before construction begins. We recommend that a ½-mile construction buffer be implemented around active eagle nest sites (known occupied within the past 5 years). Ms. Sandra Johnson, Conservation Biologist, may be contacted at 701-328-6327 for additional information on golden eagle nest sites in the state.

We do not believe this project will have significant adverse effects on wildlife or wildlife habitat provided these recommendations are implemented where appropriate during project construction and disturbed areas are reclaimed to pre-project conditions.

Sincerely,

Greg Link
Chief
Conservation & Communications Division

Governor Doug Burgum | Director Jeb Williams | Deputy Director Scott A. Peterson

100 North Bismarck Expressway | Bismarck ND, 58504-5095 | (701) 328-6300 | Fax: (701) 328-6352

United States Army Corps of Engineers
North Dakota Regulatory Office
3319 University Drive
Bismarck, North Dakota 58504

Arcadis U.S., Inc.
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To aid in your review of the project, the following background information is provided.

Arcadis conducted a wetland and waterbody delineation survey for the Project area on August 7 and 8, 2018 identifying 10 aquatic features as summarized in the Wetland and Waterbody Delineation Report previously submitted to USACE on October 18, 2018. The approved jurisdictional determination dated November 29, 2018 determined that four identified wetlands (W1, W6, W7, and W9) are jurisdictional Waters of the United States (WOTUS). Disturbances to WOTUS within the proposed pipeline corridor will be avoided by using horizontal directional drilling during construction; therefore, no impacts to WOTUS are proposed for the Project.

Please direct any questions or correspondence concerning the Project to me at 303-471-3410 or Doug Anderson at 303-471-3484.

Sincerely,

Arcadis U.S., Inc.



Kathryn Cloutier
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Subject: Thunder Butte Pipeline, LLC: Thunder Butte Pipeline Project, Ward and Mountrail Counties, North Dakota

To Whom it may Concern,

Thunder Butte Pipeline, LLC (TBPL) is proposing the Thunder Butte Pipeline Project (Project) for transport of crude oil from the existing Thunder Butte Petroleum Services, Inc. (TBPS) Crude Storage and Loading Facility (TBPS Facility) within the Fort Berthold Indian Reservation (FBIR), near Plaza, North Dakota to an existing Enbridge crude terminal in Stanley, North Dakota (**Figure 1**). The TBPS Facility is owned by the Mandan, Hidatsa, and Arikara Nation/ Three Affiliated Tribes (MHA Nation/ TAT) doing business as TBPS and the Enbridge storage facility is owned by Enbridge Pipelines North Dakota. These two facilities are not part of the TBPL Project because they are owned by third-party entities.

The Project will consist of construction of a new underground pipeline and conversion of the existing Enbridge collector (gathering) pipeline to a transmission pipeline, along with an above ground midline pump station and two associated permanent access roads in Ward and Mountrail counties.

TBPL is submitting a Consolidated Certificate of Corridor Compatibility and Route Permit Application (Consolidated Permit Application) to the North Dakota Public Service Commission (Commission) requesting a Certificate of Corridor Compatibility and Route Permit for construction and operation of the Project. On behalf of TBPL, Arcadis, U.S., Inc. is submitting this letter to inform your agency of the proposed Project and to request any comments or input. Any information received will be taken into consideration during the permitting and development process in conjunction with the Consolidated Permit Application process.

The project will include installation of a proposed 3.84-mile-long underground carbon steel pipeline with a 6.625-inch outer diameter (OD) originating at the existing TBPS Facility approximately 2.6 miles northwest of Makoti, North Dakota and terminating at the interconnection with the existing 30.8-mile-long Enbridge pipeline approximately 2.1 miles southeast of Plaza, North Dakota. The Project will also include conversion of the existing Enbridge 6.625-inch OD collector pipeline to a transmission pipeline within the existing 30-foot-wide permanent easement. From the interconnect point of the new pipeline, the existing Enbridge pipeline will transport crude oil to the existing Enbridge storage facility in Stanley, North Dakota. Associated aboveground facilities will include a proposed 4.0-acre midline pump station adjacent to the existing Enbridge pipeline along with two associated permanent access roads, each 40-foot long, 30-foot wide (**Figure 1**).

The Project is located within the following portions of Ward and Mountrail Counties, North Dakota:

- Proposed new pipeline: Sections 18 and 19, Township (T) 152 North (N), Range (R) 87 West (W), and Sections 13, 14, 11, and 2, T152N R88W
- Midline Pump Station and two permanent access roads: Section 21, T154 N R89W

- Existing Enbridge pipeline: Sections 2 and 3, T152N R88W, and Sections 36, 35, 26, 27, 22, 21, 16, 17, 8, and 7, T153N R88W, and Sections 12, 1, and 2, T153N R89W, and Sections 35, 34, 27, 28, 21, 20, 17, 8, 7, and 6, T154N R89W, and Sections 1 and 2, T154N R90W, and Sections 35, 26, 27, 22, 21, 20, 17, 18, 7, and 6, T155N R90W, and Sections 1 and 2, T155N R91W, and Sections 35, 26, and 27, T156N R91W

The Project is scheduled to begin construction in the spring of 2024. The proposed pipeline will be installed using an 80-foot-wide construction right-of way (ROW), consisting of a 30-foot-wide permanent easement and an adjacent 50-foot-wide temporary construction workspace. Approximately three miles of the proposed pipeline will be within the FBIR, approximately 2.3 miles of which will be constructed abutting the existing Canadian Pacific Railway ROW. Construction of the proposed pipeline will temporarily disturb a total of approximately 40 acres on privately-owned agricultural land. During construction, several temporary access roads and additional temporary workspaces may be required.

Following construction, the new pipeline will be buried with a minimum cover of 72 inches. TBPL will maintain a 30-foot-wide permanent easement for the new pipeline. This permanent easement along with the associated aboveground facilities will encompass a total of approximately 17 acres. The existing Enbridge pipeline is located within an existing 30-foot-wide permanent easement. *With the exception of a midline pump station and associated permanent access roads, no aboveground disturbances are anticipated to be required for conversion of the Enbridge pipeline.*

To aid in your review of the project, the following background information is provided.

Listed and candidate threatened and endangered species with the potential to be affected by the Project, as identified by the USFWS's Information Planning and Consultation (IPaC) tool completed on September 22, 2023, are listed in the following table. The Project area does not overlap the critical habitat for these species. Lands within and adjacent to the ROWs for both the proposed pipeline and the existing Enbridge pipeline and the midline pump station site are previously disturbed agricultural land. As result of historic disturbance, the pipeline corridors and midline pump station have little or no suitable habitat for these protected species. In addition, disturbances to streams and jurisdictional wetlands or Waters of the U.S. within the proposed pipeline corridor will be avoided by using horizontal directional drilling.

Name	Status	Comments
Piping Plover (*Charadrius melodus)*	Threatened	No impacts to WOUS are proposed. The Project will have no effect on this species.
Red Knot (*Calidris canutus rufa)*	Threatened	No impacts to WOUS are proposed. The Project will have no effect on this species
Whooping Crane (*Grus americana)*	Endangered	this species may occasionally traverse the Project area during migration. If whooping cranes are sighted within 1-mile (2 km) radius of any work site, all construction activities would be modified or curtailed until the bird(s) have left the area, USFWS would be contacted on how to proceed, and the TAT Fish and Wildlife Division would be notified. An identification guide will be provided for on-site personnel.
Dakota Skipper (*Hesperia dacotae)*	Threatened	No impacts to WOUS are proposed. The Project will have no effect on this species
Monarch Butterfly (*Danaus plexippus)*	Candidate	The monarch butterfly is unlikely to be present because no milkweed or other nectar plants occur within or near the Project area; however, this species may occasionally traverse the Project area during migration.

U.S. Fish and Wildlife Service
North Dakota Field Office
September 29, 2023

Please direct any questions or correspondence concerning the Project to me at 303-471-3410 or Doug Anderson at 303-471-3484.

Sincerely,

Arcadis U.S., Inc.



Kathryn Cloutier
Project Manager

Email: Kathryn.Cloutier@arcadis.com
Office: 303-471-3410

Enclosures:
Figure

Existing Enbridge Storage Facility

Proposed Midline Pump Station

Existing Block Valves

Existing Block Valves

Existing Plaza Station

Existing TBPS Crude Storage and Loading Facility

Mountrail County

Ward County



Legend

- Existing Enbridge Pipeline
- Proposed New Pipeline
- 1 Mile Buffer
- Fort Berthold Indian Reservation Boundary
- County Boundary

0 2.5 5 Miles

GRAPHIC SCALE

NOTE:
1. USGS 7.5' TOPOGRAPHIC QUADRANGLE(S) STANLEY, STANLEY SE, PALERMO, TAGUS SE, BLAISDELL, TAGUS, SIKES DAM, BELDEN, EPWORTH NW, SHELL LAKE, PLAZA NE, PLAZA NW, BELDEN SW, BELDEN SE, EPWORTH, EPWORTH SE, PLAZA, PLAZA SE, NEW TOWN, SHELL CREEK BAY, PARSHALL, PARSHALL NE, WABEK, MAKOTI, WISCONSIN. OBTAINED FROM ESRI IMAGE SERVICE.

Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 1
PROJECT OVERVIEW MAP
OVERVIEW

PN:CO002338.0001

Date: 11/21/2023

ARCADIS

Date: 11/21/2023 User Name: MNugent
Document Path: T:_EPP\Makoti_pipeline\pro\Makoti_Pipeline\Makoti_Pipeline_Rev.aprx

United States Department of the Interior

FISH AND WILDLIFE SERVICE
North Dakota Ecological Services Field Office
3425 Miriam Avenue
Bismarck, ND 58501-7926
Phone: (701) 250-4481 Fax: (701) 355-8513

In Reply Refer To: September 22, 2023
Project Code: 2023-0132116
Project Name: Thunder Butte Pipeline Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

Section 7 of the Endangered Species Act

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The Act requires that actions authorized, funded, or carried out by Federal agencies not jeopardize federally threatened or endangered species or adversely modify designated critical habitat. To fulfill this mandate, Federal agencies (or their designated non-federal representative) must consult with the Service *if they determine their project and associated actions "may affect" listed species or critical habitat*. If Federal agencies or their non-federal representatives determine their project and associated actions will have "no effect" on listed species, their habitats, or designated critical habitat, consultation is not required. However, if a "no effect" is determined, we recommend that you maintain a written record in support of your conclusion.

Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act

Additionally, while not all are listed as threatened or endangered, eagles and migratory birds

have protections under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). The BGEPA prohibits take which is defined as, “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb” (50 CFR 22.3). Disturb is defined in regulations as, “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.”. The MBTA makes it unlawful without a waiver to pursue, hunt, take, capture, kill, or sell birds listed as migratory birds, including eagles. The statute does not discriminate between live or dead birds and also grants full protection to any bird parts including feathers, eggs, and nests.

Service Property Interests

As part of the National Wildlife Refuge System, the Service administers fee title Refuge and Waterfowl Production Areas, as well as wetland and grassland easements, throughout North Dakota. For exact locations of Service interest lands, please contact the appropriate Wetland Management Districts (WMD) for guidance regarding FWS easements.

Northwest ND WMD Complex: Kyle Flanery, (701) 768-2548
Eastern ND WMD Complex: Dave Azure, (701) 285-3341
Central ND WMD Complex (also covers south and west): Todd Luke, (701) 442-5474

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

North Dakota Ecological Services Field Office
3425 Miriam Avenue
Bismarck, ND 58501-7926
(701) 250-4481

PROJECT SUMMARY

Project Code: 2023-0132116
Project Name: Thunder Butte Pipeline Project
Project Type: Pipeline - Onshore - New Constr - Below Ground
Project Description: Thunder Butte Pipeline, LLC (TBPL) is proposing the Thunder Butte Pipeline Project (Project) for transport of crude oil from the existing Thunder Butte Petroleum Services, Inc. (TBPS) Crude Storage and Loading Facility (TBPS Facility) within the Fort Berthold Indian Reservation (FBIR), near Plaza, ND to an existing Enbridge crude terminal in Stanley, ND. The project will include installation of a proposed 3.84-mile-long underground carbon steel pipeline with a 6.625-inch outer diameter (OD) originating at the existing TBPS Facility approximately 2.6 miles northwest of Makoti, ND and terminating at the interconnection with the existing 30.8-mile-long Enbridge pipeline approximately 2.1 miles southeast of Plaza, ND. The Project will also include conversion of the existing Enbridge 6.625-inch OD collector pipeline to a transmission pipeline within the existing 30-foot-wide permanent easement. From the interconnect point of the new pipeline, the existing Enbridge pipeline will transport crude oil to the existing Enbridge storage facility in Stanley, ND. Associated aboveground facilities will include a proposed 2.56-acre midline pump station adjacent to the existing Enbridge pipeline along with two associated permanent access roads, each 40-foot long, 30-foot wide. The TBPS Facility is owned by the Mandan, Hidatsa, and Arikara Nation (MHA Nation) doing business as TBPS and the Enbridge storage facility is owned by Enbridge Pipelines North Dakota. These two facilities are not part of the TBPL Project because they are owned by third-party entities.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@47.99300465,-101.90055074434673,14z



Counties: Mountrail and Ward counties, North Dakota

ENDANGERED SPECIES ACT SPECIES

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

BIRDS

NAME	STATUS
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Whooping Crane *Grus americana* Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/758	Endangered

INSECTS

NAME	STATUS
Dakota Skipper *Hesperia dacotae* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1028	Threatened
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER EMERGENT WETLAND

- PEM1A
- PEM1Ad
- PEM1C

OTHER

- Pf

RIVERINE

- R4SBC

IPAC USER CONTACT INFORMATION

Agency: Three Affiliated Tribes of the Fort Berthold Reservation, North Dakota
Name: Kathryn Cloutier
Address: 630 Plaza Drive
Address Line 2: Suite 200
City: Highlands Ranch
State: CO
Zip: 80129
Email kathryn.cloutier@arcadis.com
Phone: 3034713410

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Three Affiliated Tribes of the Fort Berthold Reservation, North Dakota

State Historical Society of North Dakota
612 East Boulevard Avenue
Bismarck, North Dakota 58505

Arcadis U.S., Inc.
630 Plaza Drive
Suite 200
Highlands Ranch
Colorado 80129
Phone: 720 344 3500
Fax: 720 344 3535
www.arcadis.com

Date: November 27, 2023
Our Ref: 30192665
Subject: Thunder Butte Pipeline, LLC: Thunder Butte Pipeline Project, Ward and Mountrail Counties, North Dakota

To Whom it May Concern,

Thunder Butte Pipeline, LLC (TBPL) is proposing the Thunder Butte Pipeline Project (Project) for transport of crude oil from the existing Thunder Butte Petroleum Services, Inc. (TBPS) Crude Storage and Loading Facility (TBPS Facility) within the Fort Berthold Indian Reservation (FBIR), near Plaza, North Dakota to the existing Stanley Pump Station and Terminal (Enbridge Facility) in Stanley, North Dakota (**Figure 1**). The TBPS Facility is owned by the Mandan, Hidatsa, and Arikara Nation/ Three Affiliated Tribes (MHA Nation/ TAT) doing business as TBPS and the Enbridge Facility is owned by Enbridge Pipelines North Dakota.

The new pipeline will transport crude from the TBPS Facility to an interconnect point with the existing pipeline. From the interconnection point, the existing pipeline will transport crude oil to the Enbridge Facility. All but the southern 3.84 miles is an existing pipeline.

The Project will consist of the following components in Ward and Mountrail Counties:

- Construction of a new 3.84-mile-long underground pipeline,
- Conversion of an existing 40.8-mile-long collector (gathering) pipeline to a transmission pipeline, and
- Construction of an aboveground midline pump station (4.0-acre site) and two permanent access roads, each approximately 40-foot long, 30-foot wide.

TBPL is submitting a Consolidated Certificate of Corridor Compatibility and Route Permit Application (Consolidated Permit Application) to the North Dakota Public Service Commission (Commission) requesting a Certificate of Corridor Compatibility and Route Permit for construction and operation of the Project. On behalf of TBPL, Arcadis, U.S., Inc. is submitting this letter to inform your agency of the proposed Project and to request any comments or input. Any information received will be taken into consideration during the permitting and development process in conjunction with the Consolidated Permit Application process.

The Project is located within the following portions of Ward and Mountrail Counties, North Dakota:

- Proposed new pipeline: Sections 18 and 19, Township (T) 152 North (N), Range (R) 87 West (W), and Sections 13, 14, 11, and 2, T152N R88W;
- Existing pipeline: Sections 2 and 3, T152N R88W, and Sections 36, 35, 26, 27, 22, 21, 16, 17, 8, and 7, T153N R88W, and Sections 12, 1, and 2, T153N R89W, and Sections 35, 34, 27, 28, 21, 20, 17, 8, 7, and 6, T154N R89W, and Sections 1 and 2, T154N R90W, and Sections 35, 26, 27, 22, 21, 20, 17, 18, 7, and 6, T155N R90W, and Sections 1 and 2, T155N R91W, and Sections 35, 26, and 27, T156N R91W; and
- Midline Pump Station: Section 21, T154 N R89W.

The Project is scheduled to begin construction in the spring of 2024. The proposed pipeline will be installed using an 80-foot-wide construction right-of way (ROW), consisting of a 30-foot-wide permanent easement and an adjacent 50-foot-wide temporary construction workspace. Construction of the proposed pipeline will temporarily disturb a total of approximately 40 acres on privately-owned agricultural land.

Approximately 3 miles of the proposed pipeline will be within the FBIR, approximately 2.3 miles of which will be constructed abutting the existing Canadian Pacific Railway ROW. Lands within and adjacent to the proposed pipeline, the existing pipeline, and the midline pump station are previously disturbed agricultural land. Following construction, the new pipeline will be located within an existing 30-foot-wide permanent easement and buried with a minimum cover of 72 inches.

Metcalf Archaeological Consultants, Inc. (Metcalf) conducted a Class III cultural resource inventory of the area of potential effects (APE). Metcalf Principal Investigator William Bluemle surveyed 3.84 miles at 300' wide of the new pipeline corridor, a proposed midline pump station (4.0-acre site), two new permanent access roads, and several temporary access roads, workspaces/laydown areas on October 2, 2023. A total of 147 acres were surveyed.

Archaeologist Bluemle found no cultural resources in the three segment APEs; therefore, Metcalf recommends a finding of *No Historic Properties Affected* [36 CFR 800.4(d)(1)] for this undertaking. A copy of the Class III Cultural Resource Inventory Report is enclosed.

Please direct any questions or correspondence concerning the Project to me at 303-471-3410 or Doug Anderson at 303-471-3484.

Sincerely,

Arcadis U.S., Inc.



Kathryn Cloutier
Project Manager

Email: Kathryn.Cloutier@arcadis.com
Office: 303-471-3410

Enclosures:
Figure 1
Metcalf Class III Cultural Resource Inventory Report

Existing Enbridge Storage Facility

Proposed Midline Pump Station

Existing Block Valves

Existing Block Valves

Existing Plaza Station

Existing TBPS Crude Storage and Loading Facility

Mountrail County

Ward County



Legend

- Existing Enbridge Pipeline
- Proposed New Pipeline
- 1 Mile Buffer
- Fort Berthold Indian Reservation Boundary
- County Boundary

0 2.5 5 Miles

GRAPHIC SCALE

NOTE:
1. USGS 7.5' TOPOGRAPHIC QUADRANGLE(S) STANLEY, STANLEY SE, PALERMO, TAGUS SE, BLAISDELL, TAGUS, SIKES DAM, BELDEN, EPWORTH NW, SHELL LAKE, PLAZA NE, PLAZA NW, BELDEN SW, BELDEN SE, EPWORTH, EPWORTH SE, PLAZA, PLAZA SE, NEW TOWN, SHELL CREEK BAY, PARSHALL, PARSHALL NE, WABEK, MAKOTI, WISCONSIN. OBTAINED FROM ESRI IMAGE SERVICE.

Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 1
PROJECT OVERVIEW MAP
OVERVIEW

PN:CO002338.0001

Date: 11/21/2023

ARCADIS

Date: 11/21/2023 User Name: MNugent
Document Path: T:_EPP\Makoti_pipeline\pro\Makoti_Pipeline\Makoti_Pipeline_Rev.aprx

January 2, 2024

Kathryn Cloutier
Arcadis
630 Plaza Drive
Suite 200
Highlands Ranch, CO 80129

SHSND Ref: 24-0067 Thunder Butte Pipeline Project Ref 301926665 in portions of McLean, Ward, and Mountrail Counties, North Dakota

Dear Kathryn,

We've reviewed the report for project SHSND Ref: 24-0067 titled "A Class III Cultural Resource Inventory for the Thunder Butte Pipeline, Mountrail and Ward Counties, North Dakota, Revised" from Metcalf Archaeological Consultants by J. Signe Snortland. We find the report acceptable and will add it to our manuscript collection.

For the portion of the project that is on the Fort Berthold Reservation, we defer to the Mandan, Hidatsa and Arikara Nation Tribal Historic Preservation Office.

For the portion of the project that is not on the Fort Berthold Reservation, there are no significant sites affected by the project provided it takes place in the manner described in the documentation and all borrow comes from an approved source.

Thank you for the opportunity to review this project under North Dakota cultural resources consultation. This letter does not serve as federal agency consultation or SHPO consultation for compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, (36 CFR Part 800), or the National Environmental Policy Act, as amended, (42 U.S.C. §§ 4321-4347).

If you have any questions please contact Margie Patton, Research Archaeologist at 701-328-3576 or mmpatton@nd.gov.

Sincerely,

for William D. Peterson, PhD
Director, State Historical Society of North Dakota

24-0067

Mr. Darren Joe Myrick
Section 106 Coordinator
Tribal Historic Preservation Office
MHA Nation/Three Affiliated Tribes
Energy Building 305 4th Avenue (1st Floor)
New Town, North Dakota 58763

Arcadis U.S., Inc.
630 Plaza Drive
Suite 200
Highlands Ranch
Colorado 80129
Phone: 720 344 3500
Fax: 720 344 3535
www.arcadis.com

Date: November 27, 2023
Our Ref: 30192665
Subject: Thunder Butte Pipeline, LLC: Thunder Butte Pipeline Project, Ward and Mountrail Counties, North Dakota

Mr. Myrick,

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Arcadis U.S., Inc.



Kathryn Cloutier
Project Manager

Email: Kathryn.Cloutier@arcadis.com
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GRAPHIC SCALE

NOTE:
1. USGS 7.5' TOPOGRAPHIC QUADRANGLE(S) STANLEY, STANLEY SE, PALERMO, TAGUS SE, BLAISDELL, TAGUS, SIKES DAM, BELDEN, EPWORTH NW, SHELL LAKE, PLAZA NE, PLAZA NW, BELDEN SW, BELDEN SE, EPWORTH, EPWORTH SE, PLAZA, PLAZA SE, NEW TOWN, SHELL CREEK BAY, PARSHALL, PARSHALL NE, WABEK, MAKOTI, WISCONSIN. OBTAINED FROM ESRI IMAGE SERVICE.

Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 1
PROJECT OVERVIEW MAP
OVERVIEW

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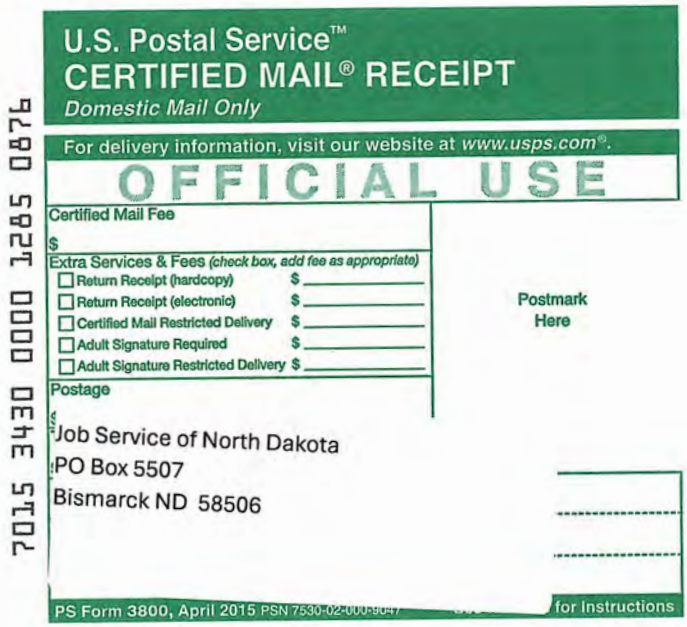
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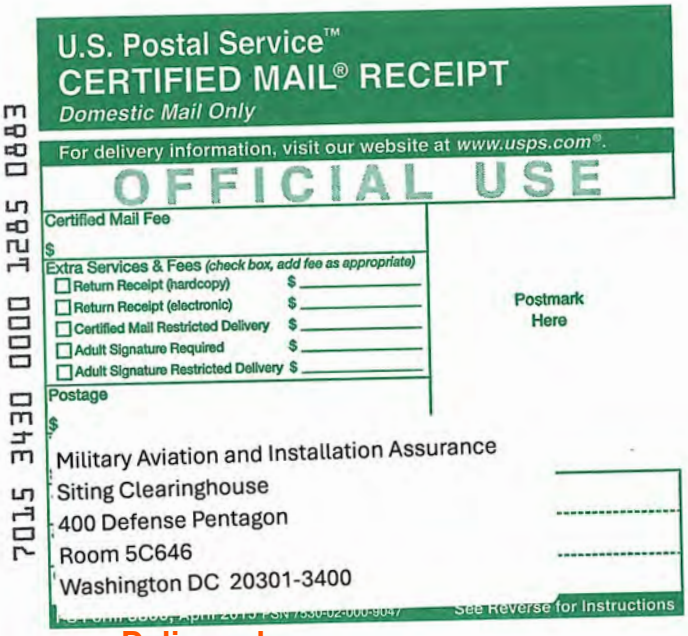
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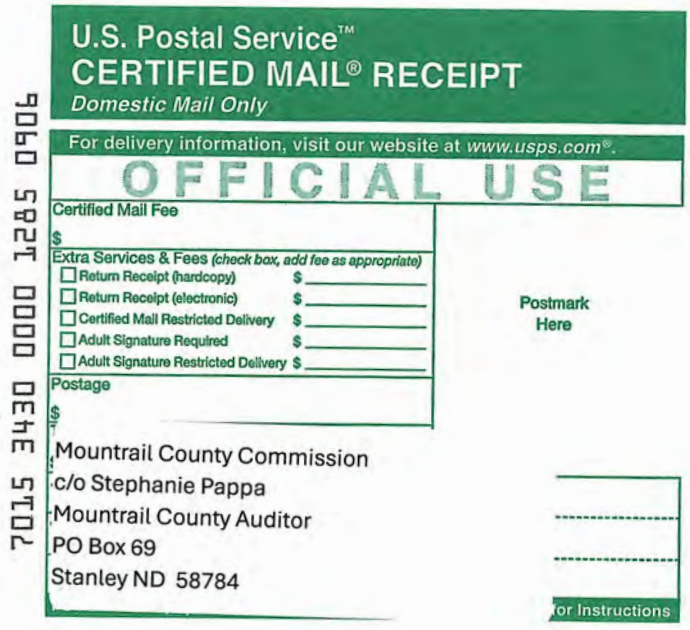
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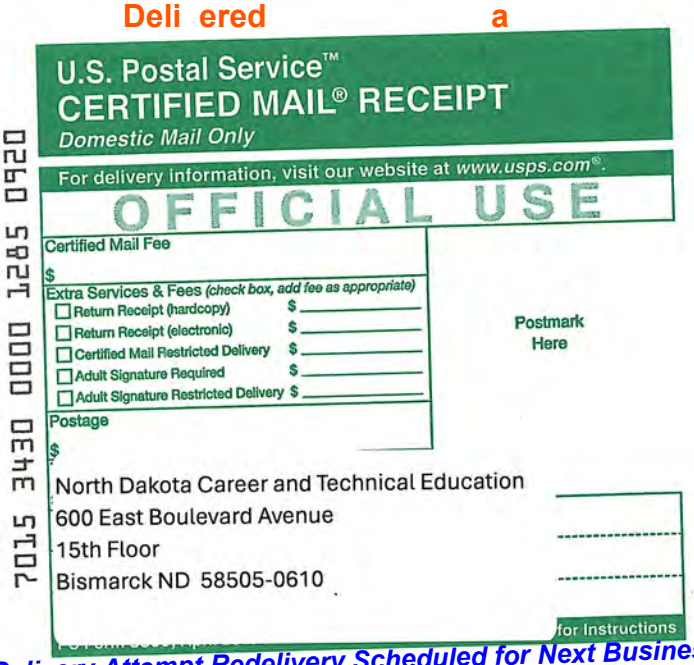
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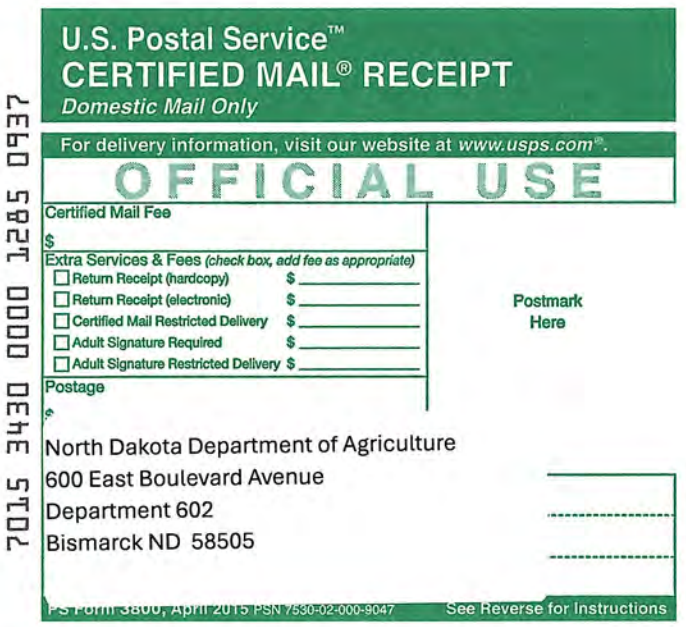
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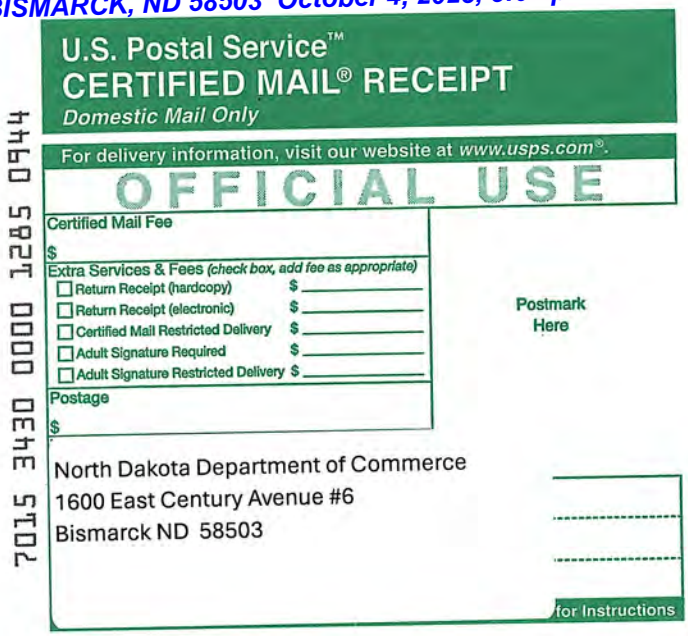




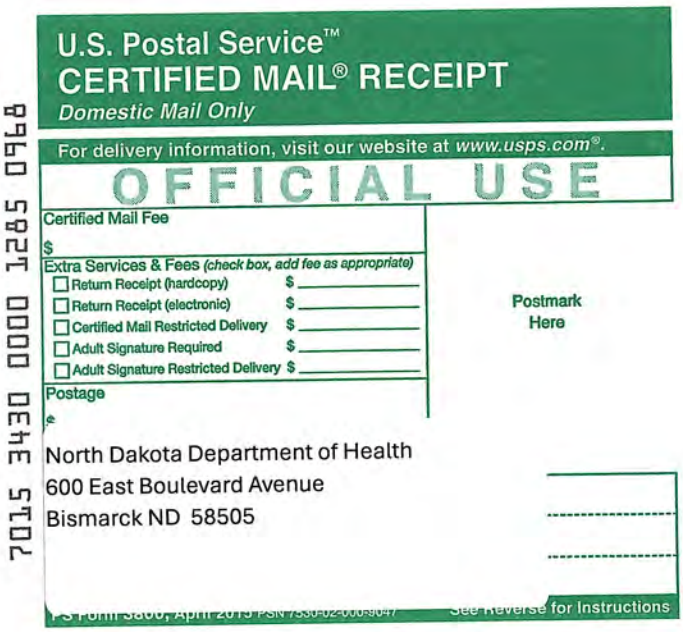


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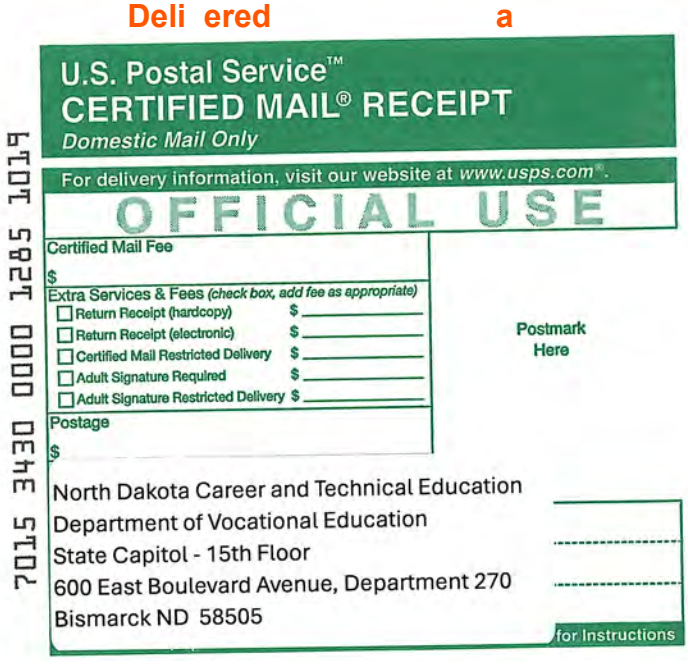



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Appendix E

Wetland and Waterbody Delineation Report

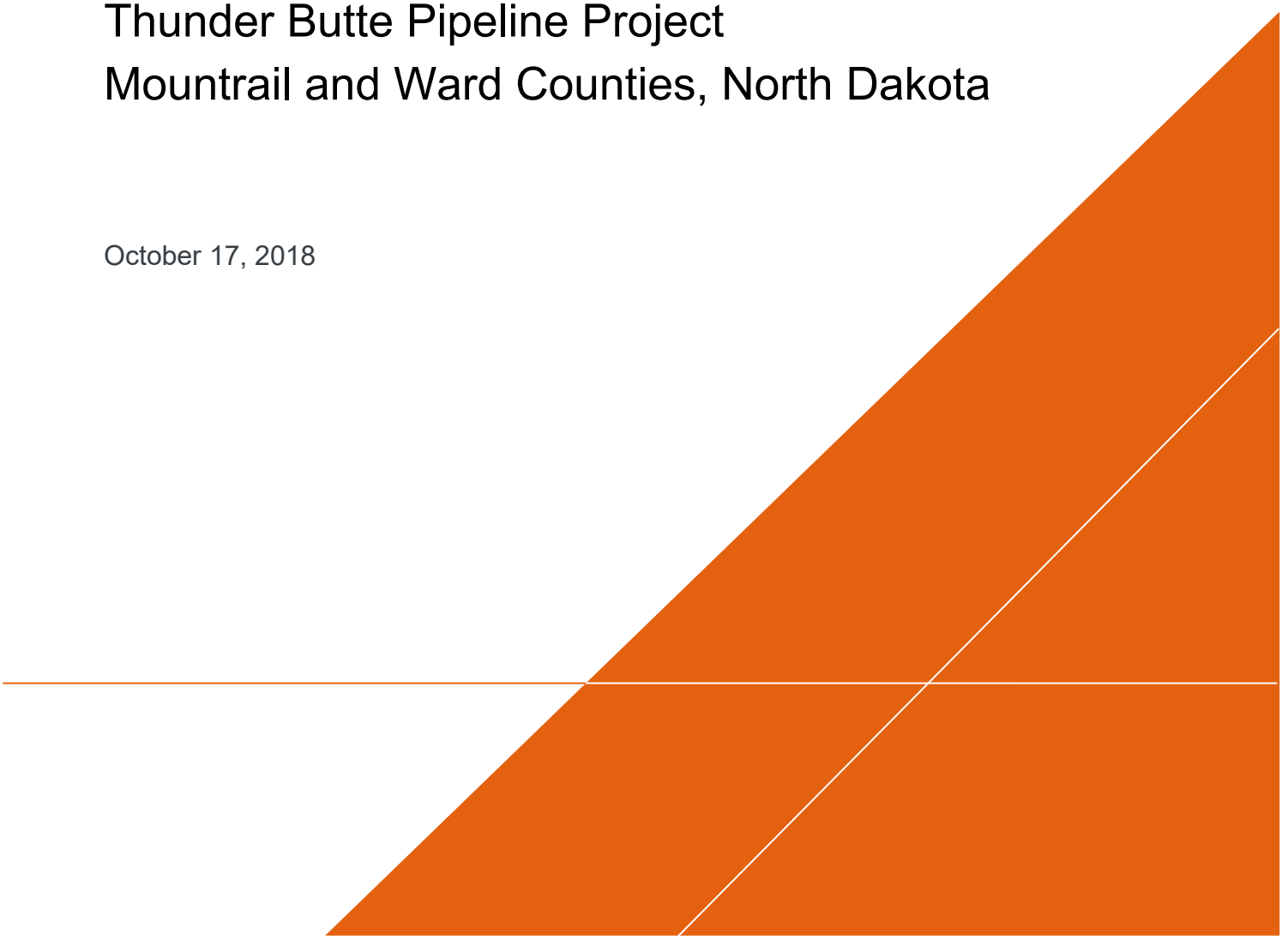
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WETLAND AND WATERBODY DELINEATION REPORT

Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

October 17, 2018





Stephen Chu, PWS
Senior Environmental Scientist



Douglas Anderson
Senior Environmental Scientist



David Gomes, PE, PMP
Certified Project Manager

WETLAND AND WATERBODY DELINEATION REPORT

Thunder Butte Pipeline Project
Mountrail and Ward Counties,
North Dakota

Prepared for:
Thunder Butte Pipeline, LLC
P.O Box 1227
New Town, ND 58763
701-726-5555

Prepared by:
Arcadis U.S., Inc.
126 North Jefferson Street
Suite 400
Milwaukee, Wisconsin 53202
Stephen.Chu@arcadis.com; 414.277.6228

Our Ref.:
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CONTENTS

1 Introduction 1
2 Statement of Qualification 2
3 Background Information 3
3.1 USGS Topographic Map 3
3.2 USGS NHD 3
3.3 National Wetlands Inventory (NWI) 3
3.4 Aerial Imagery 4
3.5 USDA NRCS WSS of Ward and Mountrail Counties, North Dakota 4
4 Methodology 6
5 Survey Results 7
5.1 Antecedent Precipitation 7
5.2 Vegetative Communities 7
5.3 Wetlands 7
5.4 Waterbodies 10
6 Conclusions 11
7 References 12

TABLES

Table 1 Soil Map Units Identified within the Environmental Survey Area 5
Table 2 Environmental Survey Area Wetland Summary 7

FIGURES

1-1 to 1-3 Project Location

2-0 to 2-7 Mountrail and Ward Counties Topographic Map

3-0 to 3-7 NHD Streams, WWI Wetlands, and FEMA Floodplain

4-0 to 4-7 USDA NRCS Mapped Soils

5-0 to 5-7 Delineated Wetlands and Waterbodies

APPENDICES

Appendix A Antecedent Precipitation Tables

Appendix B Representative Photographs

Appendix C Wetland Determination Data Forms

1 INTRODUCTION

This Wetland and Waterbody Delineation Report summarizes the results of a wetland and waterbody delineation survey conducted on August 7 and 8, 2018, by Arcadis U.S., Inc. (Arcadis) on behalf of Thunder Butte Pipeline, LLC. (Thunder Butte Pipeline) for the proposed construction of an approximately 3.84-mile-long crude oil pipeline and associated facilities in Mountrail and Ward Counties, North Dakota. The pipeline will originate at the existing Thunder Butte Petroleum Services Crude Storage and Loading Facility (TBPS Crude Facility) located approximately 2.7 miles northwest of Makoti, North Dakota and interconnect with the existing Enbridge crude oil pipeline at Plaza Station (**Figures 1-0** to **1-2**). The proposed pipeline and associated facilities are referred to as the Thunder Butte Pipeline Project (Project). The environmental survey area (ESA), approximately 96.85 acres, is located in Sections 18 and 19, Township 152 North, Range 87 West and Sections 2 and 11-14, Township 152 North, Range 88 West.

The proposed project involves the construction of an underground, 6-inch pipeline and associated facilities for the transport of crude oil. The ESA is comprised of the Project's 80-foot wide right-of-way (ROW) throughout the site. However, a 200-foot corridor (100 feet to each side of the center line) was surveyed to cover all potential wetland areas in the vicinity of the requested ROW. The purpose of the wetland and waterbody delineation survey was to assess the presence or absence of wetlands and other waters that may be affected by the proposed project, and to assess general ecological conditions within the ESA. Ten wetlands and one perennial stream (East Fork Shell Creek) were identified within the ESA.

2 STATEMENT OF QUALIFICATION

The wetland and waterbody delineation were performed and authored by Stephen W. Chu, Professional Wetland Scientist (PWS), Senior Environmental Scientist. Mr. Chu was the Lead Wetland Delineator for this project.

Mr. Stephen W. Chu, PWS (#1770) and Certified Senior Ecologist, earned a Master of Science degree in Natural Resources and Environmental Sciences from the University of Illinois at Urbana-Champaign. Mr. Chu has over 16 years of experience managing and completing complex ecological-related projects. His areas of expertise consist of wetland delineations, wetland mitigation design, wetland restoration, wetland and native area monitoring, habitat surveys, tree surveys, and threatened and endangered species surveys. Mr. Chu has extensive experience in fieldwork and permitting throughout the West and Midwest.

3 BACKGROUND INFORMATION

Prior to conducting the wetland and waterbody delineation survey, Arcadis reviewed the following resources to identify the potential location and extent of wetlands and waterbodies within the ESA:

- U.S. Geological Survey (USGS) topographic maps (Makoti, Wabek, Plaza, and Epworth SE quadrangle) (USGS, 2015).
- Aerial imagery (ESRI, 2016).
- USGS National Hydrography Dataset (NHD) mapped streams (USGS, 2018).
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) (USFWS, 2018).
- U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Web Soil Survey (WSS) of Ward and Mountrail Counties, North Dakota (NRCS, 2018).

3.1 USGS Topographic Map

According to topographic mapping (**Figures 2-0 to 2-7**), one blueline stream, East Fork Shell Creek, is located within the central portion of the ESA. Topography was gently rolling, with elevations within the ESA ranging from 2054 to 2100 feet below sea level.

3.2 USGS NHD

The USGS NHD represents the drainage network with features such as rivers, streams, canals, lakes, ponds, coastline, dams, and stream gauges. One NHD feature, East Fork Shell Creek, is mapped within the ESA. NHD mapping for the ESA is depicted in **Figures 3-0 to 3-7**.

The ESA lies within the Lake Sakakawea sub basin (HUC 10110101). The closest designated traditionally navigable waterway (TNW) to the ESA is Lake Sakakawea which flows into the Missouri River.

3.3 National Wetlands Inventory (NWI)

NWI maps are used as a guide, along with other data, to indicate the potential presence of wetlands. The information is often out of date and not necessarily field-verified. The presence of an NWI feature is not a definitive indicator that a wetland or waterbody is present. Conversely, the absence of an NWI feature is not a definitive indicator that a wetland or waterbody is not present.

The NWI data indicated a total of 13 mapped wetlands (**Figures 3-0 to 3-7**). The following below are the NWI indicated Wetlands:

- A wetland classified as a palustrine emergent (PEM)1Cd, approximately 1.87 acres (including offsite area) is located approximately half a mile northwest of the TBPS Crude Facility.
- Two Wetlands, one classified as a PEM1Cx, approximately 0.10 acres and the other classified as a PEM1Ad, approximately 0.15 acres is located approximately 0.65 miles northwest of the TBPS Crude Facility.

- Two Wetland, one classified as a PEM1A, approximately 0.21 acres and the other classified as PEM1Ad, approximately 0.40 acres is located approximately 0.10 miles northwest from NWI classified wetlands PEM1Cx and PEM1Ad.
- A wetland classified as PEM1C, approximately 0.39 acres is located approximately 0.17 miles northwest of the previous classified wetland PEM1A.
- A wetland classified as a PEM1C, approximately 1.16 acres is located approximately 0.20 miles northwest from NWI classified wetland PEM1A.
- Three wetlands, one classified as PEM1C approximately 0.76 acres and two classified as PEM1A, approximately 0.58 and 0.10 acres is located approximately 0.25 miles southeast of 66th Street.
- A wetland classified as PEM1A, approximately 0.82 acres is located approximately 0.17 miles northwest of the intersection of 66th Street and the railroad.
- A wetland classified as a PEM1A, approximately 59.13 acres (including offsite area) is located along the East Fork Shell Creek.
- A wetland classified as a PEM1A, approximately 0.67 acres is located approximately a quarter of a mile north east of intersection 62nd Avenue and 41st Street.

3.4 Aerial Imagery

A review of aerial imagery from 1995, 2003, 2005, 2006, 2009, 2010, 2013 (Google Earth Pro V 7.3.2.5487. 2018) and 2016 (ESRI 2016) shows the ESA as consisting of the railroad with adjacent agriculture and pasture land use. No other significant changes in the landscape were observed on the historic aerial imagery review.

3.5 USDA NRCS WSS of Ward and Mountrail Counties, North Dakota

According to the USDA NRCS WSS for Ward and Mountrail Counties, North Dakota, 15 soil map units, listed in **Table 1,** are mapped within the ESA. The soil units mapped were listed as:

- Predominantly nonhydric – no major component listed for a given map unit is rated hydric, and at least one contrasting minor component is rated hydric.
- Partially hydric - at least one major component listed for a given map unit is rated as hydric, and at least one other major component is not rated hydric.
- Predominantly hydric – all major components listed for a given map unit are rated as hydric, and at least one contrasting minor component is not rated hydric.

The location and extent of the soil units identified within the ESA are depicted in **Figure 4**.

Table 1 Soil Map Units Identified within the Environmental Survey Area

Soil Unit Symbol	Soil Unit Name	Hydric Rating
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly hydric
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Predominantly nonhydric
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly nonhydric
C155F	Zahl-Max-Arnegard loams, 15 to 60 percent slopes	Predominantly nonhydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly nonhydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly nonhydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly nonhydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly nonhydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly nonhydric
C424A	Minot silty clay, 0 to 2 percent slopes	Predominantly nonhydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly nonhydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly nonhydric

4 METHODOLOGY

A pedestrian survey was conducted within the ESA to identify wetlands and waterbodies on August 7 & 8, 2018. Wetland boundaries were field-delineated according to Section 404 of the Clean Water Act routine onsite methodology described in the Technical Report Y-87-1 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and subsequent guidance documents and the United States Army Corps of Engineers (USACE) 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (Version 2.0). The ESA is within the Northern Great Plains Land Resource Region (USACE 2012). National Wetland Indicator status and taxonomic nomenclature is referenced from The National Wetland Plant List (Lichvar 2016). Indicators of hydric soil are based on the Field Indicators of Hydric Soils in the United States guide Version 8.1 (Vasilas et al. 2017).

Wetland delineation data were recorded on the USACE Great Plains Regional Supplement wetland determination data forms. One representative data point was recorded for each wetland. Corresponding representative upland data points were recorded to document upland boundaries and conditions surrounding the wetlands within the ESA. In addition, data points were recorded in mapped NWI wetland polygons.

Streams were identified as those waters that possessed a defined “bed and bank” or ordinary high-water mark (OHWM) indicators and lacked a dominance of upland vegetation in the channel. Channels that parallel roadways or railroads were identified as upland drainage features and were not considered to be jurisdictional unless they had an identifiable OHWM, were identified on the USGS topographic map, or represented a presumed relocation of a natural channel.

The outer boundaries of each wetland and waterbody (determined by the OHWM) were delineated and recorded using a handheld Trimble Geo7X Global positioning system receiver, with submeter accuracy. As features were collected, they were given a unique feature identification (ID).

Precipitation data from approximately 90 days prior to the wetland and waterbody delineation survey were obtained from a weather station near the ESA and compared with 30-year average precipitation data obtained from the NRCS Wetlands (WETS) Table for Mountrail County to determine if antecedent hydrologic conditions at the time of the survey were normal, wetter, or drier than the normal range (Midwestern Regional Climate Center 2018).

5 SURVEY RESULTS

5.1 Antecedent Precipitation

Prior to conducting the field visit, antecedent precipitation data were analyzed. Data were obtained from a nearby weather station (PLAZA (ND) USC00327120) and compared to data from a nearby WETS station that had sufficient historical data (STANLEY 3 NNW, ND). The most recent rainfall event prior to the site visit occurred on July 10, 2018 with approximately 0.1 inches of precipitation. Precipitation for the 14 days prior to site visit was 0.0 inches. The precipitation data for the 90-day period prior to the field visit were entered into a WETS analysis worksheet to weight the information from each preceding month to analyze hydrologic conditions (**Appendix A**). Based on this analysis, the antecedent hydrologic conditions were considered to be within normal range, suggesting that climatic/hydrologic conditions were normal for this time of year.

5.2 Vegetative Communities

Vegetative communities observed within the ESA consisted of railroad ROW, agricultural land use, and PEM wetlands. Photographs of the ESA are provided in **Appendix B**.

Upland portions of the railroad ROW were dominated by smooth brome (*Bromus inermis*), common sow thistle (*Sonchus oleraceus*), sweet clover (*Melilotus officinalis*), Canada thistle (*Cirsium arvense*), quackgrass (*Elymus repens*), and Virginia wildrye (*Elymus virginicus*). The agriculture lands were planted with alfalfa (*Medicago sativa*), lentils (*Lens culinaris*), soy bean (*Glycine max*), and common wheat (*Triticum aestivum*). The PEM wetlands were dominated by reed canary grass (*Phalaris arundinacea*), broadleaved cattail (*Typha latifolia*), narrow-leaved cattail (*Typha angustifolia*), foxtail barley (*Hordeum jubatum*), barnyard grass (*Echinochloa crus-galli*) and prairie cordgrass (*Spartina pectinata*).

5.3 Wetlands

As shown in **Figure 6**, a total of ten PEM wetlands (Wetlands W1 to W10) were identified within the ESA, for a total of 8.479 acres. USACE Wetland Determination Data Forms are provided in **Appendix C** and wetland characteristics are summarized in **Table 2**. It should be noted that the USACE make the final determination of wetland hydrologic connectivity and jurisdiction.

Table 2 Environmental Survey Area Wetland Summary

Feature ID	Cowardin Classification	Total Approximate Area Delineated within ESA (acres)[1]	Latitude, Longitude Coordinates	Hydrologic Connection[2]
W1	PEM	0.129 acres	47.981593°, -101.869972°	East Fork Shell Creek
W2	PEM	0.249 acres	47.983102°, -101.874448°	Isolated depression
W3	PEM	0.042 acres	47.983268°, -101.875925°	Isolated depression
W4	PEM	0.200 acres	47.983659°, -101.876094°	Isolated depression
W5	PEM	0.455 acres	47.984415°, -101.878144°	Isolated depression

Table 2 Environmental Survey Area Wetland Summary

Feature ID	Cowardin Classification	Total Approximate Area Delineated within ESA (acres)[1]	Latitude, Longitude Coordinates	Hydrologic Connection[2]
W6	PEM	1.695 acres	47.985850°, -101.883267°	Isolated depression
W7	PEM	1.767 acres	47.987734°, -101.888990°	Isolated depression
W8	PEM	0.276 acres	47.991424°, -101.896871°	Isolated depression
W9	PEM	3.551 acres	47.994401°, -101.901609°	East Fork Shell Creek
W10	PEM	0.115 acres	48.009752°, -101.911743°	Isolated depression

Notes:
1 The wetland may extend outside of the ESA; this acreage corresponds to the size of the feature located within the ESA.
2 The determinations of hydrologic connection are based on the boundary delineations and have not been formally approved by the USACE.

W1 is an emergent wetland that measures approximately 0.129 acres within the ESA, located northwest of the TBPS Crude Facility. One wetland data point (W01DP01) was taken within W1 and one upland data point (W01DP02) was taken in an adjacent upland area. W1 was dominated by reed canary grass. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W1 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland continues offsite to the north, via a 36-inch culvert under the railroad, and appears to eventually drain into the East Fork Shell Creek. As a result, W1 may be considered a Waters of the United States (WOUS).

W2 is an emergent wetland that measures approximately 0.249 acres within the ESA, located northwest of W1 along the railroad. One wetland data point (W02DP01) was taken within W2 and one upland data point (W02DP02) was taken in an adjacent upland area. W02 was dominated by foxtail barley. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Three secondary hydrology indicators observed within W2 consisted of surface soil cracks (B6), geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W3 is an emergent wetland, approximately 0.042 acres within the ESA, located northwest of W2 along the railroad. One wetland data point (W03DP01) was taken within W3 and one upland data point (W03DP02) was taken in an adjacent upland area. W3 was dominated by reed canary grass. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W3 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W4 is an emergent wetland, approximately 0.200 acres within the ESA, located approximately 150 feet north of W3. One wetland data point (W04DP01) was taken within W4 and one upland data point (W03DP02) was taken in an adjacent upland area. W4 was dominated by reed canary grass. Hydric soil

indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W4 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W5 is an emergent wetland, approximately 0.455 acres within the ESA, located approximately 450 feet northwest of W4. One wetland data point (W05DP01) was taken within W5 and one upland data point (W05DP02) was taken in an adjacent upland area. W5 was dominated by reed canary grass. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W5 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W6 is an emergent wetland, approximately 1.695 acres within the ESA, located approximately 850 feet northwest of W5. One wetland data point (W06DP01) was taken within W6 and one upland data point (W06DP02) was taken in an adjacent upland area. W6 was dominated by barnyard grass and narrow-leaved cattail. Hydric soil indicator F6, redox dark surface, was observed within the wetland. One primary wetland hydrology indicator, oxidized rhizospheres on living roots (C3) was observed within the subject wetland. Two secondary hydrology indicators observed within W6 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W7 is an emergent wetland, approximately 1.767 acres within the ESA, located approximately 600 feet east of 66th Street. One wetland data point (W07DP01) was taken within W7 and one upland data point (W07DP02) was taken in an adjacent upland area. W7 was dominated by narrow-leaved cattail and foxtail barley. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W7 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W8 is an emergent wetland, approximately 0.276 acres within the ESA, located approximately 800 feet to the west of 66th Street. One wetland data point (W08DP01) was taken within W8 and one upland data point (W08DP02) was taken in an adjacent upland area. W8 was dominated by barnyard grass. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Four secondary hydrology indicators observed within W8 consisted of surface soil cracks (B6), sparsely vegetated concave surface (B8), geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

W9 is an emergent wetland, approximately 3.551 acres within the ESA, located approximately a quarter of a mile northwest of W8. Two wetland data points (W09DP01 and W09DP03) were taken within W9 and two upland data points (W09DP02 and W09DP04) were taken in adjacent upland areas. W9 is subject to grazing pressure from cattle as the wetland is within an active cow pasture. W9 was dominated by

narrow-leaved cattail, reed canary grass, prairie cordgrass, and foxtail barley. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W9 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to have a hydrologic surface connection with the East Fork Shell Creek and may be considered a WOUS.

W10 is an emergent wetland, approximately 0.115 acres within the ESA, located approximately a quarter of a mile north east of the intersection between 62nd Avenue and 41st Street. One Data point (W10DP01) was taken within W10 and one upland data point (W10DP02) was taken in an adjacent upland area. W10 was dominated by barnyard grass and foxtail barley. Hydric soil indicator F6, redox dark surface, was observed within the wetland. No primary wetland hydrology indicators were observed within the subject wetland during the time of the wetland delineation site visit. Two secondary hydrology indicators observed within W10 consisted of geomorphic position (D2) and a positive Fac-Neutral test (D5). The subject wetland appears to be within an isolated depression and will most likely not be considered a WOUS.

5.4 Waterbodies

As shown in **Figure 5-4**, one NHD stream, the East Fork Shell Creek, was identified within delineated wetland W9, measuring approximately 246 linear feet. The waterbody is within a pasture and is subject to grazing pressure from cattle. The East Fork Shell Creek crosses through the ESA heading southwest before connecting with Lake Sakakawea. Due to the hydrologic connection between these streams and Lake Sakakawea, a TNW, they may be considered a WOUS by the USACE. It should be noted that the USACE make the final determination of significant nexus with a TNW.

6 CONCLUSIONS

A wetland and waterbody delineation survey was conducted on August 7 and 8, 2018, by Arcadis for the proposed Thunder Butte Pipeline Project in Mountrail and Ward Counties, North Dakota. Arcadis identified ten wetlands (totaling 8.479 acres) and one waterbody (East Fork Shell Creek) (totaling 246 linear feet) within the ESA. Wetland W1, W9 and the East Fork Shell Creek may be considered WOUS. Wetlands W2, W3, W4, W5, W6, W7, W8, and W10 may be considered isolated wetlands.

7 REFERENCES

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FIGURES

Midline Pump Station
Site #2 Boundary
- 1.88 acres

TB to Plaza
Route -
3.80 miles



Legend

Environmental Survey Area

0 1,000 2,000 4,000
Feet

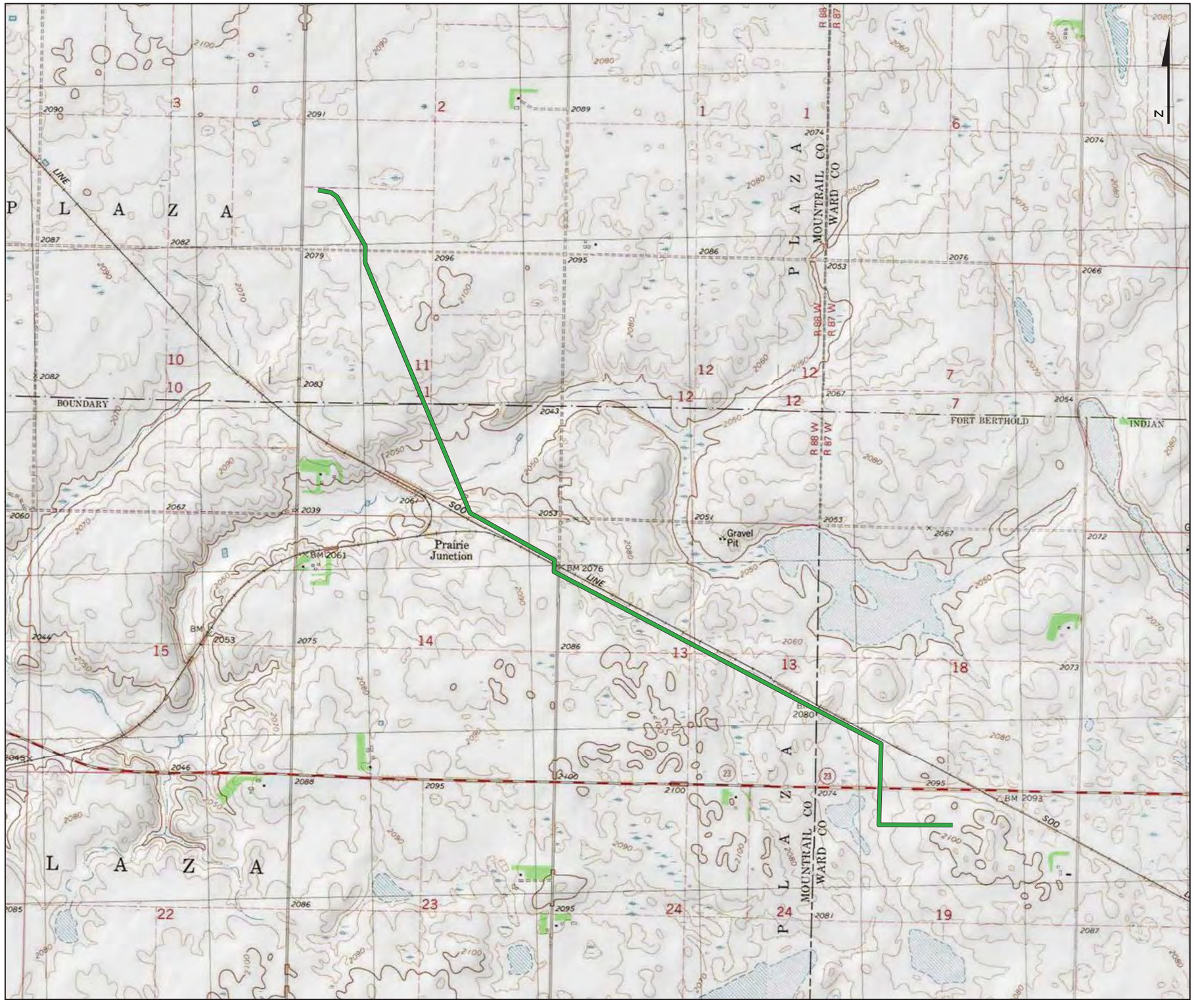
Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

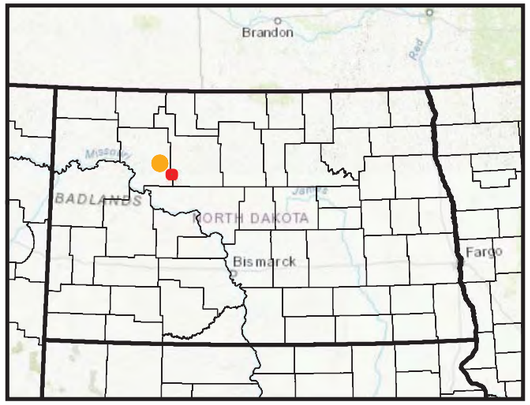
	Thunder Butte Pipeline Project Mountrail and Ward Counties, North Dakota

FIGURE 1-0
OVERALL PROJECT LOCATIONS

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Date: 10/8/2018	

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Legend

Environmental Survey Area

0 1,000 2,000 4,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

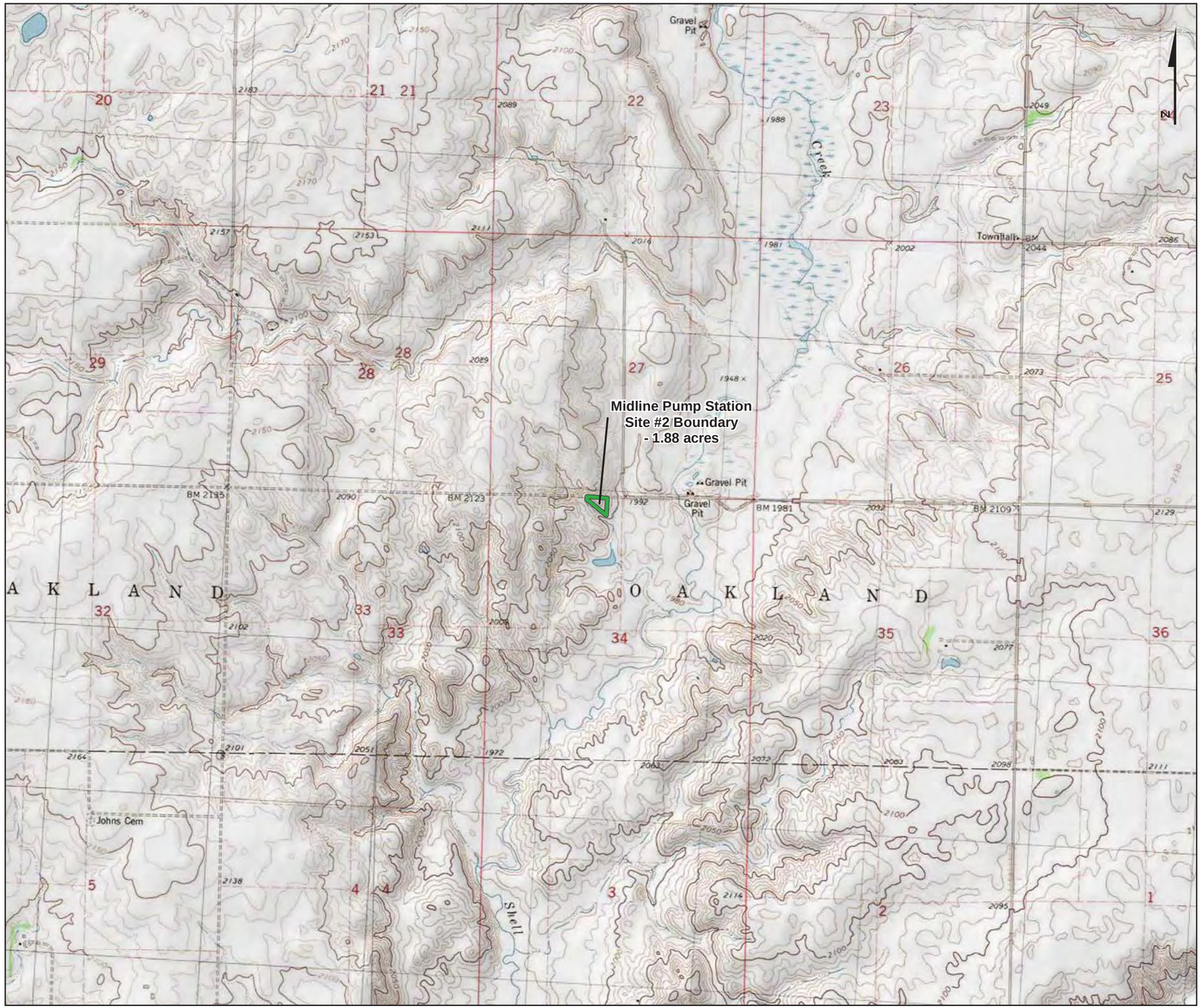
FIGURE 1-1
PROJECT LOCATION
TBPS CRUDE FACILITY TO PLAZA ROUTE

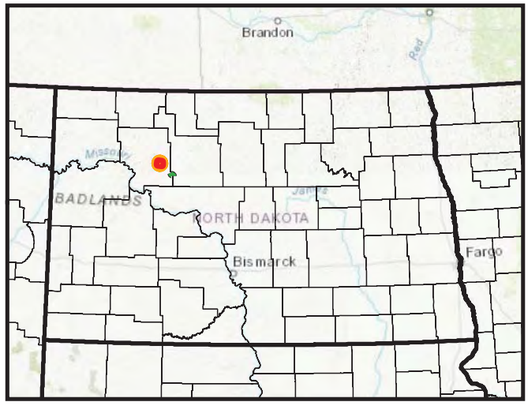
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Date: 10/8/2018

ARCADIS

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Legend

Environmental Survey Area

0 1,000 2,000 4,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

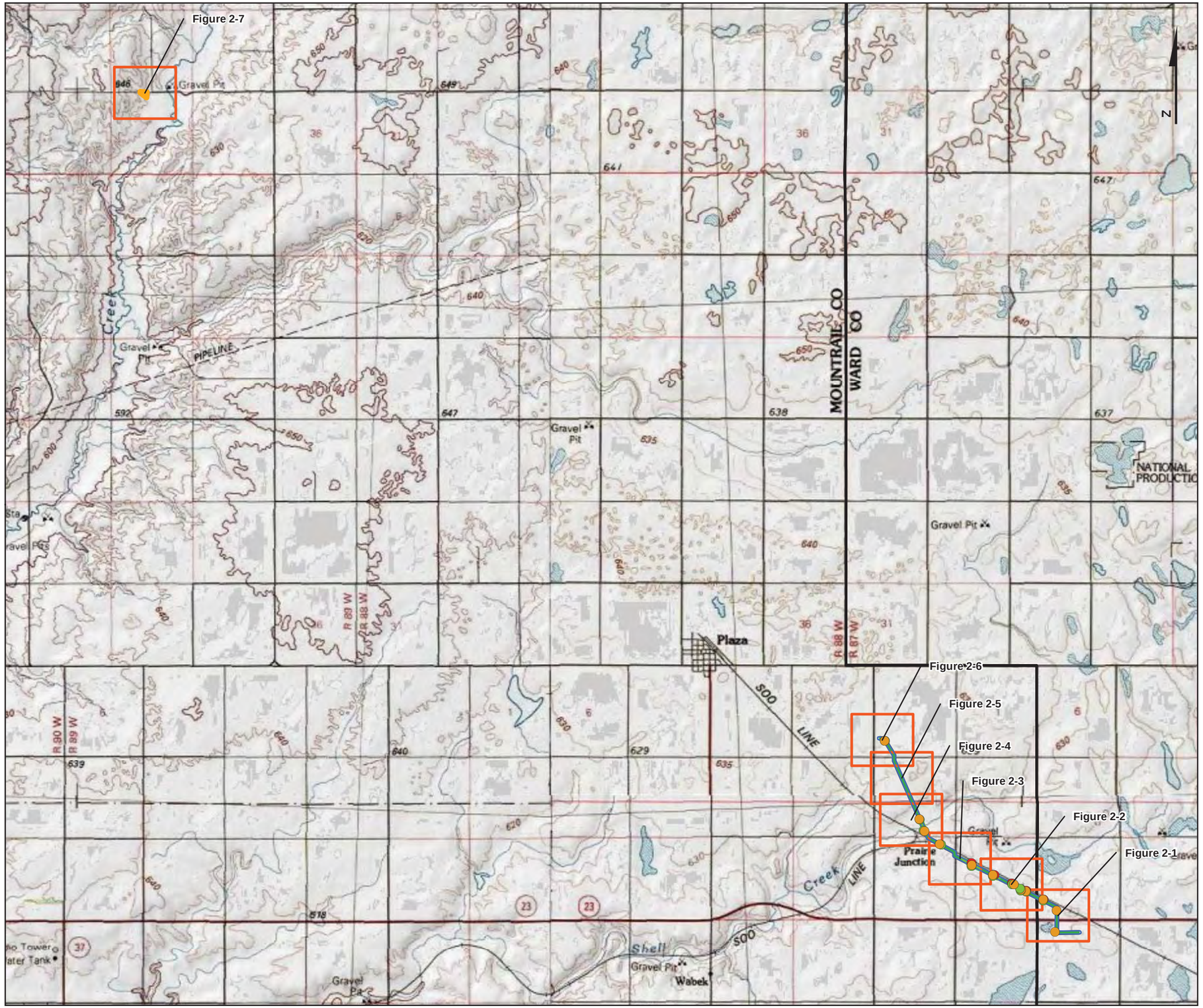
FIGURE 1-2
PROJECT LOCATION
MIDLINE PUMP STATION SITE

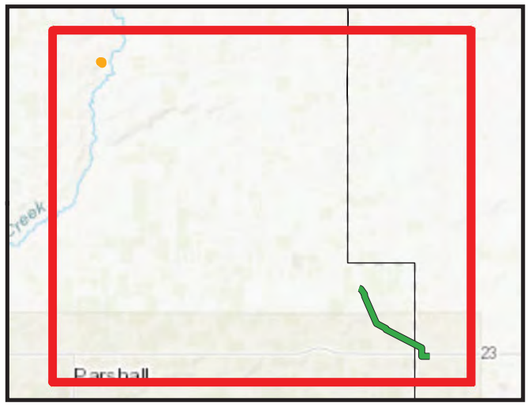
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Date: 10/8/2018

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Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- Extents6K
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

2500 0 2500 5000
Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

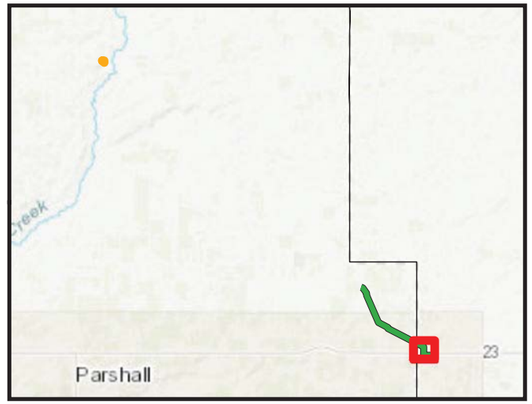
FIGURE 2-0
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
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Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

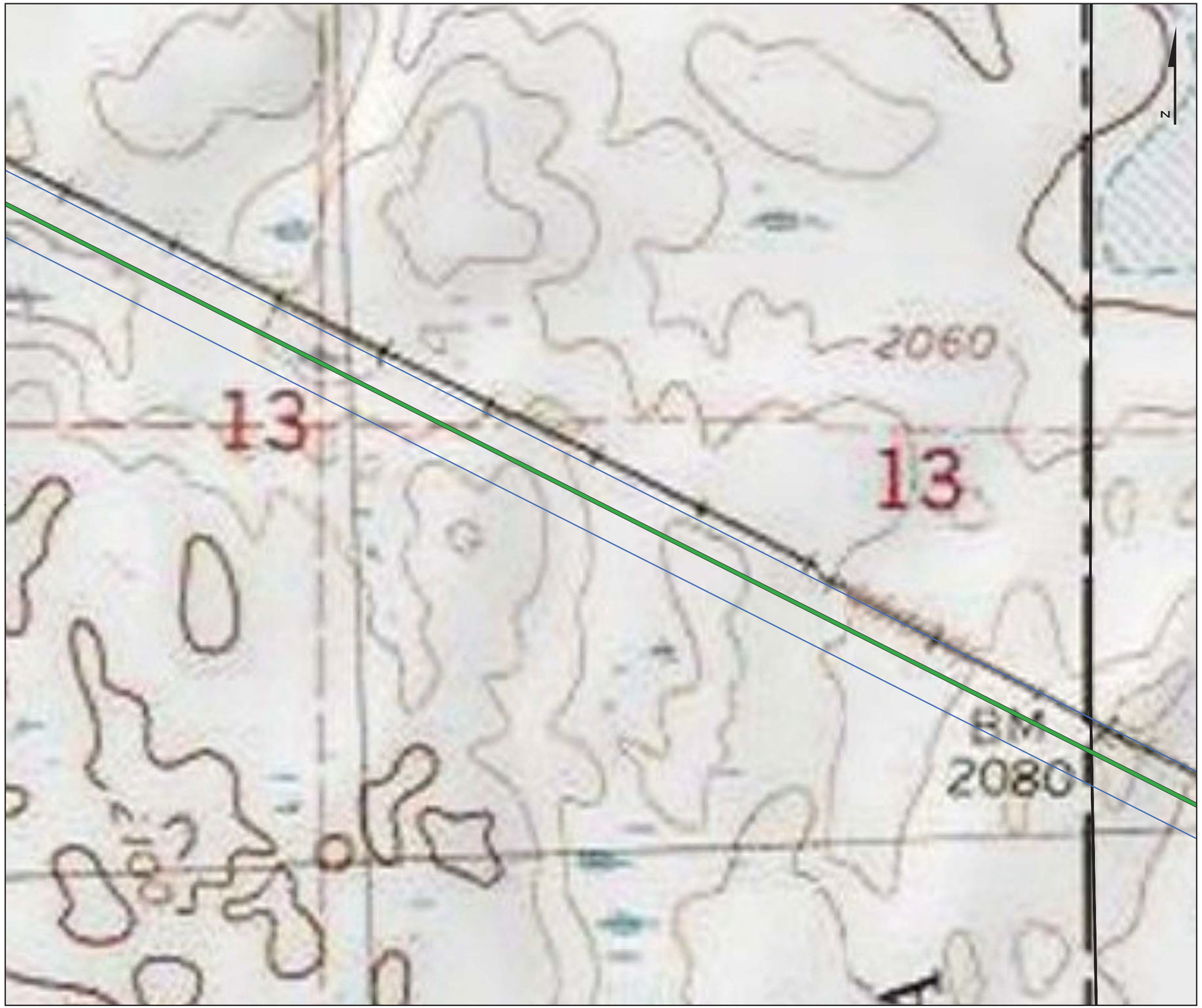
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

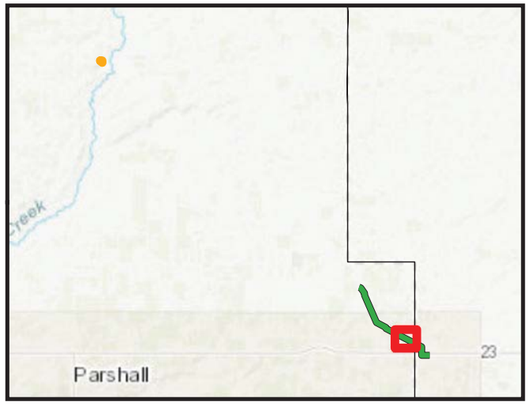
FIGURE 2-1
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDRIFig02.mxd





Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

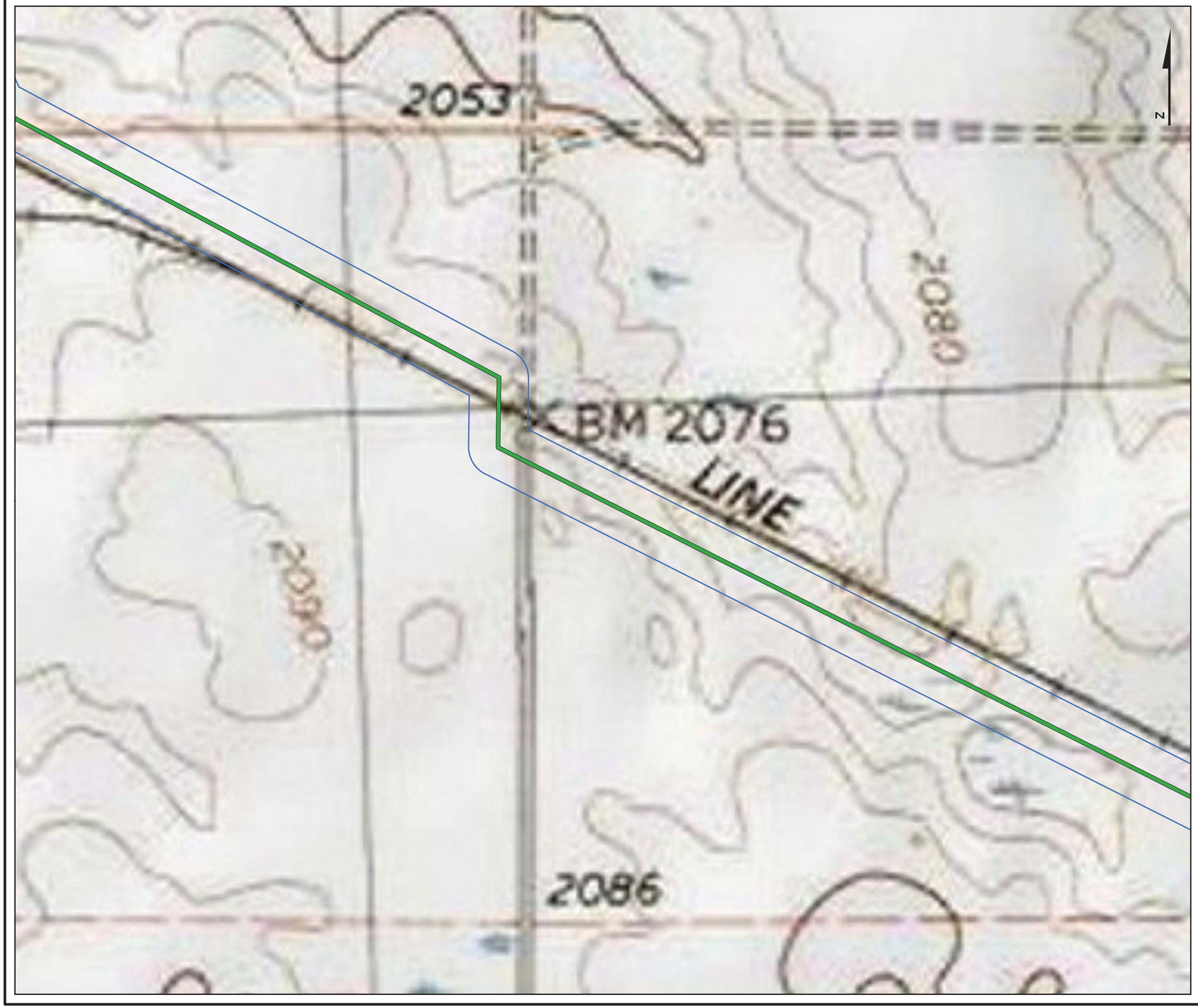
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

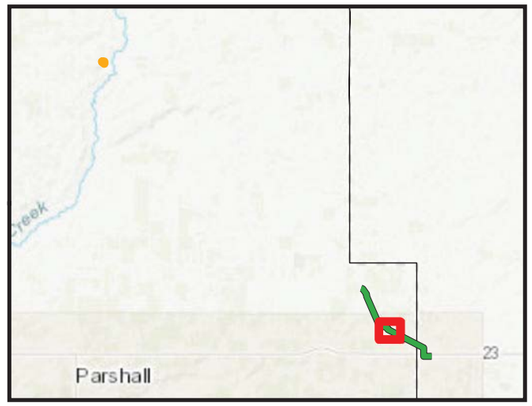
FIGURE 2-2
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDRFig02.mxd





Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000
Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

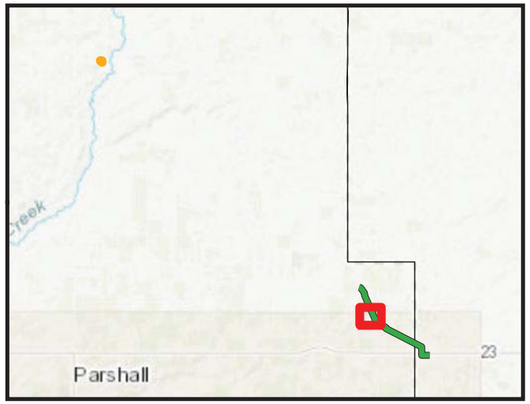
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TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig02.mxd





Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000
Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

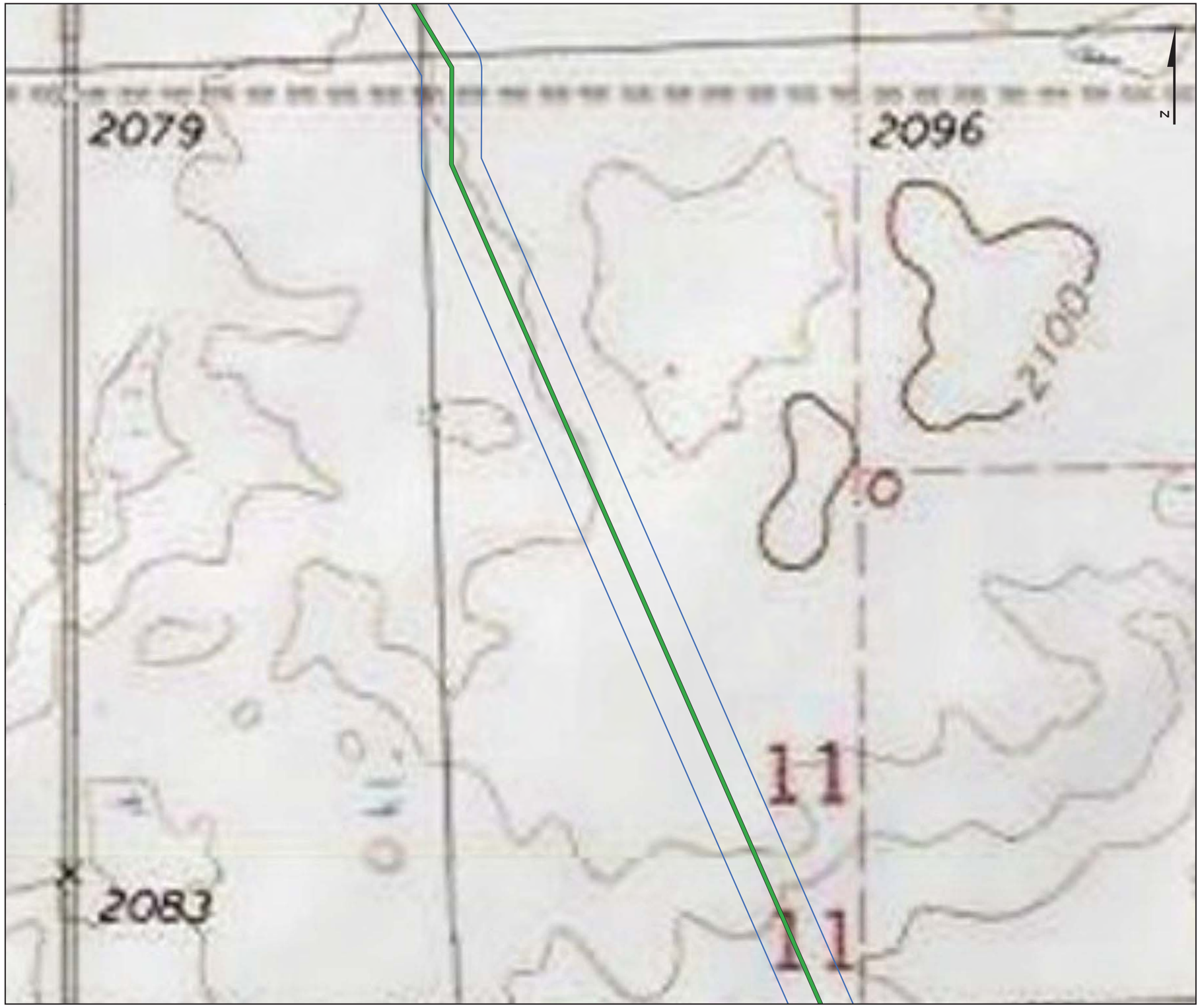
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

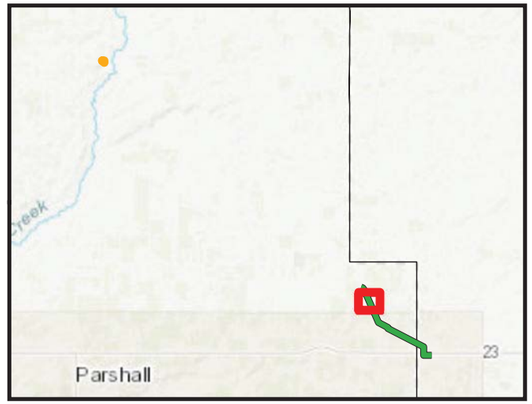
FIGURE 2-4
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig02.mxd





Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

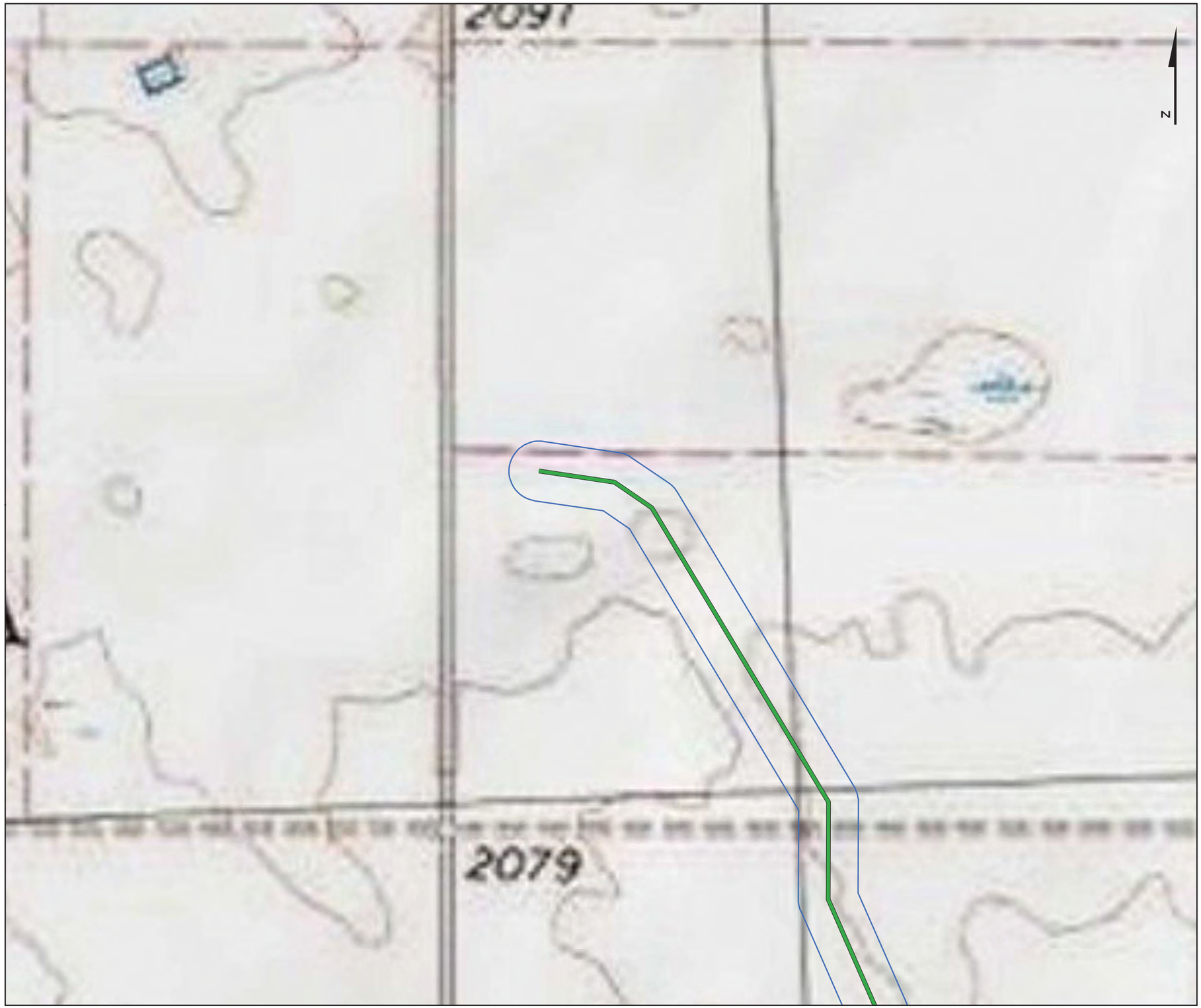
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

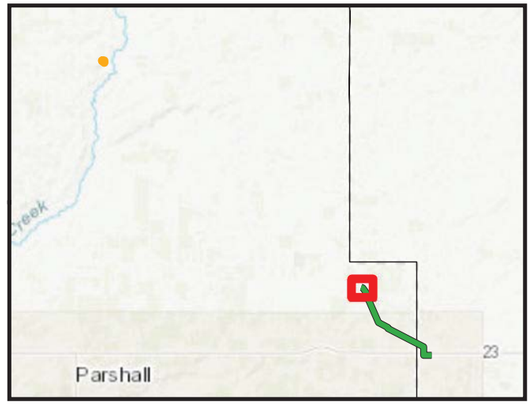
FIGURE 2-5
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GIS\Projects_ENV\Makoti_pipeline\mxd\WDR\Fig02.mxd





Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

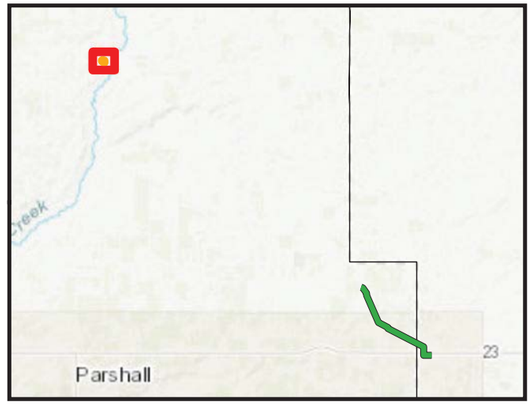
FIGURE 2-6
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig02.mxd





Legend

- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

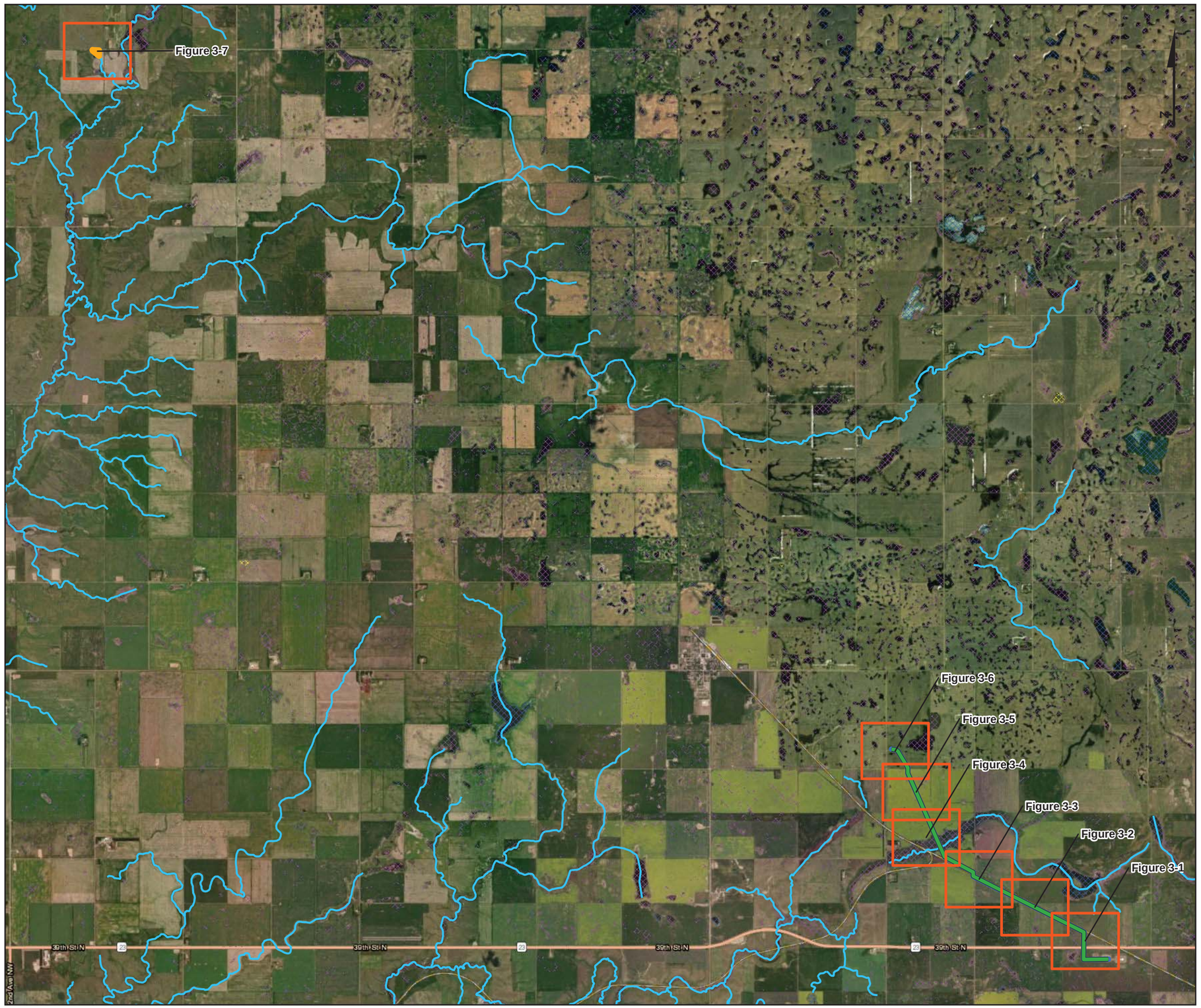
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

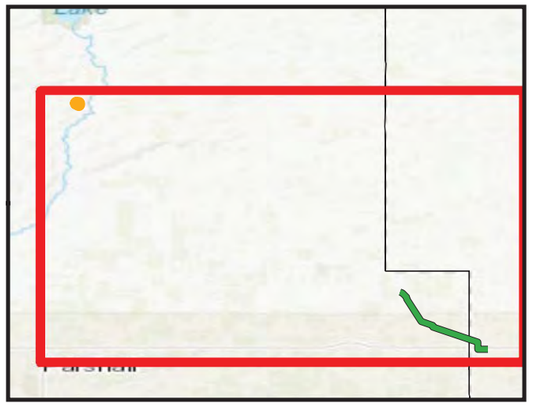
FIGURE 2-7
TOPOGRAPHIC MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig02.mxd





Legend

- TB to Plaza Route - 3.80 miles, Proposed
- NHD Stream

NWI Wetland

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond/Lake/River
- Midline Pump Station Site #2 Boundary
- Environmental Survey Area (200 feet)

0 2,5005,000 10,000
Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward Counties, North Dakota

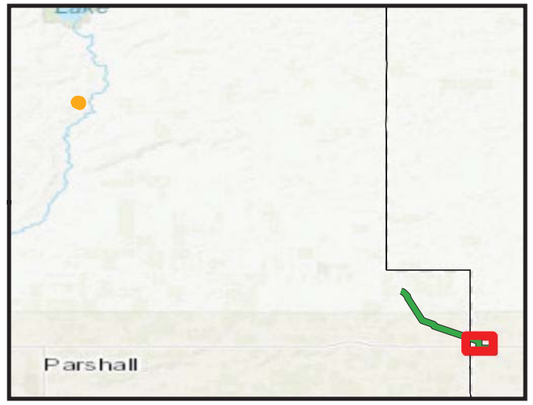
FIGURE 3-0
NWI, NHD, FEMA FLOODPLAIN MAP

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDRFig03.mxd





Legend

TB to Plaza Route - 3.80 miles, Proposed

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

FIGURE 3-1
NWI, NHD, FEMA FLOODPLAIN MAP

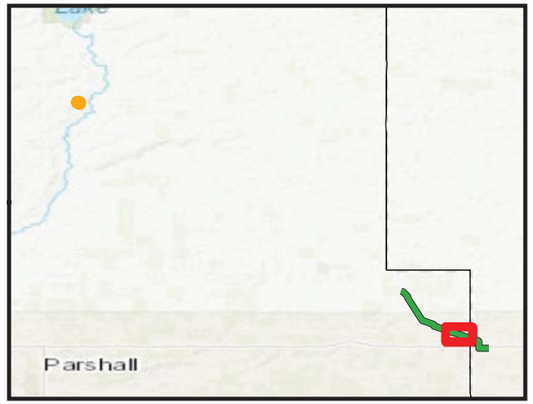
PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig03.mxd





Legend

TB to Plaza Route - 3.80 miles, Proposed

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

FIGURE 3-2
NWI, NHD, FEMA FLOODPLAIN MAP

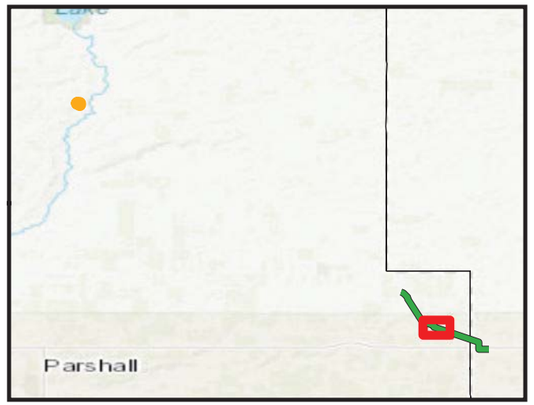
PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig03.mxd





Legend

TB to Plaza Route - 3.80 miles, Proposed

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

FIGURE 3-3
NWI, NHD, FEMA FLOODPLAIN MAP

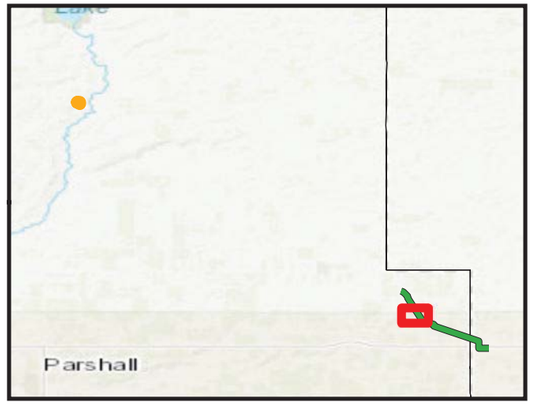
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Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig03.mxd





Legend

TB to Plaza Route - 3.80 miles, Proposed

NHD Stream

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

FIGURE 3-4
NWI, NHD, FEMA FLOODPLAIN MAP

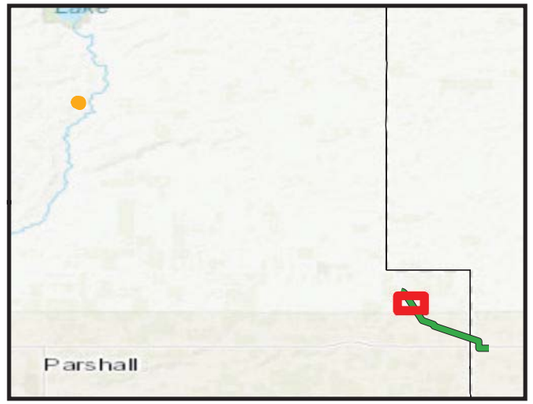
PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig03.mxd





Legend

TB to Plaza Route - 3.80 miles, Proposed

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

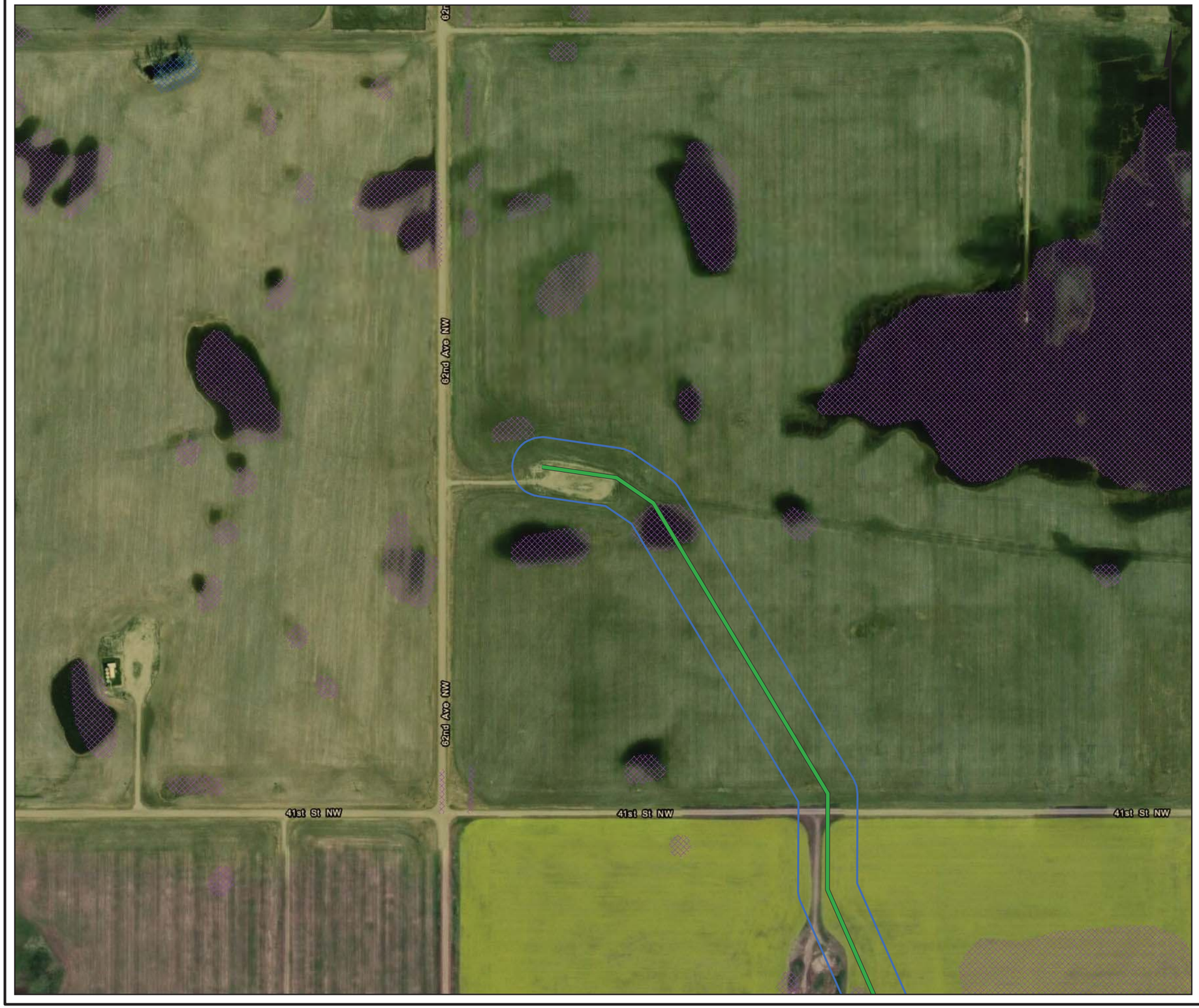
FIGURE 3-5
NWI, NHD, FEMA FLOODPLAIN MAP

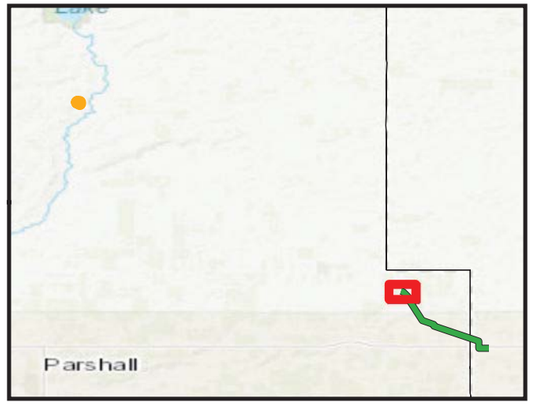
PN:CO002338.0001

Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig03.mxd





Legend

TB to Plaza Route - 3.80 miles, Proposed

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Environmental Survey Area (200 feet)

0 250 500 1,000

Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

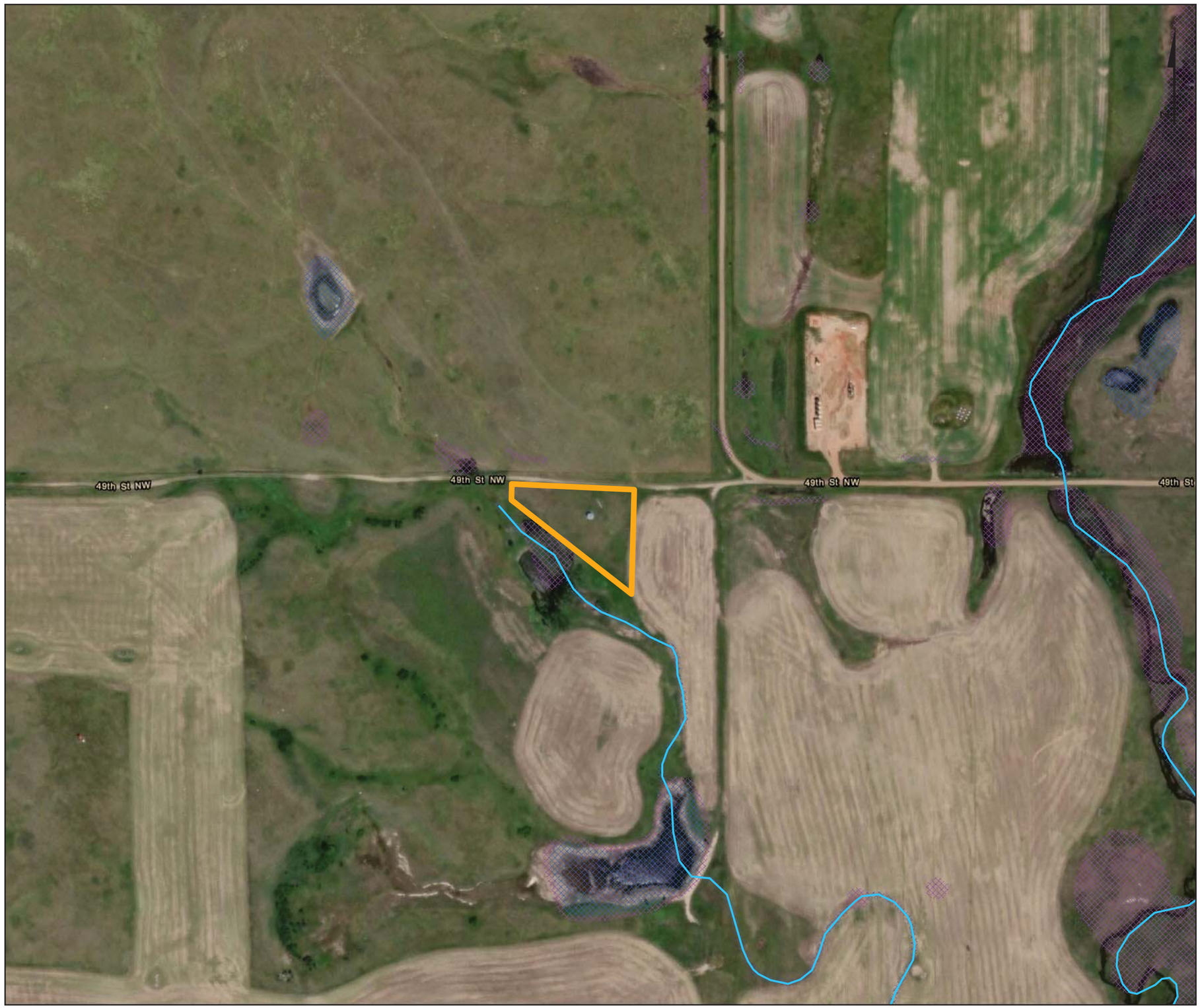
FIGURE 3-6
NWI, NHD, FEMA FLOODPLAIN MAP

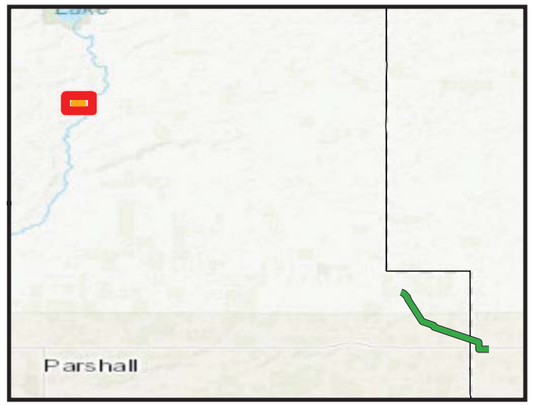
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Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig03.mxd





Legend

NHD Stream

NWI Wetland

Freshwater Emergent Wetland

Freshwater Pond/Lake/River

Midline Pump Station Site #2 Boundary

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATIONAL WETLANDS INVENTORY (NWI) WETLAND DATA OBTAINED FROM THE US FISH & WILDLIFE SERVICE AT: www.fws.gov.
3. NATIONAL HYDROGRAPHY DATASET (NHD) OBTAINED FROM THE US GEOLOGICAL SURVEY AT: https://nhd.usgs.gov.
4. FLOODPLAIN DATA OBTAINED FROM THE FEMA FLOODPLAIN SERVICE CENTER AT: https://msc.fema.gov

Makoti Pipeline
Mountrail and Ward
Counties, North Dakota

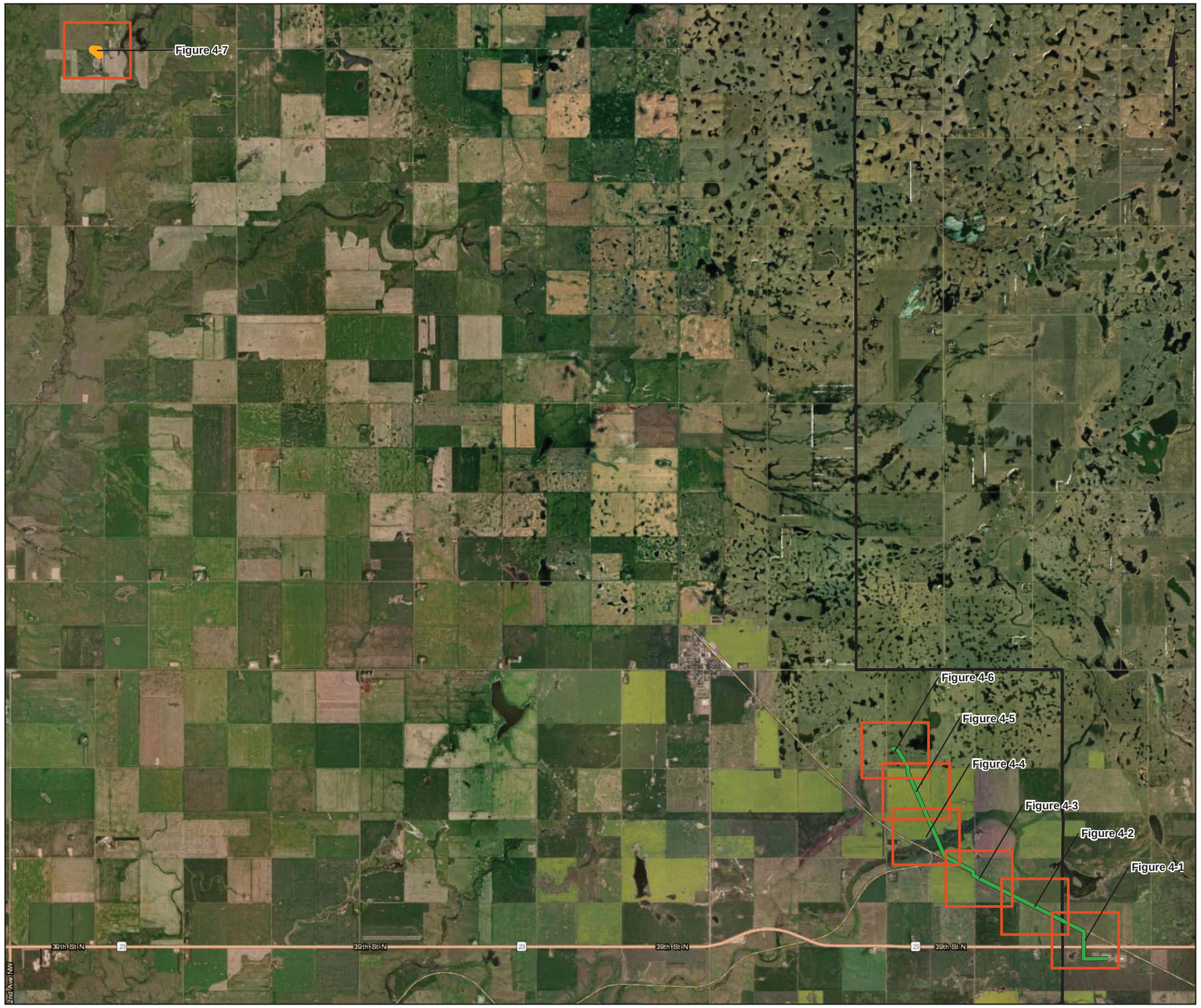
FIGURE 3-7
NWI, NHD, FEMA FLOODPLAIN MAP

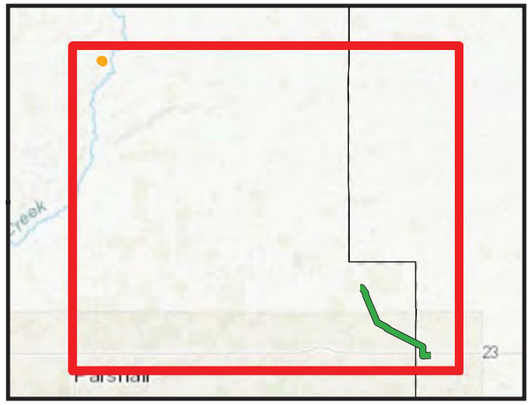
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Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig03.mxd





Legend

- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Environmental Survey Area (200 feet)

0 2,5005,000 10,000
Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

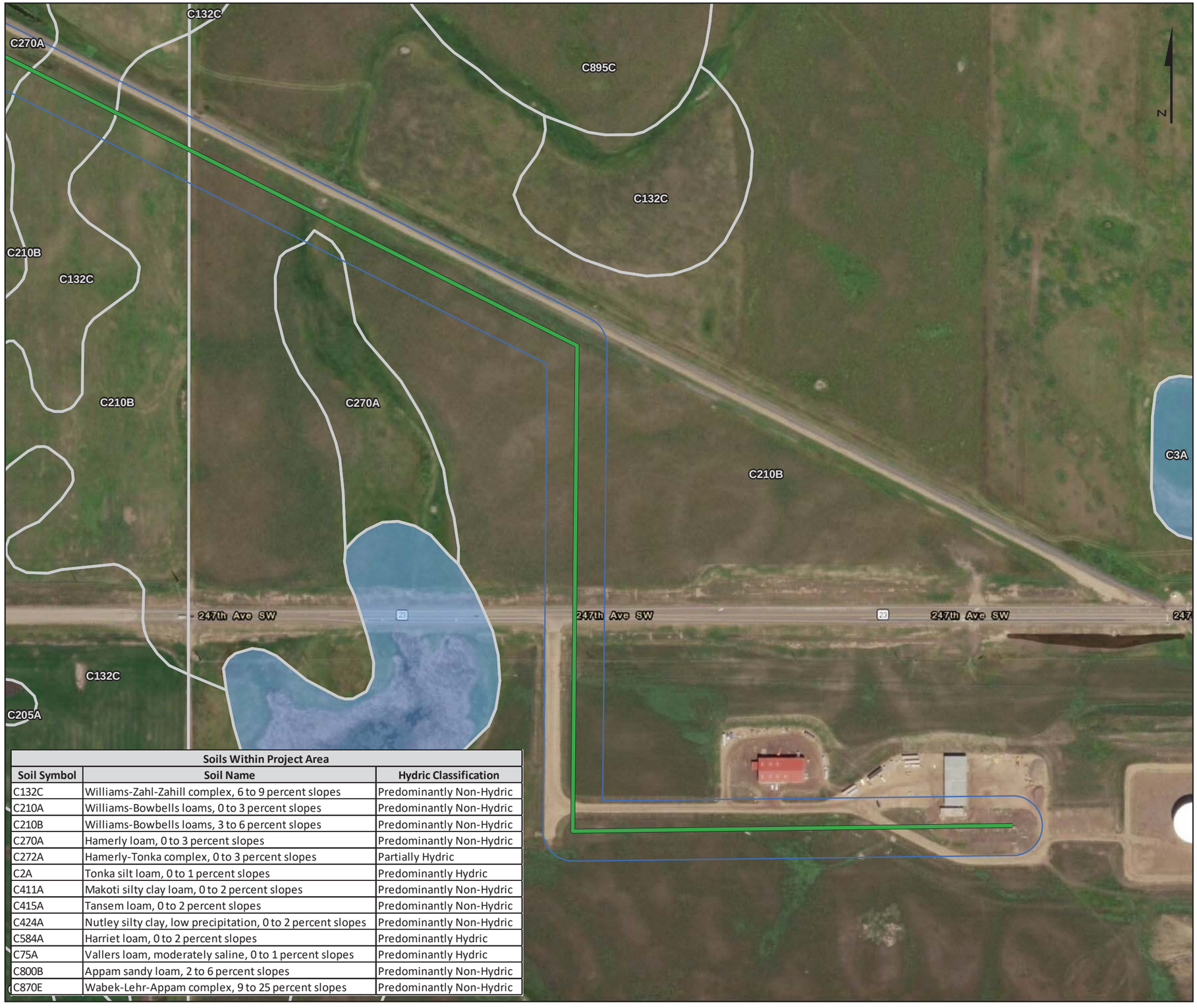
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 4-0
NRCS SOILS MAP

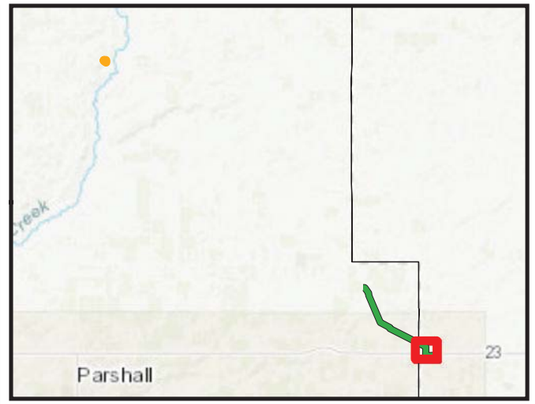
PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04_NRCS_Soils.mxd



Soils Within Project Area		
Soil Symbol	**Soil Name**	**Hydric Classification**
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Non-Hydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric



Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

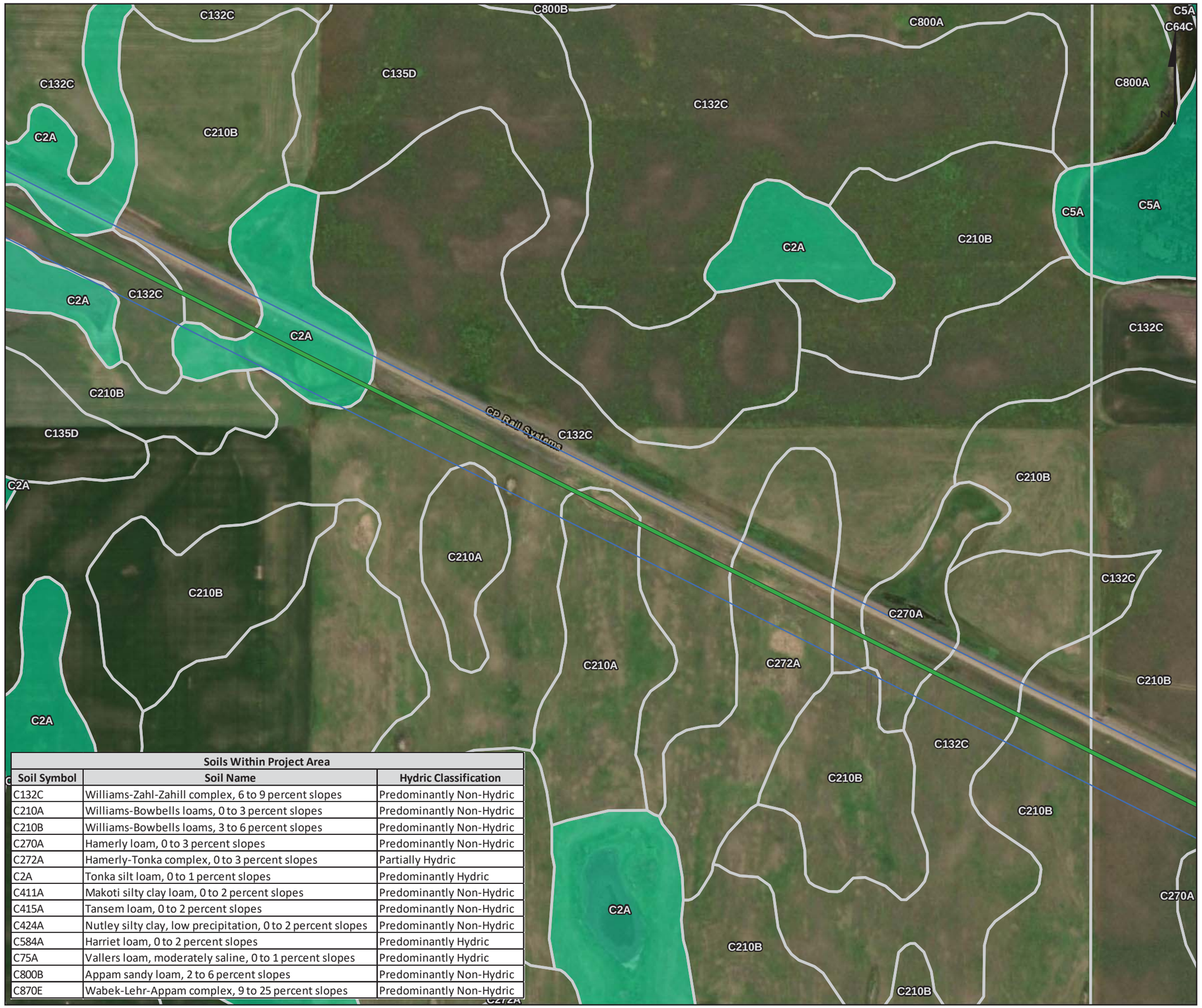
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 4-1
NRCS SOILS MAP

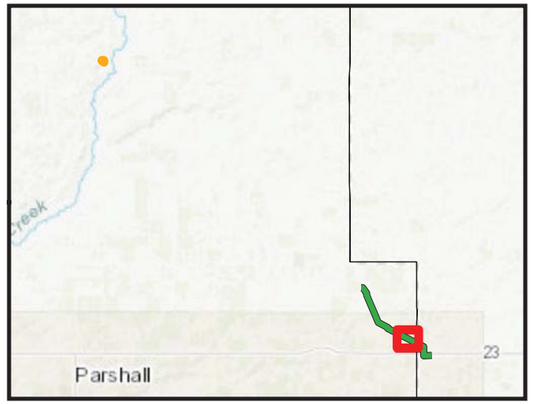
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Soils Within Project Area		
Soil Symbol	**Soil Name**	**Hydric Classification**
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Non-Hydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric



Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Thunder Butte
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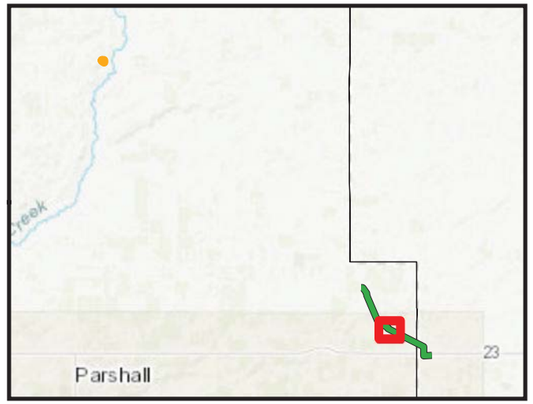
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NRCS SOILS MAP

PN:CO002338.0001
Date: 10/8/2018

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Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04_NRCS_Soils.mxd





Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Soils Within Project Area		
Soil Symbol	**Soil Name**	**Hydric Classification**
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C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
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C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric

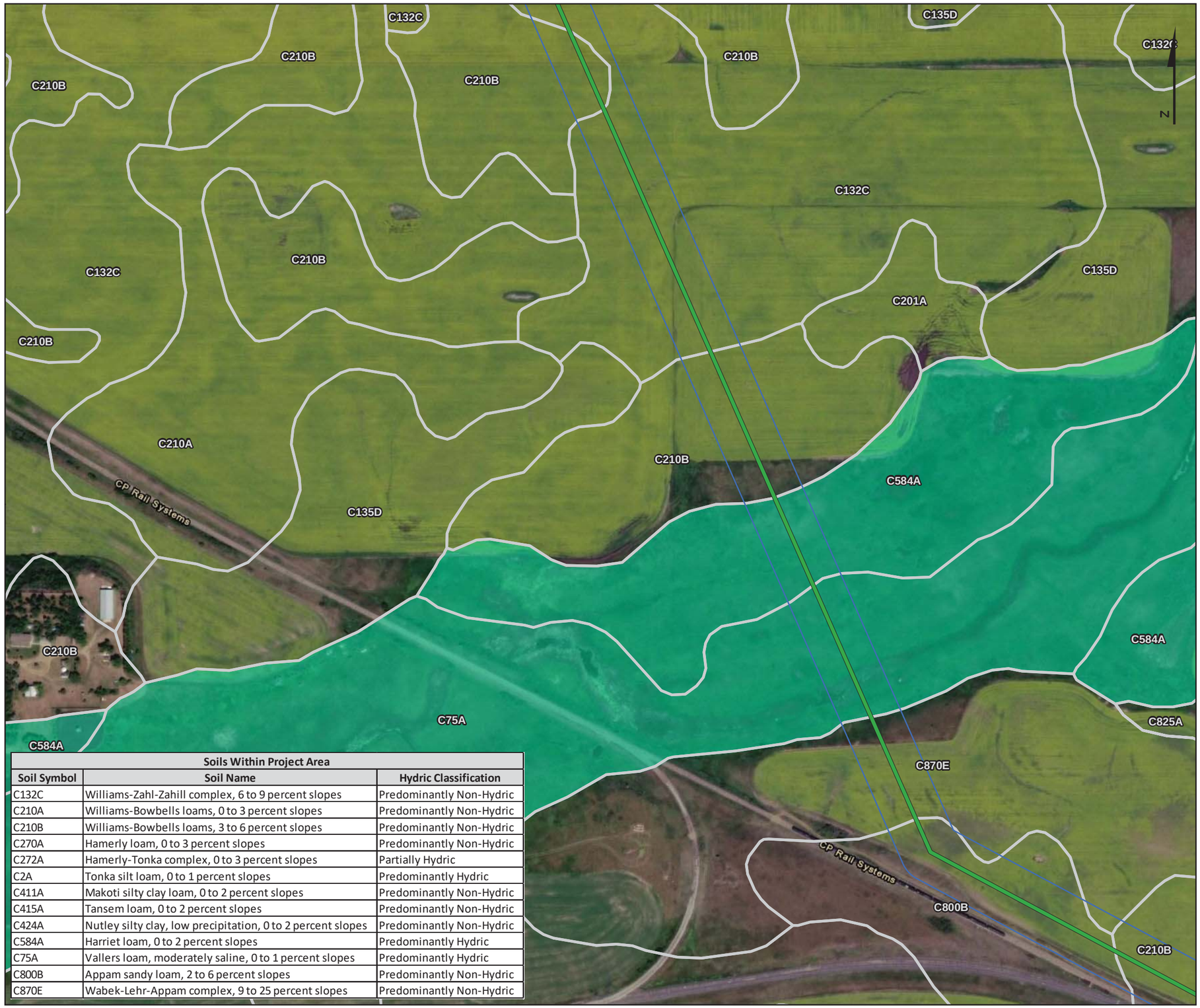
Thunder Butte
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Mountrail and Ward
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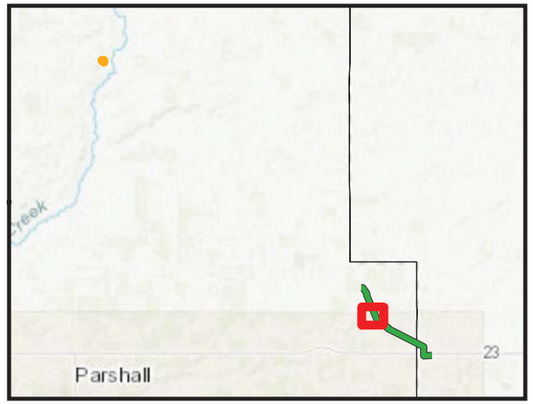
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NRCS SOILS MAP

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Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Soils Within Project Area

Soil Symbol	Soil Name	Hydric Classification
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C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric

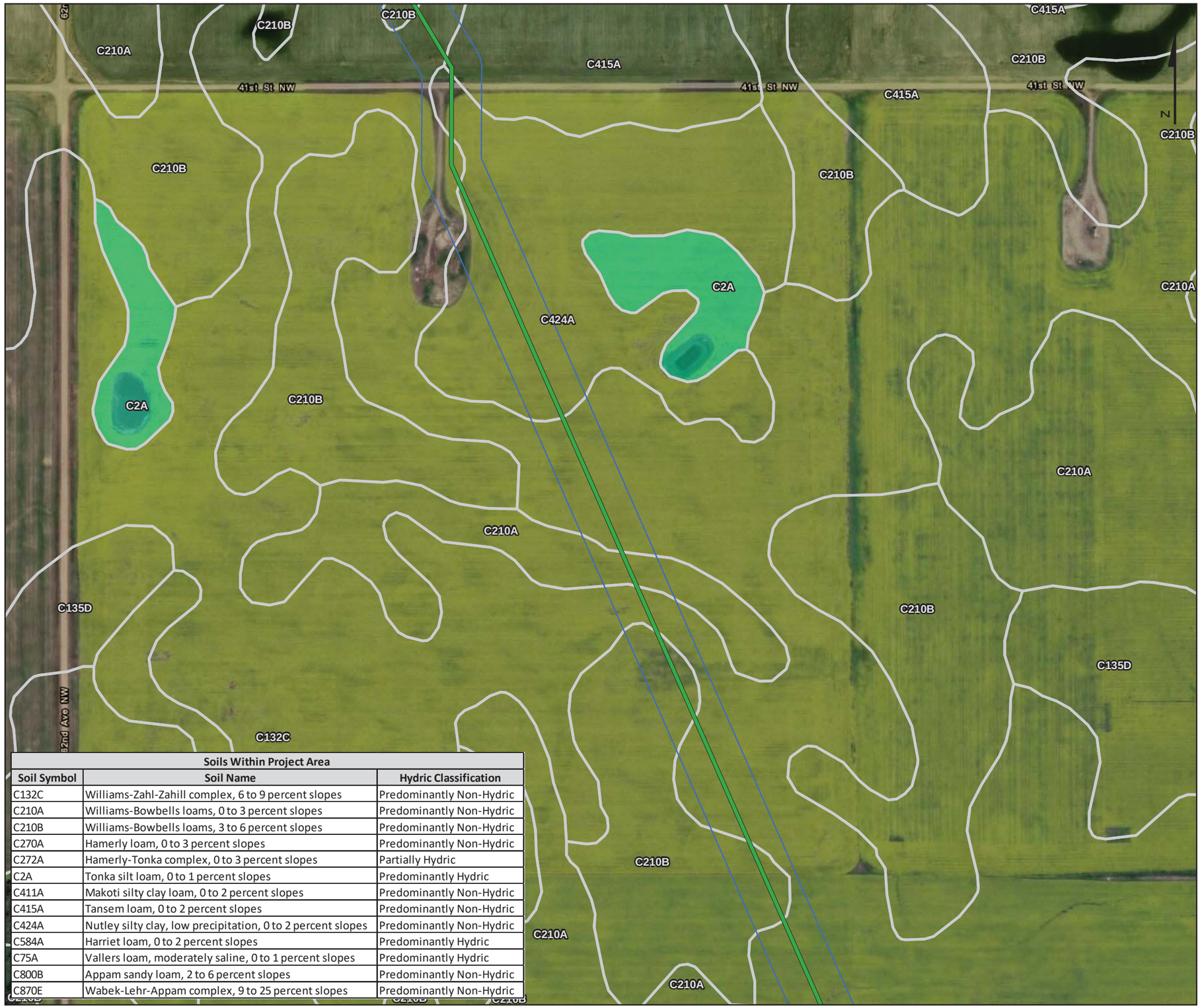
Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

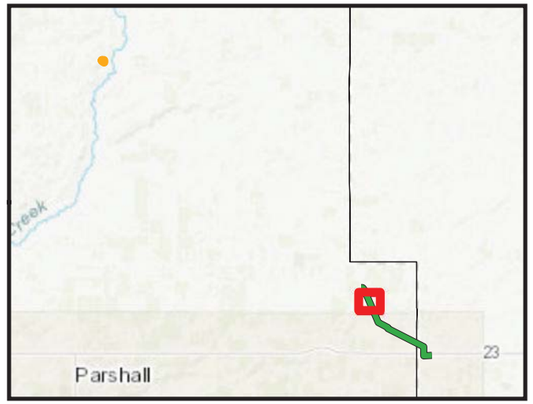
FIGURE 4-4
NRCS SOILS MAP

PN:CO002338.0001
Date: 10/8/2018

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Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04_NRCS_Soils.mxd





Soils Within Project Area		
Soil Symbol	**Soil Name**	**Hydric Classification**
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Non-Hydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric

Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

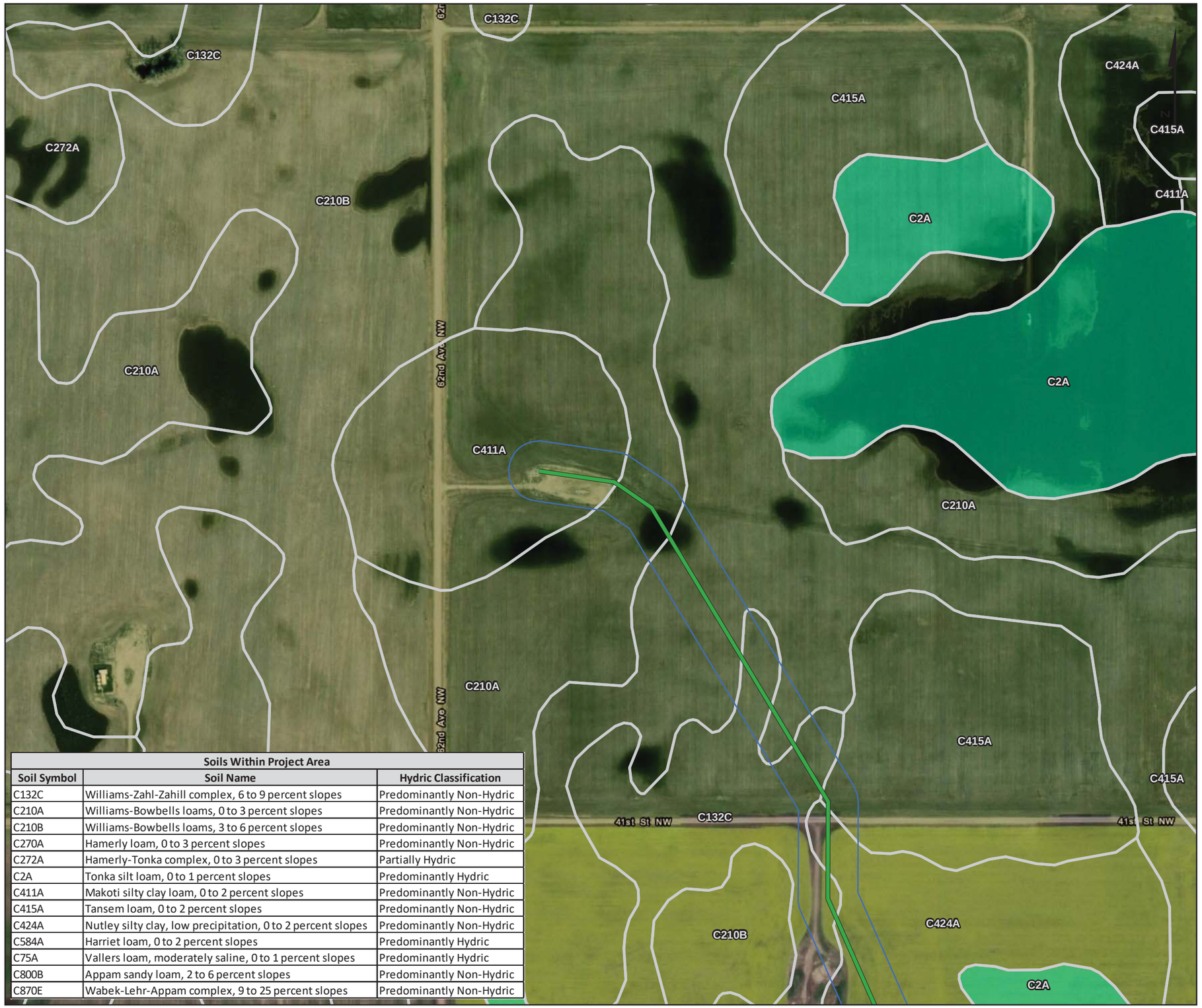
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

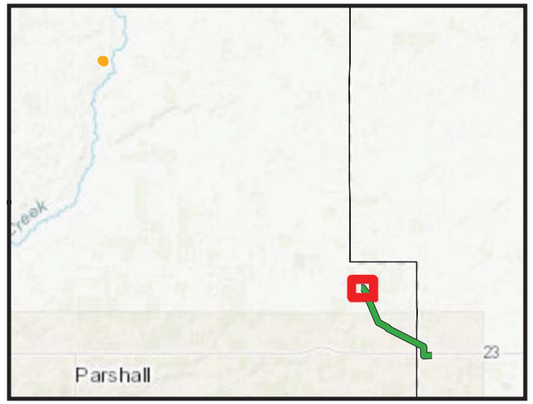
FIGURE 4-5
NRCS SOILS MAP

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Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04_NRCS_Soils.mxd





Legend

- TB to Plaza Route, Proposed
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

Soils Within Project Area

Soil Symbol	Soil Name	Hydric Classification
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Predominantly Non-Hydric
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Predominantly Non-Hydric
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C270A	Hamerly loam, 0 to 3 percent slopes	Predominantly Non-Hydric
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Partially Hydric
C2A	Tonka silt loam, 0 to 1 percent slopes	Predominantly Hydric
C411A	Makoti silty clay loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C415A	Tansem loam, 0 to 2 percent slopes	Predominantly Non-Hydric
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Predominantly Non-Hydric
C584A	Harriet loam, 0 to 2 percent slopes	Predominantly Hydric
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	Predominantly Hydric
C800B	Appam sandy loam, 2 to 6 percent slopes	Predominantly Non-Hydric
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Predominantly Non-Hydric

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

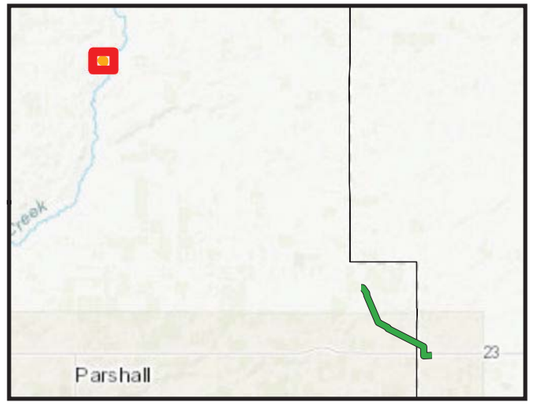
FIGURE 4-6
NRCS SOILS MAP

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Date: 10/8/2018

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Date: 10/8/2018 User Name: mvazquez
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04_NRCS_Soils.mxd





Legend

- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Environmental Survey Area (200 feet)
- Mapped Soil Unit
- Predominantly Hydric Soil

Soils Within Project Area		
Soil Symbol	Soil Name	Hydric Classification
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Predominantly Non-Hydric
C155F	Zahl-Max-Arnegard loams, 15 to 60 percent slopes	Predominantly Non-Hydric

0 250 500 1,000 Feet

NOTES:
1. 2017 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
2. NATURAL RESOURCES CONSERVATION SERVICE (NRCS) SOIL DATA OBTAINED FROM THE WEB SOIL SURVEY https://websoilsurvey.sc.egov.usda.gov

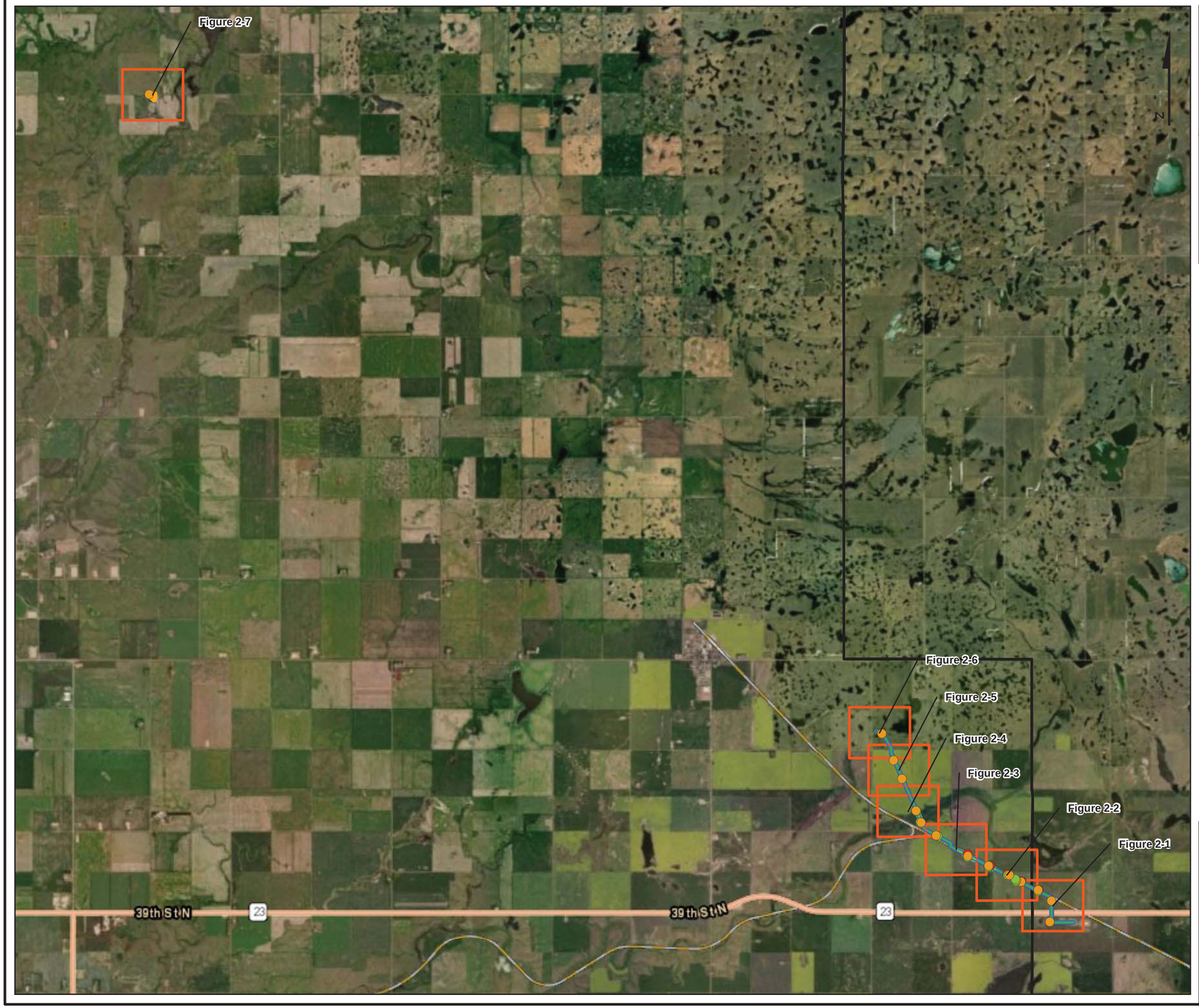
Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

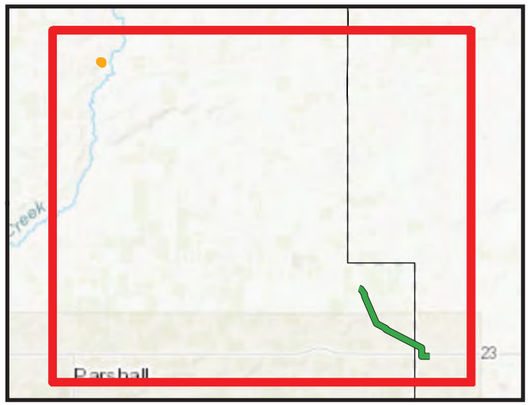
FIGURE 4-7
NRCS SOILS MAP

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Date: 10/8/2018

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Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey Area
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

2500 0 2500 5000
Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

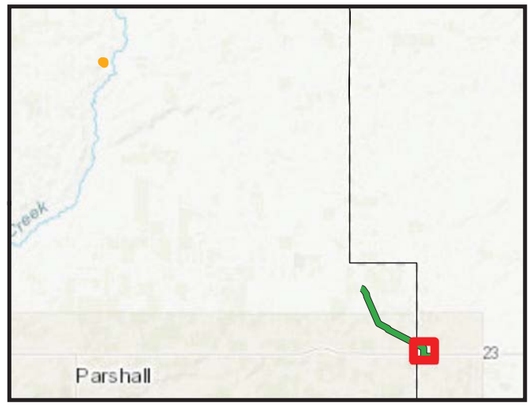
FIGURE 5-0
DELINEATED WETLANDS
AND WATERBODIES

PN:CO002338.0001
Date: 10/8/2018

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Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig05Overview.mxd





Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 5-1
DELINEATED WETLANDS
AND WATERBODIES

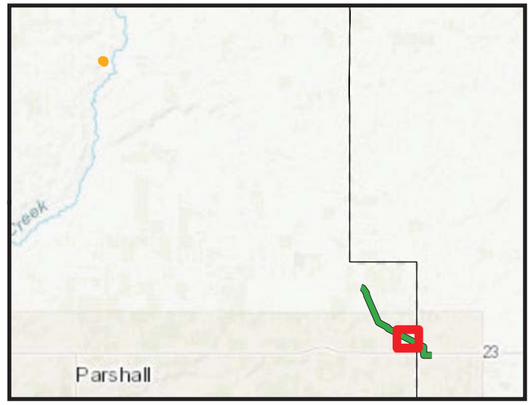
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Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
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Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

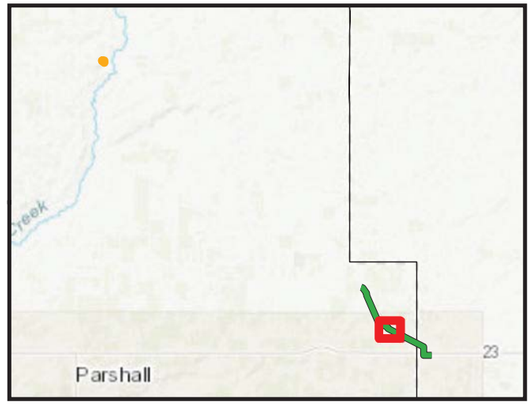
FIGURE 5-2
DELINEATED WETLANDS AND WATERBODIES

PN:CO002338.0001
Date: 10/8/2018

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Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDRFig04.mxd





Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
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Mountrail and Ward
Counties, North Dakota

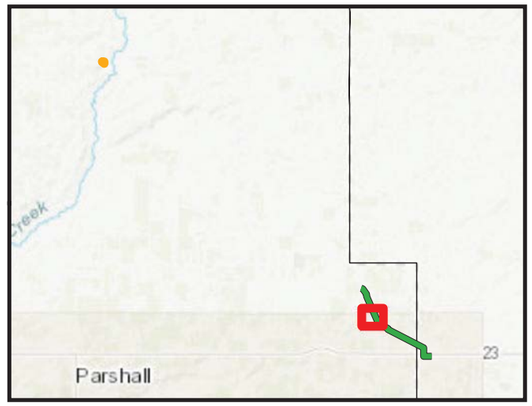
FIGURE 5-3
DELINEATED WETLANDS
AND WATERBODIES

PN:CO002338.0001
Date: 10/8/2018

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Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDRFig04.mxd





Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 5-4
DELINEATED WETLANDS AND WATERBODIES

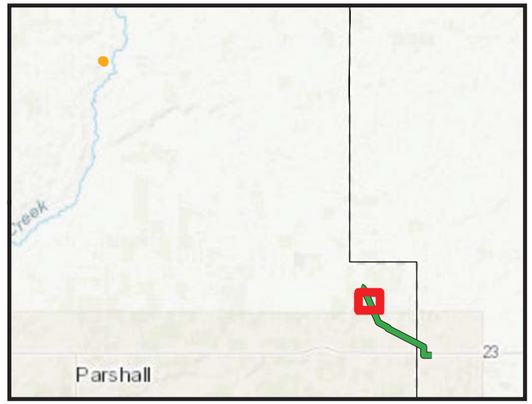
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Date: 10/8/2018

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Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
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Mountrail and Ward
Counties, North Dakota

FIGURE 5-5
DELINEATED WETLANDS
AND WATERBODIES

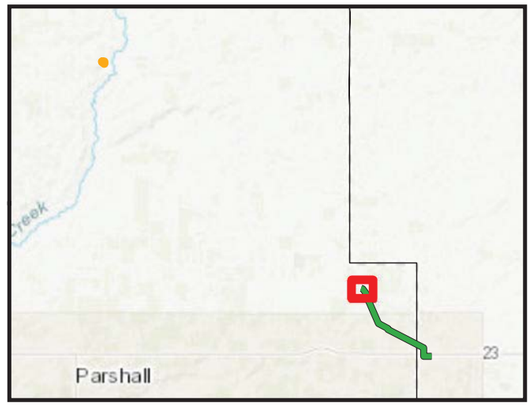
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Date: 10/8/2018 User Name: thahn
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Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte
Pipeline Project
Mountrail and Ward
Counties, North Dakota

FIGURE 5-6
DELINEATED WETLANDS
AND WATERBODIES

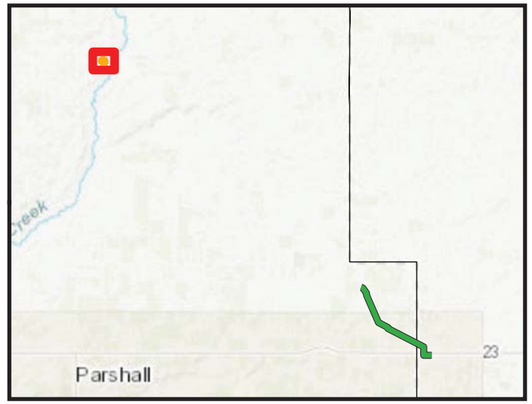
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Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDR\Fig04.mxd





Legend

- Upland
- Wetland
- Culvert Location
- Environmental Survey
- TB to Plaza Route, Proposed
- Midline Pump Station Site #2 Boundary
- Field Delinated Wetland (PEM)
- Field Delineated Wetland Boundary Outside Environmental Survey Area

0 250 500 1,000 Feet

Note:
USGS 7.5' Topographic Quad Belden, Epworth NW, Epworth SE, Makoti, Plaza, Shell Lake, StanleySE, Wabek, ND

Thunder Butte Pipeline Project
Mountrail and Ward Counties, North Dakota

FIGURE 5-7
DELINEATED WETLANDS AND WATERBODIES

PN:CO002338.0001
Date: 10/8/2018

ARCADIS

Date: 10/8/2018 User Name: thahn
Document Path: Z:\GISProjects_ENV\Makoti_pipeline\mxd\WDRFig04.mxd

APPENDIX A

Antecedent Precipitation Tables

Antecedent Precipitation Data					
May 1, 2018 - July 31, 2018					
PLAZA (ND) USC00327120					
3rd Month Prior		**2nd Month Prior**		**1st Month Prior**	
Date	**PPT**	**Date**	**PPT**	**Date**	**PPT**
5/1/2018	0	6/1/2018	0	7/1/2018	0
5/2/2018	0	6/2/2018	1.25	7/2/2018	0
5/3/2018	0	6/3/2018	0	7/3/2018	0.45
5/4/2018	0	6/4/2018	0	7/4/2018	0
5/5/2018	0	6/5/2018	0	7/5/2018	0
5/6/2018	0	6/6/2018	0.4	7/6/2018	0
5/7/2018	0	6/7/2018	0	7/7/2018	0
5/8/2018	0	6/8/2018	0	7/8/2018	0
5/9/2018	0	6/9/2018	0	7/9/2018	0
5/10/2018	0	6/10/2018	1.06	7/10/2018	0.1
5/11/2018	0	6/11/2018	0	7/11/2018	0
5/12/2018	0	6/12/2018	0	7/12/2018	0
5/13/2018	0	6/13/2018	0	7/13/2018	0
5/14/2018	0	6/14/2018	1.35	7/14/2018	0
5/15/2018	0	6/15/2018	0	7/15/2018	0
5/16/2018	0	6/16/2018	0.68	7/16/2018	0
5/17/2018	0	6/17/2018	0	7/17/2018	0
5/18/2018	0	6/18/2018	0	7/18/2018	0
5/19/2018	0	6/19/2018	0	7/19/2018	0
5/20/2018	0	6/20/2018	0	7/20/2018	0
5/21/2018	0	6/21/2018	0	7/21/2018	0
5/22/2018	0	6/22/2018	0	7/22/2018	0
5/23/2018	0	6/23/2018	0	7/23/2018	0
5/24/2018	0.18	6/24/2018	0	7/24/2018	0
5/25/2018	0	6/25/2018	0.6	7/25/2018	0
5/26/2018	0	6/26/2018	0	7/26/2018	0
5/27/2018	0.5	6/27/2018	0	7/27/2018	0
5/28/2018	0	6/28/2018	M	7/28/2018	0
5/29/2018	0	6/29/2018	0.95	7/29/2018	0
5/30/2018	1.4	6/30/2018	0.15	7/30/2018	0
5/31/2018	0.1			7/31/2018	0
Total =	**2.18**	**Total =**	**6.44**	**Total =**	**0.55**

PPT - Precipitation in inches

T - Trace

WETS Analysis

Project Site: Makoti Pipeline
Period of interest: May 1, 2018 to July 31, 2018
County: Mountrail County, ND

Long-term rainfall records (from WETS table)

	Month	3 years in 10 less than	Normal	3 years in 10 greater than
1st month prior:	July	1.87	2.98	3.59
2nd month prior:	June	2.72	4.01	4.79
3rd month prior:	May	1.68	2.69	3.25
		Sum =	**9.68**	

Site determination

	Site Rainfall (in)	Condition Dry/Normal*/Wet	Condition** Value	Month Weight	Product
	0.55	Dry	1	3	3
	6.44	Wet	3	2	6
	2.18	Normal	2	1	2
Sum =	**9.17**			Sum*** =	**11**

*Normal precipitation with 30% to 70% probability of occurrence

**Condition value:

Dry = 1
Normal = 2
Wet = 3

***If sum is:

6 to 9	then period has been drier than normal
10 to 14	then period has been normal
15 to 18	then period has been wetter than normal

Determination:

	Wet
	Dry
X	**Normal**

Precipitation data source: PLAZA (ND) USC00327120

WETS Station: STANLEY 3 NNW, ND

Reference: Donald E. Woodward, ed. 1997. *Hydrology Tools for Wetland Determination* , Chapter 19. Engineering Field Handbook. U.S. Department of Agriculture, Natural Resources Conservation Service, Fort Worth, TX.

APPENDIX B

Representative Photographs

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota



Photo: 1

Date: 8/7/2018

Description:
Upland data point OBDP01 within a stormwater basin (facing south).

Location:
OBDP01



Photo: 2

Date: 8/7/2018

Description:
Upland data point OBDP02 (facing north).

Location:
OBDP02

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota



Photo: 3

Date: 8/7/2018

Description:
Wetland W1 and representative data point W01DP01 (facing west).

Location:
W01DP01



Photo: 4

Date: 8/7/2018

Description:
Upland data point W01DP02 (facing east).

Location:
W01DP02

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota



Photo: 5

Date: 8/7/2018

Description:
Wetland W2 and representative wetland data point W02DP01. Facing west

Location:
W02DP01



Photo: 6

Date: 8/7/2018

Description:
Representative upland data point W02DP02 (facing West).

Location:
W02DP02

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota



Photo: 7

Date: 8/7/2018

Description:
Wetland W3 and representative data point W03DP01 (facing west).

Location:
W03DP01



Photo: 8

Date: 8/7/2018

Description:
Upland data point W03DO02, representative upland data point for wetlands W3 and W4 (facing west).

Location:
W03DP02

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota



Photo: 9

Date: 8/7/2018

Description:
Wetland W4 and representative wetland data point W04DP01 (facing south)

Location:
W04DP01



Photo: 10

Date: 8/7/2018

Description:
Wetland W5 and representative wetland data point W05DP01 (facing west).

Location:
W05DP01

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota



Photo: 11

Date: 8/7/2018

Description:
Representative upland data point W05DP02 (facing east).

Location:
W05DP02



Photo: 12

Date: 8/7/2018

Description:
Wetland W6 and representative wetland data point W06DP01 (facing east).

Location:
W06DP01

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota



Photo: 13

Date: 8/7/2018

Description:
Upland data point W06DP02 (Facing north).

Location:
W06DP02



Photo: 14

Date: 8/7/2018

Description:
Wetland W7 and representative wetland data point W07DP01 (facing east)

Location:
W07DP01

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota



Photo: 15

Date: 8/7/2018

Description:
Upland data point W07DP02 (facing north).

Location:
W07DP02



Photo: 16

Date: 8/7/2018

Description:
Wetland W8 and representative wetland data point W08DP01 (facing north).

Location:
W08DP01

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota



Photo: 17

Date: 8/7/2018

Description:
Upland data point W08DP02 (facing north).

Location:
W08DP02



Photo: 18

Date: 8/7/2018

Description:
Wetland W9 and representative wetland data point W09DP01 (facing north)

Location:
W09DP01

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota



Photo: 19

Date: 8/7/2018

Description:
Upland data point W09DP02 (facing south).

Location:
W09DP02



Photo: 20

Date: 8/7/2018

Description:
Wetland W9 and representative wetland data point W09DP03 (facing south).

Location:
W09DP03

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota



Photo: 21

Date: 8/7/2018

Description:
Upland data point W09DP04 (facing north).

Location:
W09DP04



Photo: 22

Date: 8/7/2018

Description:
Upland data point OBDP03 located within a mapped NWI wetland PEM1A (facing east).

Location:
OBDP03

Project Photographs

Thunder Butte Pipeline Project
Representative Photographs
Ward and Mountrail County, North Dakota



Photo: 23

Date: 8/7/2018

Description:
Upland data point OBDP04 located within a mapped NWI wetland PEM1A (facing east).

Location:
OBDP04



Photo: 24

Date: 8/7/2018

Description:
Upland data point OBDP05 (facing south).

Location:
OBDP05

APPENDIX C

Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: OBDP01

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R87W, Section 19

Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.97605219 | Long: -101.8668214 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells Loams (3 to 6 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Sample point located in a constructed stormwater basin that is actively mowed. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Elymus repens*	60	Y	FACU
2 *Poa pratensis*	30	Y	FACU
3 *Melilotus officinalis*	15	N	FACU
4			
5			
6			
7			
8			
9			
10			
	105 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	105	x 4 =	420
UPL species	0	x 5 =	0
Column totals	105 (A)		420 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The data point located within a stormwater basin that is actively mowed. Representative vegetation was recorded at a reference location approximately 180 feet north of the data point. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: OBDP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-5	10YR 2/2	100					Silt Loam	
5-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____

Water table present? Yes ____ No X Depth (inches): ____

Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: OBDP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R87W, Section 19

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 2-4%

Subregion (LRR): F | Lat: 47.97982993 | Long: -101.8663736 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells Loams (3 to 6 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Data point located in a hay field. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	90	Y	UPL
2 *Elymus repens*	10	N	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	90	x 5 =	450
Column totals	100 (A)		490 (B)

Prevalence Index = B/A = 4.90

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: OBDP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/2	100					Silt Loam	
4-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes	____	No	X	Depth (inches):	____
Water table present?	Yes	____	No	X	Depth (inches):	____
Saturation present? (includes capillary fringe)	Yes	____	No	X	Depth (inches):	____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W01DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R87W, Section 18

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.98159258 | Long: -101.8699723 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells Loams (3 to 6 percent slopes) | NWI Classification: PEM1Cd

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W01

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Phalaris arundinacea*	100	Y	FACW
2 *Sonchus oleraceus*	3	N	UPL
3 *Sonchus asper*	3	N	FAC
4 *Cirsium arvense*	3	N	FACU
5			
6			
7			
8			
9			
10			
	109	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	3	x 3 =	9
FACU species	3	x 4 =	12
UPL species	3	x 5 =	15
Column totals	109 (A)		236 (B)

Prevalence Index = B/A = 2.17

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W01DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-20	10YR 2/1	95	10YR 4/6	5	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W01DP02

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R87W, Section 18

PWS Landform (hillslope, terrace, etc.): Shoulder | Local relief (concave, convex, none): Convex | Slope (%): 5-Mar

Subregion (LRR): F | Lat: 47.98171766 | Long: -101.8699476 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells Loams (3 to 6 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present? ____	
Hydric soil present? ____	**Is the sampled area within a wetland?** No
Indicators of wetland hydrology present? N	If yes, optional wetland site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Elymus repens*	40	Y	FACU
2 *Elymus virginicus*	40	Y	FAC
3 *Cirsium arvense*	25	Y	FACU
4 *Bromus inermis*	10	N	UPL
5 *Sonchus oleraceus*	5	N	UPL
6			
7			
8			
9			
10			
	120 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 33.33% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	40	x 3 =	120
FACU species	65	x 4 =	260
UPL species	15	x 5 =	75
Column totals	120 (A)		455 (B)

Prevalence Index = B/A = 3.79

Hydrophytic Vegetation Indicators:

____ Rapid test for hydrophytic vegetation

____ Dominance test is >50%

____ Prevalence index is ≤3.0*

____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W01DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/2	100					Silt Loam	
8-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes	____	No	X	Depth (inches):	____
Water table present?	Yes	____	No	X	Depth (inches):	____
Saturation present? (includes capillary fringe)	Yes	____	No	X	Depth (inches):	____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W02DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.98310165 | Long: -101.8744484 | Datum: WGS84

Soil Map Unit Name: Hamerly loam (0 to 3 percent slopes) | NWI Classification: PEM1Cx, PEM1Ad

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W02

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Hordeum jubatum*	90	Y	FACW
2 *Melilotus officinalis*	5	N	FACU
3 *Sonchus asper*	5	N	FAC
4			
5			
6			
7			
8			
9			
10			
	100	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	90	x 2 =	180	
FAC species	5	x 3 =	15	
FACU species	5	x 4 =	20	
UPL species	0	x 5 =	0	
Column totals	100	(A)	215	(B)

Prevalence Index = B/A = 2.15

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W02DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-20	10YR 2/1	97	10YR 4/4	3	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W02DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 13

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%):

Subregion (LRR): F | Lat: 47.98320827 | Long: -101.8745875 | Datum: WGS84

Soil Map Unit Name: Hamerly loam (0 to 3 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation , soil , or hydrology significantly disturbed?

Are vegetation , soil , or hydrology naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Elymus repens*	80	Y	FACU
2 *Melilotus officinalis*	25	N	FACU
3 *Bromus inermis*	10	N	UPL
4 *Cirsium arvense*	10	N	FACU
5 *Sonchus oleraceus*	10	N	UPL
6			
7			
8			
9			
10			
	135	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	115	x 4 =	460	
UPL species	20	x 5 =	100	
Column totals	135	(A)	560	(B)

Prevalence Index = B/A = 4.15

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W02DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-17	10YR 2/1	100					Silt Loam	
17-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____

Water table present? Yes ____ No X Depth (inches): ____

Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W03DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-1

Subregion (LRR): F | Lat: 47.98326846 | Long: -101.8759252 | Datum: WGS 84

Soil Map Unit Name: Hamerly Tonka Complex (0 to 3 percent slopes) | NWI Classification: PEM1Ad

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W03

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Phalaris arundinacea*	100	Y	FACW
2 *Typha angustifolia*	10	N	OBL
3 *Scirpus cyperinus*	3	N	OBL
4			
5			
6			
7			
8			
9			
10			
	113 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	13	x 1 =	13
FACW species	100	x 2 =	200
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column totals	113 (A)		213 (B)

Prevalence Index = B/A = 1.88

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W03DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/1	100					Silt Loam	
6-12	120YR 2/1	98	10YR 4/6	2	C	M	Silt Loam	
12-20	10YR 2/1	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:
The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
X FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____

Water table present? Yes ____ No X Depth (inches): ____

Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W03DP02

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Summit | Local relief (concave, convex, none): Convex | Slope (%): 0-1

Subregion (LRR): F | Lat: 47.98350686 | Long: -101.8758045 | Datum: WGS84

Soil Map Unit Name: Hamerly Tonka Complex (0 to 3 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland. The data point is the representative upland data point for wetlands W03 and W04.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Melilotus officinalis*	60	Y	FACU
2 *Elymus repens*	30	Y	FACU
3 *Cirsium arvense*	20	N	FACU
4 *Hordeum jubatum*	5	N	FACW
5			
6			
7			
8			
9			
10			
	115	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	5	x 2 =	10	
FAC species	0	x 3 =	0	
FACU species	110	x 4 =	440	
UPL species	0	x 5 =	0	
Column totals	115	(A)	450	(B)

Prevalence Index = B/A = 3.91

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W03DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-18	10YR 2/2	100					Silt Loam	
18-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W04DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.98365946 | Long: -101.8760945 | Datum:

Soil Map Unit Name: Hamerly Tonka Complex (0 to 3 percent slopes) | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	YES
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W04

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Phalaris arundinacea*	100	Y	FACW
2			
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	100	x 2 =	200	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column totals	100	(A)	200	(B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W04DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-20	10YR 2/1	85	10YR 4/6	15	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W05DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.98441539 | Long: -101.8781437 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (0 to 3 percent slopes) | NWI Classification: PEM1C

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	YES
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W05

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Phalaris arundinacea*	100	Y	FACW
2 *Sonchus oleraceus*	5	N	UPL
3 *Melilotus officinalis*	5	N	FACU
4			
5			
6			
7			
8			
9			
10			
	110	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	5	x 5 =	25
Column totals	110 (A)		245 (B)

Prevalence Index = B/A = 2.23

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W05DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-5	10YR 2/1	100					Silt Loam	
5-20	10YR 2/1	90	10YR 4/6	10	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W05DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 13

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 4-Feb

Subregion (LRR): F | Lat: 47.98433642 | Long: -101.8776857 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (0 to 3 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	NO
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Elymus repens*	40	Y	FACU
2 *Elymus virginicus*	30	Y	FAC
3 *Bromus inermis*	30	Y	UPL
4 *Melilotus officinalis*	20	N	FACU
5 *Cirsium arvense*	10	N	FACU
6			
7			
8			
9			
10			
	130	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 33.33% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	30	x 3 =	90	
FACU species	70	x 4 =	280	
UPL species	30	x 5 =	150	
Column totals	130	(A)	520	(B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W05DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-15	10YR 2/1	100					Silt Loam	
15-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____

Water table present? Yes ____ No X Depth (inches): ____

Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W06DP01

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.98585047 | Long: -101.8832666 | Datum: WGS84

Soil Map Unit Name: Tonka silt loam (0 to 1 percent slopes) | NWI Classification: PEM1C

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	YES
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W06

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Echinochloa crus-galli*	60	Y	FAC
2 *Typha angustifolia*	30	Y	OBL
3 *Alisma subcordatum*	20	N	OBL
4 *Schoenoplectus tabernaemontani*	10	N	OBL
5 *Sonchus oleraceus*	10	N	UPL
6			
7			
8			
9			
10			
	130	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	60	x 1 =	60	
FACW species	0	x 2 =	0	
FAC species	60	x 3 =	180	
FACU species	0	x 4 =	0	
UPL species	10	x 5 =	50	
Column totals	130	(A)	290	(B)

Prevalence Index = B/A = 2.23

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W06DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-12	10YR 2/1	98	10YR 4/4	2	C	PL/M	Silt Loam	
12-20	10YR 2/1	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline | State: North Dakota | Sampling Point: W06DP02

Line, LLC Investigator(s): Stephen W. Chu, | Section, Township, Range: T152N, R88W, Section 13

PWS Landform (hillslope, terrace, etc.): Shoulder | Local relief (concave, convex, none): Convex | Slope (%): 1-3

Subregion (LRR): F | Lat: 47.98602342 | Long: -101.8832301 | Datum: WGS84

Soil Map Unit Name: Tonka silt loam (0 to 1 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	NO
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Sonchus oleraceus*	80	Y	UPL
2 *Medicago sativa*	30	Y	UPL
3			
4			
5			
6			
7			
8			
9			
10			
	110 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	110	x 5 =	550	
Column totals	110	(A)	550	(B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W06DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/1	100					Silt Loam	
8-16	10YR 2/2	100					Silt Loam	
16-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W07DP01

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 13

Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-1

Subregion (LRR): F | Lat: 47.98765022 | Long: -101.8889406 | Datum: WGS84

Soil Map Unit Name: Tonka silt loam (0 to 1 percent slopes), Williams-Bowbells loams (3 to 6 percent slopes) | NWI Classification: PEM1A, PEM1C

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	YES
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W07

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Typha latifolia*	60	Y	OBL
2 *Hordeum jubatum*	20	Y	FACW
3 *Helianthus grosseserratus*	10	N	FACW
4 *Juncus effusus*	10	N	OBL
5			
6			
7			
8			
9			
10			
	100	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	70	x 1 =	70	
FACW species	30	x 2 =	60	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column totals	100	(A)	130	(B)

Prevalence Index = B/A = 1.30

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W07DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-3	10YR 2/1	100					Silt Loam	
3-20	10YR 2/1	95	10YR 4/6	5	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W07DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 13

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 1-2

Subregion (LRR): F | Lat: 47.98780184 | Long: -101.8887884 | Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes (C132C) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	NO
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)
Data point located in an agriculture field currently farmed for lentils (*Lens culinaris*). A reference location was utilized for determining unmanged vegetation condition. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Elymus repens*	75	Y	FACU
2 *Sonchus oleraceus*	25	Y	UPL
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	75	x 4 =	300	
UPL species	25	x 5 =	125	
Column totals	100	(A)	425	(B)

Prevalence Index = B/A = 4.25

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)
Data point located in an agriculture field currently farmed for lentils (*Lens culinaris*). A refernce location approximately 100 feet north was utilized to determine unmanaged condition of vegetation.

SOIL

Sampling Point: W07DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/1	100					Silt Loam	
6-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W08DP01

Investigator(s): Stephen W. Chu. PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): 0-1

Subregion (LRR): F | Lat: 47.99142408 | Long: -101.8968711 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (3 to 6 percent slopes) | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W08

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	

Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size: 5')			
1 *Echinochloa crus-galli*	25	Y	FAC
2			
3			
4			
5			
6			
7			
8			
9			
10			
	25	= Total Cover	

Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column totals	25 (A)		75 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Unvegetated concave surface.The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W08DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-20	10YR 2/1	95	10YR 4/4	5	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W08DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Shoulder | Local relief (concave, convex, none): Convex | Slope (%): 1-2

Subregion (LRR): F | Lat: 47.99149797 | Long: -101.8973578 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (3 to 6 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)
Data point located in an agriculture field, currently farmed for lentils (*Lens culinaris*). A reference location was utilized to determine the unmanged condition of vegetation. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	95	Y	UPL
2 *Sonchus oleraceus*	15	N	UPL
3			
4			
5			
6			
7			
8			
9			
10			
	110	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	110	x 5 =	550
Column totals	110 (A)		550 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)
Data point located in an agriculture field, currently farmed for lentils (*Lens culinaris*). A reference location, approximately 60 feet south of the data point, was utilized to determine the unmanged condition of vegetation. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W08DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-4	10YR 2/1	100					Silt Loam	
4-18	10YR 2/2	100					Silt Loam	
18-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W09DP01

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concave | Slope (%): 0-1

Subregion (LRR): F | Lat: 47.99392793 | Long: -101.9016233 | Datum:

Soil Map Unit Name: Vallers loam, moderately saline (0 to 1 percent slope) | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W09

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Typha latifolia*	50	Y	OBL
2 *Phalaris arundinacea*	40	Y	FACW
3 *Cirsium arvense*	20	N	FACU
4 *Schoenoplectus tabernaemontani*	5	N	OBL
5 *Heracleum maximum*	5	N	FAC
6			
7			
8			
9			
10			
	120	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	55	x 1 =	55	
FACW species	40	x 2 =	80	
FAC species	5	x 3 =	15	
FACU species	20	x 4 =	80	
UPL species	0	x 5 =	0	
Column totals	120	(A)	230	(B)

Prevalence Index = B/A = 1.92

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W09DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/1	100					Silt Loam	
6-20	10YR 2/1	90	10YR 4/6	10	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W09DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 1-2

Subregion (LRR): F | Lat: 47.99377312 | Long: -101.9013401 | Datum: WGS84

Soil Map Unit Name: Wabek-Lehr-Appam complex(9 to 25 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	75	Y	UPL
2 *Cirsium arvense*	25	Y	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	25	x 4 =	100	
UPL species	75	x 5 =	375	
Column totals	100	(A)	475	(B)

Prevalence Index = B/A = 4.75

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W09DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/1	100					Silt Loam	
8-15	10YR 2/2	100					Silt Loam	
15-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____

Water table present? Yes ____ No X Depth (inches): ____

Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W09DP03

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Concane | Slope (%): 0-2

Subregion (LRR): F | Lat: 47.99578757 | Long: -101.9025466 | Datum: WGS84

Soil Map Unit Name: Harriet loam (0 to 2 percent slopes) | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?	Y	If yes, optional wetland site ID:	W09

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the presence of all three parameters, this area is a wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Spartina pectinata*	80	Y	FACW
2 *Hordeum jubatum*	25	Y	FACW
3 *Sonchus oleraceus*	5	N	UPL
4			
5			
6			
7			
8			
9			
10			
	110	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	105	x 2 =	210
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column totals	110 (A)		235 (B)

Prevalence Index = B/A = 2.14

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

X Dominance test is >50%

X Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W09DP03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-2	10YR 2/1	100					Silt Loam	
2-20	10YR 2/1	98	10YR 4/4	2	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
X FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____

Water table present? Yes ____ No X Depth (inches): ____

Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W09DP04

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 1-3

Subregion (LRR): F | Lat: 47.99596295 | Long: -101.9027162 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (3 to 6 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0	= Total Cover	
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: 5')			
1 *Cirsium arvense*	90	Y	FACU
2 *Poa pratensis*	30	Y	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	120	= Total Cover	
Woody vine stratum (Plot size: 30')			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	120	x 4 =	480
UPL species	0	x 5 =	0
Column totals	120 (A)		480 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W09DP04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-9	10YR 2/1	100					Silt Loam	
9-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____

Water table present? Yes ____ No X Depth (inches): ____

Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: OBDP03

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 2-4%

Subregion (LRR): F | Lat: 48.001867° | Long: -101.906264° | Datum: WGS84

Soil Map Unit Name: Williams-Zahl-Zahill complex, 6 to 9 percent slopes | NWI Classification: PEM1Ad

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Data point located in a hay field, with vegetation recently harvested. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	60	Y	UPL
2 *Elymus repens*	40	Y	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	40	x 4 =	160
UPL species	60	x 5 =	300
Column totals	100 (A)		460 (B)

Prevalence Index = B/A = 4.60

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

Harvested vegetation was still identifiable during the site observation. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: OBDP03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/2	100					Silt Loam	
8-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____
Water table present? Yes ____ No X Depth (inches): ____
Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: OBDP04

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 11

Landform (hillslope, terrace, etc.): Backslope | Local relief (concave, convex, none): Convex | Slope (%): 2-4%

Subregion (LRR): F | Lat: 48.005308° | Long: -101.908983° | Datum: WGS84

Soil Map Unit Name: Minot silty clay, 0 to 2 percent slopes | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Data point located in a hay field, with vegetation recently harvested. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	70	Y	UPL
2 *Elymus repens*	30	Y	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	30	x 4 =	120
UPL species	70	x 5 =	350
Column totals	100 (A)		470 (B)

Prevalence Index = B/A = 4.70

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

Harvested vegetation was still identifiable during the site observation. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: OBDP04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/2	100					Silt Loam	
6-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present? Yes ____ No X Depth (inches): ____

Water table present? Yes ____ No X Depth (inches): ____

Saturation present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W10DP01

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 02

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): 0-1

Subregion (LRR): F | Lat: 48.0097522 | Long: -101.9117429 | Datum:

Soil Map Unit Name: Williams-Bowbells loams (0 to 3 percent slopes) | NWI Classification: PEM1A

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation X, soil , or hydrology significantly disturbed?

Are vegetation , soil , or hydrology naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Yes
Indicators of wetland hydrology present?		If yes, optional wetland site ID:	W10

Remarks: (Explain alternative procedures here or in a separate report.)
Data point located in an agriculture field currently under a soy bean (*Glycine max*) rotation. Based on the presence of all three parameters, this area is a wetland. The subject wetland is a farmed wetland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Echinochloa crus-galli*	70	Y	FAC
2 *Hordeum jubatum*	25	Y	FACW
3			
4			
5			
6			
7			
8			
9			
10			
	95 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	70	x 3 =	210
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column totals	95 (A)		260 (B)

Prevalence Index = B/A = 2.74

Hydrophytic Vegetation Indicators:

- Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)
The criterion for hydrophytic vegetation is met.

SOIL

Sampling Point: W10DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/1	100					Silt Loam	
8-20	10YR 2/1	95	10YR 4/6	5	C	M	Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)(**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F,G,H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

The criterion for hydric soil is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? ___

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:

The criterion for wetland hydrology is met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Mountrail County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: W10DP02

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T152N, R88W, Section 02

Landform (hillslope, terrace, etc.): Summit | Local relief (concave, convex, none): None | Slope (%): 0

Subregion (LRR): F | Lat: 48.00984974 | Long: -101.9118519 | Datum: WGS84

Soil Map Unit Name: Williams-Bowbells loams (0 to 3 percent slopes) | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation X, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? No

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)
Data point located in an agriculture field currently under a soy bean (Glycine max) rotation. A reference location was utilized to determine the unmanaged condition of the vegetation. Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	90	Y	UPL
2 *Taraxacum officinale*	5	N	FACU
3 *Setaria pumila*	5	N	FACU
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	90	x 5 =	450
Column totals	100 (A)		490 (B)

Prevalence Index = B/A = 4.90

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)
Data point located in an agriculture field currently under a soy bean (Glycine max) rotation. A reference location, approximately 50 feet northwest of the data point, was utilized to determine the unmanaged condition of the vegetation. The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: W10DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-10	10YR 2/1	100					Silt Loam	
10-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes	____	No	X	Depth (inches):	____
Water table present?	Yes	____	No	X	Depth (inches):	____
Saturation present? (includes capillary fringe)	Yes	____	No	X	Depth (inches):	____

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Thunder Butte Pipeline Project | City/County: Ward County | Sampling Date: 8/7/2018

Applicant/Owner: Thunder Butte Pipeline Line, LLC | State: North Dakota | Sampling Point: OBDP05

Investigator(s): Stephen W. Chu, PWS | Section, Township, Range: T154N, R89W, Section 34

Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): Convex | Slope (%): 3-Jan

Subregion (LRR): F | Lat: 48.124224° | Long: -102.108232° | Datum: WGS84

Soil Map Unit Name: Zahl-Max-Arnegard loams, 15 to 60 percent slopes | NWI Classification: None

Are climatic/hydrologic conditions of the site typical for this time of the year? Y (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed?

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? Are "normal circumstances" present? Yes

SUMMARY OF FINDINGS (If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	No
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

Based on the absence of all three parameters, this area is an upland.

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species	Indicator Staus
1			
2			
3			
4			
5			
	0 = Total Cover		
Sapling/Shrub stratum (Plot size: 15')			
1			
2			
3			
4			
5			
	0 = Total Cover		
Herb stratum (Plot size: 5')			
1 *Bromus inermis*	90	Y	UPL
2 *Poa pratensis*	20	N	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	110 = Total Cover		
Woody vine stratum (Plot size: 30')			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	20	x 4 =	80
UPL species	90	x 5 =	450
Column totals	110 (A)		530 (B)

Prevalence Index = B/A = 4.82

Hydrophytic Vegetation Indicators:

___ Rapid test for hydrophytic vegetation

___ Dominance test is >50%

___ Prevalence index is ≤3.0*

___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

The criterion for hydrophytic vegetation is not met.

SOIL

Sampling Point: OBDP05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-14	10YR 2/2	100					Silt Loam	
14-20	10YR 4/3	100					Silt Loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)(**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72, 73 of LRRH**)

Indicators for Problematic Hydric Soils:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F,G,H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (LRRH outside MLRA 72,73)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: None

Depth (inches):

Hydric soil present? N

Remarks:
The criterion for hydric soil is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (where not tiled)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (where tiled)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface water present?	Yes		No	X	Depth (inches):	
Water table present?	Yes		No	X	Depth (inches):	
Saturation present? (includes capillary fringe)	Yes		No	X	Depth (inches):	

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

USGS Topo maps, NRCS Soils map, NWI map, and aerial imagery.

Remarks:
The criterion for wetland hydrology is not met. Based on WETS analysis, antecedent hydrologic conditions are within a normal range.

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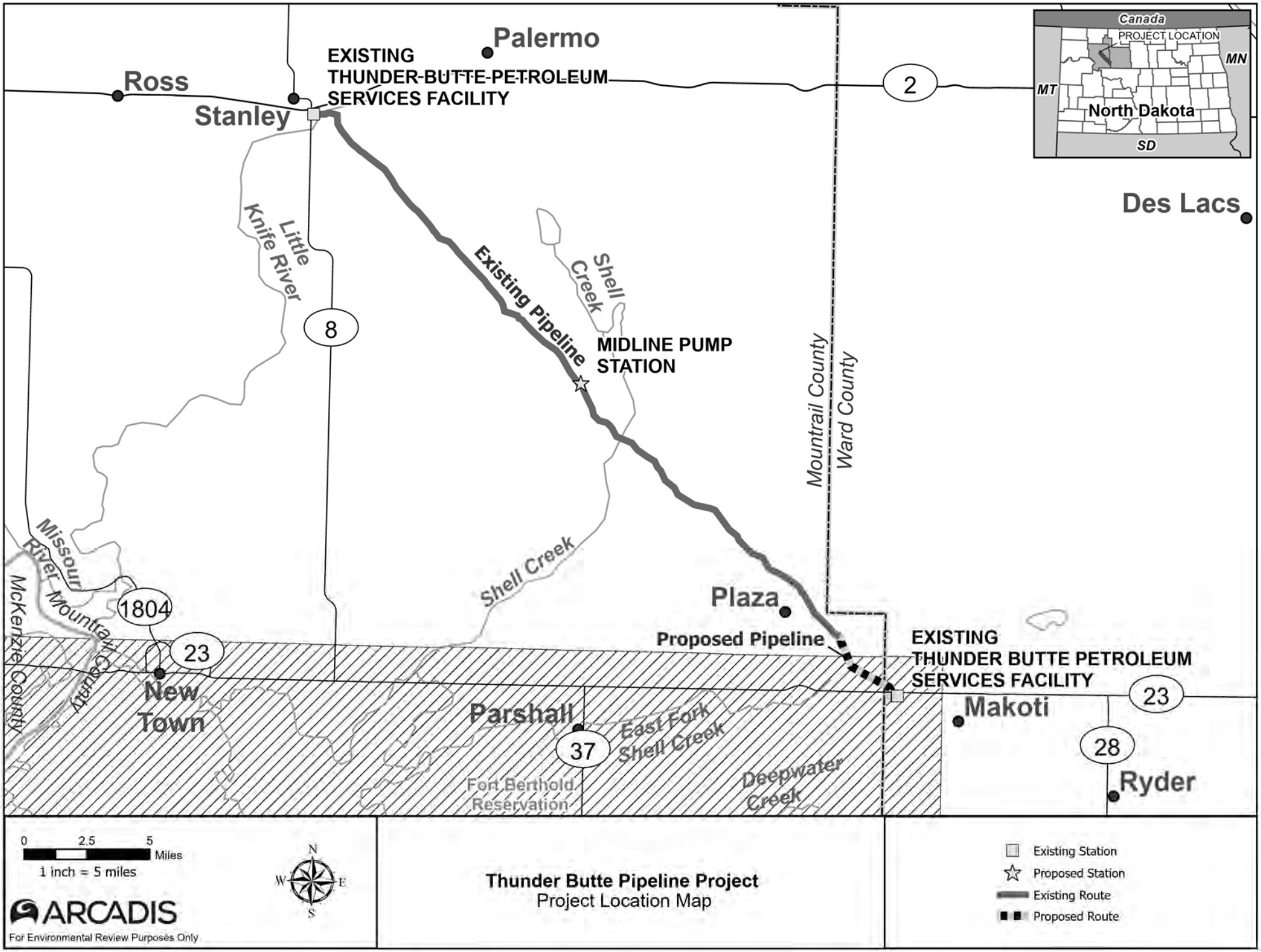
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Appendix

Cultural Resources Report

Appendix G

Black and White Project Location Map


Palermo
EXISTING
THUNDER-BUTTE-PETROLEUM
SERVICES FACILITY
Ross
Stanley
2
Canada
PROJECT LOCATION
MN
MT
North Dakota
SD
Des Lacs
Little
Knife River
Shell
Creek
Existing Pipeline
8
MIDLINE PUMP
STATION
Mountrail County
Ward County
Missouri
River
Mountrail
County
McKenzie County
1804
23
Shell Creek
Plaza
Proposed Pipeline
EXISTING
THUNDER BUTTE PETROLEUM
SERVICES FACILITY
New
Town
Parshall
37
East Fork
Shell Creek
Fort Berthold
Reservation
Deepwater
Creek
Makoti
23
28
Ryder
0
2.5
5
Miles
1 inch = 5 miles
N
W
E
S
ARCADIS
For Environmental Review Purposes Only
Thunder Butte Pipeline Project
Project Location Map
Existing Station
Proposed Station
Existing Route
Proposed Route

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