



North Dakota Public Service Commission Consolidated Application

Certificate of Corridor Compatibility and Route Permit

Little Muddy Creek Pipeline & Epping Station Project

Prepared for:

Meadowlark Midstream Company, LLC &

Epping Transmission Company, LLC

Prepared by:

E3 Environmental, L.L.C.

October 2014



E3 ENVIRONMENTAL
Enhancing Execution with Experience



North Dakota Public Service Commission

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INTRODUCTION

Meadowlark Midstream Company, LLC (MMC) and Epping Transmission Company, LLC (ETC) are wholly owned subsidiaries of Summit Midstream Partners, LLC (Summit). Summit, through its subsidiaries, owns and operates crude oil and gas assets throughout North Dakota. Jointly MMC and ETC are proposing the Little Muddy Creek Pipeline and Epping Station Project (Project.) The Project will include the expansion of the existing Epping Station (ES), which is currently operated by MMC, and the construction of the Little Muddy Creek Pipeline (Pipeline), which will be constructed and operated by ETC. The Pipeline would be approximately 14 miles in length and would transport crude oil from MMC's ES, located near the city of Epping in Williams County, to North Dakota Pipeline Company LLC's Little Muddy Creek Station (LMCS), which is located approximately 10 miles northwest of Epping in Williams County.

Prior to commencement of this Project, approximately 10 miles of the proposed 14-mile transmission line will be operated as a gathering pipeline. The gathering pipeline is needed to fulfill existing commitments with area producers. The gathering pipeline gathers crude oil directly from the wellhead and delivers it to the ES. This Project would involve modifications to the 10-mile gathering pipeline. Modifications would include the reversal of the direction of the flow and the connection of the gathering pipeline to the newly constructed transmission pipeline. The new transmission pipeline would be approximately 4-miles in length and would connect the modified and reversed gathering pipeline to the LMCS.

The proposed Project will also include the construction of one additional above ground tank at the existing ES. This tank will provide surge protection for, storage associated with, and general support for, the proposed Pipeline. Currently there is one existing aboveground tank at the ES which is used for storage for the gathering lines.

MMC/ETC jointly submit to the North Dakota Public Service Commission (PSC) a single consolidated application for a Certificate of Corridor Compatibility and Route Permit for the Project.

The application provides the information required by:

- North Dakota Century Code, Energy Conversion and Transmission Facility Siting Act, Chapter 49-22-08; and
- North Dakota Administrative Code, Article 69-06-05, Transmission Facility Permit.

SECTION 1: DESCRIPTION

1.1 TYPE AND SIZE OF FACILITY

1.1.1 TYPE

The proposed Project would result in a new crude oil transmission pipeline, comprised of both converted gathering lines and new construction, and expansion of the existing ES. The steel pipeline will meet U.S. Department of Transportation (DOT) regulations, specifically the design criteria outlined in 49 CFR 195.100, constructed per 49 CFR 195.200 operated and maintained per 49 CFR 195.400. The new tank will be constructed to meet DOT regulations and API 650 Standards.

1.1.2 SIZE

The Project pipeline specifications are detailed below:

- 10-inch Nominal Diameter Steel Pipe.
- API 5L ERW/FBE. ARO pipe.
- Wall Thickness of 0.365 inch.
- Pipeline casings installed at State and US Highway crossings and Railroad crossings.
- Maximum Operating Pressure: 1,480 pounds per square inch (psi).
- Normal Operating Pressure: 500 psi.
- Maximum Throughput: 100,000 barrels per day (bpd).
- Normal Throughput: 50,000 bpd.
- Maximum Operating Temperature: 180 degrees Fahrenheit.

1.1.3 LENGTH

The proposed Project is approximately 14 miles in length.

1.2 PURPOSE OF FACILITY

The purpose of the Project is to transport crude oil from the ES northwest to the LMCS. From the LMCS the crude will be transported through North Dakota Pipeline Company LLC's North Dakota Pipeline System for further distribution throughout the United States.

1.3 LOCATION

The Project will be located in Williams County, North Dakota. The Project would result in a transmission pipeline originating at the ES in Williams County, approximately 1-mile south of Epping, ND. From the ES the pipeline will extend in a northwest direction to its terminus at the existing LMCS, located 10 miles northwest of Epping, ND. Please refer to the project maps provided in Appendix B.

1.4 ABOVEGROUND FACILITIES

The proposed Project will include the construction of one (1) additional above ground tank with 55,000 barrels of storage capacity. The addition of this tank will bring the total storage capacity at the ES to approximately 75,000 barrels. The additional storage is required to support the transmission line. Additionally, the transmission line will include four (4) block valves, one at each the terminus and two additional mainline block valves. These aboveground appurtenances will be designed to and installed at locations that will meet DOT regulations. The valves will be actuated, fail-safe, automated and controlled by both the local actuation and by a 24-hour Control Center located in the City of The Woodlands, Texas. Please see Appendix A for engineering documents and Appendix B for the location of these facilities.

The ES storage tanks specifications are detailed below:

- One 105.5-foot diameter storage tank with 55,000-barrel capacity to support the new crude oil transmission pipeline to LMCS.

The existing storage tank is, and the new storage tank would be located within an earthen berm with adequate capacity to satisfy applicable regulations.

1.5 PROJECT SCHEDULE

1.5.1 CERTIFICATE OF CORRIDOR COMPATIBILITY

MMC/ETC are seeking a Certificate of Corridor Compatibility in or before January 2015.

1.5.2 ROUTE PERMIT

MMC/ETC are seeking a Route Permit in or before January 2015.

1.5.3 CONSTRUCTION SCHEDULE

MMC/ETC have scheduled construction activities to commence as early as the first quarter of 2015. The construction activities would take approximately 4-6 months to complete. Commissioning and restoration activities will commence immediately after construction is complete.

SECTION 2: STUDIES

2.1 CORRIDOR

MMC/ETC selected the proposed corridor based upon several criteria designed to conform to the PSC's siting requirements and to avoid and minimize socioeconomic and environmental impacts, while maximizing the benefits to local resource developers in the Williston Basin. The location of existing infrastructure was also considered during the selection process.

MMC/ETC's process of selecting a corridor to site a route between two fixed assets was influenced by the opportunity to collocate with other utility corridors. Agencies and the public at large generally prefer the collocation of utilities within an existing corridor.

The proposed corridor is a one-mile wide area centered upon a proposed pipeline alignment which was selected utilizing web-based mapping tools (*e.g.*, one-half mile on either side of the proposed alignment) (Corridor). The Corridor is illustrated on the maps located in Appendix B.

A comprehensive desktop analysis of the Corridor included consultations with the federal and state agencies identified below. Summarized in Section 2.2 are the results of this environmental analysis.

- U.S. Fish and Wildlife Service (USFWS)
- North Dakota Game and Fish Department (NDGFD)
- North Dakota Parks and Recreation-Natural Heritage Program (NDPRD)
- North Dakota State Lands Department (NDSLDD)
- North Dakota State Historic Preservation Office (NDSHPO)
- North Dakota Department of Health (NDDoH)

On May 20, 2014, agency consultations were distributed. E3 sent out an amendment to these consultations on July 1, 2014. The purpose of this amendment was to clarify typographical errors contained in the original consultation. Below these corrections are summarized. Records of consultation with the agencies listed below is contained in Appendix C.

- The pipeline will originate at the ES not the Colt Rail Terminal as indicated on the consultation map;
- The ES is approximately 1-mile south of Epping, North Dakota not 10-miles; and
- The Little Muddy Creek pipeline endpoint will tie-in to the North Dakota Pipeline Company, LLC's LMCS, not existing MMC assets.

2.2 ENVIRONMENTAL DESKTOP ANALYSIS

2.2.1 WILDLIFE INVENTORY

Approximately 160 wildlife species are residents or seasonal visitors to the greater Missouri River ecosystem, and hundreds of native fish species live in the river and its tributaries, including the Knife River. Some of these animal species include fur-bearing mammals (*e.g.* beaver, muskrat, moose, and mule deer), bird and waterfowl species (*e.g.*, mallard, Canada goose, sharp-tailed grouse and golden eagles).

MMC/ETC engaged federal and state agencies in consultations to identify potential occurrences of sensitive species or their critical habitats. Refer to Appendix C for complete record of agency consultations.

2.2.2 WETLAND AND WATERBODIES ANALYSIS

To evaluate the location and extent of mapped wetlands and waterbodies within the Corridor a desktop analysis of aerial photography, National Hydrography Data set (NHD) and National Wetland Inventory (NWI) maps was completed. Desktop analysis identified approximately nine (9) individual streams and approximately 141 NWI features within the Corridor. MMC/ETC commissioned field studies to augment the desktop analysis. The field study results are discussed in the Route Permit Application.

2.2.3 TREE/SAPLING/SHRUB ANALYSIS

Desktop analysis of aerial photography was used to evaluate the location and extent of woody vegetation within the Corridor. The density of the woody cover is generally sparse, and typically appeared in association with banks or incised drainage channels, cultivated windrow features or farmsteads. MMC/ETC commissioned additional studies of the proposed route to inventory woody vegetation, study avoidance measures and inventory proposed impacts for mitigation. The results of these studies are included in Appendix D and proposed mitigation is detailed in Section 5: Mitigative Measures of the Route Permit application.

2.3 AGENCY CONSULTATIONS

2.3.1 U.S. FISH AND WILDLIFE SERVICE

The USFWS administers several programs designed to identify and protect special status plant and animal species and critical habitats. Additionally, the USFWS utilizes conservation programs such as Waterfowl Production Areas and wetland and grassland easements to identify and manage high quality wildlife habitat.

2.3.1.1 FEDERALLY PROTECTED SPECIES REVIEW

The USFWS identifies and maintains a list of species and critical habitats that have been afforded protection by the Endangered Species Act (ESA). The ESA provides a program for the conservation of threatened and endangered plants and animals and their critical habitats.

E3 reviewed USFWS published data and identified the following listed species and the potential for the species to occur within the Corridor.

- Whooping crane (*Grus americana*) – Endangered
- Interior least tern (*Sternula antillarum*) – Endangered
- Pallid sturgeon (*Scaphirhynchus albus*) – Endangered
- Gray wolf (*Canis lupus*) – Endangered
- Piping plover (*Charadrius melodus*) – Threatened

E3 reviewed available information describing life history, critical habitats and conservation measures associated with each species, to assess the potential effects of the Project on these resources. The results of the assessment are provided below:

Whooping crane: The Aransas-Wood Buffalo Population of Whooping Cranes engages in semi-annual migration through North Dakota. This flock breeds in the Wood Buffalo National Park in Alberta and Northwest Territories, Canada, and winters in the Aransas National Wildlife Refuge in Texas. This species has been closely studied and monitored in recent years due to its small, fragile population. North Dakota provides migratory habitat for the species, providing roosting and feeding opportunities during migration. During migration, the species is most closely associated with larger wetland complexes for roosting habitat, typically using adjacent uplands to forage. Desktop screening identified potential foraging and roosting habitat for the whooping crane within the Corridor.

Interior least tern: The interior population(s) of the least tern have historically been associated with large river systems for breeding and migratory habitats. Breeding birds are known to breed in colonies, utilizing sandbar habitat common to larger rivers. Regionally the Missouri River is known to host remnant breeding populations of terns. The Project is approximately 12 miles north/northwest of the Missouri River and Lake Sakakewea; and therefore, is anticipated to have no effect on the species.

Pallid sturgeon: The pallid sturgeon preferred habitat includes the benthic environment associated with swift waters of large turbid, free-flowing rivers with braided channels, dynamic flow patterns, periodic flooding of terrestrial habitats and requiring extensive microhabitat diversity. Portions of the Missouri River are thought to provide the required habitat for the pallid sturgeon though much of the habitat has been compromised due to channelization, installation of impoundments and altered flow regimes. The Project is approximately 12 miles north/northwest of the Missouri River and Lake Sakakewea, and therefore, is anticipated to have no effect on the species.

Gray wolf: The gray wolf uses a variety of habitats that support a large prey base including montane and low-elevation forests, grasslands and desert scrub. The Corridor generally lacks forested habitat and is a great distance from the known Minnesota and Manitoba populations. The Corridor does not provide suitable habitat or host known populations of the gray wolf, and as such, the proposed Project will have no effect on the gray wolf.

Piping plover: The piping plover is associated with shorelines along small alkaline lakes, large reservoir beaches, river islands and adjacent sand pits. Breeding birds select wide beaches with highly clumped vegetation covering less than 25 percent of the area. The piping plover's current breeding range on the Northern Great Plains extends south along major prairie rivers including the Yellowstone and Missouri, and in alkali wetlands including those in northeastern Montana and North Dakota. No records of piping plovers or its critical habitat were documented by the USFWS to occur within the Corridor. The Project is approximately 12 miles north/northwest of the Missouri River and Lake Sakakewea, and therefore will have no effect on the species.

2.3.1.2 MIGRATORY BIRD TREATY ACT

On May 20, 2014, E3, on behalf of MMC/ETC, initiated consultation with the USFWS with respect to several topics that fall under the purview of the USFWS including the Migratory Bird Treaty Act (MBTA). The USFWS responded on August 11, 2014, via letter, identifying the management of MBTA compliance as a concern. The USFWS concerns correspond with the regional timing associated with annual phenology of migratory species. In North Dakota, it is generally acknowledged MBTA species of concern may be present and active in North Dakota from February 1 through July 15 annually. Currently the proposed Project construction scheduled to commence in the first quarter of 2015 and be complete in early 2015. If construction were to take place during this interval, MBTA mitigation may be required. MMC/ETC will continue to consult with agencies as necessary regarding this subject and shall develop MBTA mitigation as appropriate.

2.3.1.3 BALD AND GOLDEN EAGLES PROTECTION ACT

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

On May 20, 2014, E3, on behalf of MMC/ETC, initiated BGEA consultations with the USFWS seeking confirmation of presence or absence of known nesting locations for either eagle species within the Corridor. The USFWS responded via letter on August 11, 2014, recommending that the Project avoid wetland and grassland easements by coordinating with the Crosby Wetland Management District (see Appendix C for complete record of this consultation). The USFWS indicated that the proposed project area has potential suitable roosting and feeding habitat for the Whooping Crane. The USFWS recommends that if a Whooping Crane is sighted within a mile of the Project that project activities cease within one mile of that part of the project and the USFWS is contacted. The USFWS also stated that if Sprague's pipit habitat is located within the proposed project area that the steps taken to avoid and minimize disturbance to this habitat should be documented and shared with the USFWS. Please see Appendix C for a record of this consultation.

2.3.1.4 U.S. FISH AND WILDLIFE SERVICE MANAGED LANDS

The USFWS administers National Wildlife Refuges and Waterfowl Production Areas as well as wetland and grassland easements throughout North Dakota. No USFWS managed areas were identified within the Corridor based upon a review of information available in the public domain, including U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle maps, USGS PAD-US dataset, and the USFWS Information, Planning, and Conservation System (IPaC).

2.3.2 NORTH DAKOTA GAME AND FISH DEPARTMENT

The NDGFD exercises oversight and management of the state's game species. On May 20, 2014, E3 initiated consultations with NDGFD and requested confirmation regarding the presence or the absence of both state-managed lands and wildlife concerns within the proposed Corridor.

E3 reviewed the NDGFD's map service applications on May 22, 2014 to identify the presence or absence of NDGFD managed Private Land Open to Sportsmen (PLOTS) lands within the corridor. Review of this database confirmed the presence of NDGFD PLOTS lands within the Corridor.

On June 10th, 2014, the NDGFD responded via letter stating that the Project should not affect wetlands provided steps are taken to protect them; the Project cannot have alterations to drainage patterns and no above ground appurtenances should be placed in wetlands. Additionally, the NDGFD stated that the Project should not have significant adverse effects on wildlife or wildlife habitat. On July 10, 2014, E3 submitted an amendment consultation to the NDGFD and on August 7, 2014, the NDGFD responded via email stating that they have no additional concerns based on the amendment consultation. Refer to appendix C for a copy of this correspondence.

2.3.3 NORTH DAKOTA PARKS AND RECREATION DEPARTMENT

The NDPRD Natural Resource Division's scope of authority and expertise covers recreation and biological resources (in particular, rare species and ecological communities). The NDPRD also maintains a database comprised of the location and recorded occurrences of plant and animal species of special concern. The NDPRD authority includes management of state park lands and Land and Water Conservation Funded recreation projects.

On May 20, 2014, E3 initiated consultations with NDPRD seeking confirmation regarding the presence or the absence of managed lands, ecological resources, rare species or their critical habitats within the Corridor.

On June 2, 2014, the NDPRD responded via letter stating that the Project does not affect NDPRD managed state park lands or Land and Water Conservation Fund recreation projects under NDPRD coordination. Additionally, no documented occurrences of plants, animals of special concern or other significant ecological communities were documented within or adjacent to the Project area. The NDPRD recommended that the Project be accomplished with minimal impacts and that all efforts be made to ensure

that critical habitats or rare species are not disturbed. The NDPRD also recommends that all disturbed areas be restored with species native to the project area. On July 10, 2014, E3 submitted an amendment consultation to the NDPRD; agency response is pending. Refer to Appendix C for a complete record of this consultation.

2.3.4 NORTH DAKOTA STATE LANDS DEPARTMENT

The NDSLDD is in charge of managing surface acres and mineral interests held in trust for various schools and institutions. Based on review of publically available information, thirteen (13) state trust lands are within the Corridor.

On May 20, 2014, E3 initiated consultations with the NDSLDD requesting comments regarding the presence of school trust lands within the Corridor; the NDSLDD responded on May 21, 2014 confirming the presence of school trust lands within the Corridor. On July 10, 2014, E3 submitted an amendment consultation to the NDSLDD, again the agency confirmed the presence of school lands within the Corridor. See Appendix C for a copy of this correspondence. MMC's/ETC's land department will coordinate with the NDSLDD to obtain the necessary easements to construct and operate the Project.

On May 20, 2014, E3 initiated consultations with the NDSLDD requesting comments regarding the presence or absence of state mineral trust lands within the Corridor; the NDSLDD responded on May 22, 2014 confirming the presence of mineral trust lands within the Corridor. On July 10, 2014, E3 submitted an amendment consultation to the NDSLDD; agency response is pending. See Appendix C for a copy of this correspondence.

2.3.5 NORTH DAKOTA STATE HISTORIC PRESERVATION OFFICE

The NDSHPO is responsible for managing the historic and archaeological resources of the state; as such, the NDSHPO maintains records of all previously recorded cultural resources within the state. E3 commissioned SWCA Environmental Consultants to conduct a Class I inventory of the Corridor. The Class I effort was completed on April 22, 2014 and identified 42 previously recorded cultural resources that were identified within the Corridor. The results of this Class I effort are documented in Appendix E. To augment this Class I effort, SWCA conducted a Class III field investigation. The details of this effort can be found in Appendix E and in the Route Permit.

2.3.6 NORTH DAKOTA DEPARTMENT OF HEALTH

The North Dakota Department of Health (NDDoH) administers regulatory programs governing certain water quality issues including construction stormwater runoff and other discharges. MMC/ETC is currently in the process of preparing permit application materials to acquire the requisite NDDoH approval with respect to these issues.

2.3.6.1 NDDOH POLLUTION DISCHARGE ELIMINATION SYSTEM

The North Dakota Pollution Discharge Elimination System (ND PDES) is the regulatory program that regulates water discharges such as construction stormwater, site dewatering, and hydrostatic discharge permits. MMC/ETC will procure the following ND PDES permits from the NDDoH as described below

Construction Stormwater: MMC/ETC will be seeking coverage under NDR10-0000 *Authorization to Discharge Under the North Dakota Pollutant Discharge Elimination System* general permit for construction activities. A Storm Water Pollution Prevention Plan (SWPPP) will be prepared and maintained on-site for the duration of the Project. MMC/ETC will properly implement the SWPPP, which will be designed to manage run-off and trench dewatering discharges in a manner that will minimize exposure to chemicals, waste, and petroleum products, as well as describing erosion control measures designed to minimize off-site transfer of sediments.

Hydrostatic test water discharges: MMC/ETC will be seeking coverage under NDG07-0000 *Authorization to Discharge Under the North Dakota Pollutant Discharge Elimination* general permit for various temporary discharges including both construction site dewatering and hydrostatic test water discharges.

SECTION 3: NEED FOR FACILITY

3.1 ANALYSIS OF NEED BASED ON PRESENT AND PROJECTED DEMAND, INCLUDING SYSTEM STUDIES

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 Shale and Three Forks oil reserves are subject to interpretation and speculation. Studies conducted by the North Dakota Department of Mineral Resources and the USGS in 2010 estimated mean undiscovered volumes of 3.65 billion barrels of recoverable crude oil reserves may be available in North Dakota's deep shale formations. From March of 2007 to March of 2013, oil production in North Dakota has surged by 564 percent. In March of 2007, North Dakota produced 118,000 bpd. That figure has increased to 783,000 bpd in March of 2013. In 2007, North Dakota accounted for roughly 2.5 percent of all the oil produced in the United States. In 2013, North Dakota accounted for roughly 11 percent of all the oil produced in the country.

A major constraint in transporting hydrocarbons from North Dakota to distribution centers and eventual end users in the United States is the lack of pipeline capacity. To relieve the pipeline constraints, several projects have been planned to address the growing volumes of crude oil, natural gas and natural gas liquids. However, pipeline capacity is not expected to keep pace with production, leaving incremental volumes to find alternative transportation methods, primarily rail or other surface transportation alternatives.

Construction of the proposed Project will provide firm, reliable service for 50,000 bpd and provide a critical link between the ES and the LMCS. From the LMCS, the crude would be transported through North Dakota Pipeline Company LLC's North Dakota Pipeline System to Clearbrook, MN for further distribution to market hubs and centers throughout the United States.

SECTION 4: CORRIDOR LOCATION AND CRITERIA EVALUATION

The information presented in this section was developed to demonstrate conformation with the Commission's siting criteria for transmission facilities. MMC/ETC has conducted a thorough inventory of the Corridor and evaluated the resources within it to assess the compatibility of the Project with the PSC's siting criteria. The following sections identify and discuss the presence or absence of siting criteria within the Corridor. Where siting criteria are identified, the location of each is shown on the maps in Appendix B as appropriate.

4.1 CORRIDOR LOCATION

MMC/ETC has identified a preferred Corridor, which is a one-mile-wide area centered upon a preferred pipeline alignment. The selection of the proposed Corridor was a multi-disciplinary effort that included socioeconomic, environmental, logistics, engineering and financial considerations. The Corridor described in this application provides MMC/ETC with the opportunity to utilize existing and planned assets, minimizes landowner impacts, and minimizes environmental impacts.

MMC/ETC have initiated agency consultations, and conducted a desktop analysis of the Corridor. These efforts were augmented by site visits, including natural and cultural resource field surveys. These results are discussed in detail in the Route Permit application.

4.2 FACTORS TO BE CONSIDERED IN EVALUATING APPLICATIONS AND DESIGNATION OF CORRIDORS AND ROUTES (NDCC 49-22-09)

4.2.1 FEASIBLE ALTERNATIVES TO THE PROPOSED CORRIDOR OR ROUTE

The Project will deliver an average of 50,000 bpd of crude oil from the ES to the LMCS. From the LMCS the crude would be transported through North Dakota Pipeline Company LLC's North Dakota Pipeline System for further distribution to market hubs/centers throughout the United States. MMC/ETC identified and evaluated several project alternatives; however, none of these alternatives effectively satisfied the Project objective. These alternatives included:

- No Action Alternative;
- Trucking Alternative; and
- Rail Alternative.

4.2.1.1 NO ACTION ALTERNATIVE:

This alternative would leave the region constrained by limited transport capacity for safe and reliable transmission of crude oil products to markets. Overall, regional oil and gas production would continue to be constrained by the limited volume of product that could be shipped utilizing existing infrastructure. No action could result in curtailment of crude oil production. For these reasons, MMC/ETC rejected a *No Action Alternative*.

4.2.1.2 TRUCKING ALTERNATIVE:

This alternative was reviewed and eliminated due to the volume of crude oil to be transported. The normal daily throughput of the proposed Project would be approximately 50,000 barrels or 2,100,000 gallons of crude oil. The average load for a truck carrying crude oil is approximately 178 barrels (7,500 gallons) per truck. Thus, it will require 280 trucks per day, an average of 11.7 trucks every hour for 24 hours a day to transport the volume of product the pipeline would transport to the LMCS. This level of truck activity is not logistically feasible; it would cause an unacceptable amount of heavy vehicle traffic for the area's residents as well additional wear and tear on the infrastructure. Disruption in the trucking capacity due to seasonal load restrictions on roads, inclement weather or road repairs would cause a delay in delivering this valuable resource to market. This alternative is not desirable; therefore, MMC/ETC rejected a *Trucking Alternative*.

4.2.1.3 RAIL ALTERNATIVE:

Rail transport was also evaluated as a surface transportation alternative. However, the lack of active railroad service within reasonable proximity to the LMCS limited the viability of this alternative. Upon further analysis, this alternative was determined to be not feasible due to the associated environmental impacts, financial, logistic, and time constraints necessary to acquire land and construct the requisite rail infrastructure. This alternative is not desirable; therefore, MMC/ETC rejected a *Rail Alternative*.

4.2.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF NATURAL RESOURCES SHOULD THE PROPOSED CORRIDOR BE DESIGNATED

MMC/ETC is not aware of any irreversible or irretrievable commitments of natural resources that would result from the requested approvals.

4.2.3 EXISTING PLANS OF THE STATE, LOCAL GOVERNMENT AND PRIVATE ENTITIES FOR OTHER DEVELOPMENTS AT OR IN THE VICINITY OF THE PROPOSED ROUTE

MMC/ETC is not aware of any other future development plans within or in close proximity to the Project.

4.2.4 PROBLEMS RAISED BY FEDERAL AGENCIES, OTHER STATE AGENCIES AND LOCAL ENTITIES

MMC/ETC has consulted with several federal and state agencies to identify possible environmental resources within the Corridor and any related agency concerns.

4.3 EXCLUSION AREAS (NAC 69-06-08-02.1)

Exclusion areas are geographical areas that should be excluded from consideration when siting an energy transmission facility. A proposed Corridor may contain exclusion areas, but exclusion areas may not encompass more than 50 percent of the Corridor width at any point, unless there is no reasonable alternative. The following table and text identify and discuss exclusion areas identified within the Corridor.

Exclusion Area	Within Corridor
Federal	
National Parks or Memorial Parks	No
Historic Sites, or Landmarks	No
Natural Landmarks or Monuments	No
Wilderness Areas	No
State	
Historic Sites, Monuments, or Historical Markers	No
Archaeological Sites	Yes
Parks	No
Nature Preserves	No
County	
Parks	No
Recreation Areas	No
Municipal Parks	No
Other	
Areas Critical to the Life Stages of Threatened and Endangered Animal or Plant Species	No
Areas where Animal or Plant Species that are Unique or Rare to this State would be Irreversibly Damaged	No
Areas within 1,200 feet of a geographic center of an intercontinental ballistic missile (ICBM) launch or launch control facility.	No
Areas within 30 feet on either side of a direct line between (ICBM) launch or launch control facilities to avoid microwave interference.	No

4.3.1 FEDERAL RESOURCE REVIEW

MMC/ETC have initiated consultations with various federal agencies and has conducted a comprehensive review of published information. MMC/ETC concluded no national or memorial parks, natural landmarks or monuments, or wilderness areas will be affected by the Project. Please refer to Section 2: Studies of this document for a comprehensive discussion of MMC's/ETC's agency consultations, and Appendix C for copies of the consultations.

4.3.2 STATE RESOURCE REVIEW

MMC/ETC have confirmed through a combination of agency consultations, review of publicly available information and field studies the absence of state parks, historic sites, monuments, historical markers or nature preserves within the proposed Corridor. Please refer to Section 2: Studies of this document for a comprehensive discussion of MMC's/ETC's related consultations.

MMC/ETC commissioned a Class I Inventory of the Corridor. These efforts identified previously recorded historic properties and cultural resources. Please refer to Section 2: Studies of this document for a comprehensive discussion of MMC's/ETC's related consultations, and Appendix E for the Cultural Resource Report. Mitigation details are discussed in Section 5: Mitigative Measures of the Route Permit Application.

4.3.3 COUNTY RESOURCE REVIEW

MMC/ETC has confirmed through a combination of agency consultations and review of publicly available information the absence of county parks or recreation areas, municipal parks, or parks owned by other subdivisions of government bodies within the proposed Corridor. Please refer to Section 2: Studies of this document for a comprehensive discussion of MMC's/ETC's consultations and Appendix C for documentation of agency consultations.

4.3.4 AREAS CRITICAL TO THE LIFE STAGES OF THREATENED AND ENDANGERED ANIMAL OR PLANT SPECIES

MMC/ETC has conducted a comprehensive desktop review of the Corridor; these efforts were augmented with agency consultations and additional field surveys to confirm presence or absence of critical habitat.

Please refer to Appendix C for documentation of the agency consultations as well as Section 2: Route Analysis and Environmental Studies of the application for a Route Permit for details of the field studies.

4.3.5 AREAS WHERE ANIMAL OR PLANT SPECIES THAT ARE UNIQUE OR RARE TO THIS STATE WOULD BE IRREVERSIBLY DAMAGED

MMC/ETC has engaged in federal and state agency consultations, reviewed published information and conducted a desktop analysis of the Corridor to determine if areas of critical animal or plant habitat may occur. Based on these studies, MMC/ETC has confirmed the absence of protected species and/or their critical habitats. Please refer Appendix C for supporting documentation of agency consultations.

4.3.6 AREAS WITHIN 1,200 FEET OF THE GEOGRAPHIC CENTER OF AN ICBM LAUNCH OR LAUNCH CONTROL FACILITY

MMC/ETC conducted a review of publicly available information and concluded there are no ICBM launch or launch control facilities within the Corridor.

4.3.7 AREAS WITHIN 30 FEET ON EITHER SIDE OF A DIRECT LINE BETWEEN ICBM LAUNCH OR LAUNCH CONTROL FACILITIES TO AVOID MICROWAVE INTERFERENCE

MMC/ETC conducted a review of publicly available information and concluded there are no ICBM launch or launch control facilities within the Corridor.

4.4 AVOIDANCE AREAS (NAC 69-06-08-02.2)

Avoidance areas are geographic areas that shall not be considered in the routing of a transmission facility unless it is shown there is no reasonable alternative under the circumstances. A proposed corridor may contain avoidance areas, but may not encompass more than 50 percent of the corridor width at any point, unless there is no reasonable alternative. The following table and text identify and discuss avoidance areas within the proposed Corridor.

Avoidance Area	Within Corridor
Federal	
Historic Districts	No
Wildlife Areas	No
Wild, Scenic or Recreational Rivers	No
Wildlife Refuges	No
Grasslands	No
State	
Wild, Scenic, or Recreational Rivers	No
Game Refuges or Game Management Areas	No
Forests or Forest Management Areas	No
Grasslands	No
Other	
Other Historic Resources not meeting Exclusion Areas criteria	Yes
Areas of Known Geologic Instability	Yes
Areas within 500-Feet of a Residence, School, or Place of Business	Yes
Reservoirs and Municipal Water Supplies	No
Water Sources for Organized Rural Water Districts	No
Irrigated Land (not applicable to underground facilities)	N/A
Areas of Recreational Significance which are not designated as Exclusion Areas	No

4.4.1 FEDERAL RESOURCE REVIEW

MMC/ETC conducted a comprehensive review of publicly available information, and agency consultations of the proposed Corridor. This review indicated the absence of

designated or registered historic districts, refuges, grasslands, and wild, scenic or recreational rivers within the Corridor. Please refer to Appendix C for documentation of agency consultation.

4.4.2 STATE RESOURCE REVIEW

MMC/ETC conducted a review of publicly available information and conducted agency consultations and concluded there are no designated or registered state game refuges, game management areas, management areas, forests, forest management lands, grasslands or wild, scenic, or recreational rivers within the Corridor. Refer to Appendix C for documentation of agency consultation.

4.4.3 HISTORICAL RESOURCES NOT MEETING EXCLUSION AREA CRITERIA

MMC/ETC conducted a Class I Cultural Resource Inventory of the Corridor. The Class I work identified five historical resourced within the survey corridor that did not meet the exclusion area criteria. Refer to Appendix C for agency consultations and Appendix E for the complete Cultural Resource Report.

4.4.4 AREAS OF KNOWN GEOLOGIC INSTABILITY

A desktop review of the North Dakota Geological Survey (NDGS) landslide mapping data was completed. Review of *Areas of Landslides, Blacktail Lake & Spring Brook 24K Sheet, North Dakota* indicated landslide deposits are present within the Corridor in T156N R100W Sec. 26 and 27 and T155N R99W Sec. 11. These areas are not traversed by the preferred Route.

Additionally, North Dakota has not experienced an earthquake of sufficient magnitude to damage steel welded pipe or structural steel structures in recorded history. Sinkholes are known to occur in the region, but these are related to subsurface mining activities as opposed to limestone dissolution. One (1) abandoned mine was found within the Corridor; refer to Appendix B for its location.

4.4.5 AREAS WITHIN 500-FEET OF A RESIDENCE, SCHOOL OR PLACE OF BUSINESS

MMC/ETC utilized aerial photography to identify structures located within 500 feet of the proposed pipeline alignment. There appears to be one (1) residence located within 500 feet of the Project. MMC/ETC has obtained a landowner waiver from hits landowner; it is located in Appendix G.

4.4.6 RESERVOIRS AND MUNICIPAL WATER SUPPLIES

MMC/ETC has confirmed the Corridor does not contain reservoirs or municipal water supply sources. The wells identified within the Corridor are used for domestic, stock or irrigation purposes; however, the majority were test holes. The maps in Appendix B depict the location of these resources.

4.4.7 WATER SOURCES FOR ORGANIZED RURAL WATER DISTRICTS

Desktop analysis confirmed the presence of six (6) wells located within the Corridor. These wells are utilized for domestic, stock or irrigation purposes; however, the majority were observation wells. The location of these wells are depicted on the maps in Appendix B.

4.4.8 IRRIGATED LAND

This criterion does not apply to underground transmission facilities and as such, it is not applicable to this Project.

4.4.9 AREAS OF RECREATIONAL SIGNIFICANCE WHICH ARE NOT DESIGNATED AS EXCLUSION AREAS

MMC/ETC have confirmed the Corridor does not contain any areas of recreational significance that are not designated as exclusion areas.

4.5 SELECTION CRITERIA (NAC 69.06-08-02.3)

The selection criteria require assessment of the environmental impacts and alterations to land use that may result from the siting of the proposed Project. Through this process, MMC/ETC proposes that it has successfully avoided or minimized these effects to the maximum extent practicable.

4.5.1 AGRICULTURAL IMPACT

Agricultural Production: The Pipeline will temporarily affect approximately 196 acres of private land in North Dakota. The majority of the land crossed can be characterized as either agricultural or natural vegetative cover. Once construction is completed, the land will be restored to its pre-construction contours and land use. ETC will provide settlements to landowners for crop loss resulting from Pipeline construction. The expansion at the ES will not have a significant effect on agricultural projection, as it is located in an area previously developed for oil production.

Family Farms and Ranches: The Project will temporarily affect approximately 196 acres of private land in North Dakota. Once construction is complete, the land will be restored to its pre-construction contours and land use. MMC/ETC will negotiate easements with all affected landowners. The Project will have no permanent impacts to lifestyle or farm/ranch operations once construction has been completed.

Lands Suitable for Irrigation: This section is not applicable to buried pipelines (69-06-08-02.2h). The expansion at the ES will not affect lands suitable for irrigation as all ground disturbing/construction activities will occur within the boundaries of the existing MMC facility.

Surface Drainage: Standard construction techniques will be employed; significant modifications to surface drainage patterns are not anticipated. Site grading will be necessary at the ES; however, site design will minimize runoff impacts to adjacent landowners. Care will be taken throughout the construction process to minimize environmental impacts, including modification of drainage patterns. During restoration,

those areas that were disturbed during construction shall be restored, the local topography shall be restored to its original contours, vegetation shall be re-established and impacts shall be minimal and temporary. Best management practices will be implemented in accordance with the project-specific Storm water Pollution Prevention Plan (SWPPP), which will comply with the NDDoH Construction Storm Water General Permit requirements. The grading for the ES will occur to allow for the siting and construction of the storage tank. Permanent impacts to surface drainage will be minimized to the maximum extent possible. ES site drainage will be designed in a manner in which impacts to adjacent properties are not altered from pre-construction conditions.

Ground Water: Well data has been recorded by the State Water Commission for the Project area. Well data indicates that groundwater is located between 50-90 feet below the surface. The required tie-in excavations for the proposed Project are not anticipated to reach these depths as such no impact to ground water is anticipated.

4.5.2 THE IMPACTS UPON OTHER RESOURCES

Noise-Sensitive Land Uses: The Project is located in a rural setting, effectively isolating it from the majority of sensitive receptors. Construction of the proposed Project would affect the local noise environment. The ambient sound level of a region is defined by the total noise generated within the specific environment and is usually comprised of sounds emanating from natural and artificial sources. Construction could cause temporary increases in the ambient sound environment in the areas immediately surrounding active construction. Once constructed and in-service, normal pipeline operations and station operations are not audible. Once construction at the ES are complete the noise associated with operation the ES should not exceed 20% of the ambient noise level.

The construction of the proposed Project would be conducted during typical working hours and is expected to cause temporary increases in ambient sound within and adjacent to the Project area. The use of heavy equipment or trucks would be the primary noise source during construction and excavation. The level of impact would vary by equipment type, duration of construction activity, and the distance between the noise source and the receptor.

Visual Effect on Adjacent Areas: The proposed Project will include the installation of a block valve at each terminus of the pipeline and two additional mainline block valves. These block valves are small aboveground features which will be installed within the footprint of the facility. The visible piping and equipment are finished and maintained with a white painted surface.

One additional aboveground storage tank, associated secondary containment, and facility fencing will be constructed at the existing ES. Other oil development is occurring in proximity to the ES, and as such, visual impacts associated with the addition of one tank is minimal in this landscape.

No other permanent aboveground features are to be installed as a part of the Project.

Extractive and Storage Resources: This Project will not affect any extractive or storage resources.

Wetlands, Woodlands and Wooded Areas: A comprehensive desktop review of published data, including aerial photography and NWI data, was conducted to assess the presence or absence of wetlands, woodlands and wooded areas. The review of the proposed Corridor confirmed the presence of these resources. MMC/ETC commissioned field surveys to identify and record the locations of these resources within the survey corridor. Please refer to Section 2: Studies in Route Permit Application for a comprehensive discussion of MMC's/ETC's consultations, and Appendix C for copies of the consultations. Mitigation details are discussed in Section 5: Mitigative Measures of the Route Permit Application.

Radio and Television Reception, and other Communication or Electronic Control Facilities: MMC/ETC does not anticipate the Project will affect radio, television, or other electronic control facilities.

Human Health and Safety: MMC's/ETC's corporate Health and Safety policy meets or exceeds federal and state laws, rules and regulations, and is enforced equally with respect to MMC/ETC and contractor employees. The implementation of this policy promotes a safe and healthy workplace during construction and operation of all MMC's/ETC's assets.

The design of the Project has incorporated the use of block valves at regular intervals. The purpose of the block valve is to segment the system and allow for the isolation of select portions of the system to facilitate maintenance in a safe and controlled manner. Additionally, in the event of an abnormal operating condition, block valves can be closed as necessary to prevent an uncontrolled release of crude oil. Finally, the operation of the pipeline will be monitored in accordance with DOT regulations.

MMC has developed an Emergency Response Plan for the Epping Station storage facility and will train all employees on that plan and provide a copy of the plan to first responders. MMC prides itself on its safe work practices and considers health and safety to be among its core values.

Animal Health and Safety: The wildlife currently inhabiting the Corridor are common and are generally mobile. The local wildlife inhabitants will not be displaced by the Project with no measurable impact to the viability of these populations. No species of special concern are anticipated to experience direct impacts due to conversion or operation of the Project.

Plant Life: No species of special concern will be impacted by the Project. Reclamation will be completed utilizing native seed mixes where appropriate.

4.6 POLICY CRITERIA

4.6.1 POLICIES AND COMMITMENTS TO LIMIT ENVIRONMENTAL IMPACT

MMC/ETC will comply with requirements contained in the Corridor Certificate and Route Permit. MMC/ETC will conduct its activities with the objectives of providing a healthful and safe workplace for its employees, and preventing accidents and environmental incidents. All persons and firms providing service to MMC/ETC are required to conduct their work in compliance with environmental conditions, permit authorizations, and applicable regulations, and will be held accountable for their actions in that regard. MMC/ETC are committed to conducting its business in compliance with all applicable environmental laws and regulations. These laws, regulations and standards are designed to safeguard the environment, human health, wildlife and natural resources.

4.6.2 LOCATION AND DESIGN

This Project will connect two facilities, the ES to tie-in to the LMCS. From this location, the crude would be transported through North Dakota Pipeline Company LLC's North Dakota Pipeline System to Clearbrook, MN for further distribution to market hubs/centers throughout the United States. Refer to Appendix B for Project location maps.

The proposed pipeline will be constructed of steel and will be a nominal 10-inch diameter pipe. The pipe installed will have a nominal wall thickness of 0.365 inches denoted as API Code 5L specification ERW/FBE ARO pipe. The maximum operating pressure (MOP) of the pipeline will be 1,480 psi.

The proposed pipeline will meet DOT regulations, specifically the design criteria outlined in 49 CFR 195.100, constructed per 49 CFR 195.200 operated and maintained per 49 CFR 195.400.

The new storage tank will be located at the existing ES, approximately 1-mile south of Epping, ND. The new storage tank and associated containment structures will meet DOT regulations and be constructed to meet API 650 Standards.

4.6.3 TRAINING AND UTILIZATION OF AVAILABLE LABOR IN THIS STATE FOR THE GENERAL AND SPECIALIZED SKILLS REQUIRED

Pipeline construction is a specialized construction market and the labor force needed to build the Project will be primarily comprised of a workforce with these niche construction skills. The primary contractor will be a local contractor, supplying specialized skilled labor. MMC/ETC will draw upon the local labor force to supply general laborers. The workforce is anticipated to reach a peak of approximately 100 personnel.

4.6.4 ECONOMIES OF CONSTRUCTION AND OPERATION

The Project represents a total investment of approximately \$18 million to be spent in Williams County, North Dakota for the construction of the pipeline. Once in-service, the

continued costs of maintenance and operation of the proposed pipeline are expected to be minimal.

4.6.5 USE OF CITIZEN COORDINATING COMMITTEES

Through its corporate presence in the region (local office in Stanley, ND), MMC/ETC has established and maintains a good relationship with the local community officials and the local population. These relationships provide multiple grass roots communication channels to inform local residents regarding the developments associated with the Project.

4.6.6 COMMITMENT OF A PORTION OF THE TRANSMITTED PRODUCT FOR USE IN THIS STATE.

The proposed Project will interconnect with existing facilities. The products currently handled, transferred and shipped at these facilities are currently delivered to markets located in and out of the state.

4.6.7 LABOR RELATIONS

MMC/ETC maintains positive labor relations with its staff and contract work force and does not anticipate encountering any adverse labor relations on this Project. The labor market in the region is generally supportive of the oil and gas industry.

4.6.8 THE COORDINATION OF FACILITIES

MMC owns and operates the existing ES and will be responsible for its expansion; ETC will construct and own the Pipeline. The project will connect with the North Dakota Pipeline Company LLC's existing pipeline. MMC/ETC expect coordination with this entity to be seamless as the Project is of benefit to both parties.

4.6.9 MONITORING OF IMPACTS

MMC/ETC has operated pipeline gathering and associated facilities in the area since February of 2013. Through these operations, MMC/ETC have established and maintained positive landowner and community relationships throughout the region. MMC's/ETC's operations reflect its commitment to corporate citizenship standards founded on integrity. MMC/ETC will monitor landowner concerns, if any, through its Land Department and will respond to all reasonable concerns. Similarly, MMC/ETC will monitor community concerns and will respond to all reasonable concerns brought to its attention by local community leaders. Environmental responsibilities shall be coordinated in the same manner.

4.6.10 UTILIZATION OF EXISTING AND PROPOSED RIGHTS-OF-WAY AND CORRIDORS

MMC/ETC chose the preferred Project alignment in an effort to maximize the use of existing utility corridors.

4.6.11 OTHER EXISTING OR PROPOSED TRANSMISSION FACILITIES

Refer to Appendix F for MMC/ETC's 10-Year Plan.

SECTION 5: MITIGATIVE MEASURES

5.1 LOCATION

The selection of the proposed Corridor was a multi-disciplinary effort that included socio economic, environmental, logistics, engineering and financial considerations. The Corridor described in this application meets the siting criteria and provides MMC/ETC with the opportunity to utilize existing assets, and minimize landowner and environmental impacts.

Landowner considerations also factored into the Corridor selection. The proposed Corridor limits the number of potentially affected landowners while providing potential routing opportunities that would further minimize individual impacts to current land practices. All affected landowners would be compensated for Project impacts through negotiated easement agreements and settlements for seasonal crop losses.

The proposed Corridor selection was also influenced by environmental studies that suggested the area lacked sensitive features such as critical wildlife habitat, major wetlands or waterbodies, or other unique environmental features. The proposed Corridor will allow routing options that will further minimize waterbody crossings and potentially avoid all the wetland crossings entirely. In addition to these routing considerations, compliance with environmental permits procured for the Project will serve to effectively mitigate the impacts of construction along the final approved route. Standard pipeline construction techniques will involve temporary impacts, but long term or permanent impacts will be avoided through implementation of modern construction techniques, adherence to permit requirements, and avoidance of sensitive features identified during routing studies. Permanent impacts during ES construction will be minimized to the maximum extent possible.

MMC/ETC own and operate other assets in the region. Planning and development of these assets are conducted in a manner that maximizes the benefits to the region's resources. The proposed Corridor and Route will allow MMC/ETC to draw upon planned and existing pipeline and facility assets in the region.

5.2 CONSTRUCTION

The proposed construction of the Project will be conducted in an orderly sequence designed to complete the Project in the minimum amount of time required to safely prepare the site, install the pipeline and station facilities and restore the areas disturbed by construction.

Construction is estimated to require a minimum of 4-6 months to complete. Construction techniques will be employed that minimize the area of ground disturbance, off-site deposition of sediments and long-term impacts to agricultural productivity. Construction activities shall conform to all applicable permit stipulations; these requirements are mandated by the agency and implemented by the Project sponsor for minimizing impacts to the environment.

Restoration will immediately follow Project construction. Final grading will restore the original contours of the land where possible. Disturbed areas will be prepared for re-seeding and restoration will be coordinated to meet landowner specifications.

5.3 OPERATION

Once put into service, the proposed Pipeline will operate continuously, delivering crude oil from the ES to the LMCS. Normal pipeline operations are imperceptible to the public, as they are silent, buried and therefore not visible, and require only minimal aboveground activity. Standard operating procedures will conform to applicable DOT requirements, which include regular pipeline monitoring and periodic inspection. Additionally, routine maintenance of the right-of-way will likely be required on a regular basis to remain in compliance.

The ES will also operate continuously providing storage and supplying the Pipeline with oil for transport. Station operations will include pumping and allocation of the oil throughout the Project.

SECTION 6: LIST OF PREPARERS

John Millar

Vice President-Liquids Group
Summit Midstream

Mr. Millar is Vice President, Liquids Group for Summit Midstream and is responsible for developing liquid pipeline commercial opportunities and for managing Summit's liquid pipeline assets. Prior to joining Summit Midstream, Mr. Millar was Vice President and General Manager of Genesis Energy, L.P.'s pipeline, terminal, and trucking businesses, responsible for improving safety, operating efficiency, and service quality and for developing growth projects involving liquid pipeline facilities, marine terminals, rail facilities, and truck stations. Prior to joining Genesis, Mr. Millar held numerous positions in engineering, project management, field operations, control center operations, joint ventures, and business development for Chevron Pipe Line Company, EOTT Energy, Unocal Corporation, and Enbridge Energy Partners. Mr. Millar has over 28 years of experience in nearly all aspects of the oil pipeline industry and holds BS and MS degrees in Civil Engineering from the University of California and an MBA from the University of Houston. Mr. Millar is a licensed Civil Engineer in the State of California.

William McCarthy, C.W.B.

Senior Environmental Compliance Analyst
E3 Environmental, LLC, 871 West Jefferson Avenue, St. Paul, MN 55102

M.S. Wildlife Biology, University of Minnesota – Twin Cities; and B.S. Wildlife Biology, Michigan State University. Mr. McCarthy is an environmental compliance analyst with 15 years of environmental consulting experience working with various energy assets and regulatory agencies. As a compliance analyst, he has managed the environmental requirements for facility siting, pipeline routing, federal licensing and various federal, state and local permits. Mr. McCarthy is a certified wildlife biologist, and in this role conducts and coordinates field studies, agency consultations, mitigation and avoidance plans.

Katie Schmidt, EIT

Environmental Engineer and Senior Consultant

E3 Environmental, LLC, 871 West Jefferson Avenue, St. Paul, MN 55102

B.S. Civil Engineering with an emphasis in Environmental Engineering-Iowa State University. Ms. Schmidt is a Senior Environmental Consultant with 8 years of experience working with various energy assets and regulatory agencies. As a consultant, she has managed multiple pipeline projects supporting clients through the construction permitting and siting processes, which included coordination with various federal, state and local agencies.

Chris Schmidt, GIT

Associate Consultant 3

E3 Environmental, LLC, 871 Jefferson Avenue, St. Paul, MN 55102

B.S. in Environmental Geology and Geologist-In-Training Certification for Minnesota. Mr. Schmidt has over 3 years of environmental consulting experience. Mr. Schmidt has pursued a career focused on regulatory compliance and supports energy clients by providing regulatory review and permitting services. Mr. Schmidt's experience includes work supporting pipeline systems of natural gas, natural gas liquids, and petroleum throughout multiple states.

Dan Woodward, RPA

Senior Archaeologist

E3 Environmental, LLC, 871 Jefferson Ave St Paul, MN 55102

M.A. Anthropology (archaeology focus), California State University -- Fullerton; and B.A. History, University of Florida. Mr. Woodward is a secretary of the interior qualified archaeologist with 15 years of environmental consulting experience working with various energy assets and regulatory agencies. As a senior archaeologist, he has overseen all phases of archaeological fieldwork from class I record searches and class III intensive surveys to detailed excavations and archaeological damage assessments. He has authored dozens of cultural resource technical reports fulfilling NHPA and NEPA cultural resource requirements. Mr. Woodward has also coordinated with multiple Native American groups and has met with interested Tribal representatives in the field to address project concerns. Mr. Woodward has performed historic building analysis and authored built-environment technical reports. Mr. Woodward has also assisted with extensive paleontological fieldwork including paleontological surveys, monitoring, and salvage activities.

North Dakota Public Service Commission

Application for Route Permit

**Meadowlark Midstream Company, LLC &
Epping Transmission Company, LLC**

Little Muddy Creek Pipeline & Epping Station Project

Prepared by:

E3 Environmental, L.L.C.

October 2014



E3 ENVIRONMENTAL
Enhancing Execution with Experience

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INTRODUCTION

Meadowlark Midstream Company, LLC (MMC) and Epping Transmission Company, LLC (ETC) are wholly owned subsidiaries of Summit Midstream Partners, LLC (Summit). Summit, through its subsidiaries, owns and operates crude oil and gas assets throughout North Dakota. Jointly MMC and ETC are proposing the Little Muddy Creek Pipeline and Epping Station Project (Project). The Project will include the expansion of the existing Epping Station (ES), which is currently operated by MMC, and the construction of the Little Muddy Creek Pipeline (Pipeline), which will be constructed and operated by ETC. The Pipeline would be approximately 14 miles in length and would transport crude oil from MMC's ES, located near the city of Epping in Williams County, to North Dakota Pipeline Company LLC's Little Muddy Creek Station (LMCS), which is located approximately 10 miles northwest of Epping in Williams County.

Prior to commencement of this Project, approximately 10 miles of the proposed 14-mile transmission line will be operated as a gathering pipeline. The gathering pipeline is needed to fulfill existing commitments with area producers. The gathering pipeline gathers crude oil directly from the wellhead and delivers it to the ES. This Project would involve modifications to the 10-mile gathering pipeline. Modifications would include the reversal of the direction of the flow and the connection of the gathering pipeline to the newly constructed transmission pipeline. The new transmission pipeline would be approximately 4-miles in length and would connect the modified and reversed gathering pipeline to the LMCS.

The proposed Project will also include the construction of one additional above ground tank at the existing ES to support the Pipeline. This tank will provide surge protection for, storage associated with, and general support for the proposed Pipeline. Currently there is one existing aboveground tank at the ES which is used for storage for the gathering lines.

MMC/ETC jointly submit to the North Dakota Public Service Commission (PSC) a single consolidated application for a Certificate of Corridor Compatibility and Route Permit for the Project.

The application provides the information required by:

- North Dakota Century Code, Energy Conversion and Transmission Facility Siting Act, Chapter 49-22-08; and
- North Dakota Administrative Code, Article 69-06-05, Transmission Facility Permit.

SECTION 1: DESCRIPTION

1.1 TYPE OF TRANSMISSION FACILITY

The proposed Project would result in a new crude oil transmission pipeline and expansion of the existing ES. The steel pipeline will meet U.S. Department of Transportation (DOT) regulations, specifically the design criteria outlined in 49 CFR 195.100, constructed per 49 CFR 195.200 operated and maintained per 49 CFR 195.400. Tanks constructed at the Epping Station will meet DOT regulations and will be constructed to API 650 Standards.

1.2 PURPOSE OF TRANSMISSION FACILITY

The purpose of the Project is to transport crude oil from the ES northwest to the LMCS. From the LMCS the crude will be transported through North Dakota Pipeline Company LLC's North Dakota Pipeline System for further distribution throughout the United States.

1.3 LENGTH, SIZE AND DESIGN OF PIPELINE FACILITY

1.3.1 LENGTH OF FACILITY

The proposed Project is approximately 14 miles in length.

1.3.2 PIPE SIZE

The Project pipeline specifications are detailed below:

- One 10-inch Nominal Diameter Steel Pipe
 - API 5L ERW/FBE. ARO pipe.
 - Wall Thickness of 0.365 inch.
 - Pipeline casings installed at State and US Highway crossings and Railroad crossings.

1.3.3 OPERATING PRESSURE AND THROUGHPUT

The Project has been designed with the following design parameters listed below:

- Maximum Operating Pressure: 1,480 pounds per square inch (psi).
- Normal Operating Pressure: 500 psi
- Maximum Throughput: 100,000 barrels per day (bpd)
- Normal Throughput: 50,000 bpd
- Maximum Operating Temperature: 180 degrees Fahrenheit

1.4 ABOVEGROUND FACILITIES

The proposed Project will include one (1) additional above ground tank with 55,000 barrels of storage capacity, which will bring total storage capacity at the ES to approximately 75,000 barrels. The additional storage is required to support the

transmission line. Additionally, the transmission line will include four (4) block valves, one at each the terminus and two additional mainline block valves. These aboveground appurtenances will be designed to and installed at locations that will meet DOT regulations. The valves will be actuated, fail-safe, automated and controlled by both the local actuation and by a 24-hour Control Center located in the City of The Woodlands, Texas. Please see Appendix A for engineering documents and Appendix B for the location of these facilities.

The ES storage tank specifications are detailed below:

- One 105.5-foot diameter storage tank with 55,000-barrel capacity to support the new crude oil transmission pipeline to LMCS.

The existing storage tank is, and the new storage tanks will be located within an earthen berm with adequate capacity to satisfy applicable regulations.

1.5 WIDTH OF RIGHT-OF-WAY

This pipeline will be constructed utilizing a 110-foot construction right-of-way (ROW). ETC will maintain a typical 25-foot permanent ROW along the entire length of the Project.

1.6 LOCATION

The Project will be located in Williams County, North Dakota. The Project would result in a transmission pipeline originating at the ES in Williams County, approximately 1-mile south of Epping, ND. From the ES the pipeline will extend in a northwest direction to its terminus at the existing LMCS, located approximately 10 miles northwest of Epping, ND. Please refer to the project maps provided in Appendix B.

1.7 PROJECT SCHEDULE

1.7.1 ROUTE PERMIT

MMC/ETC is seeking a Route Permit in or before January 2015.

1.7.2 CERTIFICATE OF CORRIDOR COMPATIBILITY

MMC/ETC are seeking a Certificate of Corridor Compatibility in or before January 2015.

1.7.3 CONSTRUCTION SCHEDULE

MMC/ETC has scheduled construction activities to commence as early as the first quarter of 2015. The construction activities would take approximately 4-6 months to complete. Commissioning and restoration activities will commence immediately after construction is complete.

SECTION 2: ROUTE ANALYSIS AND ENVIRONMENTAL STUDIES

2.1 PIPELINE ROUTE

MMC/ETC has conducted a thorough analysis of the proposed Corridor as reported in the Application for a Certificate of Corridor Compatibility. This analysis was a broad based study of the proposed Corridor (a 1-mile corridor centered upon a proposed route which was chosen utilizing web-based mapping tools, (*i.e.*, one-half mile on either side of the proposed route). The purpose of this analysis was to confirm that the proposed Project corridor was suitable and that it would cause minimal environmental impacts thus conforming to the PSC siting criteria.

In conjunction with these efforts, MMC/ETC studied routing alternatives and developed the proposed Project alignment (Route). MMC/ETC chose this Project alignment to meet landowner requests and to minimize impacts to environmental features. The Route meets the Project's objectives while conforming to the PSC's transmission route siting requirements. In support of MMC/ETC's route selection, the desktop studies from the Corridor were refined and augmented with field studies along the entire length of the Project by trained natural and cultural resource specialists. The environmental survey corridor was a minimum of 150-feet centered on the proposed Route and encompassed the entire footprint of the ES. Field crews performed these comprehensive natural and cultural resource surveys on April 23-25, 2014 and September 2-3. The purpose of these field studies was two-fold: (1) to definitively identify any potential resource issues (*e.g.*, wetlands, waterbodies, protected species, critical habitats or cultural resources) within the survey corridor; and (2) to provide the baseline field data necessary to prescribe alternative routing or mitigation as necessary to minimize environmental impacts. The results of these field surveys are discussed in the following sections, while the full Natural Resources Survey Report is contained in Appendix D and the Class I and Class III Cultural Resource Inventories are detailed in the Cultural Resources Report located in Appendix E.

2.2 ROUTE ALTERNATIVES

The Project will deliver an average of 50,000 bpd of crude oil from the ES to the LMCS. From the LMCS the crude would be transported through North Dakota Pipeline Company LLC's North Dakota Pipeline System for further distribution to market hubs/centers throughout the United States. MMC/ETC identified and evaluated several project alternatives; however, none of these alternatives effectively satisfied the Project objective. These alternatives included:

- No Action Alternative;
- Trucking Alternative; and
- Rail Alternative.

No Action Alternative:

This alternative would leave the region constrained by limited transport capacity for safe and reliable transmission of crude oil products to markets. Overall, regional oil and gas production would continue to be constrained by the limited volume of product that could be shipped utilizing existing infrastructure. No action could result in curtailment of crude oil production. For these reasons, MMC/ETC rejected a *No Action Alternative*.

Trucking Alternative:

This alternative was reviewed and eliminated due to the volume of crude oil to be transported. The normal daily throughput of the proposed Project would be approximately 50,000 barrels or 2,100,000 gallons of crude oil. The average load for a truck carrying crude oil is approximately 178 barrels (7,500 gallons) per truck. Thus, it will require 280 trucks per day, an average of 11.7 trucks every hour for 24 hours a day to transport the volume of product the pipeline would transport to the LMCS. This level of truck activity is not logistically feasible; it would cause an unacceptable amount of heavy vehicle traffic as well additional wear and tear on the infrastructure. Disruption in the trucking capacity due to seasonal load restrictions on roads, inclement weather or road repairs would cause a delay in delivering this valuable resource to market. This alternative is not desirable; therefore, MMC/ETC rejected a *Trucking Alternative*.

Rail Alternative:

Rail transport was also evaluated as a surface transportation alternative. However, the lack of active railroad service within reasonable proximity to the LMCS limited the viability of this alternative. Upon further analysis, this alternative was determined to be not feasible due to the associated environmental impacts, financial, logistic, and time constraints necessary to acquire land and construct the requisite rail infrastructure. This alternative is not desirable; therefore, MMC/ETC rejected a *Rail Alternative*.

2.3 ENVIRONMENTAL SURVEY

Field surveys were conducted of the survey corridor, depicted on the maps in Appendix B, on April 23-25, 2014 and ancillary natural resource and cultural resource surveys were conducted on September 2-3, 2014 to accommodate alignment adjustments that fell outside the original survey corridor.

2.3.1 NOXIOUS WEEDS

“Noxious weed” is a general term used to describe fast-spreading, non-native plant species in a given area. They have adverse ecological and economic impacts due to their ability to outcompete native plant species for habitat and resources. Field surveys identified one (1) area of Canada thistle in the survey corridor. MMC/ETC will

implement the appropriate mitigation measures in this area to avoid the spread of this noxious weed. Please see Appendix D for the complete Natural Resources Survey Report, and Section 5: Mitigative Measures in this document for the proposed mitigation procedures.

2.3.2 TREE/SAPLING/SHRUB SURVEY

During field survey, crews performed a detailed tree/shrub inventory. This inventory recorded the pre-construction status of these resources, which will form the baseline for restoration and mitigation reconciliation. Based on this effort, 9 tree rows and 11 naturally occurring wooded areas were observed within the survey corridor. In total, approximately 1,835 trees were identified within the survey corridor; 59 of these features were located within the surveyed 110-foot wide construction ROW. Please see Appendix D for the complete Natural Resources Survey Report and Section 5 for planned mitigation measures.

2.3.3 WETLAND AND WATERBODIES SURVEY

The survey corridor was inventoried for wetland and waterbody features (*i.e.*, creek, pond, streams, rivers). Field crews identified features, characterized these features as a wetland or waterbody and recorded feature boundaries relative to the proposed Route to facilitate avoidance mitigation where practicable. Appendix D contains the Natural Resources Survey Report, which outlines the results of these field efforts.

2.3.3.1 WETLAND SURVEY

Field surveys identified six (6) wetland features within the 110-foot wide construction ROW. MMC/ETC will implement appropriate mitigation at these features, which may include avoidance (*e.g.* workspace modification or horizontal directional drill) or use of construction mats and other best management practices to minimize impacts when working in or around wetlands. Please see Appendix B: Project Maps for the mapped location of each feature and Appendix D for the detailed Natural Resources Survey Report.

2.3.3.2 WATERBODIES SURVEY

No waterbodies and three (3) ephemeral drainages were identified during field surveys. See Appendix B for the mapped location of each feature, Appendix D for the detailed Natural Resources Survey Report, and Section 5: Mitigative Measures of this application for the proposed mitigation measures.

2.3.4 WILDLIFE INVENTORY

Approximately 160 wildlife species are resident or seasonal visitors to the Project Area. These include common mammals (*i.e.*, white-tailed deer, mule deer, raccoon and pronghorn antelope); various song birds (*i.e.*, western meadowlark, LeConte's sparrow, and horned lark); raptors (*i.e.*, bald eagle, golden eagle, red-tailed hawk, rough-legged hawk) and numerous other fauna. The proposed Route was inventoried for general wildlife species, state-listed plant and animal species of concern, and other significant ecological communities. No state-listed species or significant ecological communities

were observed by field biologists during field surveys. Please see Appendix D for the Natural Resources Report.

2.3.4.1 FEDERALLY PROTECTED SPECIES SURVEY

Under authority of the Endangered Species Act (ESA), the USFWS and the Fisheries Service division of the National Oceanic and Atmospheric Administration (NOAA) have identified and maintain a list of species and critical habitats that have been afforded protection under the ESA. The ESA also provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they live.

MMC/ETC commissioned field studies to confirm the presence or absence of these species and/or their critical habitats within the survey corridor. The results of this assessment are outlined below; refer to the Natural Resources Report in Appendix D, which outlines the results of these field efforts.

Whooping Crane: The Aransas-Wood Buffalo Population of Whooping Cranes engages in semi-annual migration through North Dakota. This flock breeds in the Wood Buffalo National Park in Alberta and Northwest Territories, Canada, and winters in the Aransas National Wildlife Refuge in Texas. This species has been closely studied and monitored in recent years due to its small, fragile population. North Dakota provides migratory habitat for the species, providing roosting and feeding opportunities during migration. During migration, the species is most closely associated with larger wetland complexes for roosting habitat, typically using adjacent uplands to forage.

Suitable foraging habitat (*i.e.*, cultivated cropland and wetlands) was observed within the survey corridor. Additionally, the Project is located within the migratory corridor for the whooping crane. The proposed Project may affect but is not likely to adversely affect the whooping crane. Please refer to Appendix C for related agency consultations, Appendix D for the detailed Natural Resources Report, and Section 5: Mitigative Measures in this document for proposed mitigation measures.

Interior least tern: The interior population(s) of the least tern have historically been associated with large river systems for breeding and migratory habitats. Breeding birds are known to breed in colonies, utilizing sandbar habitat common to larger rivers. Regionally the Missouri River is known to host remnant breeding populations of terns. The Project is approximately 12 miles north/northwest of the Missouri River and Lake Sakakewea. Suitable shoreline habitat for breeding and nesting terns does not occur in the survey corridor. Terns may transition through the project area during migration. The Project may, but is not likely to adversely affect the least terns. Refer to Appendix D for the detailed Natural Resources Report, and Section 5: Mitigative Measures in this document for proposed mitigation measures.

Pallid sturgeon: The pallid sturgeon preferred habitat includes the benthic environment associated with swift waters of large turbid, free-flowing rivers with braided channels, dynamic flow patterns, periodic flooding of terrestrial habitats and requiring extensive microhabitat diversity. Portions of the Missouri River are thought

to provide the required habitat for the pallid sturgeon though much of the habitat has been compromised due to channelization, installation of impoundments and altered flow regimes. If a large spill were to occur the pallid sturgeon could be impacted by from impacts to water quality. Therefore, proposed Project may affect but is not likely to adversely affect the pallid sturgeon. Please refer to Appendix D for the detailed Natural Resources Report, and Section 5: Mitigative Measures in this document for proposed mitigation measures.

Piping plover: The piping plover is associated with shorelines along small alkaline lakes, large reservoir beaches, river islands and adjacent sand pits. Breeding birds select wide beaches with highly clumped vegetation covering less than 25 percent of the area. The piping plover's current breeding range on the Northern Great Plains extends south along major prairie rivers including the Yellowstone and Missouri, and in alkali wetlands including those in northeastern Montana and North Dakota. The piping plover may occur within the project area as a migrant. Therefore, proposed Project may affect but is not likely to adversely affect the piping plover. Please refer to Appendix D for the detailed Natural Resources Report, and Section 5: Mitigative Measures in this document for proposed mitigation measures.

Bald Eagle: Field studies confirmed the absence of nesting or roosting habitat within 0.5 miles of the centerline of the survey corridor.

Golden Eagle: Field studies confirmed the absence of nesting or roosting habitat within 0.5 miles of the centerline of the survey corridor.

Migratory Bird: Field studies identified an active migratory bird nest (Horned lark) within the survey corridor during survey in April of 2014. The federally-listed candidate species and migratory bird, Sprague's pipit, was heard vocalizing near the Project however no there was no primary siting and no suitable nesting habitat for this species was observed. Project activities may occur within the February 1- July 15 breeding season. Please refer to Appendix D for the detailed Natural Resources Report, and Section 5: Mitigative Measures in this document for proposed mitigation measures.

2.3.5 NORTH DAKOTA STATE HISTORIC PRESERVATION OFFICE

The North Dakota State Historic Preservation Office (NDSHPO) is responsible for managing the historic and archaeological resources of the state; as such, the NDSHPO maintains records of all previously recorded cultural resources within the state. On April 22, 2014, SWCA conducted a Class I Cultural Resources Literature Search of records from the NDSHPO to identify previously completed cultural resource investigations and recorded cultural resources within the Corridor. Results of the investigation identified 42 previously recorded cultural sites within the Corridor.

The ensuing Class III Cultural Resource Inventory of the survey corridor was completed on April 23-25, 2014 by SWCA. During the inventory, SWCA personnel revisited one (1) previously recorded cultural resource (32WIX572), recorded one

(1) new isolated find (32WIX627) and recorded one (1) undocumented segment of the Great Northern Railroad (32WI481). Each cultural resource is detailed in Appendix E in the Cultural Resources Report.

The previously recorded isolated find is a prehistoric chipped stone (32WIX572). The newly recorded isolated find is an isolated piece of farm equipment (32WIX627) and an undocumented segment of the Great Northern Railroad (32WI481). Of these resources, 32WIX572 and 32WIX627 are recommended not eligible for the National Register of Historic Places (NRHP), and therefore no further work is necessary. Site 32WI481 has been previously determined to be eligible for NHRP, therefore this site will be avoided via horizontal directional drilling underneath the site.

The Cultural Resource Report was submitted to the NDSHPO for review and concurrence on June 4, 2014, the NDSHPO responded on June 10, 2014 concurring that the Project will have *No Significant Impacts* provided the mitigation measures outlined in the Cultural Resource Report are implemented. A record of this communication can be found in Appendix C.

On September 2-3, 2014, E3 commissioned SWCA Environmental Consultants to conduct an additional Class I and Class III Cultural Resource Inventory to accommodate Project adjustments that placed the centerline outside of the previously inventoried survey corridor. During the inventory, SWCA personnel recorded two resources; site 32WI481, which is detailed in the original Class I and Class III survey and in the paragraphs above. An isolated find (32WIX646) consisting of a Knife River Flint biface was also surveyed, it is recommended not eligible for the NRHP, and therefore no further work is necessary. The Addendum Cultural Resource Report was submitted to the NDSHPO and concurrence with the finding was received on October 10, 2014. A record of this communication can be found in Appendix C.

2.3.6 U.S. FISH AND WILDLIFE SERVICE MANAGED LANDS

On May 20, 2014, E3 requested a USFWS review of the Project, requesting information relating to the presence or absence of USFWS managed land within the survey corridor. The USFWS responded on August 11, 2014 and recommended that coordination with the Crosby Wetland Management District to confirm the presence or absence of USFWS wetland and grassland easements. MMC coordinated with the USFWS Crosby and Lostwood Wetland Management District on October 2, 2014 and on October 8, 2014 they confirmed that the pipeline does not cross any USFWS wetland easements. A record of this communication can be found in Appendix C.

SECTION 3: NEED FOR FACILITY

3.1 ANALYSIS OF NEED BASED ON PRESENT AND PROJECTED DEMAND, INCLUDING SYSTEM STUDIES

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. Studies conducted by the North Dakota Department of Mineral Resources and the USGS in 2010 estimated mean undiscovered volumes of 3.65 billion barrels of recoverable crude oil reserves may be available in North Dakota's deep shale formations. From March of 2007 to March of 2013, oil production in North Dakota has surged by 564 percent. In March of 2007, North Dakota produced 118,000 barrels of oil per day. That figure has increased to 783,000 barrels per day in March of 2013. In 2007, North Dakota accounted for roughly 2.5 percent of all the oil produced in the United States. In 2013, North Dakota accounted for roughly 11 percent of all the oil produced in the country.

A major constraint in transporting hydrocarbons from North Dakota to distribution centers and eventual end users in the United States is the lack of pipeline capacity. To relieve the pipeline constraints, several projects have been planned to address the growing volumes of crude oil, natural gas and natural gas liquids. However, pipeline capacity is not expected to keep pace with production, leaving incremental volumes to find alternative transportation methods, primarily rail or other surface transportation alternatives.

Construction of the proposed Project will provide firm, reliable service for 50,000 barrels of crude oil per day and provide a critical link between the ES and the LMCS. From the LMCS facilities, the crude would be transported through North Dakota Pipeline Company LLC's North Dakota Pipeline System for further distribution to market hubs/centers throughout the United States.

SECTION 4: SITING CRITERIA ANALYSIS

4.1 FACTORS TO BE CONSIDERED IN EVALUATING APPLICATIONS AND DESIGNATIONS OF SITES, CORRIDORS AND ROUTES (NDCC 49-22-09)

4.1.1 AVAILABLE RESEARCH AND INVESTIGATION RELATING TO THE EFFECTS OF THE LOCATION, CONSTRUCTION, AND OPERATION OF THE PROPOSED FACILITY ON PUBLIC HEALTH AND WELFARE, NATURAL RESOURCES AND THE ENVIRONMENT:

Route planning between the existing ES and the LMCS identified and evaluated several options for routing this Project. These studies were designed to define a preferred route that achieves project objectives, is technologically and economically feasible to construct, and minimizes impacts on landowners and the environment. The key logistical considerations were identification of existing utility corridors for collocation, and acquisition of pipeline rights-of-way (ROW) from area landowners. The majority of the proposed Project will be collocated with existing utilities or will parallel existing roadways.

Field studies were conducted to identify environmental, biological, and cultural resources along the Route; the results of this effort are discussed in Section 2 of this document, and full reports are provided in Appendices D and E. The sections below discuss possible effects on the public health and welfare.

4.1.2 THE EFFECTS OF NEW ENERGY CONVERSION AND TRANSMISSION TECHNOLOGIES AND SYSTEMS DESIGNED TO MINIMIZE ADVERSE ENVIRONMENTAL EFFECTS:

The Project does not include energy conversion or transmission technologies/systems that are specifically designed to minimize adverse environmental impacts. The Project will be constructed in compliance with environmental permits; the conditions of these permits are designed to minimize adverse environmental impacts. Refer to Section 5 of this document for a full description of the mitigation measures MMC/ETC has planned to minimize impacts resulting from the Project's location, construction and operation.

4.1.3 ADVERSE DIRECT AND INDIRECT ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED SHOULD THE PROPOSED SITE OR ROUTE BE DESIGNATED:

Unavoidable adverse direct and indirect environmental effects will be temporary and shall be minimized through compliance with environmental permits. The potential impacts to resources including vegetation, wildlife, agricultural operations, transportation and noise levels associated with construction as discussed in Section 4.4. MMC/ETC will mitigate these temporary impacts to the maximum extent possible.

The Project will be constructed in compliance with environmental permits; the conditions of these permits are designed to minimize adverse environmental impacts. Refer to Section 5 for a full description of the mitigative measures planned to minimize impacts resulting from the Project's location, construction and operation.

4.1.4 ALTERNATIVES TO THE PROPOSED CORRIDOR OR ROUTE WHICH ARE DEVELOPED DURING THE HEARING PROCESS AND WHICH MINIMIZE ADVERSE EFFECTS:

MMC/ETC will fully participate in the hearing process and will address any alternatives developed during the hearing process, as applicable.

4.1.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF NATURAL RESOURCES SHOULD THE PROPOSED CORRIDOR AND ROUTE BE DESIGNATED:

MMC/ETC is not aware of any irreversible or irretrievable commitments of natural resources that would result from the requested approvals.

4.1.6 DIRECT AND INDIRECT ECONOMIC IMPACTS OF THE PROPOSED FACILITY:

Construction of this Project will provide firm, reliable service for 50,000 bpd of crude oil and provide a critical transportation link between the ES and the LMCS for delivery to critical United States markets.

4.1.7 EXISTING PLANS OF THE STATE, LOCAL GOVERNMENT, AND PRIVATE ENTITIES FOR OTHER DEVELOPMENTS AT OR IN THE VICINITY OF THE PROPOSED ROUTE:

MMC/ETC is not aware of any other future development plans within or in close proximity to the Project.

4.1.8 THE EFFECT OF THE PROPOSED ROUTE ON EXISTING SCENIC AREAS, HISTORIC SITES AND STRUCTURES AND PALEONTOLOGICAL OR ARCHAEOLOGICAL SITES:

MMC/ETC has commissioned Class I and Class III cultural resource surveys of the Project. MMC/ETC developed mitigation plans for registered, eligible or unevaluated sites that encroach on the proposed construction corridor. The proposed mitigation is detailed in Section 5 of this document. All related correspondence can be found in Appendix C and supporting documentation of field studies can be found in Appendix E.

Project-specific consultation with various federal, state, and local agencies did not identify any scenic areas within the Route. Refer to Appendix C for a record of these consultations.

4.1.9 THE EFFECT OF THE PROPOSED ROUTE ON AREAS WHICH ARE UNIQUE BECAUSE OF BIOLOGICAL WEALTH OR BECAUSE THEY ARE HABITATS FOR RARE AND ENDANGERED SPECIES:

The proposed Project is not anticipated to result in permanent adverse impacts to the environment. Please see Section 2: Route Analysis and Environmental Studies for a comprehensive discussion of MMC/ETC'S efforts to identify sensitive environmental resources along the proposed Route and Section 5 for a comprehensive discussion of proposed mitigation. MMC/ETC has worked with agencies to develop a route that avoids or minimizes environmental impacts. Provided the mitigation plans are fully implemented and environmental permit conditions are faithfully executed, the Project will not result in any impact to listed or sensitive species or their habitats. Please see Appendix C for complete federal and state agency consultations. Detailed survey results can be found in Appendix D.

4.1.10 PROBLEMS RAISED BY FEDERAL AGENCIES, OTHER STATE AGENCIES AND LOCAL ENTITIES:

MMC/ETC consulted with several federal and state agencies to identify possible environmental resources within the Corridor and any related agency concerns. Resource issues raised by agencies included:

- USFWS: Additional coordination is recommended to confirm that the Project avoids USFWS wetland and grassland easements. The USFWS also recommend that if the project area has potential Sprague's pipit habitat that impacts should be minimized and documented. USFWS also indicated that the project area has potentially suitable roosting and feeding habitat for the Whooping crane and that proper steps should be taken to prevent impacts.
- ND Department of Trust Lands: Gravel deposits are located along pipeline corridor. If deposits are crossed MMC/ETC will need to test for gravel depth and pay royalties for lost gravel.
- NDGFD: The Department's primary concern is with the disturbance to native prairie and wooded draws associated with construction of the pipeline and associated access roads. Avoidance of these areas is recommended, if avoidance cannot be achieved areas should be reclaimed to pre-project conditions.

MMC/ETC incorporated this feedback into the Route selection process, and as appropriate, into field survey protocols. If field studies confirmed the presence of these items, MMC/ETC refined the proposed alignment or developed mitigation strategies to avoid or minimize direct impacts. Further discussion on agency consultations and concerns can be found in the Certificate of Corridor Compatibility application and discussions of avoidance and mitigation measures are found in Section 5 of this document. Please see Appendix C for complete federal and state agency consultations. Detailed survey results can be found in Appendix D and E.

4.2 EXCLUSION AREAS (NAC 69-06-08-02.1)

Exclusion areas are geographical areas that must be excluded in the consideration of a route for a transmission facility. The following table and text identify and discuss exclusion areas identified along the proposed Route.

Exclusion Area	Crossed by Proposed Route
Federal	
National Parks or Memorial Parks	No
Historic Sites or Landmarks	No
Natural Landmarks or Monuments	No
Wilderness Areas	No
State	
Historic Sites, Monuments, or Historical Markers;	No
Archaeological Sites	Yes
Parks	No
Nature Preserves	No
County	
Parks	No
Recreation Areas	No
Municipal Parks	No
Other	
Areas Critical to the Life Stages of Threatened or Endangered Animal or Plant Species	No
Areas where Animal or Plant Species that are Unique or Rare to this State would be Irreversibly Damaged	No
Areas within 1,200 feet of a geographic center of an intercontinental ballistic missile (ICBM) launch or launch control facility.	No
Areas within 30 feet on either side of a direct line between (ICBM) launch or launch control facilities to avoid microwave interference.	No

4.2.1 FEDERAL RESOURCE REVIEW

MMC/ETC has initiated consultations with various federal agencies and has conducted a comprehensive review of published information. MMC/ETC has concluded no national parks, memorial parks, landmarks, natural landmarks, monuments, or wilderness areas will be affected by the Project.

4.2.2 STATE RESOURCE REVIEW

MMC/ETC has confirmed, through a combination of agency consultations, review of publicly available information and field studies, no state parks, historic sites,

monuments, historical markers, or nature preserves are crossed by the proposed Route. Please refer to Section 2 of this document for a comprehensive discussion of MMC/ETC's consultations and Appendix C for copies of the correspondence.

MMC/ETC commissioned a Class I Cultural Resource Inventory of the proposed Corridor and augmented the effort with a Class III Cultural Resource Inventory of the Route. The results of the Class III effort are summarized in Section 2.3.5. Please see Appendix C for copies of agency consultations and Appendix E for the Cultural Resources Survey Report.

4.2.3 COUNTY RESOURCE REVIEW

MMC/ETC has confirmed through a combination of agency consultations, review of publicly available information and field studies the absence of county parks, county recreation areas, municipal parks, or parks owned by other subdivisions of government bodies within the proposed Route. Please refer to Section 2 of this document for a comprehensive discussion of MMC/ETC's consultations and Appendix C for copies of the correspondence.

4.2.4 AREAS CRITICAL TO THE LIFE STAGES OF THREATENED AND ENDANGERED ANIMAL OR PLANT SPECIES

MMC/ETC commissioned natural resource surveys of the proposed Route. The scope of the surveys included documentation of the presence or absence of federally listed and state listed species of concern or evidence of suitable habitats for these species. Emphasis was placed on those species identified through project consultations for the Corridor analysis that agencies indicated had the potential to occur within the Corridor and therefore, the Route. The results of these field efforts are detailed in Section 2.3 and planned mitigative measures are discussed in Section 5 of this document. Appendix D contains the complete Natural Resources Survey Report.

4.2.5 AREAS WHERE ANIMAL OR PLANT SPECIES THAT ARE UNIQUE OR RARE TO THIS STATE WOULD BE IRREVERSIBLY DAMAGED

Based upon agency consultations and subsequent field surveys, the proposed Project would not result in irreversible impacts that are detrimental to sensitive plant and animal species or their habitats. The implementation of the proposed mitigation plans and full compliance with environmental permits will fully mitigate the potential for irreversible damage.

4.2.6 AREAS WITHIN 1,200 FEET OF THE GEOGRAPHIC CENTER OF AN ICBM LAUNCH OR LAUNCH CONTROL FACILITY

MMC/ETC conducted a review of publicly available information and concluded there are no ICBM launch or launch control facilities within 1,200 feet of the Route.

4.2.7 AREAS WITHIN 30 FEET ON EITHER SIDE OF A DIRECT LINE BETWEEN ICBM LAUNCH OR LAUNCH CONTROL FACILITIES TO AVOID MICROWAVE INTERFERENCE

MMC/ETC conducted a review of publicly available information and concluded there are no ICBM launch or launch control facilities within 30-feet of the Route.

4.3 AVOIDANCE AREAS (NAC 69-06-08-02.2)

Avoidance areas are geographical areas that shall not be considered in the routing of a transmission facility unless, under the circumstances, it is shown there is no reasonable alternative. The following table and text identify and discuss avoidance areas crossed by the proposed Route.

Avoidance Area	Crossed by Proposed Route
Federal	
Historic Districts	No
Wildlife Areas	No
Wild, Scenic or Recreational Rivers	No
Wildlife Refuges	No
Grasslands	No
State	
Wild, Scenic or Recreational Rivers	No
Game Refuges or Game Management Areas	No
Forests or Forest Management Lands	No
Grasslands	No
Other	
Historic Resources not meeting Exclusion Areas criteria	Yes
Areas of Known Geologic Instability	No
Areas within 500-Feet of a Residence, School, or Place of Business	Yes
Reservoirs and Municipal Water Supplies	No
Water Sources for Organized Rural Water Districts	No
Irrigated Land (not applicable to underground facilities)	N/A
Areas of Recreational Significance which are not designated as Exclusion Areas	No

4.3.1 FEDERAL RESOURCE REVIEW

MMC/ETC conducted a comprehensive review of publicly available information and field studies of the survey corridor. This review indicated the absence of designated or

registered historic districts, refuges, grasslands, and wild, scenic or recreational rivers in the survey corridor.

4.3.2 STATE RESOURCE REVIEW

MMC/ETC conducted a review of publicly available resources and concluded no designated or registered state wild, scenic or recreational rivers, game refuges, game management areas, management areas, forests, forest management lands, or grasslands are crossed by the survey corridor.

4.3.3 HISTORICAL RESOURCES NOT MEETING EXCLUSION AREA CRITERIA

MMC/ETC conducted a review of publicly available resources along with field surveys and concluded there is one historical resource within the survey corridor that did not meet the exclusion area criteria. Refer to Section 5 of this document for additional mitigative measures, Appendix C for agency consultations and Appendix E for the complete Cultural Resources Report.

4.3.4 AREAS OF KNOWN GEOLOGIC INSTABILITY

There are no known areas of geological instability within the survey corridor. North Dakota has not experienced an earthquake of sufficient magnitude to damage welded steel piping or structural steel in recorded history. Sink holes are known to occur in North Dakota but are more closely related to mining activities and no evidence of mining or sink holes was identified. Finally, the potential for landslides was evaluated; earth movement of this nature is closely associated with areas of great topographic relief, high gradient slopes, recent deposits that have yet to reach a stable angle of repose, or where underground water movement may create a slurry of rock and mud resulting in a subsidence. No locations along the Route that can be characterized as unstable or prone to landslides.

4.3.5 AREAS WITHIN 500-FEET OF A RESIDENCE, SCHOOL OR PLACE OF BUSINESS

MMC/ETC utilized aerial photography to identify structures located within 500 feet of the proposed pipeline alignment. There appears to be one (1) residence located within 500 feet of the Project. MMC/ETC has obtained a landowner waiver from his landowner; it is located in Appendix G.

4.3.6 RESERVOIRS AND MUNICIPAL WATER SUPPLIES

MMC/ETC has confirmed the Route does not contain reservoirs or municipal source water protection areas for community water supply sources. While a number of wells were identified adjacent to the Route, these wells are used for either local domestic, stock, or irrigation purposes and none were located directly within the Route. The maps in Appendix B depict the location of these resources.

4.3.7 WATER SOURCES FOR ORGANIZED RURAL WATER DISTRICTS

MMC/ETC has confirmed the Route does not contain known water sources within the proposed Route. While a number of wells were identified adjacent to the Route, these wells are used for either local domestic, stock, or irrigation purposes and none were

located directly within or near the construction ROW. The maps in Appendix B depict the location of these resources.

4.3.8 IRRIGATED LAND

This criterion does not apply to underground transmission facilities and as such, it is not applicable to this Project.

4.3.9 AREAS OF RECREATIONAL SIGNIFICANCE WHICH ARE NOT DESIGNATED AS EXCLUSION AREAS

MMC/ETC has confirmed the Route does not traverse areas of recreational significance.

4.4 SELECTION CRITERIA (NAC 69-06-08-02.3)

The selection criteria require assessment of the environmental impacts and alterations to land use that may result from the siting of the proposed Project. Through this process, MMC/ETC proposes that it has successfully avoided or minimized these effects to the maximum extent practicable.

4.4.1 AGRICULTURAL IMPACTS

Agricultural Production: The Pipeline will temporarily affect approximately 186 acres of private land in North Dakota. The majority of the land crossed can be characterized as either agricultural or natural vegetative cover. Once the construction is complete, the land will be restored to its pre-construction contours and land use. MMC/ETC will provide settlements to landowners for crop loss resulting from Pipeline construction. The expansion at the ES will not have a significant effect on agricultural production, as it is located in an area previously developed for oil production.

Family Farms and Ranches: The Project will have no appreciable impact to lifestyle or farm/ranch operations, as no construction activities will be taking place in proximity to these areas. Ground-disturbing activities will take place only within the confines of the proposed construction right-of-way.

The location of pipeline markers is defined under 49 CFR 195 for pipelines. MMC/ETC works with local landowners and county officials to ensure that pipeline markers are located where required but also in an acceptable location for these parties. These markers are to be placed in full view so that they are not accidentally damaged by nor cause damage to landowner or county equipment.

Lands Suitable for Irrigation: This section is not applicable to buried pipelines (69-06-08-02.2h). The expansion at the ES will not affect lands suitable for irrigation as all ground disturbing/construction activities will occur within the boundaries of the existing MMC facility.

Surface Drainage: Standard pipeline construction techniques to be employed will not modify existing surface drainage patterns. Care will be taken throughout the construction process to minimize environmental impacts, including modification of

drainage patterns. During restoration, those areas that were disturbed during construction shall be restored, the local topography shall be restored to its original contours, vegetation shall be re-established and impacts shall be minimal and temporary. Best management practices will be implemented in accordance with the project-specific Storm water Pollution Prevention Plan (SWPPP), which will comply with the NDDoH Construction Storm Water General Permit requirements. The grading for the ES will occur to allow for the siting and construction of the storage tank. Permanent impacts to surface drainage will be minimized to the maximum extent possible. ES site drainage will be designed in a manner in which impacts to adjacent properties are not altered from pre-construction conditions.

Ground Water: Well data has been recorded by the State Water Commission for the Project area. Well data indicates that groundwater is located between 50-90 feet below the surface. The required tie-in excavations for the proposed Project are not anticipated to reach these depths as such no impact to ground water is anticipated.

4.4.2 THE IMPACTS UPON OTHER RESOURCES

Noise-Sensitive Land Uses: The Project is located in a rural setting, effectively isolating it from the majority of sensitive receptors. Construction of the proposed Project would affect the local noise environment. The ambient sound level of a region is defined by the total noise generated within the specific environment and is usually comprised of sounds emanating from natural and artificial sources. Construction could cause temporary increases in the ambient sound environment in the areas immediately surrounding active construction. Once constructed and in-service, normal pipeline operations are not audible. The ES is located in a rural setting, effectively isolating it from the majority of sensitive receptors. Once in operation noise from the ES should not exceed 20% of the ambient noise level.

The construction of the proposed Project would be conducted during typical working hours and is expected to cause temporary increases in ambient sound within and adjacent to the Project area. The use of heavy equipment or trucks would be the primary noise source during construction and excavation. The level of impact would vary by equipment type, duration of construction activity, and the distance between the noise source and the receptor.

Visual Effect on Adjacent Areas: The proposed Project will include the installation of a block valve at each terminus of the pipeline and two additional mainline block valves. These block valves are small aboveground features which will be installed within the footprint of each the facility. The visible piping and equipment are finished and maintained with a white painted surface.

One additional aboveground storage tank, associated secondary containment, and facility fencing will be constructed at the existing ES. Other oil development is occurring in proximity to the ES, and as such, visual impacts associated with the addition of one tank is minimal in this landscape.

No other permanent aboveground features are to be installed as a part of the Project.

Extractive and Storage Resources: One additional aboveground storage tank, associated secondary containment, and facility fencing will be constructed at the existing ES. Other oil development is occurring in proximity to the ES, and as such, visual impacts associated with the addition of one tank is minimal in this landscape.

Wetlands, Woodlands, and Wooded Areas: A comprehensive desktop review of published data, including aerial photography and NWI data, was conducted to assess the presence or absence of wetlands, woodlands, and wooded areas. The review of the proposed Corridor confirmed the presence of these resources. MMC/ETC commissioned field surveys to further identify and record the locations of these resources along the proposed Route. The results of these field studies will be used to implement construction measures to avoid or minimize impacts to wetlands, woodlands and wooded areas. The proposed mitigation is detailed in Section 5 of this document and detailed survey results can be found in Appendix D.

Radio and Television Reception, and other Communication or Electronic Control Facilities: MMC/ETC does not anticipate that the Project will affect radio, television, or other electronic control facilities.

Human Health and Safety: MMC/ETC's corporate Health and Safety policy meets or exceeds federal and state laws, rules and regulations, and is enforced equally with respect to both MMC/ETC and contractor employees. The implementation of this policy promotes a safe and healthy workplace during construction and operation of all MMC/ETC's assets.

The design of the Project has incorporated the use of block valves at regular intervals. The purpose of the block valve is to segment the system and allow for the isolation of select portions of the system to facilitate maintenance in a safe and controlled manner. Additionally, in the event of an abnormal operating condition, block valves can be closed as necessary to prevent an uncontrolled release of crude oil. Finally, the operation of the pipeline will be monitored in accordance with DOT regulations.

MMC has developed an Emergency Response Plan for the Epping Station storage facility and will train all employees on that plan and provide a copy of the plan to first responders. MMC prides itself on its safe work practices and considers health and safety to be among its core values

Animal Health and Safety: The wildlife currently inhabiting the Route are common and are generally mobile. The local wildlife inhabitants will not be displaced by the Project with no measurable impact to the viability of these populations. No species of special concern are anticipated to experience direct impacts due to construction or operation of the Project.

Plant Life: The Project will not result in the loss of agricultural or pastureland. No species of special concern will be impacted by the Project. Reclamation will be completed utilizing native seed mixes where appropriate.

4.5 POLICY CRITERIA (NAC 69-06-08-02.4)

4.5.1 POLICIES AND COMMITMENTS TO LIMIT ENVIRONMENTAL IMPACT

MMC/ETC will comply with requirements contained in the Corridor Compatibility Certificate and Route Permit. MMC/ETC will conduct its activities with the objectives of providing a healthful and safe workplace for its employees, and preventing accidents and environmental incidents. All persons and firms providing service to MMC/ETC are required to conduct their work in compliance with environmental conditions, permit authorizations, and applicable regulations, and will be held accountable for their actions in that regard. MMC/ETC is committed to conducting its business in compliance with all applicable environmental laws and regulations. These laws, regulations and standards are designed to safeguard the environment, human health, wildlife and natural resources.

4.5.2 LOCATION AND DESIGN

This Project will connect two facilities, the ES to tie-in to the LMCS. From this location, the crude would be transported through North Dakota Pipeline Company LLC's North Dakota Pipeline System to Clearbrook, MN for further distribution to market hubs/centers throughout the United States. Refer to Appendix B for Project location maps.

The proposed pipeline will be constructed of steel and will be a nominal 10-inch diameter pipe. The pipe installed will have a nominal wall thickness of 0.365 inches denoted as API Code 5L specification ERW/FBE ARO pipe. The maximum operating pressure (MOP) of the pipeline will be 1,480 psi.

The proposed pipeline will meet US Department of Transportation regulations, specifically the design criteria outlined in 49 CFR 195.100, constructed per 49 CFR 195.200 operated and maintained per 49 CFR 195.400.

The new storage tank will be located at the existing ES, approximately 1-mile south of Epping, ND. The new storage tank and associated containment structures will meet DOT regulations and be constructed to meet API 650 Standards.

4.5.3 TRAINING AND UTILIZATION OF AVAILABLE LABOR IN THIS STATE FOR THE GENERAL AND SPECIALIZED SKILLS REQUIRED

Pipeline construction is a specialized construction market and the labor force needed to build the Project will be primarily comprised of a workforce with these niche construction skills. The primary contractor will be a local contractor, supplying specialized skilled labor. MMC/ETC will draw upon the local labor force to supply general laborers. The workforce is anticipated to reach a peak of approximately 100 personnel.

4.5.4 ECONOMIES OF CONSTRUCTION AND OPERATION

The Project represents a total investment of approximately \$18 million to be spent in Williams County, North Dakota for the construction of the pipeline and station expansion. Once in-service, the continued costs of maintenance and operation of the proposed pipeline are expected to be minimal.

4.5.5 USE OF CITIZEN COORDINATING COMMITTEES

Through its corporate presence in the region (local office in Stanley), MMC/ETC has established and maintains a good relationship with the local community officials and the local population. These relationships provide multiple grass roots communication channels to inform local residents regarding the developments associated with the Project.

4.5.6 COMMITMENT OF A PORTION OF THE TRANSMITTED PRODUCT FOR USE IN THIS STATE

The proposed Project will interconnect with existing facilities. The products currently handled, transferred, and shipped at these facilities are currently delivered to markets located in and out of the state.

4.5.7 LABOR RELATIONS

MMC/ETC maintains positive labor relations with its staff and contract work force and does not anticipate encountering any adverse labor relations on this Project. The labor market in the region is generally supportive of the oil and gas industry.

4.5.8 THE COORDINATION OF FACILITIES

MMC own and operate the existing ES and will be responsible for its expansion; ETC will construct and own the Pipeline. The project will connect with the North Dakota Pipeline Company LLC's existing pipeline. MMC/ETC expect coordination with this entity to be seamless as the Project is of benefit to both parties.

4.5.9 MONITORING OF IMPACTS

MMC/ETC has operated pipeline gathering and associated facilities in the area since February of 2013. Through these operations has established and maintained positive landowner and community relationships throughout the region. MMC/ETC's operations reflect its commitment to corporate citizenship standards founded on integrity. MMC/ETC will monitor landowner concerns, if any, through its Land Department and will respond to all reasonable concerns. Similarly, MMC/ETC will monitor community concerns and will respond to all reasonable concerns brought to its attention by local community leaders. MMC/ETC is currently in the process of selecting a primary contractor for the construction of the Project, and will coordinate with this contractor with respect to the oversight responsibilities for construction activities. Environmental responsibilities shall be coordinated in the same manner.

4.5.10 UTILIZATION OF EXISTING AND PROPOSED ROW AND CORRIDORS

MMC/ETC chose the preferred Project alignment in an effort to maximize the use of existing utility corridors. Much of the proposed Project is adjacent to existing roadways or will share a corridor with another pipeline.

4.5.11 OTHER EXISTING OR PROPOSED TRANSMISSION FACILITIES

Appendix F contains MMC/ETC's 10-Year Plan.

SECTION 5: MITIGATIVE MEASURES

5.1 LOCATION

The location of the proposed route is a function of location of the ES, the LMCS and suitable routing. MMC/ETC commissioned field surveys of the proposed Route to facilitate treatment of specific agency concerns expressed during consultations; inventory the resources throughout the survey corridor, define the location and boundaries of resources that intersect the proposed alignment; identify potential impacts to natural resources; and identify avoidance or other mitigation opportunities to further minimize the impacts of the Project.

Trees and shrubs: MMC/ETC shall comply with the Commission's tree and shrub mitigation specifications. Field surveys included a pre-construction tree and shrub inventory. The clearing or removal of trees or shrubs will be done selectively, in a manner that minimizes the disturbance to woody vegetation and in compliance with the Commission's specifications. The replacement of trees and shrubs will be based upon actual impacts due to construction, shall meet the 2:1 ratio specified, and shall be fully documented.

Wetlands and Waterbodies: MMC/ETC will minimize impacts to wetland and waterbodies by minimizing workspace through these features and by utilizing low-impact crossing methods such as horizontal directional drilling where appropriate. Furthermore MMC/ETC would conduct all regulated crossings in compliance with the U.S. Army Corps of Engineers Nationwide Permit #12. Features will be returned to their pre-construction condition and contours.

Migratory Bird Treaty Act: The commonly observed timeframe for migration of protected species in North Dakota is February 1st to July 15th. Construction activities for the proposed Project are planned to begin in the first quarter of 2015. Based on the Project's schedule, construction activities may occur during the recognized migration/breeding season. MMC/ETC will develop and implement a mitigation plan which may include conducting survey for nesting birds prior to the commencement of ground disturbing activities and implementing avoidance and monitoring measures of any active nests.

Interior least tern: The interior population(s) of the least tern have historically been associated with large river systems for breeding and migratory habitats. Breeding birds are known to breed in colonies, utilizing sandbar habitat common to larger rivers. The interior least tern may occur within the Project area as a migrant. MMC/ETC will suspend heavy equipment operations when Interior least terns are found within 0.5 mile (line of sight) of the construction corridor. Suspended activities would resume in the absence of the Interior least tern(s).

Pallid sturgeon: The pallid sturgeon preferred habitat includes the benthic environment associated with swift waters of large turbid, free-flowing rivers with braided channels, dynamic flow patterns, periodic flooding of terrestrial habitats and

requiring extensive microhabitat diversity. Portions of the Missouri River are thought to provide the required habitat for the pallid sturgeon though much of the habitat has been compromised due to channelization, installation of impoundments and altered flow regimes. MMC/ETC maintains spill and emergency response plans which meet the requirement of federal agencies. The implementation of these plans in the event of a spill or release will mitigate the potential for such a release to impact water quality of the river infrastructure associated with Lake Sakakawea, which is located over 21.75 river miles from the Project.

Whooping crane: The Whooping crane is federally listed as an endangered species. It is present in North Dakota on a semi-annual basis during the spring and fall migration between breeding grounds in Wood Buffalo National Park in Alberta and Northwest Territories, Canada, winter grounds in the Aransas National Wildlife Refuge in the Gulf of Mexico. Whooping cranes may utilize a variety of habitats across a vast landscape during migration. Field surveys identified potential migratory foraging and roosting habitat in the survey corridor.

Scientists assume that the changing length of daylight coupled with seasonal weather patterns trigger the annual fall migration event. In North Dakota, the cranes will typically pass through the state during the fall migration occurring late August through mid-October with peak migration typically occurring in September. The spring migration typically occurs from late-March to mid-April. Construction activities for the proposed Project are scheduled to begin in the first quarter of 2015, which should largely mitigate impacts to this species. Additionally, to mitigate any adverse effects on migratory cranes, MMC/ETC will suspend heavy equipment operations when whooping crane(s) are found within 1 mile of the construction corridor. Suspended activities would resume in the absence of whooping cranes. Please see Appendix C for MMC/ETC's project notification to the USFWS.

Piping plover: The piping plover is associated with shorelines along small alkaline lakes, large reservoir beaches, river islands and adjacent sand pits. Breeding birds select wide beaches with highly clumped vegetation covering less than 25 percent of the area. The piping plover's current breeding range on the Northern Great Plains extends south along major prairie rivers including the Yellowstone and Missouri, and in alkali wetlands including those in northeastern Montana and North Dakota. The Piping plover may occur within the project area as a migrant. MMC/ETC will suspend heavy equipment operations when Interior least terns are found within 0.5 mile (line of sight) of the construction corridor. Suspended activities would resume in the absence of the Interior least tern(s).

Bald and Golden Eagle: Field surveys conducted in April and September of 2014 confirmed the absence of nests or nesting activities where habitat was suitable along the route.

To mitigate potential adverse effects on nesting and breeding eagles, the USFWS generally recommends maintaining a nest buffer of at least 0.5 miles for any eagles

nesting in the area. MMC/ETC will work with the USFWS as necessary if an eagle nest is identified within 0.5 miles of the proposed pipeline route.

Cultural Resources: On June 10th, 2014 and October 10, 2014 the NDSHPO provided concurrence of *No Significant Sites Affected* for the Project provided the mitigation measures outlined below are implemented.

32WIX572: This is a previously recorded isolated find located within the survey area. 32WIX572 is a prehistoric chipped stone consisting of a single Knife River Flint utilizing flake. Attempts were made to relocate this isolated find, however the resource was not found during field efforts. By definition, isolated finds are considered to lack the historic integrity to be determined eligible for nomination to the NRHP. Therefore, no further work is recommended or mitigation required for this resource.

32WIX627: This is a newly recorded isolated find located within the survey area. 32WIX627 consists of the remains of a Deering harvester with DEERING CHICAGO USA on the harvester. This harvester most likely dates back the early 20th century, potentially before the merger of McCormick-Deering. By definition, isolated finds are considered to lack the historic integrity to be determined eligible for nomination to the NRHP. Therefore, no further work is recommended or mitigation required for this resource.

32WI481: This is a previously recorded site within the survey area. 32WI481 is a segment of the Great Northern Railroad that is now owned and operated by Burlington Northern Santa Fe (BNSF). Segments of 32WI481 were recorded in 2001, 2008, 2010, 2011, 2012 and 2013. In 2001, these sites were recommended eligible for listing on the NRHP under Criterion A. Therefore, it is recommended that the site continue to be considered eligible for listing under Criterion A. In order to avoid this site MMC will horizontal directional drill beneath the site.

32WIX646: This is a prehistoric isolated find located within a harvested wheat field in the Missouri Coteau region surrounded by a low, rolling plain. The isolated find consists of an early stage Knife River Flint biface. Heavy patination and cortex were observed. Flakes had only been removed along the edge of the tool; none extended into the middle. No evidence of use-wear or retouching was observed on the biface. By definition, isolated finds are considered to lack the historic integrity to be determined eligible for nomination to the NRHP. Therefore, no further work is recommended or mitigation required for this resource.

5.2 CONSTRUCTION

The proposed construction of the pipeline will be conducted in an orderly sequence designed to complete the project in the minimum amount of time required to safely prepare the site, install the pipeline and restore the areas disturbed by construction.

Construction is estimated to require approximately 4-6 months to complete. Construction techniques will be employed that minimize the area of ground disturbance, off site deposition of sediments and long-term impacts to agricultural

productivity. Construction activities shall conform to all applicable permit stipulations; these requirements are mandated by the agency and implemented by the Project sponsor for minimizing impacts to the environment.

Restoration will immediately follow pipeline construction. Final grading will restore the original contours of the land. Disturbed areas will be prepared for re-seeding and restoration will be coordinated to meet landowner specifications.

No ground-disturbing activities will take place outside of the confines of the existing ES for the planned expansion. Construction of the ES will be done in accordance with all applicable local, state and federal regulations.

5.3 OPERATION

Once put into service, the proposed Project will operate continuously, delivering crude oil from the ES to the LMCS. Normal pipeline operations are imperceptible to the public, as they are silent, buried and therefore not visible, and require only minimal aboveground activity. Standard operating procedures will conform to applicable DOT requirements, which include regular pipeline monitoring and periodic inspection. Additionally, routine maintenance of the right-of-way will likely be required on a regular basis to remain in compliance.

The ES will also operate continuously providing storage and supplying the Pipeline with oil for transport. Station operations will include pumping and allocation of the oil throughout the Project

SECTION 6: DESCRIPTION OF RIGHT-OF-WAY PREPARATION, CONSTRUCTION AND RECLAMATION PROCEDURES

6.1 PIPELINE CONSTRUCTION

Construction will be an assembly-line process and will include the following general tasks: surveying and staking, clearing and grading, trenching, pipe stringing, pipe bending, welding, coating, hydrostatic testing, lowering in, tie-ins, backfilling, rough grading, and final restoration (*e.g.*, topsoil replacement, final grading, seeding and mulching, where required). The pipeline may be placed into service before final restoration has been completed in all areas.

At any location in the Project Area, construction activities will require approximately 4-6 months to complete from start to finish, except when weather-related delays affect the schedule. However, construction activity at any location is not continual but occurs in distinct phases with several days or weeks between each phase. For example, clearing and grading may require 10 hours to progress for one mile along the pipeline right-of-way, but trenching may not follow in that area for several weeks. During the interim, activity in the area may be completely lacking or limited to occasional vehicular or pedestrian traffic.

Surveying and Staking: Prior to construction activities, ETC will stake the centerline and establish the boundaries of the approved work areas (*e.g.*, the construction right-of-way boundaries and temporary extra workspace areas), and flag the location of approved access roads and foreign utility lines. Wetland boundaries and other environmentally sensitive areas will also be marked or fenced for protection at this time.

Clearing and Grading: Prior to clearing, landowner fences will be braced and cut, and temporary gates and fences will be installed to control livestock where necessary. A clearing crew will clear the work area of vegetation and obstacles that may be encountered (*e.g.*, remaining trees, stumps, logs, brush, and rocks) in the work area.

The right-of-way will be graded, where necessary, to provide a reasonably level work surface and to segregate topsoil. Topsoil will be carefully removed and stored along the edge(s) of the right-of-way in a manner that allows for a haul road and trench line. The topsoil depth in the area is variable, but generally, the topsoil is between 2-9 inches deep with the deepest topsoil in valleys and the thinnest topsoil on the hillsides and hilltops. The topsoil depth and the layer removed will be determined in the field; upon completion of pipeline construction, the trench will be backfilled and topsoil will to be returned to the upper soil horizon. All disturbed areas shall be graded to restore the original contours.

Where steep slopes or side slopes are encountered, the construction contractor may grade the slope to reduce the grade, or in areas of side slopes, two-tone the area to create level working surface. At these locations, excess spoil will be pushed to the side of the construction right-of-way, distributed over the working area and travel lane, or

stored in alternative temporary work space (ATWS.) This material will be returned to the original location and preconstruction contours reestablished during restoration.

Concurrent with grading, erosion and sediment control devices will be installed as required by state storm water permit conditions. Water bodies may be bored using horizontal directional drilling (HDD) methods to place pipe under the water body without disturbing the water body. The pipeline will be placed such that adequate cover from the bottom of the water body is in place. This is individual to the water body but is to be no closer than 5 feet to the bottom of the water body. Construction mats will also be installed across saturated wetlands to prevent rutting as equipment travels the right-of-way. Erosion and sediment control devices, which may include silt fences, straw wattles, straw bales and road access pads, will be installed where necessary to prevent soil and sediment from leaving the construction work area.

Following installation of the pipe and backfilling of subsoil in the trench, the right-of-way will be returned to the original grade and the topsoil will be redistributed over the work area.

Trenching: The trench will be excavated by using backhoes to a depth that provides sufficient cover over the pipeline after backfilling. The bottom width of the trench will be sufficient to accommodate the 10-inch-diameter pipeline. Typically, the trench will be excavated to a depth of about five feet deep to allow for a minimum of four feet of cover after construction. In cultivated areas, the depth of cover will be sufficient to be safely below the maximum tillage depth. Additional cover requirements may be applicable at public road crossings.

Trench spoil will be stored adjacent to but will not be mixed with topsoil on the non-working side of the right-of-way. In some cases, however, where sufficient space is lacking on the non-working side, trench spoil may be side cast on the travel lane and spread over the working side of the right-of-way.

Pipe Stringing, Bending, and Welding: Sections of externally coated pipe up to 60 feet long (*e.g.*, joints) will be transported over public roads to the right-of-way by truck and placed or “strung” along the right-of-way parallel to the trench in a continuous line. After the pipe sections are strung along the trench and before they are welded together, individual sections of the pipe may be bent, where necessary, so that the finished pipeline sections conform to the natural contours of the land. Typically, a track-mounted, hydraulic pipe-bending machine will be used. Where multiple or complex bends greater than what can be properly bent in the field are required, a factory made “fitting” will be used.

After the pipe sections are bent, the joints will be welded together into sections and placed on temporary supports. Welding will comply with requirements listed in Title 49 CFR Part 195 and API Standard 1104 *Welding of Pipelines and Related Facilities*. Each weld will be tested by using radiographic non-destructive examination to ensure that no defective welds are present and that ETC engineering standards are met. Welds that do not meet standards and specifications will be removed and/or repaired.

A third-party contractor certified in non-destructive inspection will be used and inspections will be performed as outlined in Title 49 CFR Part 195. After the welds are approved, a protective epoxy coating will be applied to the welded joints. The pipeline will subsequently be electronically and visually inspected for defects in the epoxy coating. Damage to or defects in the coating will be repaired prior to lowering-in the pipeline. Cathodic protection systems will also be directly bonded to the pipe at this time.

Lowering-in and Backfilling: The trench will be inspected for the presence of rocks and other debris that could damage the pipe or protective coating. If rocks or other obstructions are observed, these will be removed or the pipeline trench bottom will be padded with subsoil or sand prior to the pipeline lowered into the trench.

If the trench bottom is obscured by water, the trench will be dewatered. Where dewatering is required, ETC will pump water from the trench into well-vegetated upland areas or into sediment filtration/energy dissipation devices.

In areas of steep slopes, breakers consisting of sand bags or foam will be installed to prevent 'piping' from occurring along the pipe in the trench after the area is backfilled.

The trench will be backfilled using the native material removed and compacted; however, the trench may be slightly crowned to accommodate settling.

Hydrostatic Testing: ETC will hydrostatically test the pipeline. Hydrostatic testing shall conform to DOT standards and shall establish the maximum operating pressure (MOP) for the pipeline when it is operational. Testing involves installation of test headers that control the pressure applied. The test headers are later removed upon the completion of a successful pressure test. The test procedures are a function of pressure and time, once the desired test pressure has been achieved, the test section must hold the pressure for an 8-hour period, without a significant change in pressure. Once testing is completed, the test water is evacuated; the line is dried, and prepared for commissioning. ETC will either procure discharge permit(s) from the NDDoH and the ensuing discharge will conform to the conditions stipulated in the permit, or capture the water and transport the water offsite for disposal.

Final Tie-in and Commissioning: Following successful pressure testing, test manifolds will be removed and the final pipeline tie-ins will be made. After final tie-ins are complete, the tie-in welds have been inspected and the line is sufficiently dried, the pipeline will be commissioned. Commissioning involves activities to verify that equipment is properly installed and working, the controls and communications systems are functional, and that the pipeline is ready for service. The pipeline will be cleaned and dried using mechanical devices; the line will be purged of air and then loaded with product.

Cleanup and Restoration: Final cleanup will begin after backfilling as soon as weather and site conditions permit. During cleanup, construction debris remaining on

the right-of-way will be collected and disposed of properly. Work areas will be graded and restored to preconstruction contours as closely as practical.

During restoration, segregated topsoil will be spread over the surface after final grading and permanent erosion controls will be installed. After permanent erosion control devices are installed, disturbed, non-cultivated areas will be seeded and slopes mulched where required. Seed mixes will be approved in advanced by the landowner, and seeding will occur within the recommended seeding dates for the Project area.

For cultivated areas, no seed or mulch will be applied after the topsoil is replaced unless specifically requested by the landowner.

Every reasonable effort will be made to complete final cleanup (including final grading and installation of erosion control devices) in accordance with landowner requests or permit conditions within 21 days of backfilling.

Markers showing the location of the pipeline will be installed at fence and road crossings in order to identify the owner of the pipeline and convey emergency information in accordance with applicable governmental regulations, including DOT safety requirements. Special markers providing information and guidance to aerial patrol pilots will also be installed.

The horizontal directional drilling bore method involves setting a horizontal drill rig at one or both ends of the bore area. If the drill rig is located on or near the stream bank, erosion countermeasures will be installed to minimize bank disturbance and prevent further erosion during the drilling operation. The drill bores underneath the water body followed by a casing pipe, which provides drilling fluid to dissipate heat and remove soil spoils. The main pipe, known as the string pipe, will be installed inside the casing pipe once the bore has been completed. The string pipe will then be connected to the main pipeline.

Following installation of the casing and string pipes, the stream bank will be restored as necessary. ETC will compact the banks and install erosion and sediment control blankets on the banks after seeding to prevent scour and a discharge of sediment to the waterbody. In addition, sediment control barriers will be installed on the top of the banks to prevent sediment generated from the right-of-way from entering the waterbody. These barriers will remain in place until the right-of-way approaches are adequately vegetated.

ETC is proposing to cross-flowing waterbodies using methods that will minimize the length of time necessary to install the pipes and restore the stream bank, as well as to prevent sediment from entering the waterbody during construction to reduce the impacts on the waterbody. For all ephemeral, intermittent and perennial crossings, ETC will implement the following mitigative measures:

- Temporary extra workspaces will be located at least 50 feet from the edges of the waterbody, unless a 10-foot setback is identified for waterbodies located in actively cultivated agricultural fields.
- Temporary extra workspaces will be limited to the minimum size needed to construct the waterbody crossing.
- Riparian vegetation will be preserved by limiting clearing of vegetation between temporary extra workspace areas and waterbody edges;
- Temporary sediment and erosion control devices will be installed across the width of the right-of-way after clearing but before ground disturbance. These devices will remain in place throughout construction until stream banks and adjacent upland areas are stabilized.
- Trench spoil placement will be restricted to at least 10 feet from the water's edge on the right-of-way, or in temporary extra workspace areas.
- Waterbody buffers will be maintained (*e.g.*, temporary extra workspace area setbacks, refueling restrictions) in the field with signs until construction, related ground-disturbing activities are complete.
- The use of equipment operating in the waterbody will be limited to that needed to construct the crossing.
- Construction will be completed across minor waterbodies (*i.e.*, less than or equal to 10 feet wide) within a single 24-hour time period.
- Storage and refueling activities will be restricted near surface waters and procedures in the Spill Prevention, Control and Countermeasure (SPCC) Plan will be promptly implemented if a spill or leak occurs during construction.
- Bank stabilization and re-establishment of streambed and bank contours will be required after construction.
- A permanent slope breaker will be installed across the right-of-way at the base of slopes greater than 5 percent that are less than 50 feet from the water's edge.

Wetland Restoration: Following pipeline installation, the trench will be backfilled with the material excavated and, to the maximum extent possible, restored to pre-construction contours. Replacing the wetland soil and restoring pre-construction hydrology will promote the rapid re-establishment of hydrophytic vegetation.

ETC will also take precautionary measures outside wetland boundaries to prevent construction in uplands from having an impact on wetlands. These measures include:

- Installing sediment barriers across the entire construction right-of-way immediately upslope of the wetland boundary where necessary to prevent sediment flow into the wetlands.
- Installing sediment barriers along the edge of the construction work area where wetlands are adjacent to the construction right-of-way and the ground surface slopes toward the wetland.

Following backfilling, topsoil segregated before trenching will be returned to the area from which it was stripped. If timber mats or riprap were used, ETC will remove the supports from the wetland. No lime, mulch or fertilizer will be used in wetlands, but ETC will apply annual ryegrass in wetlands without standing water.

All materials used for equipment crossings in wetlands will be removed in their entirety following construction, and the area will be restored and stabilized according to the relevant permit authorizations.

Agricultural Land Restoration: Extensive portions of the Project will involve heavy construction through agricultural areas. These areas consist of active croplands predominately used to grow durum, hard red spring wheat, red winter wheat, barley, sunflowers and canola. Additionally, agricultural lands are also used as range or pasture land used for livestock production. ETC will utilize the following general construction methods in agricultural areas, consistent with the requirements of landowners:

- Prior to construction, landowners will be contacted and irrigation facilities, and wells, waterlines and other and livestock watering systems will be located.
- Water flow will be maintained in supply systems unless shutoff is coordinated with the affected parties.
- Existing fences will be cut and braced along the right-of-way, and temporary gates and fences, if necessary, will be installed to control livestock and limit public access.
- On all active agricultural lands, which include fallow or rotated cropland, hayfields, improved pastures and rangeland, ETC will remove the topsoil removal and segregate the soil from subsoil.
- ETC will decompact the travel lane on the right-of-way if requested by the landowner.
- On all actively cultivated lands free of shallow bedrock, the trench would be excavated to sufficient depth to allow a minimum of 4 feet of soil cover between the top of the pipe and the final land surface after backfilling.
- Restoration and revegetation practices (*i.e.*, seeding) will comply with the requirements outlined in the landowner line list.
- ETC will not plant an annual cover crop on actively cultivated land unless requested by the landowner.
- Weed-free mulch will be used on steep slopes to control erosion unless the landowner requests that mulch not be applied. Mulch will be crimped into the soil.
- Earthen diversion berms will be constructed to reduce runoff on steep slopes only when the landowner approves.
- No erosion control fabric will be used in rangeland without having landowner approval.

- Fences and gates will be replaced in accordance with landowner agreements.
- Private roads will be restored to equal pre-construction condition.
- ETC will respond promptly to landowner concerns following construction to mitigate areas of subsidence and erosion problems should they occur.
- ETC will require the contractor to thoroughly clean the equipment and materials (*e.g.*, timber mates, bridges, etc.) at the contractor yard prior to mobilization to the right-of-way to prevent spread of nuisance weeds.

6.2 EPPING STATION EXPANSION

No construction-related activities will take place outside of the footprint of MMC'S properties at the existing ES. As such, no surveying, staking or clearing will be necessary. The construction activities will include grading, tie-in and commissioning, and clean/final restoration activities.

Grading: The storage tank site will be graded, where necessary, to provide a reasonably level work surface. Where steep slopes or side slopes are encountered, the construction contractor may grade the slope to reduce the grade, or in areas of side slopes, two-tone the area to create level working surface.

Concurrent with grading, erosion and sediment control devices will be installed as required by state storm water permit conditions. Erosion and sediment control devices, which may include silt fences, straw wattles, straw bales and road access pads, will be installed where necessary to prevent soil and sediment from leaving the construction work area.

Final Tie-in and Commissioning: Following successful testing, test manifolds will be removed and the final pipeline tie-ins will be made. After final tie-ins are complete, the tie-in welds have been inspected and the line is sufficiently dried, the storage tank will be commissioned. Commissioning involves activities to verify that equipment is properly installed and working, the controls and communications systems are functional, and that the storage tank is ready for service. The storage tank will be cleaned and dried using mechanical devices; the tank will be purged of air and then loaded with product.

Cleanup and Restoration: Final cleanup will begin after backfilling as soon as weather and site conditions permit. During cleanup, construction debris remaining in the work area will be collected and disposed of properly. Work areas will be graded and restored to preconstruction contours as closely as practical.

Every reasonable effort will be made to complete final cleanup (including final grading and installation of erosion control devices) in accordance with landowner requests or permit conditions within 21 days of completion.

SECTION 7: EASEMENT, ACQUISITION, LANDOWNER NOTIFICATION AND EASEMENT COMPENSATION PLAN

7.1 LANDOWNER INFORMATION REGARDING EASEMENT ACQUISITION, AND NECESSARY EASEMENT CONDITIONS AND RESTRICTIONS

Once a preliminary route has been established, a title review is conducted of courthouse records for the purpose of identifying the current landowner. ETC initiates contacts with affected landowners via telephone to be followed with personal visits and e-mail correspondence. Contact by surface mail may be used as a last resort if no other means of landowner contact is successful.

The refinement of the Route includes adjustments made per landowner request. ETC, at all times, negotiates in good faith and necessary easement conditions and restrictions are presented and discussed. All fee land easements for the proposed Route have been acquired at this time for the portion of the route located in the State of North Dakota.

7.2 COMPENSATION POLICY

ETC'S practice for determining landowner compensation for easements is based on research of comparable fair market pricing and prior experience negotiating easements locally.

SECTION 8: LIST OF PREPARERS

John Millar

Vice President-Liquids Group
Summit Midstream

Mr. Millar is Vice President, Liquids Group for Summit Midstream and is responsible for developing liquid pipeline commercial opportunities and for managing Summit's liquid pipeline assets. Prior to joining Summit Midstream, Mr. Millar was Vice President and General Manager of Genesis Energy, L.P.'s pipeline, terminal, and trucking businesses, responsible for improving safety, operating efficiency, and service quality and for developing growth projects involving liquid pipeline facilities, marine terminals, rail facilities, and truck stations. Prior to joining Genesis, Mr. Millar held numerous positions in engineering, project management, field operations, control center operations, joint ventures, and business development for Chevron Pipe Line Company, EOTT Energy, Unocal Corporation, and Enbridge Energy Partners. Mr. Millar has over 28 years of experience in nearly all aspects of the oil pipeline industry and holds BS and MS degrees in Civil Engineering from the University of California and an MBA from the University of Houston. Mr. Millar is a licensed Civil Engineer in the State of California.

William McCarthy, C.W.B.

Senior Environmental Compliance Analyst
E3 Environmental, LLC, 871 Jefferson Avenue, St. Paul, MN 55102

M.S. Wildlife Biology, University of Minnesota – Twin Cities; and B.S. Wildlife Biology, Michigan State University. Mr. McCarthy is an environmental compliance analyst with 15 years of environmental consulting experience working with various energy assets and regulatory agencies. As a compliance analyst, he has managed the environmental requirements for facility siting, pipeline routing, federal licensing and various federal, state and local permits. Mr. McCarthy is a certified wildlife biologist and in this role conducts and coordinates field studies, agency consultations, mitigation and avoidance plans.

Katie Schmidt, EIT

Environmental Engineer and Senior Consultant

E3 Environmental, LLC, 871 Jefferson Avenue, St. Paul, MN 55102

B.S. Civil Engineering with an emphasis in Environmental Engineering-Iowa State University. Ms. Schmidt is a Senior Environmental Consultant with 8 years of experience working with various energy assets and regulatory agencies. As a consultant, she has managed multiple pipeline projects supporting clients through the construction permitting and siting processes, which included coordination with various federal, state and local agencies.

Chris Schmidt, GIT

Associate Consultant 3

E3 Environmental, LLC, 871 Jefferson Avenue, St. Paul, MN 55102

B.S. in Environmental Geology and Geologist-In-Training Certification for Minnesota. Mr. Schmidt has over 3 years of environmental consulting experience. Mr. Schmidt has pursued a career focused on regulatory compliance and supports energy clients by providing regulatory review and permitting services. Mr. Schmidt's experience includes work supporting pipeline systems of natural gas, natural gas liquids, and petroleum throughout multiple states.

Dan Woodward, RPA

Senior Archaeologist

E3 Environmental, LLC, 871 Jefferson Ave St Paul, MN 55102

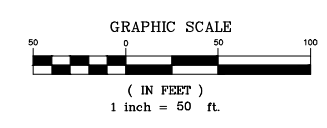
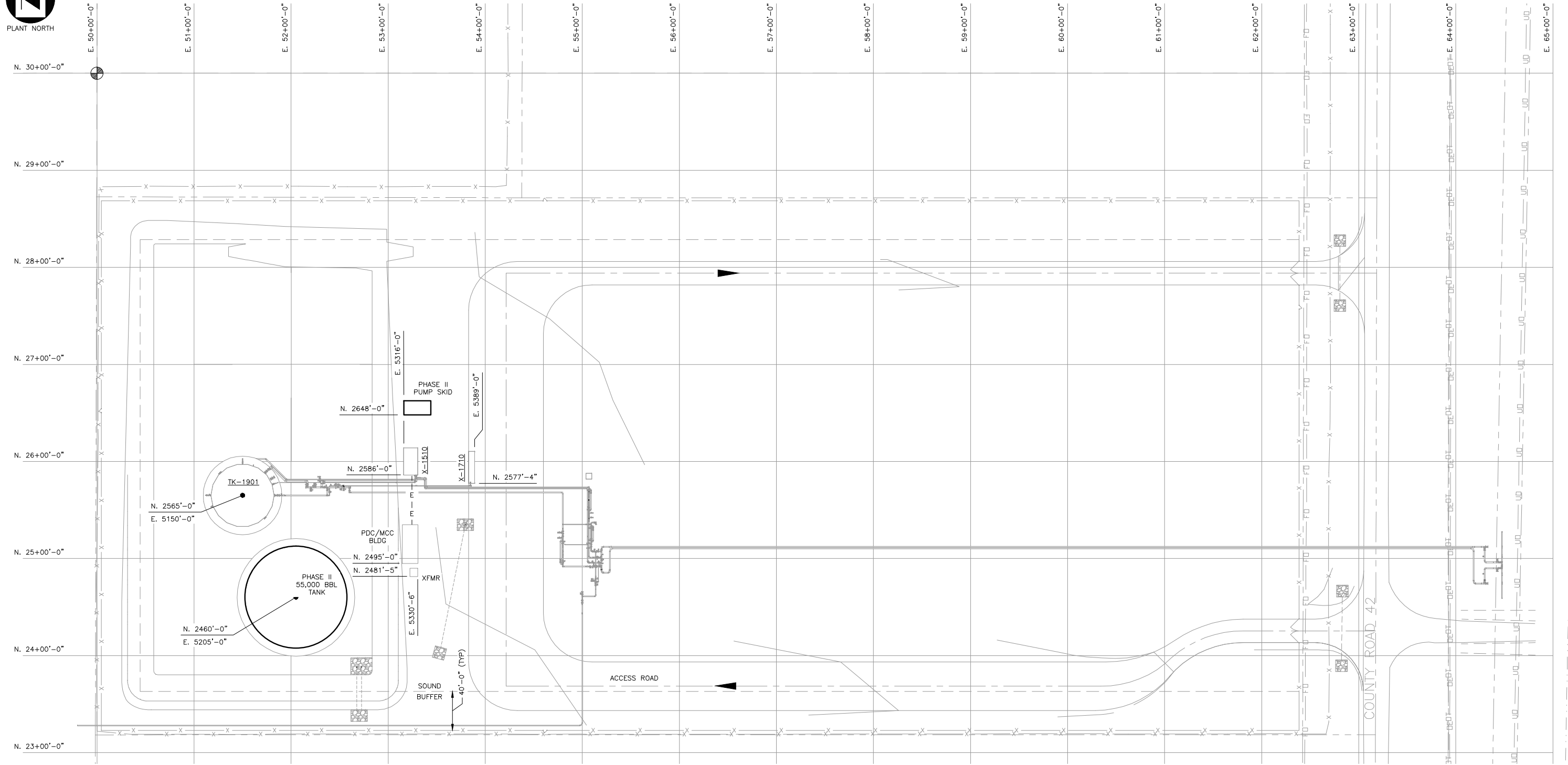
M.A. Anthropology (archaeology focus), California State University -- Fullerton; and B.A. History, University of Florida. Mr. Woodward is a secretary of the interior qualified archaeologist with 15 years of environmental consulting experience working with various energy assets and regulatory agencies. As a senior archaeologist, he has overseen all phases of archaeological fieldwork from class I record searches and class III intensive surveys to detailed excavations and archaeological damage assessments. He has authored dozens of cultural resource technical reports fulfilling NHPA and NEPA cultural resource requirements. Mr. Woodward has also coordinated with multiple Native American groups and has met with interested Tribal representatives in the field to address project concerns. Mr. Woodward has performed historic building analysis and authored built-environment technical reports. Mr. Woodward has also assisted with extensive paleontological fieldwork including paleontological surveys, monitoring, and salvage activities.

Appendix A

Engineering Documents



PLANT NORTH



NOTES:

REV	DESCRIPTION	DATE	BY	APPROVED
B	ISSUED FOR CLIENT REVIEW			HLN
A	ISSUED FOR INTERNAL REVIEW			HLN

DRAWING NUMBER	DESCRIPTION
	CONFIDENTIAL



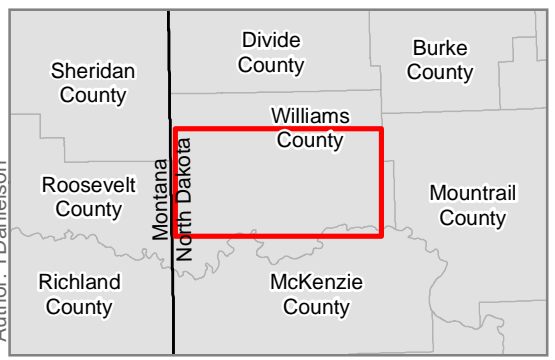
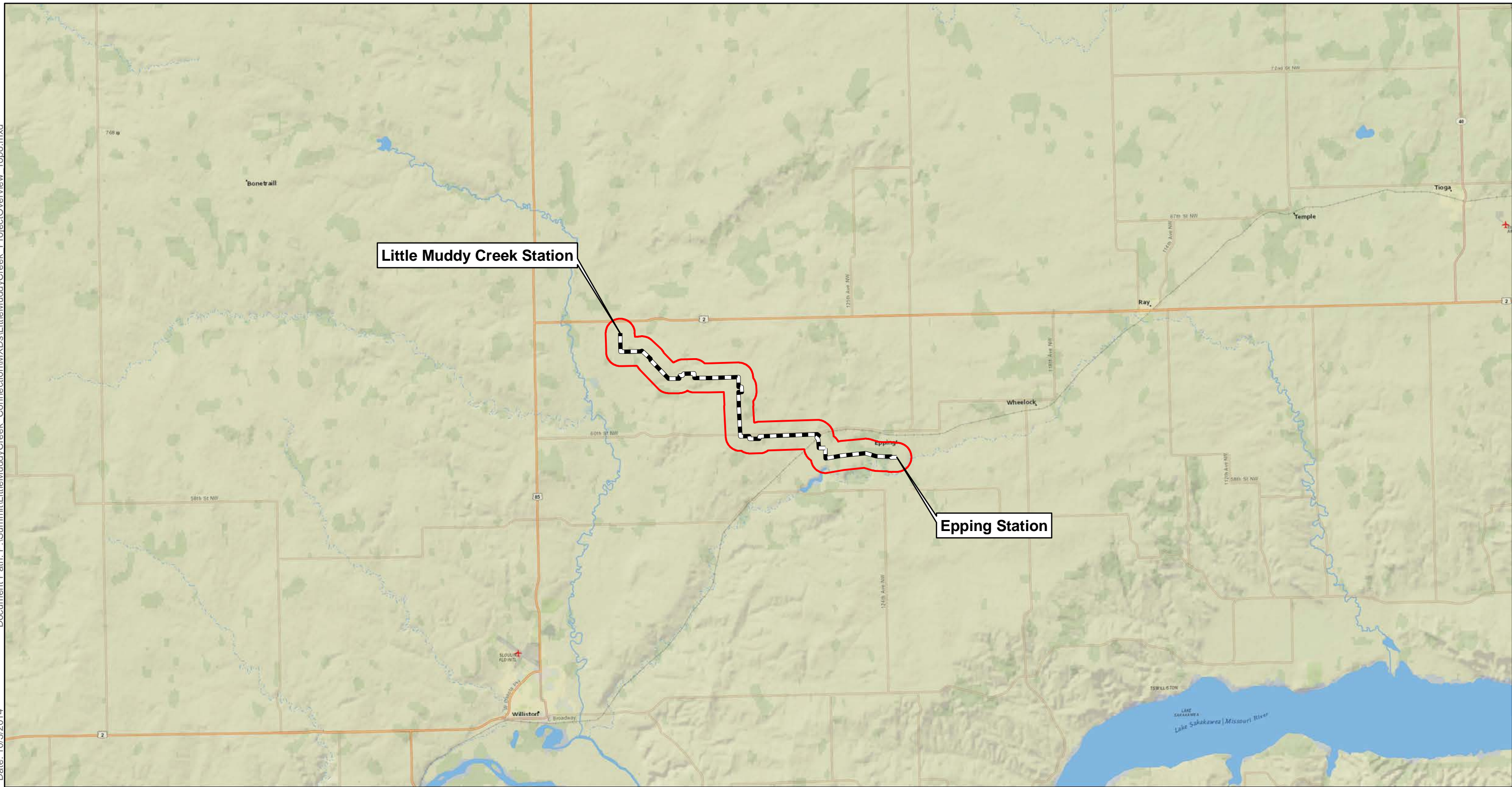
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09/09/13	HLN



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GENERAL ARRANGEMENT	
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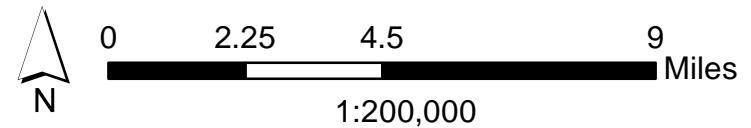
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Appendix B

Project Maps



-  Pipeline
-  Corridor (1 Mile)



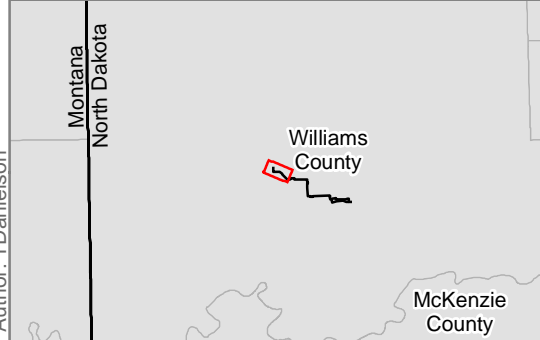
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Meadowlark Midstream Company, LLC
 Little Muddy Creek Pipeline
 Topo Overview Map
 Williams County, ND

Document Path: P:\Summit\LittleMuddyCreek_Connection\MXD\PS_C_Maps\LMCC_11x17_NaturalResource.mxd

Date: 10/7/2014

Author: TDanielson



Centerline	Noxious Weed
Inventory Corridor	NDWC Well
Corridor (1 mile)	Potentially Occupied Structure
Ephemeral Drainage	1 Mile Corridor
Wetland	Inventory Corridor
Woody Vegetation	

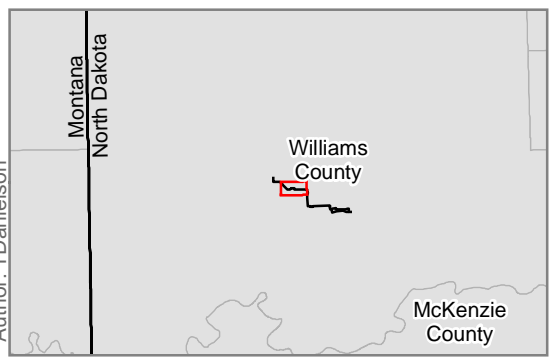
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Enhancing Execution with Experience

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Map not to scale, for environmental review purposes only.

Summit Midstream Partners
Little Muddy Creek Connection
 Siting Criteria
 Natural Resource - Aerial Map
Page 1 of 6
 Williams County, North Dakota



Centerline	Noxious Weed
Inventory Corridor	NDWC Well
Corridor (1 mile)	Potentially Occupied Structure
Ephemeral Drainage	1 Mile Corridor
Wetland	Inventory Corridor
Woody Vegetation	

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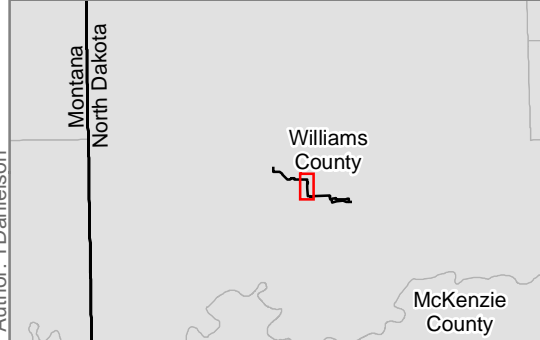
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Summit Midstream Partners
Little Muddy Creek Connection
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Page 2 of 6
 Williams County, North Dakota


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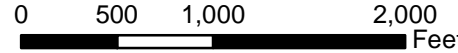
Author: TDanielson



-  Centerline
-  Inventory Corridor
-  Corridor (1 mile)
-  Ephemeral Drainage
-  Wetland
-  Woody Vegetation
-  Noxious Weed
-  NDWC Well
- Potentially Occupied Structure**
-  1 Mile Corridor
-  Inventory Corridor



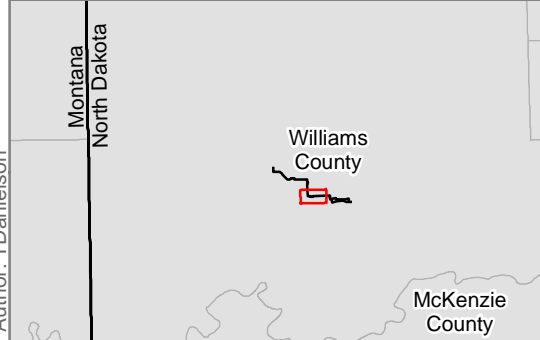
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Little Muddy Creek Connection
 Siting Criteria
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- | | |
|--------------------|---------------------------------------|
| Centerline | Noxious Weed |
| Inventory Corridor | NDWC Well |
| Corridor (1 mile) | Potentially Occupied Structure |
| Ephemeral Drainage | 1 Mile Corridor |
| Wetland | Inventory Corridor |
| Woody Vegetation | |

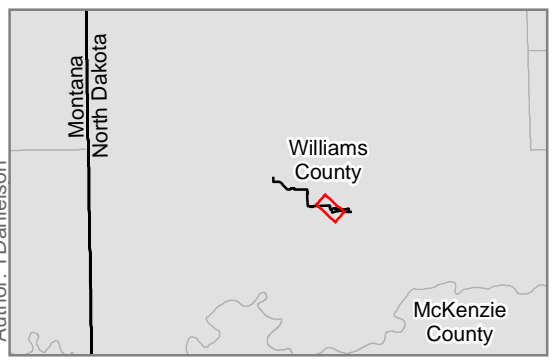
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Summit Midstream Partners
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 Natural Resource - Aerial Map
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 Williams County, North Dakota



Centerline	Noxious Weed
Inventory Corridor	NDWC Well
Corridor (1 mile)	Potentially Occupied Structure
Ephemeral Drainage	1 Mile Corridor
Wetland	Inventory Corridor
Woody Vegetation	

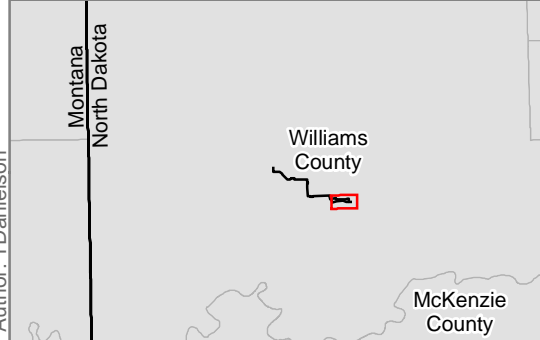
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Little Muddy Creek Connection
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 Williams County, North Dakota



Centerline	Noxious Weed
Inventory Corridor	NDWC Well
Corridor (1 mile)	Potentially Occupied Structure
Ephemeral Drainage	1 Mile Corridor
Wetland	Inventory Corridor
Woody Vegetation	

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Enhancing Execution with Experience

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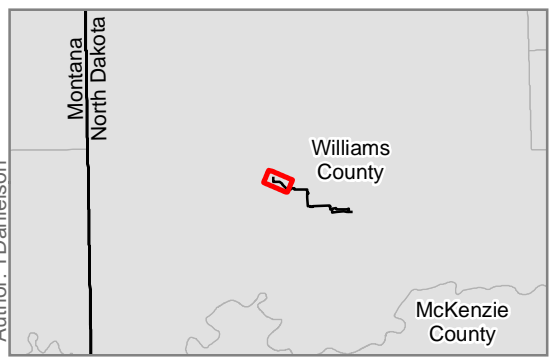
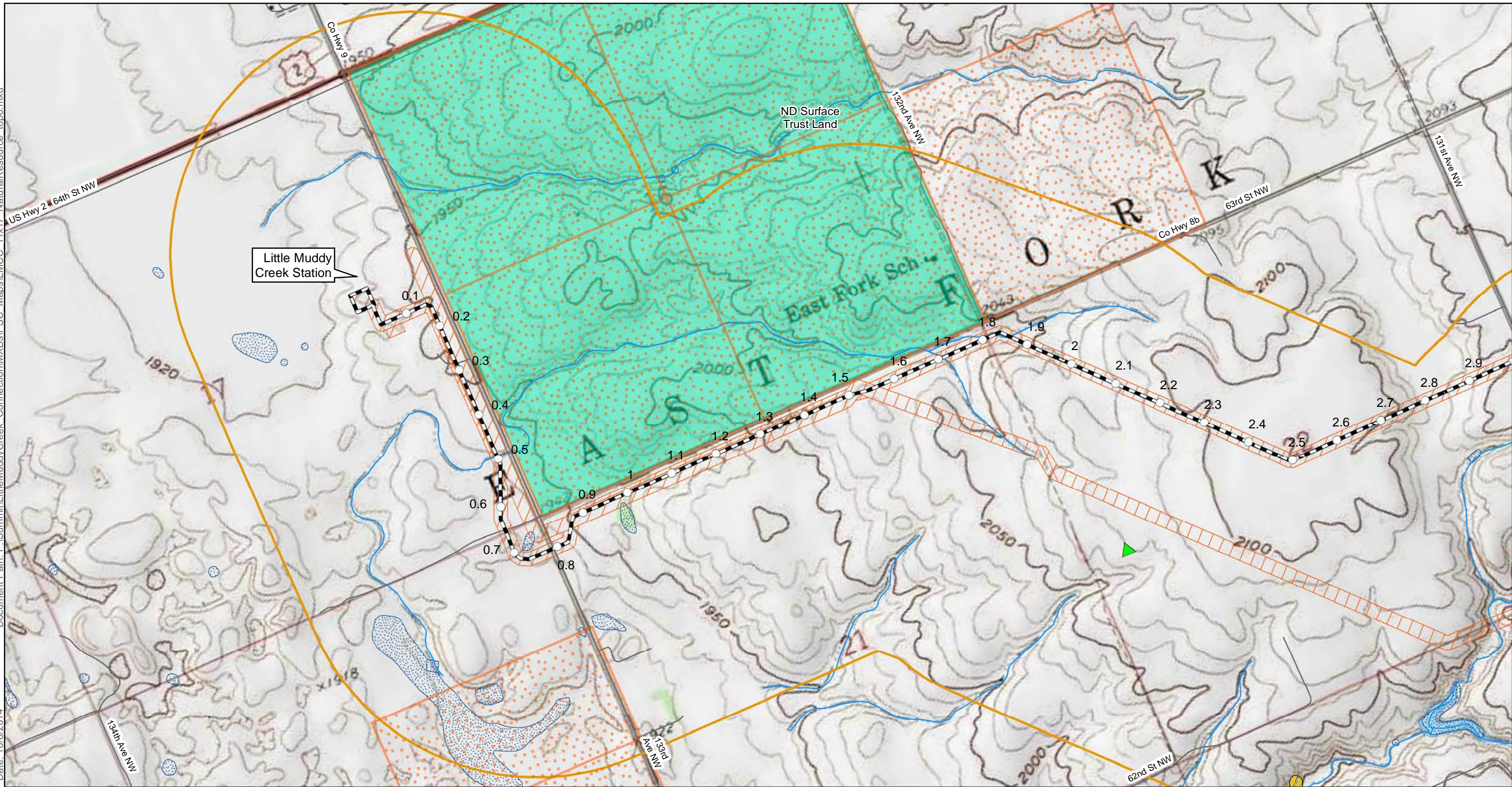
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Summit Midstream Partners
Little Muddy Creek Connection
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 Natural Resource - Aerial Map
Page 6 of 6
 Williams County, North Dakota

Author: TDanielson
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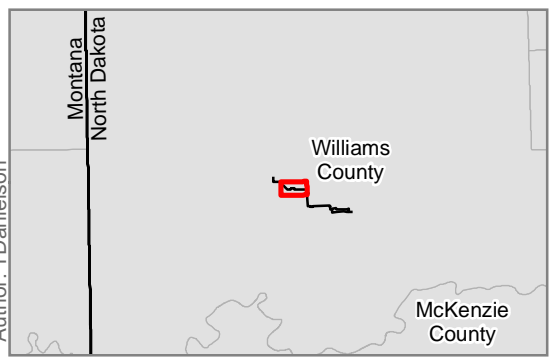
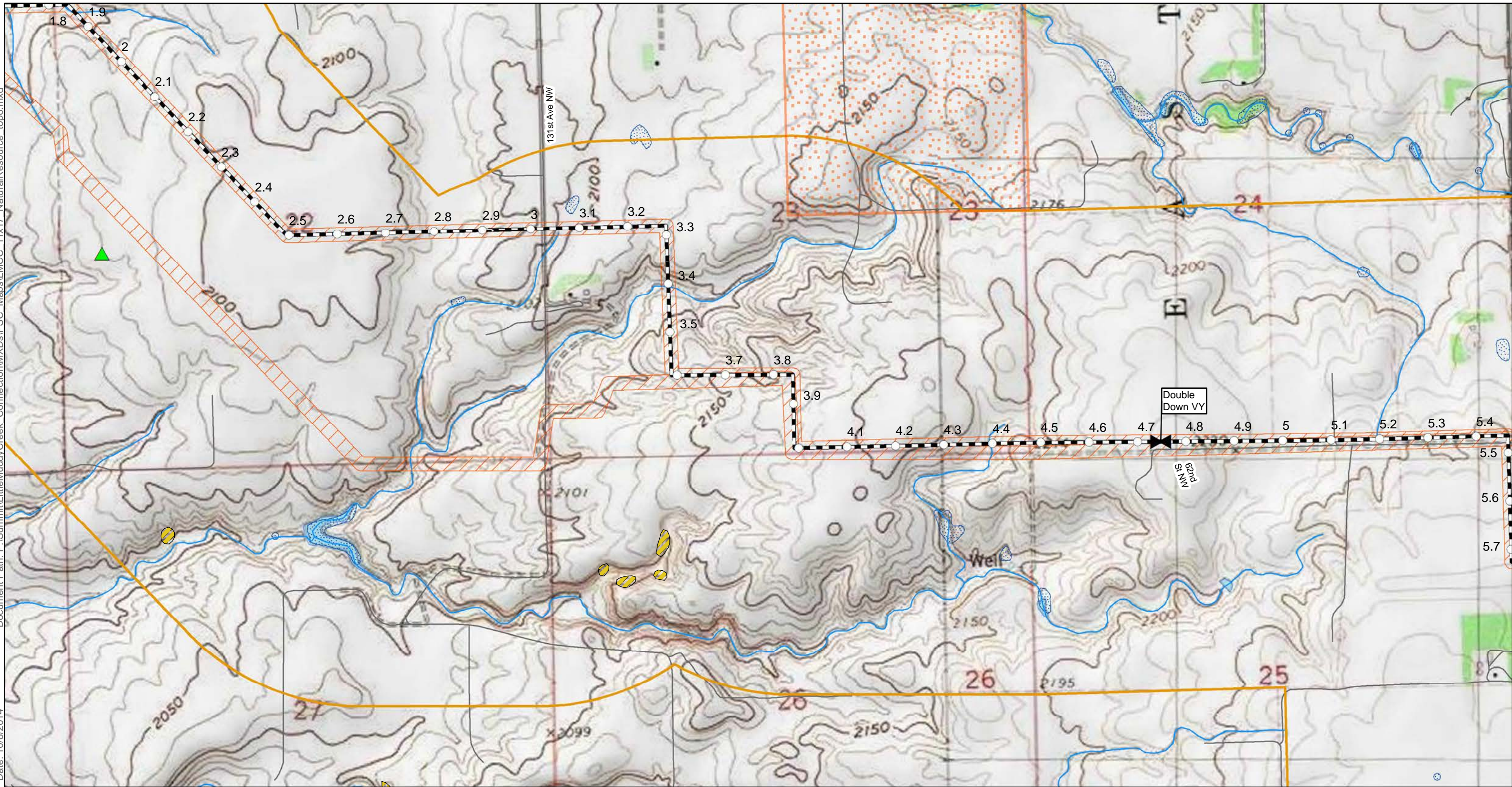
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Page 1 of 6
 Williams County, North Dakota

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 Author: TDanielson



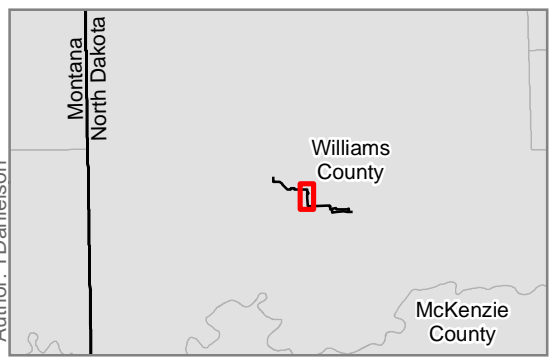
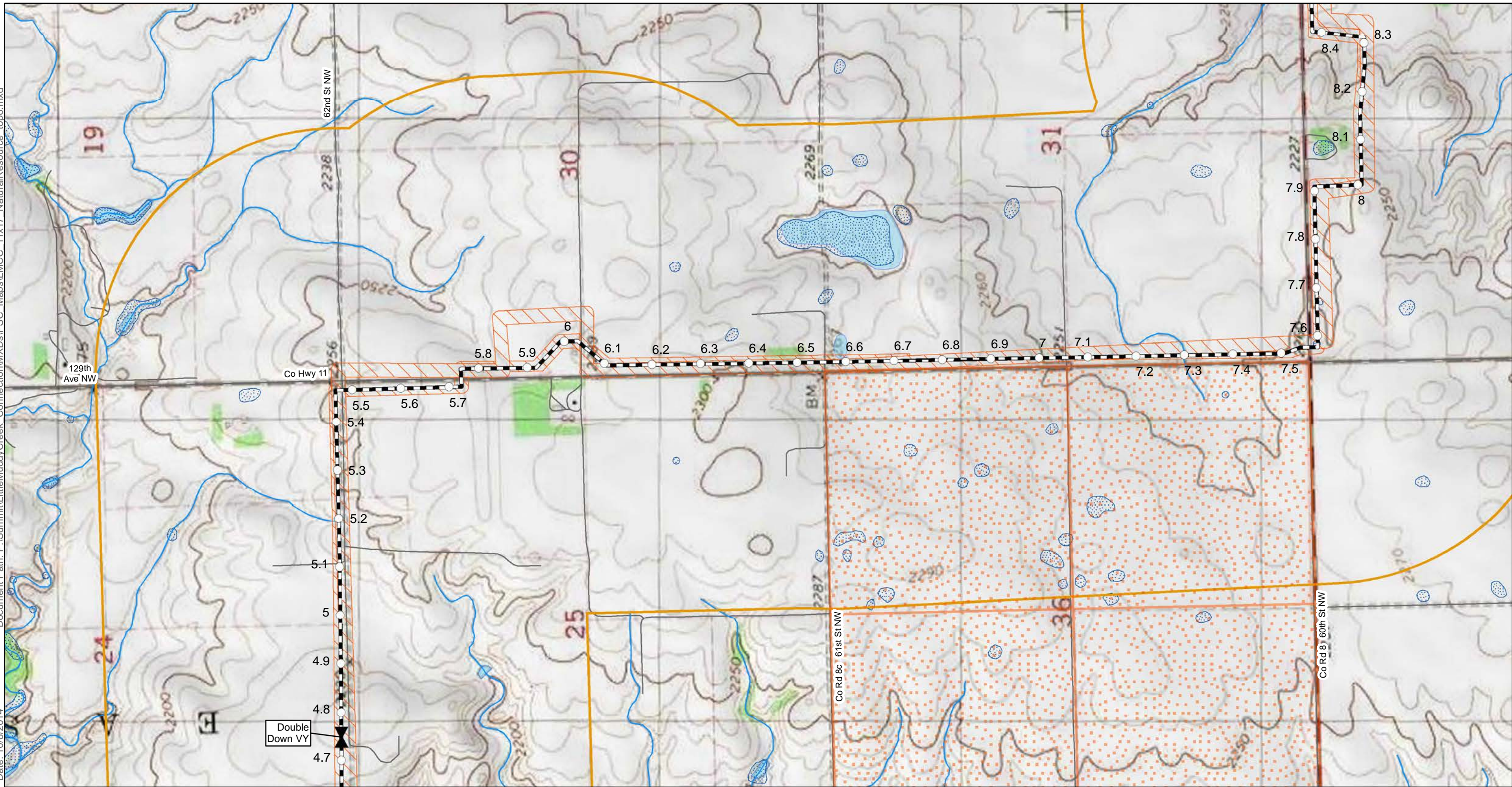
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Summit Midstream Partners
 Little Muddy Creek Connection
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 Williams County, North Dakota

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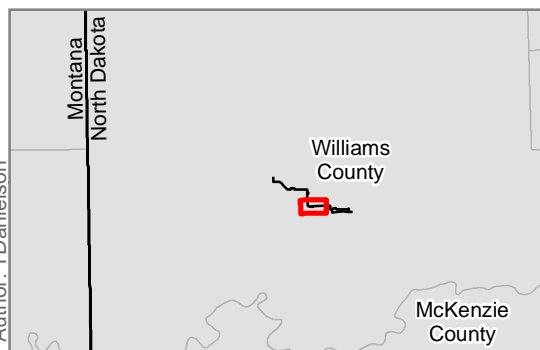
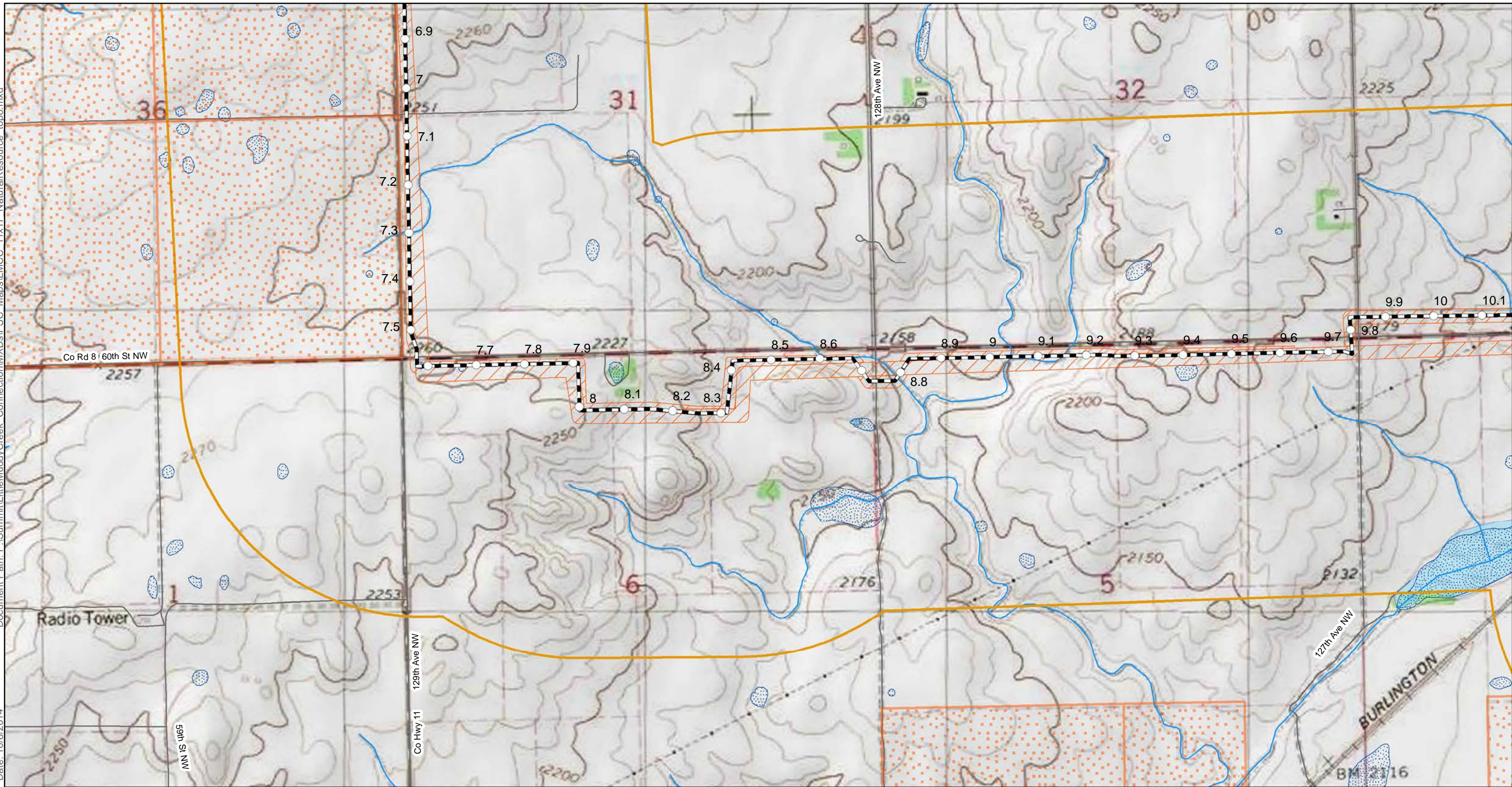
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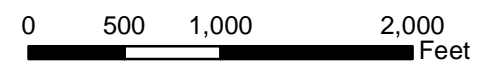
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Summit Midstream Partners
 Little Muddy Creek Connection
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Page 3 of 6
 Williams County, North Dakota

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 Date: 10/8/2014
 Author: TDanielson



Centerline	NHD Waterbody	State Land
Valve	Criteria Data	PLOTS Land
Milepost	Federal Land	Abandoned Mine
Inventory Corridor	Joint Ownership	NDGS Landslide Deposits
Corridor (1 mile)	Local Land	North Dakota Mineral Trust Lands
NHD Waterway	Native American Land	
NWI Wetland	Private Conservation Land	

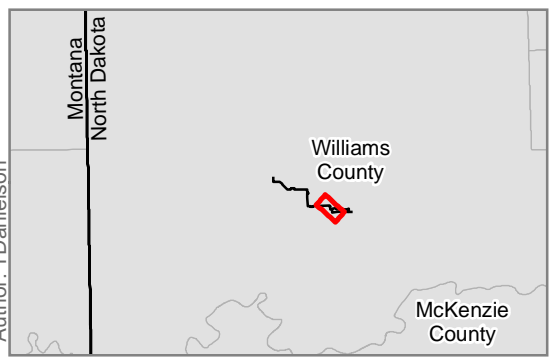
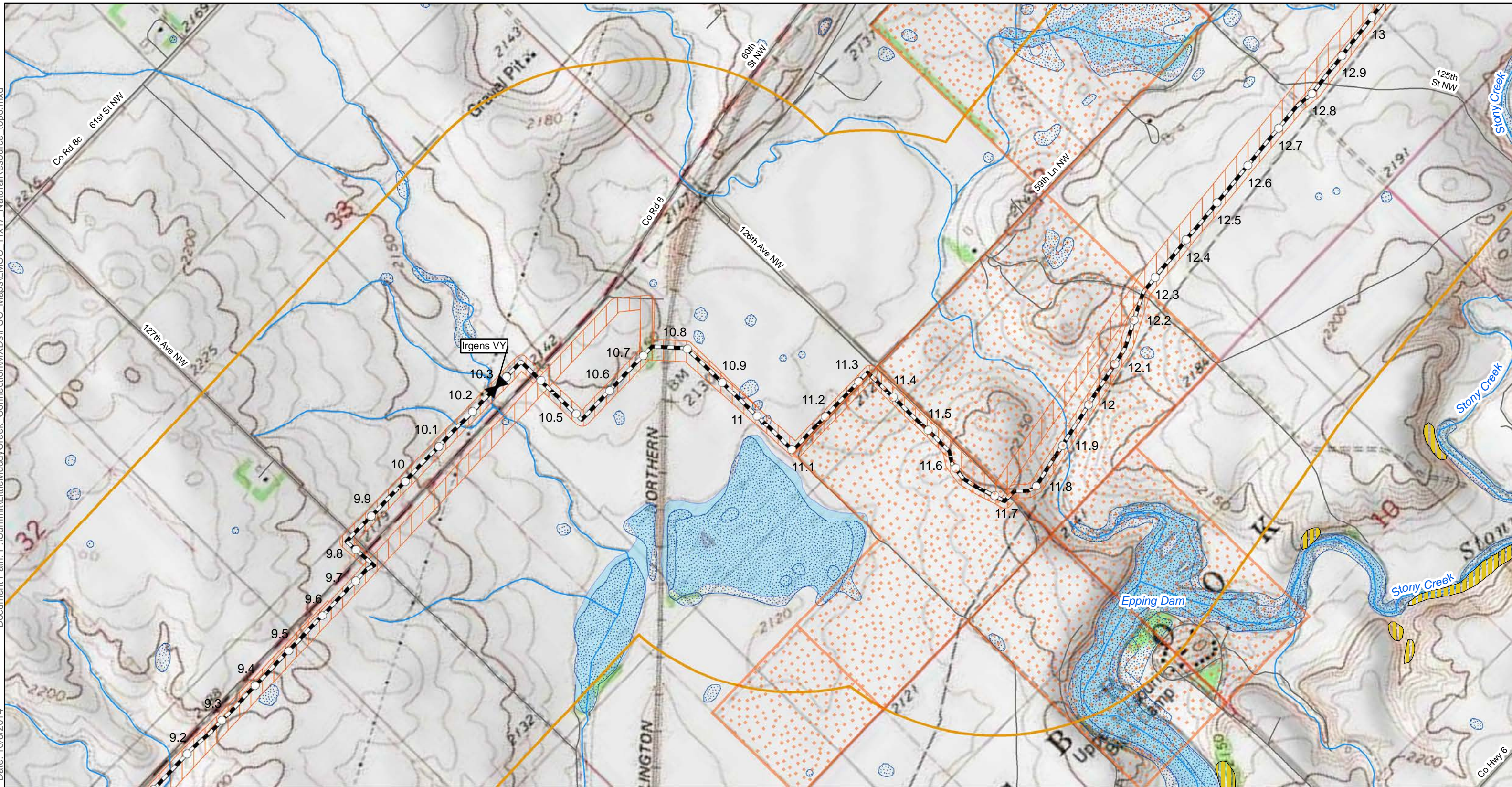


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 Author: TDanielson



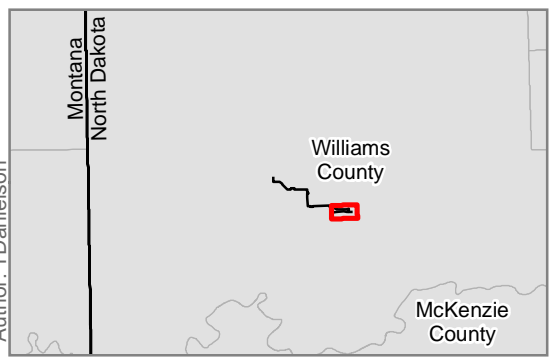
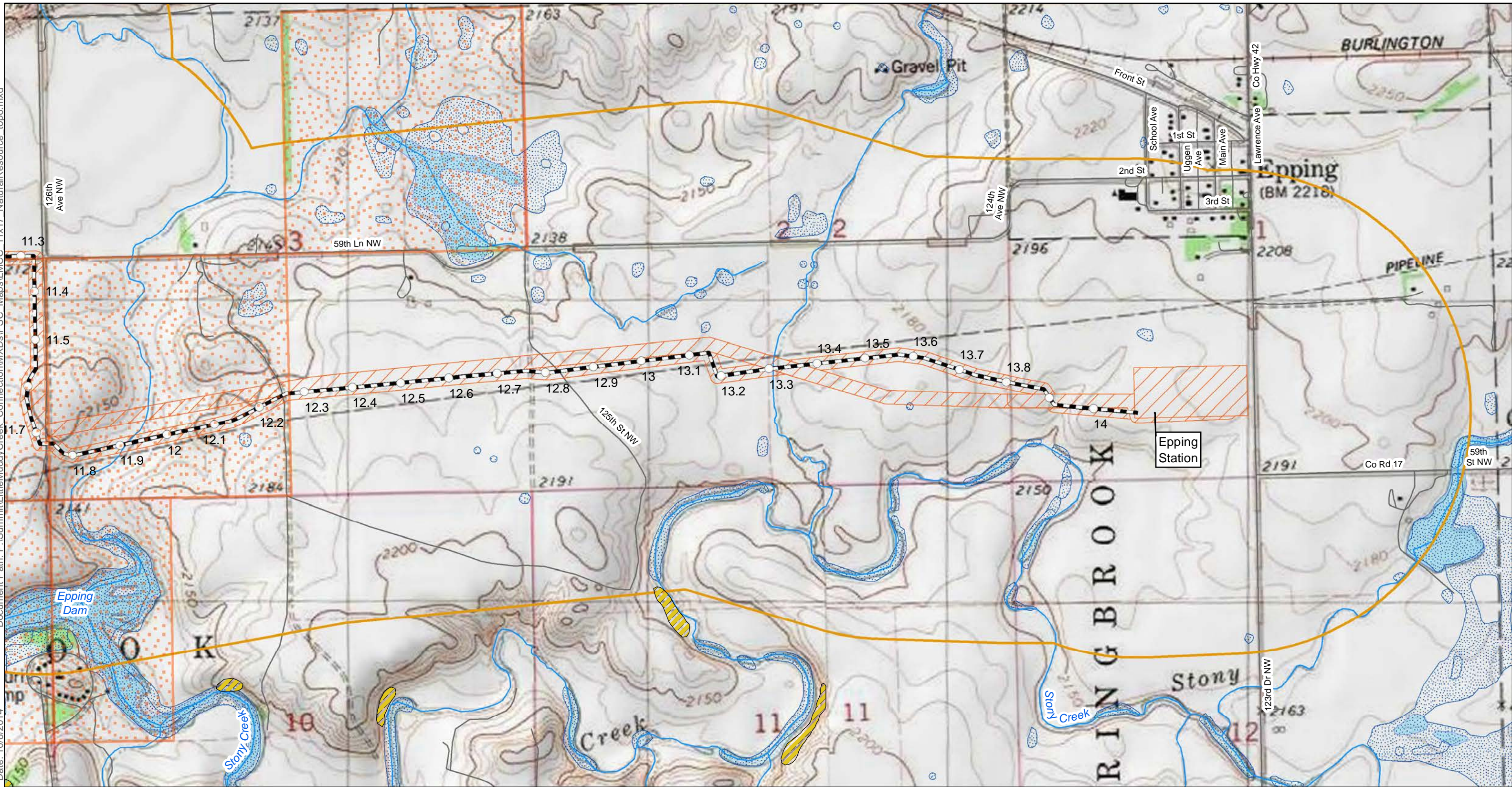
Centerline	NHD Waterbody	State Land
Valve	Criteria Data	PLOTS Land
Milepost	Federal Land	Abandoned Mine
Inventory Corridor	Joint Ownership	NDGS Landslide Deposits
Corridor (1 mile)	Local Land	North Dakota Mineral Trust Lands
NHD Waterway	Native American Land	
NWI Wetland	Private Conservation Land	

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Map not to scale, for environmental review purposes only.

Summit Midstream Partners
 Little Muddy Creek Connection
 Siting Criteria
 Natural Resource - Topo Map
Page 5 of 6
 Williams County, North Dakota

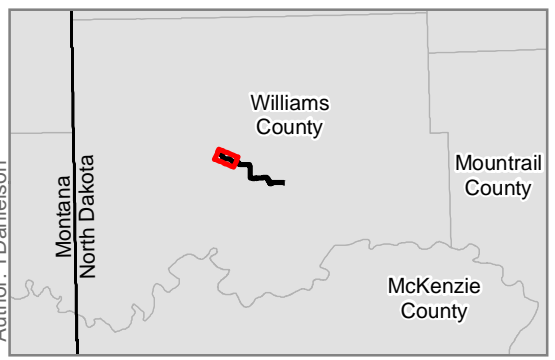
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 Date: 10/8/2014
 Author: TDanielson



<ul style="list-style-type: none"> Centerline Valve Milepost Inventory Corridor Corridor (1 mile) NHD Waterway NWI Wetland 	<p>Criteria Data</p> <ul style="list-style-type: none"> Federal Land Joint Ownership Local Land Native American Land Private Conservation Land 	<ul style="list-style-type: none"> State Land PLOTS Land Abandoned Mine NDGS Landslide Deposits North Dakota Mineral Trust Lands 	 1:12,000	 E3 ENVIRONMENTAL <i>Enhancing Execution with Experience</i>
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Map not to scale, for environmental review purposes only.

Summit Midstream Partners
Little Muddy Creek Connection
 Siting Criteria
 Natural Resource - Topo Map
Page 6 of 6
 Williams County, North Dakota

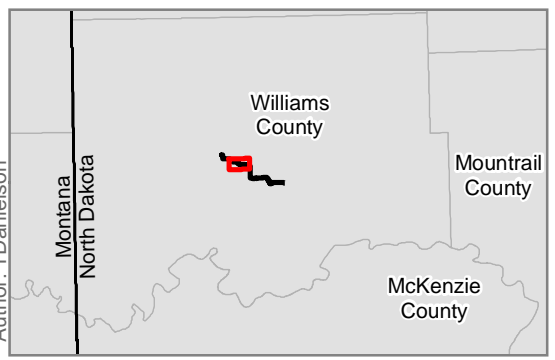


Valves	Corridor (1 mile)
Milepost	Cultural Avoidance
NHD Waterway	
Centerline	
Inventory Corridor	

Note: Class III survey efforts confirmed the that the site leads do not occur within the Inventory Corridor.
Map not to scale, for environmental review purposes only.

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Summit Midstream Partners
Little Muddy Creek Connection
 Siting Criteria
 Cultural Resource
Page 1 of 6
 Williams County, North Dakota

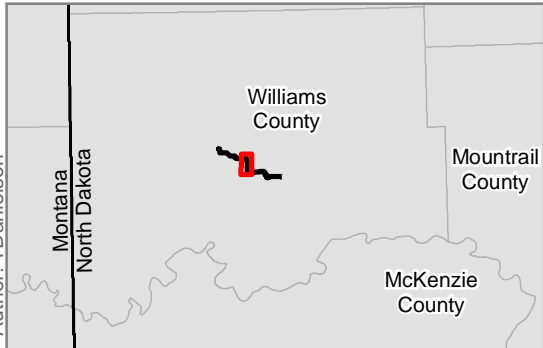


Valves	Corridor (1 mile)
Milepost	Cultural Avoidance
NHD Waterway	
Centerline	
Inventory Corridor	

Note: Class III survey efforts confirmed the that the site leads do not occur within the Inventory Corridor.
Map not to scale, for environmental review purposes only.

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Summit Midstream Partners
Little Muddy Creek Connection
 Siting Criteria
 Cultural Resource
Page 2 of 6
 Williams County, North Dakota

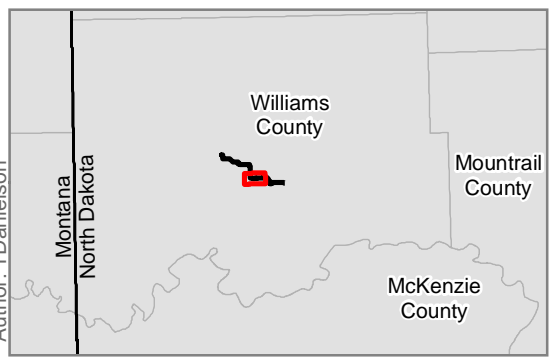


Valves	Corridor (1 mile)
Milepost	Cultural Avoidance
NHD Waterway	
Centerline	
Inventory Corridor	

Note: Class III survey efforts confirmed the that the site leads do not occur within the Inventory Corridor.
Map not to scale, for environmental review purposes only.

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Summit Midstream Partners
Little Muddy Creek Connection
 Siting Criteria
 Cultural Resource
Page 3 of 6
 Williams County, North Dakota



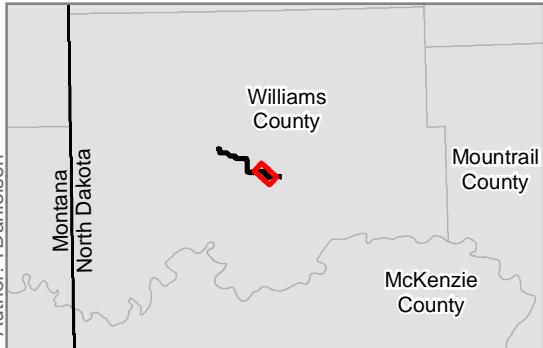
Valves	Corridor (1 mile)
Milepost	Cultural Avoidance
NHD Waterway	
Centerline	
Inventory Corridor	

Note: Class III survey efforts confirmed the that the site leads do not occur within the Inventory Corridor.
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E3 ENVIRONMENTAL
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Summit Midstream Partners
Little Muddy Creek Connection
 Siting Criteria
 Cultural Resource
Page 4 of 6
 Williams County, North Dakota

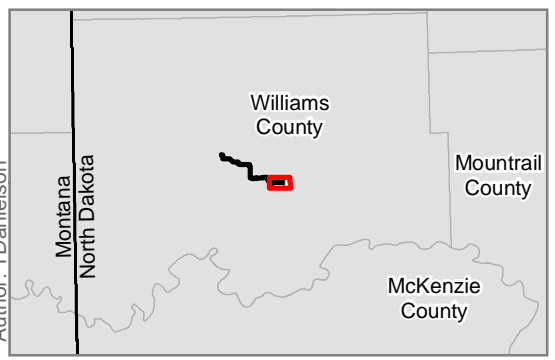


Valves	Corridor (1 mile)
Milepost	Cultural Avoidance
NHD Waterway	
Centerline	
Inventory Corridor	

Note: Class III survey efforts confirmed the that the site leads do not occur within the Inventory Corridor.
Map not to scale, for environmental review purposes only.

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Summit Midstream Partners
Little Muddy Creek Connection
 Siting Criteria
 Cultural Resource
Page 5 of 6
 Williams County, North Dakota



Valves	Corridor (1 mile)
Milepost	Cultural Avoidance
NHD Waterway	
Centerline	
Inventory Corridor	

Note: Class III survey efforts confirmed the that the site leads do not occur within the Inventory Corridor.
Map not to scale, for environmental review purposes only.

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Summit Midstream Partners
Little Muddy Creek Connection
 Siting Criteria
 Cultural Resource
Page 6 of 6
 Williams County, North Dakota

Appendix C

Consultations

U.S. Fish and Wildlife Service

Consultation



United States Department of the Interior
FISH AND WILDLIFE SERVICE

Lostwood Wetland Management District Complex
8315 Hwy 8
Kenmare, ND 58746
Refuges: Lostwood
Wetland Districts: Crosby, Lostwood



October 8, 2014

ATTN: Scott Sanders
Dakota Land Services
PO Box 733
Minot, ND 58702-0733

Dear Mr. Sanders:

This letter is in reference to Meadowlark Midstream Company, LLC proposed Little Muddy pipeline in Sections 17, 20, 21, 22, 23, 24, 25, T. 156 N., R. 100 W., Sections 30, 31, 33, T.156 N. 99 W., Sections 1, 2, 3, 4, 5, 6, T. 155 N. R. 99 W. Williams County, North Dakota. Mr. Jacob Krebsbach of the U.S. Fish and Wildlife Service (Service) received GIS shape files for the pipeline from Mr. Scott Sanders of Dakota Land Services on October 2nd, 2014. Jacob Krebsbach reviewed the survey information and found that the pipeline does not cross Service wetland easement tracts.

This letter does not supersede any required permits from landowners, local, state, and federal entities.

Please be advised of other federal laws including the Endangered Species Act (ESA), the Migratory Bird Treaty Act (MBTA), the National Wildlife Refuge System Improvement Act and the Bald and Golden Eagle Protection Act (BGEPA) when planning your proposal. The ESA, MBTA, and BGEPA prohibit the unauthorized take of federally-listed threatened and endangered species, all migratory birds, and bald and golden eagles, respectively. You must ensure that your activities do not violate these laws. The best way to do that is through early coordination of your plans with the Ecological Services office for North Dakota. Please contact the acting ND field supervisor, Mr. Scott Larson, 420 South Garfield Ave., Pierre SD 57501; by phone 605-224-8693 x224, or email at Scott_larson@fws.gov. Additional information on these wildlife resources and potential impacts and requirements for oil and gas development is available at website www.fws.gov/northdakotafielddoffice/.

If you have any questions please contact Scott Williams or myself at Lostwood Wetland Management District Complex, telephone 701-965-6488, from 7 a.m. to 4:30 p.m. Thank you for your cooperation.

Sincerely,

A handwritten signature in blue ink, appearing to read "David Gillund", with a stylized flourish at the end.

David Gillund
Project Leader



United States Department of the Interior



FISH AND WILDLIFE SERVICE
North Dakota Ecological Services Field Office
3425 Miriam Avenue
Bismarck, North Dakota 58501
(701) 250-4481, ndfieldoffice@fws.gov

August 11, 2014

Katie Schmidt, Senior Consultant
E3 Environmental, LLC
871 Jefferson Avenue
St. Paul, Minnesota 55102

Dear Ms. Schmidt:

This is in response to your letter dated July 10, 2014, regarding a proposal by the Meadowlark Midstream Company (MMC) to construct and operate a 14.75-mile, 10-inch crude pipeline in Williams County, North Dakota. In addition to the pipeline, MMC is also proposing to expand the tank storage capacity at their existing Epping Station in Williams County.

The U.S. Fish and Wildlife Service (Service) offers the following comments under the authority of and in accordance with the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703 *et seq.*), the Endangered Species Act (ESA) (16 U.S.C. 1531 *et seq.*), the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57), and the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d, 54 Stat. 250).

Service Property Interests

The Service administers National Wildlife Refuges and Waterfowl Production Areas owned in fee title as well as wetland and grassland easements throughout North Dakota, including an ongoing easement acquisition program.

The Service recommends that all property interests within the National Wildlife Refuge System be avoided whenever possible. A special use permit or right-of-way will be necessary for construction affecting property interests administered by the Service. The issuance of a special use permit or right-of-way is subject to the final determination of a refuge compatibility review process. This determination may add some time to the review process so early coordination with the affected Refuge or Wetland Management District is important. Please contact David Gillund, Project Leader, Crosby Wetland Management District, 10100 Hwy 42 NW, Crosby, ND 58730; Phone: (701)965-6488; Email: david_gillund@fws.gov, for additional information on Service property interests and specific information relative to Service easements and up to date realty records.

Threatened and Endangered Species

Private individuals and companies are required to ensure that their actions do not result in “take” of federally listed animals. Take is broadly defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct”. Section 10(a)(1)(B) of the ESA allows non-Federal parties planning activities that have no Federal nexus, but which could result in the incidental taking of listed animals, to apply for an incidental take permit. (A Federal nexus exists whenever an activity is conducted, funded, or licensed or permitted by a Federal agency). The application must include a habitat conservation plan (HCP) describing the proposed actions, determining the effects of those actions on Federally-listed plant and wildlife species and their habitats (and may include proposed or candidate species), and defining measures to minimize and mitigate adverse effects. The following species may be located in the project area:

Whooping Crane

The Aransas Wood Buffalo Population (AWBP) of the endangered whooping crane (*Grus americana*) is the only self-sustaining migratory population of whooping cranes remaining in the wild. Whooping cranes breed in the wetlands of Wood Buffalo National Park in Alberta and the Northwest Territories of northern Canada, and overwinter on the Texas coast. Whooping cranes in the AWBP annually migrate through North Dakota during their spring and fall migrations.

The proposed project lies within a corridor that includes approximately 95 percent of all reported whooping crane sightings in the State. The presence of suitable roosting and feeding habitat for whooping cranes indicate the potential for whooping crane presence in the proposed project area. The Service recommends that if a whooping crane is sighted within one mile of project while it is under construction, that all work cease within one mile of that part of the project and the Service be contacted immediately. In coordination with the Service, work may resume after the bird(s) leave the area. Whooping cranes are unlikely to spend more than a few days in any one spot during migration.

Proposed Species

Northern Long-Eared Bat

The northern long-eared bat (*Myotis septentrionalis*) (NLEB) is currently proposed for listing as endangered under the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). The final listing decision for the NLEB is expected in March 2015. At this time, no critical habitat has been proposed for the NLEB. The state of North Dakota is within the known range of the NLEB. During the summer, NLEBs typically roost singly or in colonies in cavities, underneath bark, crevices, or hollows of both live and dead trees and/or snags (typically ≥ 3 inches dbh). Males and non-reproductive females may also roost in cooler places, like caves and mines. This bat seems opportunistic in selecting roosts, using tree species based on presence of

cavities or crevices or presence of peeling bark. It has also been occasionally found roosting in structures like barns and sheds (particularly when suitable tree roosts are unavailable). They forage for insects in upland and lowland woodlots and tree lined corridors. During the winter, NLEBs predominately hibernate in caves and abandoned mine portals. Additional habitat types may be identified as new information is obtained.

Species proposed for listing are not afforded protection under the ESA; however as soon as a listing becomes effective, the prohibition against jeopardizing its continued existence and “take” applies regardless of an action’s stage of completion. If the agency retains any discretionary involvement or control over on-the-ground actions that may affect the species after listing, section 7 applies. Therefore, if suitable NLEB habitat is present within the proposed project area, we recommend further coordination with our office to avoid potential project delays should the species be listed. Additional information regarding NLEB and conference procedures can be found at (<http://www.fws.gov/midwest/endangered/mammals/nlba/index.html>).

Candidate Species

Sprague’s pipit (*Anthus spragueii*) was added to the candidate species list in 2010. Candidate species such as the Sprague’s pipit are not protected under the ESA. However Sprague’s pipit as a migratory bird is still protected under the MBTA. Sprague’s pipits require large patches of grassland habitat for breeding, with preferred grass height between 4-12 inches (10-30 cm). The species prefers to breed in well-drained, open grasslands and avoids grasslands with excessive shrubs. They can be found in lightly to heavily grazed areas. They avoid intrusive human features on the landscape, so the impact of a development can be much larger than the actual footprint of the feature. If Sprague’s pipit habitat is present within your proposed project area, the Service requests that you document any steps taken to avoid and minimize disturbance of this habitat, and that you share this information with our office.

No legal requirement exists to protect candidate species; however, it is within the spirit of the ESA to consider these species as having significant value and worth protecting. The Service’s Candidate Conservation Program provides a means for conserving these species. Early conservation preserves management options, minimizes the cost of recovery, and reduces the potential for restrictive land use policies in the future. Through Candidate Conservation Agreements and Candidate Conservation Agreements with Assurances the Service can work with interested public and private parties to identify threats to candidate species or species at risk. If there is a federal nexus, a federal agency may also request a conference on any proposed action that may affect a proposed or candidate species.

Migratory Birds

The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, and transportation, (among other actions) of migratory birds, their eggs, parts, and nests, except when specifically permitted by regulations. While the MBTA has no provision for allowing incidental take, the Service realizes that some birds may be killed during project construction and operation even if all known reasonable and effective measures to protect birds are used. The Service’s

Office of Law Enforcement carries out its mission to protect migratory birds through investigations and enforcement, as well as by fostering relationships with individuals, companies, and agencies that have taken effective steps to avoid take of migratory birds, and by encouraging others to implement measures to avoid take of migratory birds. It is not possible to absolve individuals, companies, or agencies from liability even if they implement bird mortality avoidance or other similar protective measures. However, the Office of Law Enforcement focuses its resources on investigating and prosecuting individuals, companies, and agencies that take migratory birds without identifying and implementing all reasonable, prudent, and effective measures to avoid that take. Individuals, companies, or agencies are encouraged to work closely with Service biologists to identify available protective measures when developing project plans and/or avian protection plans, and to implement those measures prior to/during construction or similar activities.

To the extent practicable, schedule construction for late summer or fall/early winter so as not to disrupt migratory birds during the breeding season, February 1 to July 15. If work is proposed to take place during the breeding season, there may be take of migratory birds, their eggs, or active nests. If project construction cannot avoid the nesting season, the Service suggests that a qualified biologist could be hired to conduct bird/nest surveys within five days prior to the initiation of construction. If active nests are identified, the project proponent should cease construction, maintain a sufficient buffer around active nests to avoid disturbing breeding activities and contact the Service immediately. The Service recommends that MMC implement all practicable measures to avoid all take, such as suspending construction where necessary, and/or maintaining adequate buffers to protect the birds until the young have fledged. The Service further recommends that if you choose to conduct field surveys for nesting birds with the intent of avoiding take, that you maintain any documentation of the presence of migratory birds, eggs, and active nests, along with information regarding the qualifications of the biologist(s) performing the survey(s), and any avoidance measures implemented at the project site. Should surveys or other available information indicate a potential for take of migratory birds, their eggs, or active nests, the Service requests that you contact this office for further coordination on the extent of the impact and the long-term implications of the intended use of the project on migratory bird populations.

Our GIS analysis of the proposed project shows that it crosses a number of wetlands and native prairie. These habitat types provide important ecological services, including nesting and foraging habitat for migratory birds. Wetlands typically take at least two to three years for the vegetation to return, and at least this long for full functionality to be recovered. Native prairie can take a decade or more to recover, and even then, the replanted area is not as diverse as the original habitat. Additionally, non-natives which become established when the project area is disturbed may spread into the adjacent prairie.

To help ameliorate these impacts, the Service suggests that MMC develop a conservation plan for migratory birds to compensate for the impacts associated with the construction, operation, and maintenance of the proposed project. We recommend that the conservation plan include the following: an analysis of the type and acreage of each habitat impacted; a discussion of how impacts on native habitat (wetlands, native prairie, woody draws) will be avoided or minimized

to the extent practicable; a plan to reclaim the native habitat that cannot be avoided; a monitoring plan to ensure that reclamation is successful and that non-natives do not take over; and a compensation plan for the impacts on native habitat that cannot be avoided. As part of the conservation plan, we recommend that MMC may consider purchasing perpetual grassland easements or perform additional habitat mitigation to ensure that the overall amount and quality of native habitat does not decline as a result of this project. In addition to benefitting migratory birds, the actions in the conservation plan may also benefit any proposed and candidate species that may be affected.

Bald and Golden Eagles

Bald and Golden Eagles are federally-protected under both the BGEPA and the MBTA. The BGEPA prohibits anyone without a permit issued by the Secretary of the Interior from taking bald eagles (*Haliaeetus leucocephalus*) or golden eagles (*Aquila chrysaetos*), including their parts, nests, or eggs. The BGEPA provides criminal and civil penalties for persons who take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald or golden eagle, alive or dead, or any part, nest, or egg thereof. The BGEPA defines take as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. "Disturb" means 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) a 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. In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagles return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment.

The Service's overall management objective for golden eagle and bald eagle populations is to ensure no declines in breeding populations of either species. Numerous relatively minor disruptions to eagle behaviors from multiple activities, even if spatially or temporally distributed, may lead to disturbance that would not have resulted from fewer or more carefully sited activities. The accumulation of multiple land development projects or siting of multiple infrastructures that may be hazardous to eagles can cumulatively reduce the availability of alternative sites suitable for breeding, feeding, or sheltering, resulting in a greater than additive risk of take to eagles.

If your proposed activity is anticipated to result in take of bald or golden eagles, you must first apply for, and receive a permit to take prior to the taking. The determination of the likelihood of take will entail identifying the impacts of your proposed activity. The proposed project area may contain suitable habitat for bald eagles.

Recommendations Specific to Bald Eagles

The size and shape of effective buffers vary depending on the topography and other ecological characteristics surrounding the nest site. In open areas where there are little or no forested or topographical buffers, such as in North Dakota, distance alone must often serve as the buffer. To avoid/minimize impacts to nesting bald eagles from construction activities, the Service recommends: (1) keeping a minimum ½-mile buffer between the activity and any bald eagle nest if no landscape buffer exists; (2) keeping a minimum 660-foot buffer and maintaining a landscape buffer or natural areas between the activity and around nest trees; and (3) avoiding activities during the bald eagle breeding season (February 1 – July 15). The buffer areas serve to minimize visual and auditory impacts associated with human activities near nest sites. Ideally, buffers would be large enough to protect existing nest sites and provide for alternative or replacement nest sites. The Service's May 2007, National Bald Eagle Management Guidelines contains detailed information on protecting bald eagles from disturbance due to human activity. The guidelines can be accessed on the Service's website at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BaldEagle/NationalBaldEagleManagementGuidelines.pdf>.

We appreciate the opportunity to provide comments on your proposed project. For further information, please have your staff contact Heidi Riddle of my staff at (701) 355-8503, or contact me at 605-224-8693 ext. 224, or at the letterhead address.

Sincerely,



Scott Larson
Field Supervisor
North Dakota and South Dakota Field Offices

cc: USFWS, Crosby Wetland Management District, Crosby, ND (Attn: D. Gillund)

Katie Schmidt

To: Heidi_Riddle@fws.gov
Cc: Chris Schmidt
Subject: MMC-Little Muddy Creek Project Data and Amended Project Consultation
Attachments: LittleMuddyCreek_Amended_Consultation_07102014.pdf; LMCC_Shapefiles_07082014.zip

Heidi,

Good afternoon. Per our conversation earlier this week I have attached a zip file which contains the shapefile data for the Little Muddy Creek Pipeline Project. In addition to this data I have also attached an amended consultation letter. The scope of the project has changed slightly since the original submittal and this letter and associated maps detail these minor changes. Please let me know if you have any questions or need additional information.

Thanks-Katie

Katie Schmidt, EIT
Senior Consultant
E3 Environmental, LLC
kschmidt@go2e3.com
O: 651.282.0652
M: 651.216.6881
871 Jefferson Avenue
St. Paul, MN 55102
www.go2e3.com



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July 10, 2014

Mr. Jeffrey Towner, Field Supervisor
U.S. Fish and Wildlife Service
North Dakota Field Office
3425 Miriam Avenue
Bismarck, ND 58501-7926

RE: Little Muddy Creek Pipeline and Epping Station expansion Project: Consultation Letter Amendment.

E3 Environmental, LLC (E3), on the behalf of Meadowlark Midstream Company (MMC), submitted a consultation letter for your review regarding the proposed Little Muddy Creek Pipeline Project (Project). This submittal was dated May 20, 2014. Typographical errors were noted in this original consultation request and the corrections are as follows:

- The pipeline will originate at the Epping Station not the Colt Rail Terminal as indicated on the original Project map;
- The Epping Station is approximately 1-mile south of Epping, North Dakota not 10-miles; and
- The Little Muddy Creek pipeline endpoint will tie-in to the North Dakota Pipeline Company, LLC's Little Muddy Creek Injection Station, not existing MMC assets.

The Project, as described in the previous submittal, includes the construction and operation of a 14.75 mile, 10-inch crude pipeline. In addition to the pipeline, MMC will be expanding the tank storage capacity at their existing Epping Station. This expansion will occur within the 1-mile corridor depicted on the original consultation maps.

MMC is a wholly owned subsidiary of Summit Midstream Partners, LLC. MMC will expand and currently operates the existing Epping Station. The Little Muddy Creek Pipeline will be constructed and operated by Epping Transmission Company, LLC (ETC). ETC is also a wholly owned subsidiary of Summit Midstream Partners, LLC.

E3 has been retained by MMC/ETC to provide environmental consulting support for this Project. Should you have any questions or require additional information, please contact me at 651-282-0652 or kschmidt@go2e3.com.

Sincerely,

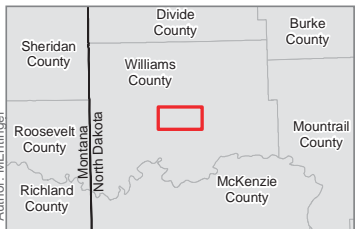
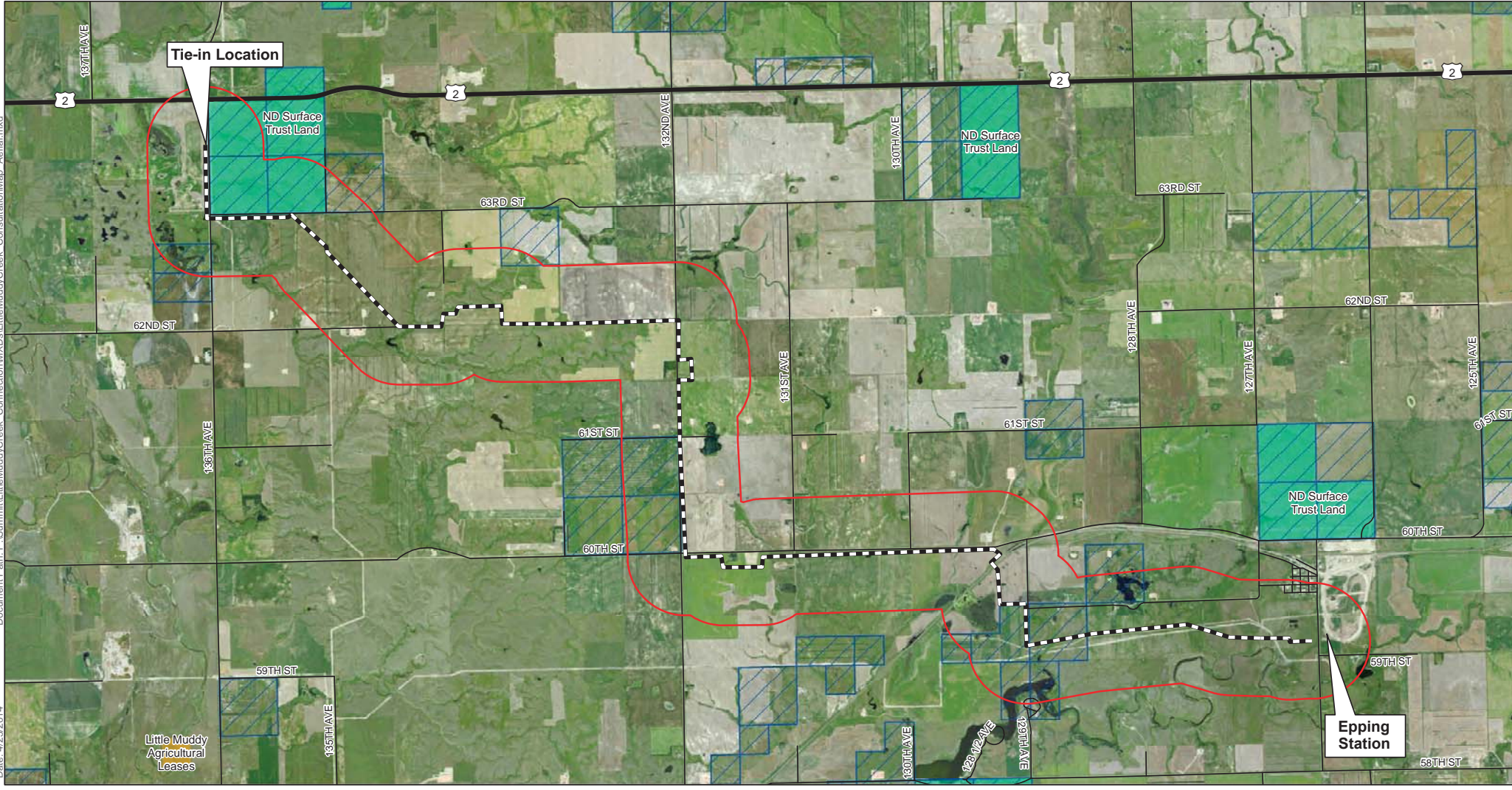
Katie Schmidt, Senior Consultant
E3 Environmental, LLC
871 Jefferson Ave
St. Paul, MN 55102

Enclosures: Project maps

cc: E3 Project Files

Document Path: P:\Summit\LittleMuddyCreek_Connection\MXD\LittleMuddyCreek_ConsultationMap_Aerial.mxd

Date: 4/25/2014
Author: MEminger



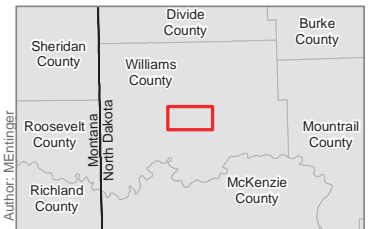
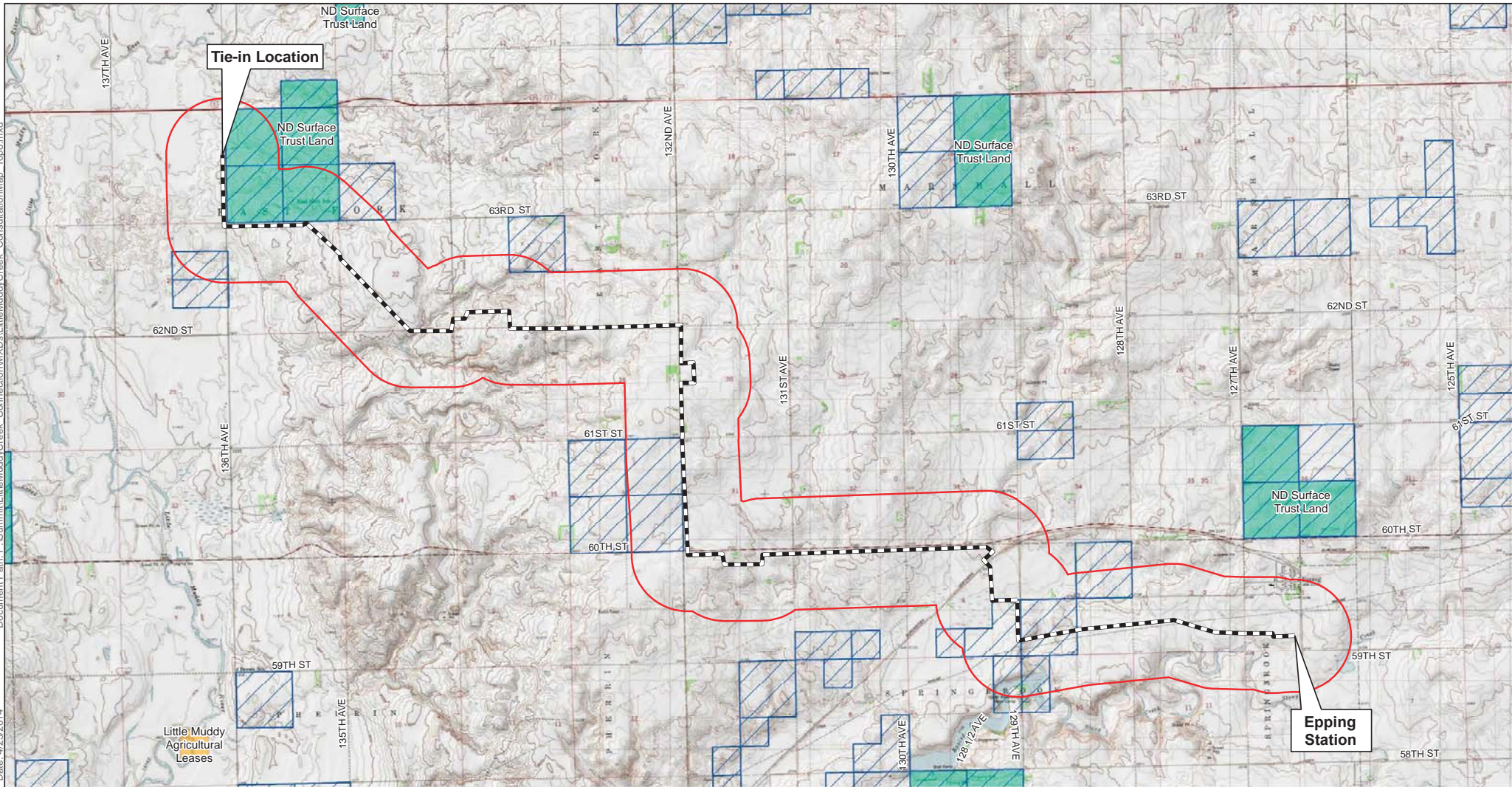
Pipeline
 Corridor (1 Mile)
 Mineral Trust Land
 Federal Land
 State Land

E3 ENVIRONMENTAL
Enhancing Execution with Experience

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 Map not to scale, for environmental review purposes only.

Meadowlark Midstream Company, LLC
 Little Muddy Creek Pipeline
 Aerial Overview Map
 Williams County, ND

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Date: 4/25/2014



Pipeline
 Corridor (1 Mile)
 Mineral Trust Land
 Federal Land
 State Land



E3 ENVIRONMENTAL
Enhancing Execution with Experience



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Map not to scale, for environmental review purposes only.

**Meadowlark Midstream
Company, LLC**
 Little Muddy Creek Pipeline
 Topo Overview Map
 Williams County, ND



May 20, 2014

Mr. Jeffrey Towner, Field Supervisor
U.S. Fish and Wildlife Service
North Dakota Field Office
3425 Miriam Avenue
Bismarck, ND 58501-7926

RE: Meadowlark Midstream Company, LLC – Little Muddy Creek Pipeline Project
Threatened and Endangered Species, Migratory Bird, and Managed Lands
Review.

Meadowlark Midstream Company, LLC (MMC) has proposed the construction of the Little Muddy Creek Pipeline Project (Project). The proposed Project is a new 14.75-mile; 10-inch diameter Crude Pipeline that will originate at the Epping Station located approximately 10 miles south of Epping, ND and will tie-in to existing MMC assets located northwest of Epping, ND. Pipeline construction activities would typically occupy a 110-foot right-of-way. Following construction, the pipeline would be operated within a 25-foot permanent easement. Pipeline construction involves temporary impacts, with a post-construction restoration standard of restoring disturbed areas to their original pre-construction condition.

The location of the proposed Project is described below and depicted on the attached maps.

Williams County, North Dakota the pipeline crosses:

- Township 155N, Range 99W, Section 1, 2, 3, 4, 5, and 6
- Township 156N, Range 99W, Sections 19, 20, and 31
- Township 156N, Range 100W, Sections 17, 20, 21, 22, 23, and 24

The purpose of this request is to compile U.S. Fish and Wildlife Service's (USFWS) comments on environmental topics that are relevant to the North Dakota Public Service Commission's (PSC) siting requirements for Energy Transmission Facility Siting. This request has been prepared to augment that effort and facilitate a thorough project review.

Federally Listed Species Analysis:

Results of the review of the USFWS Information Planning and Conservation System (IPaC) database, at <http://ecos.fws.gov/ipac>, on April 25, 2014 listed the following species to be considered in an effects analysis for the Project:

Federally Listed Species

- Whooping crane (*Grus americana*) – Endangered
- Interior least tern (*Sternula antillarum*) – Endangered
- Pallid sturgeon (*Scaphirhynchus albus*) – Endangered
- Gray wolf (*Canis lupus*) – Endangered
- Piping plover (*Charadrius melodus*) – Threatened
- Designated Critical Habitat – Missouri River

E3 has reviewed the available data describing the life history, critical habitat, and conservation measures associated with each species to evaluate the potential effects of the Project on these resources. The results of this analysis are as follows:

Whooping crane: The whooping crane is a large bodied marsh species that breeds primarily in Canada and winters in the Gulf of Mexico. This species has been closely studied and monitored in recent years due to its small population. North Dakota provides migratory habitat for the species, providing roosting and feeding opportunities during migration. This species prefers larger wetland complexes for roosting habitat, typically using adjacent uplands for foraging opportunities. The proposed project will not result in a loss of crane habitat. Pipeline construction involves temporary impacts, with a post-construction restoration standard of restoring disturbed areas to their original pre-construction condition. Potential impacts are anticipated to be limited to the time period during active construction should it coincide with the spring migration period. Spring migration by the Aransas/Wood Buffalo population from the Texas Gulf Coast begins between the end of March and mid-April, with the last birds generally leaving Texas by the first of May. Experienced breeders are among the first to arrive in Canadian nesting areas in late April, with the rest of the birds arriving throughout the following 6-8 weeks.

Project precautionary measures would be implemented if a whooping crane is sighted in or near the project area. MMC would voluntarily suspend all heavy equipment operation activities and notify the USFWS should a whooping crane be spotted within 0.5 mile of the project area. Heavy equipment activities would resume upon the departure of the individual(s). The pipeline is a buried utility and will not have a direct impact on this species. As a result, the proposed pipeline would have **no effect** on the species.

Interior least tern: The interior population(s) of the least tern has historically been associated with large river systems for breeding and migratory habitats. Breeding birds are known to breed in colonies, utilizing sandbar habitat common to larger rivers. Regionally the Missouri River is known to host remnant breeding populations of terns. The project is approximately 13 miles north of the Missouri River, and therefore will have **no effect** on the species.

Pallid sturgeon: The pallid sturgeon preferred habitat includes the benthic environment associated with swift waters of large turbid, free-flowing rivers with braided channels, dynamic flow patterns, periodic flooding of terrestrial habitats, and requiring extensive micro habitat diversity. Portions of the Missouri River are thought to provide the required habitat for the pallid sturgeon though much of the habitat has been compromised due to channelization, installation of impoundments and altered flow regimes. The project is approximately 13 miles from the Missouri River and Lake Sakakewea, and therefore will have **no effect** on the species.

Gray wolf: Historical records show that wolf sightings are very rare within North Dakota. Sightings in proximity to the project have been reported in the Killdeer Mountains in Dunn County (Johnson 1999). The Killdeer Mountains are about 60 miles to the southeast of the survey area. Most wolves in North Dakota are likely dispersed animals that originated in northern Minnesota, Riding National Park or Spruce Woods Reserve, Manitoba. Currently, wolves are not known to inhabit the project area. The proposed project will have **no effect** on the gray wolf.

Piping plover: The piping plover is associated with shorelines along small alkaline lakes, large reservoir beaches, and river islands and adjacent sand pits. Breeding birds select wide beaches with highly clumped vegetation covering less than 25% of the area. Current breeding range on the Northern Great Plains extends south along major prairie rivers including the Yellowstone and Missouri, and in alkali wetlands including those in northeastern Montana and North Dakota. The project will intersect prairie pothole wetlands, some of which may be suitable alkali wetland *habitat*, particularly in low-water years. Total pipeline distance that intersects wetlands is less than one mile and shorelines and bars were not exposed during the field surveys due to high water. No records of piping plovers in the area were cited by the USFWS or North Dakota Parks and Recreation in consultations conducted for the biological assessment. The project is approximately 13 miles from the Missouri River. All construction will occur within the fence line of existing production plants. The proposed project will have **no effect** on piping plovers or designated critical habitat for the piping plover.

USFWS Managed Lands:

Conservation programs such as Waterfowl Production Areas and wetland and grassland easements represent an important tool used by USFWS to identify and manage high quality wildlife habitat. A review of public records failed to identify any of these USFWS managed lands in the project study area. MMC requests confirmation regarding the presence or absence of USFWS managed lands within the proposed study area.

Migratory Bird Consultation:

USFWS administers various wildlife related mandates of national concern including the Migratory Bird Treaty Act (MBTA). MMC understands that unlike the Endangered Species Act, the MBTA has no provisions for the allowance of a take and therefore compliance may best be achieved by avoiding or minimizing the potential to interact with migratory species during the active breeding season. MMC also understands that in North Dakota, the breeding season is typically defined as occurring annually from February 1 through July 15.

Meadowlark Midstream Company, LLC
Little Muddy Creek Pipeline Project
May 20th, 2014



E3 ENVIRONMENTAL
871 Jefferson Avenue
St. Paul, MN 55102

E3 Environmental, LLC (E3) has been retained by MMC to provide environmental consulting support for this project. Should you have any questions or require additional information, please contact me at 651-282-0652 or kschmidt@go2e3.com.

Sincerely,

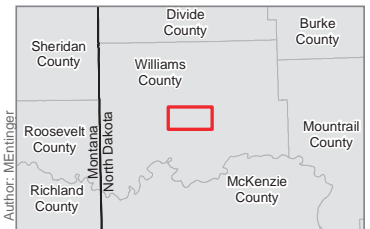
A handwritten signature in purple ink that reads "Katie Schmidt". The signature is written in a cursive style.

Katie Schmidt, Senior Consultant
E3 Environmental, LLC
871 Jefferson Ave
St. Paul, MN 55102

Enclosures: Project maps – USGS topographic and aerial photography

cc: E3 Project Files

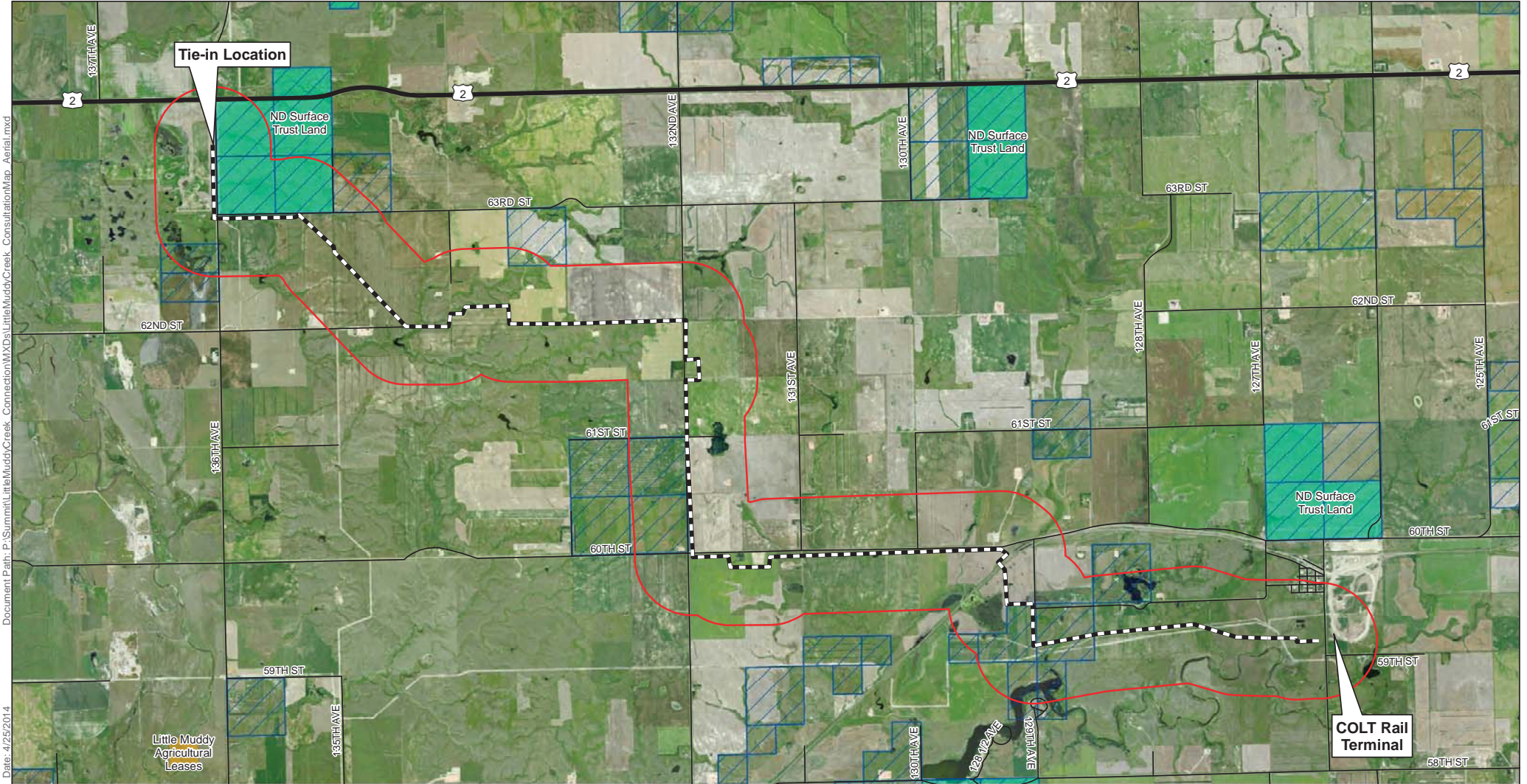
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Date: 4/25/2014



Pipeline
 Corridor (1 Mile)
 Mineral Trust Land
 Federal Land
 State Land

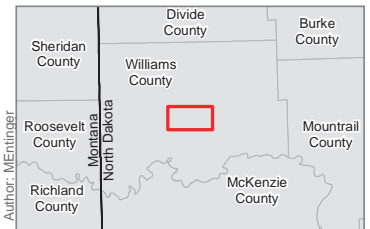
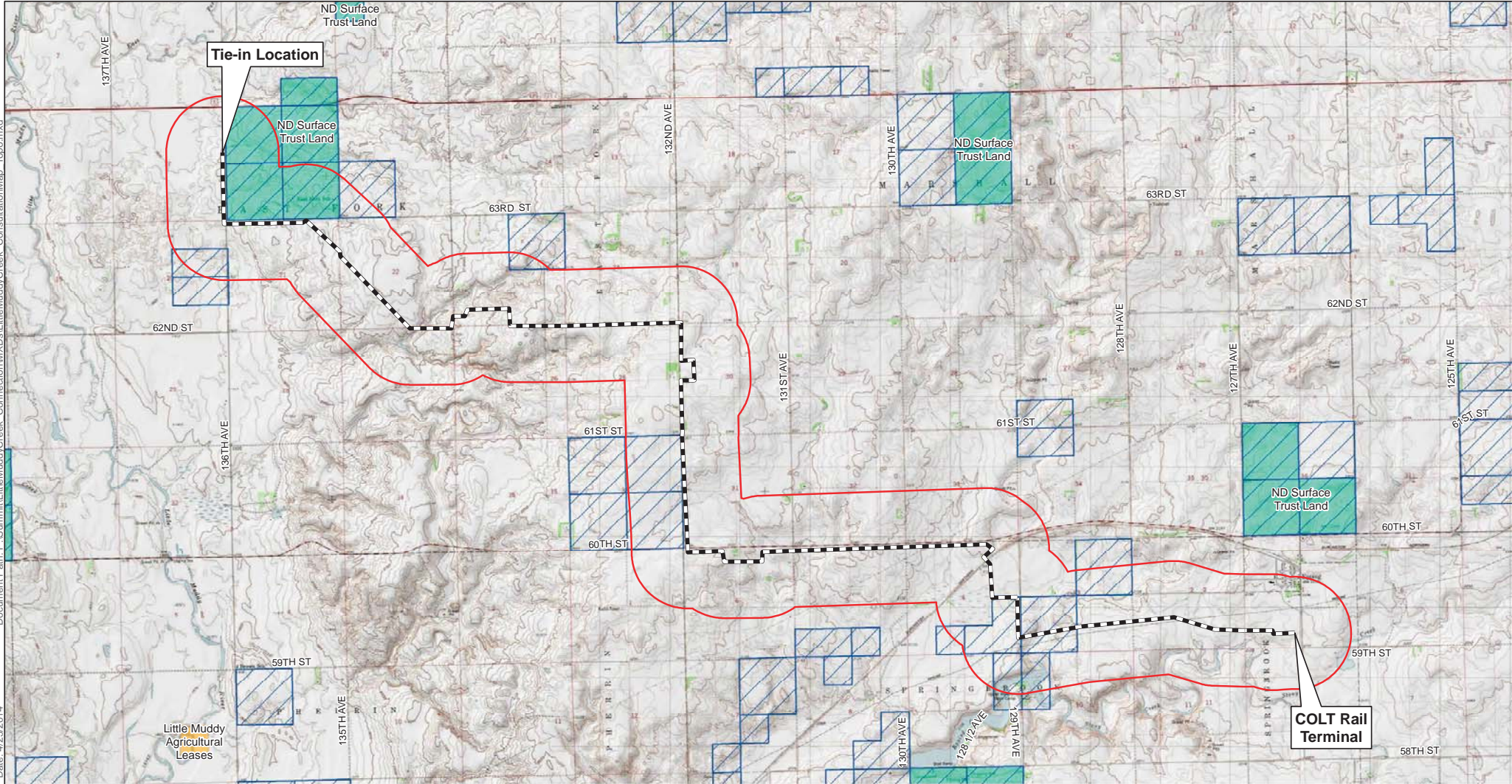
E3 ENVIRONMENTAL
 Enhancing Execution with Experience

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 Map not to scale, for environmental review purposes only.



Meadowlark Midstream Company, LLC
 Little Muddy Creek Pipeline
 Aerial Overview Map
 Williams County, ND

Document Path: P:\Summit\LittleMuddyCreek_Connection\MXD\LittleMuddyCreek_ConsultationMap_Topo.mxd
Date: 4/25/2014



- - - Pipeline
 [Red Outline] Corridor (1 Mile)
 [Blue Hatched] Mineral Trust Land
 [Yellow] Federal Land
 [Green] State Land


E3 ENVIRONMENTAL
 Enhancing Execution with Experience

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Meadowlark Midstream Company, LLC
 Little Muddy Creek Pipeline
 Topo Overview Map
 Williams County, ND

North Dakota Game and Fish Department

Consultation

From: Schumacher, John D. [mailto:jdschumacher@nd.gov]
Sent: Thursday, August 7, 2014 2:07 PM
To: Katie Schmidt
Subject: Little Muddy Creek Pipeline & Epping Station Expansion

Ms. Schmidt,

The North Dakota Game and Fish Department has reviewed this project as amended and has no additional concerns. Our original comments are still applicable. If you have any questions, please let me know.

JOHN SCHUMACHER
RESOURCE BIOLOGIST
ND GAME AND FISH DEPT
701.328.6321



July 10, 2014

Mr. Greg Link, Chief
Conservation and Communication Division
North Dakota Game and Fish Department
100 N. Bismarck Expressway
Bismarck, ND 58501-5095

Dear Mr. Link,

RE: Little Muddy Creek Pipeline and Epping Station expansion Project: Consultation Letter Amendment.

E3 Environmental, LLC (E3), on the behalf of Meadowlark Midstream Company (MMC), submitted a consultation letter for your review regarding the proposed Little Muddy Creek Pipeline Project (Project). This submittal was dated May 20, 2014. Typographical errors were noted in this original consultation request and the corrections are as follows:

- The pipeline will originate at the Epping Station not the Colt Rail Terminal as indicated on the original Project map;
- The Epping Station is approximately 1-mile south of Epping, North Dakota not 10-miles; and
- The Little Muddy Creek pipeline endpoint will tie-in to the North Dakota Pipeline Company, LLC's Little Muddy Creek Injection Station, not existing MMC assets.

The Project, as described in the previous submittal, includes the construction and operation of a 14.75 mile, 10-inch crude pipeline. In addition to the pipeline, MMC will be expanding the tank storage capacity at their existing Epping Station. This expansion will occur within the 1-mile corridor depicted on the original consultation maps.

MMC is a wholly owned subsidiary of Summit Midstream Partners, LLC. MMC will expand and currently operates the existing Epping Station. The Little Muddy Creek Pipeline will be constructed and operated by Epping Transmission Company, LLC (ETC). ETC is also a wholly owned subsidiary of Summit Midstream Partners, LLC.

E3 has been retained by MMC/ETC to provide environmental consulting support for this Project. Should you have any questions or require additional information, please contact me at 651-282-0652 or kschmidt@go2e3.com.

Sincerely,

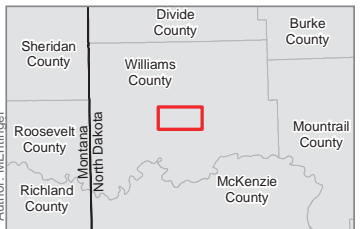
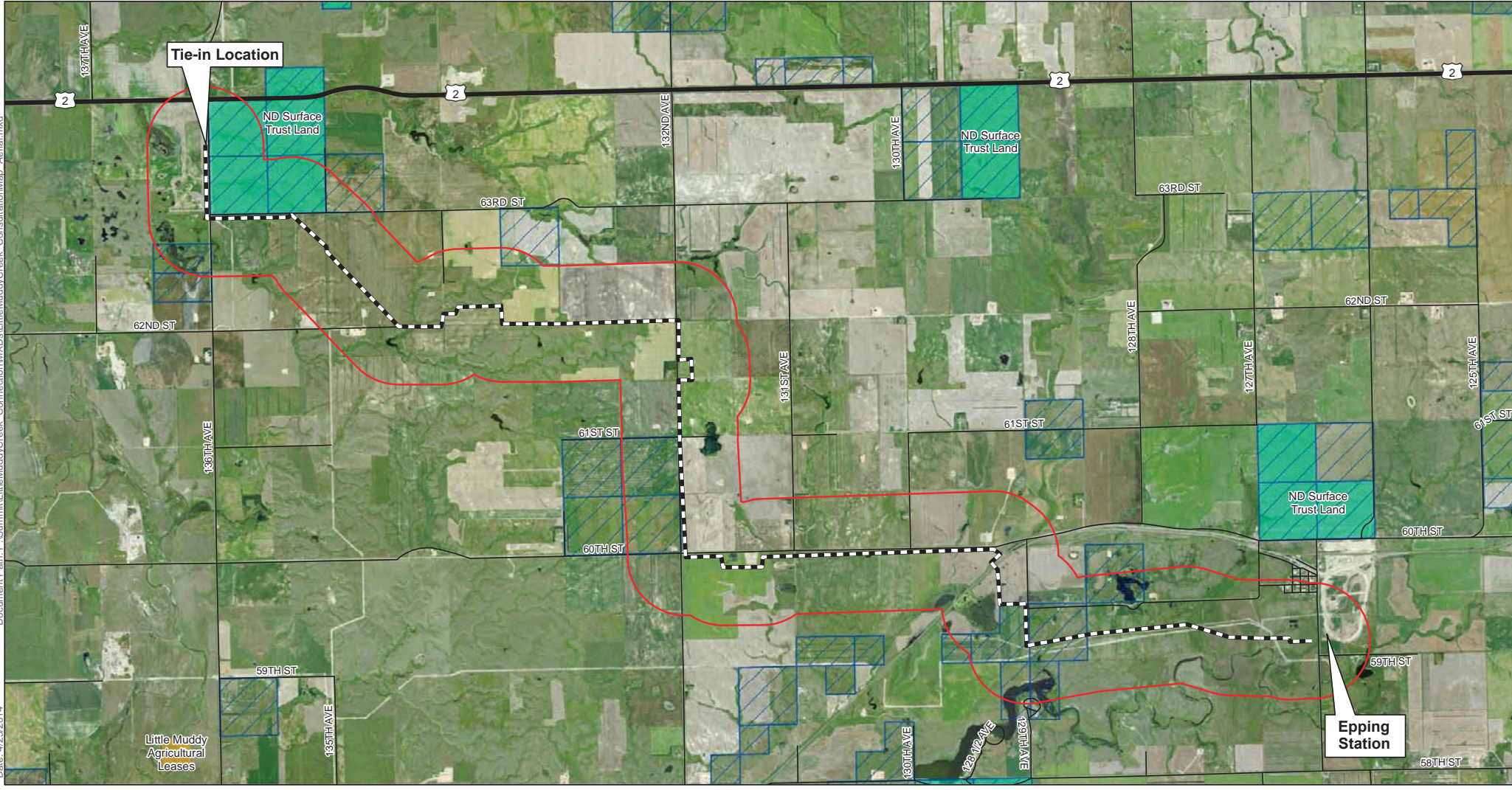
Katie Schmidt, Senior Consultant
E3 Environmental, LLC
871 Jefferson Ave
St. Paul, MN 55102

Enclosures: Project Map

cc: E3 Project Files

Document Path: P:\Summit\LittleMuddyCreek_Connection\MXD\LittleMuddyCreek_ConsultationMap_Aerial.mxd

Date: 4/25/2014
Author: MEminger



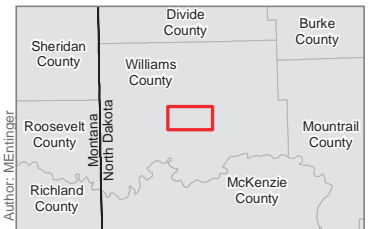
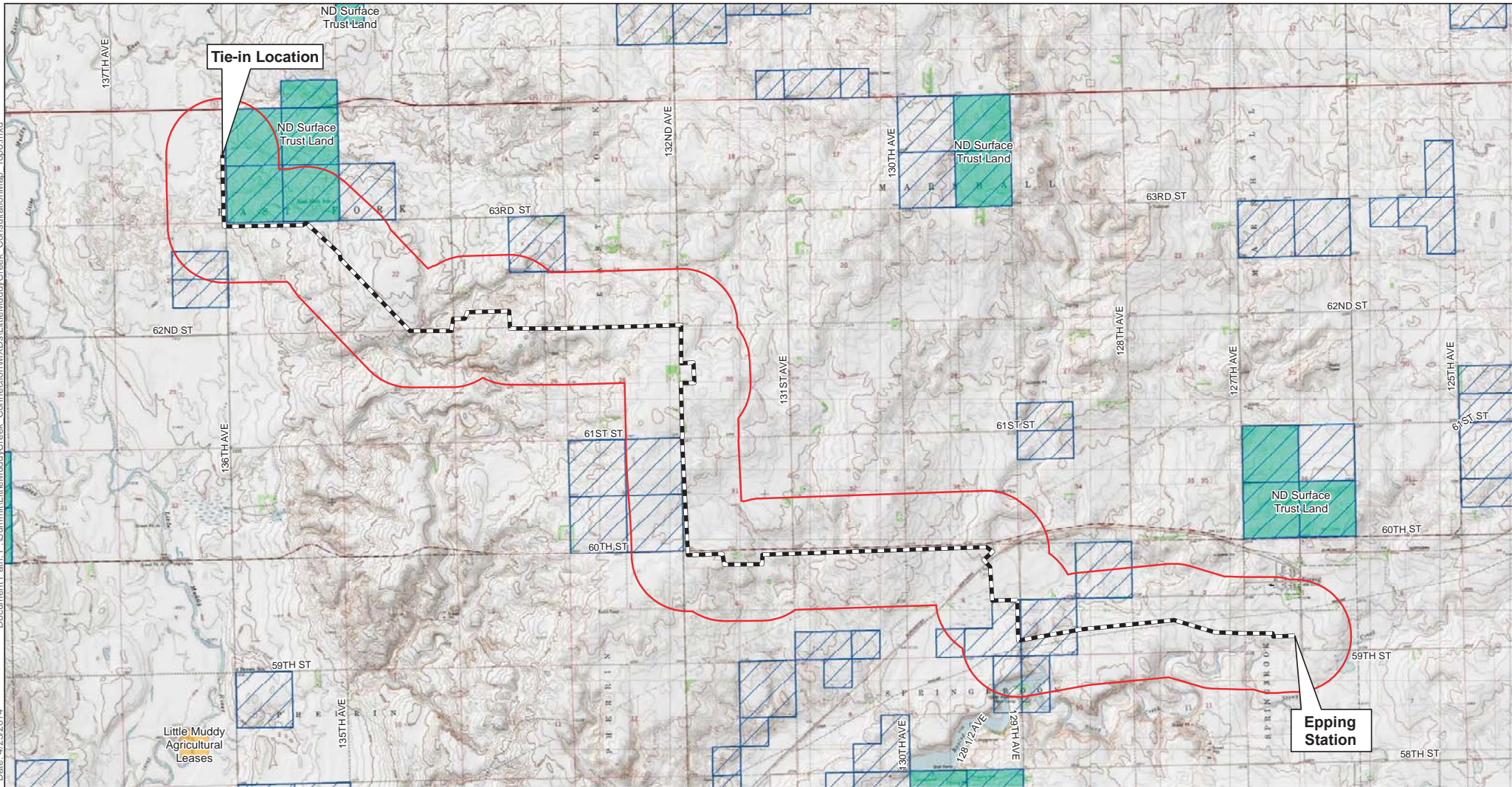
Pipeline
 Corridor (1 Mile)
 Mineral Trust Land
 Federal Land
 State Land

E3 ENVIRONMENTAL
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 Map not to scale, for environmental review purposes only.

Meadowlark Midstream Company, LLC
 Little Muddy Creek Pipeline
 Aerial Overview Map
 Williams County, ND

Document Path: P:\Summit\LittleMuddyCreek_Connection\MXD\LittleMuddyCreek_ConsultationMap_Topo.mxd
Date: 4/25/2014



Pipeline
 Corridor (1 Mile)
 Mineral Trust Land
 Federal Land
 State Land



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Map not to scale, for environmental review purposes only.

**Meadowlark Midstream
Company, LLC**
 Little Muddy Creek Pipeline
 Topo Overview Map
 Williams County, ND



"VARIETY IN HUNTING AND FISHING"

NORTH DAKOTA GAME AND FISH DEPARTMENT

100 NORTH BISMARCK EXPRESSWAY BISMARCK, NORTH DAKOTA 58501-5095 PHONE 701-328-6300 FAX 701-328-6352

June 10, 2014

Katie Schmidt
Senior Consultant
E3 Environmental, LLC
871 Jefferson Avenue
St. Paul, MN 55102

Dear Ms. Schmidt:

RE: Meadowlark Midstream Company, LLC – Little Muddy Creek Pipeline Project

Meadowlark Midstream Company, LLC (MMC) has proposed the construction of the Little Muddy Creek Pipeline, a new 14.75-mile 10-inch diameter crude oil pipeline that will originate at the Epping Station and tie-in to existing MMC assets northwest of Epping in Williams County, North Dakota.

The National Wetland Inventory indicates various 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.

We do not believe this project will have significant adverse effects on wildlife or wildlife habitat, including species of conservation priority, provided any unavoidable destruction or degradation of wetland acres is mitigated in kind, and disturbed areas are reclaimed to pre-project conditions.

Private Lands Open to Sportsmen (PLOTS) is a public access program which cost-shares with private landowners to help conserve fish and wildlife habitat. The ND Game and Fish Department does not own or manage PLOTS lands. Information regarding PLOTS locations is available on the department website at: <http://gf.nd.gov/hunting/private-land-open-sportsmen>. This page is updated to reflect changes as tracts are added or removed.

Sincerely,

A handwritten signature in blue ink that reads "Greg Link".

Greg Link
Chief
Conservation & Communication Division

js



May 20, 2014

Mr. Greg Link, Chief
Conservation and Communication Division
North Dakota Game and Fish Department
100 N. Bismarck Expressway
Bismarck, ND 58501-5095

Dear Mr. Link,

RE: Meadowlark Midstream Company, LLC – Little Muddy Creek Pipeline Project
State Conservation Priority Species Consultation, State Plots Land Review.

Meadowlark Midstream Company, LLC (MMC) has proposed the construction of the Little Muddy Creek Pipeline Project (Project). The proposed Project is a new 14.75-mile; 10-inch diameter Crude Pipeline that will originate at the Epping Station located approximately 10 miles south of Epping, ND and will tie-in to existing MMC assets located northwest of Epping, ND. Pipeline construction activities would typically occupy a 110-foot right-of-way. Following construction, the pipeline would be operated within a 25-foot permanent easement. Pipeline construction involves temporary impacts, with a post-construction restoration standard of restoring disturbed areas to their original pre-construction condition.

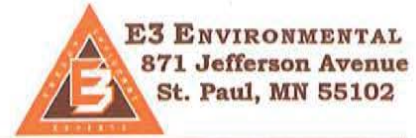
The location of the proposed Project is described below and depicted on the attached maps.

Williams County, North Dakota the pipeline crosses:

- Township 155N, Range 99W, Section 1, 2, 3, 4, 5, and 6
- Township 156N, Range 99W, Sections 19, 20, and 31
- Township 156N, Range 100W, Sections 17, 20, 21, 22, 23, and 24

The purpose of this correspondence is twofold: to request a review of the proposed Project for presence or absence of State Conservation Priority Species; and to request confirmation of the presence or absence of North Dakota Game and Fish Department PLOTS Lands within the proposed pipeline corridor (see attached). This information will be included in a North Dakota Public Service Commission application for the Project.

Meadowlark Midstream Company, LLC
Little Muddy Creek Pipeline Project
May 20th, 2014



E3 Environmental, LLC (E3) has been retained by MMC to provide environmental consulting support for this Project. Should you have any questions or require additional information, please contact me at 651-282-0652 or kschmidt@go2e3.com.

Sincerely,



Katie Schmidt, Senior Consultant
E3 Environmental, LLC
871 Jefferson Ave
St. Paul, MN 55102

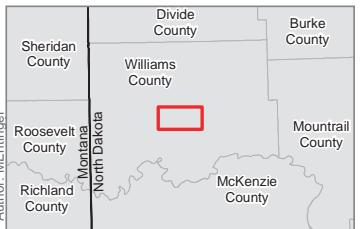
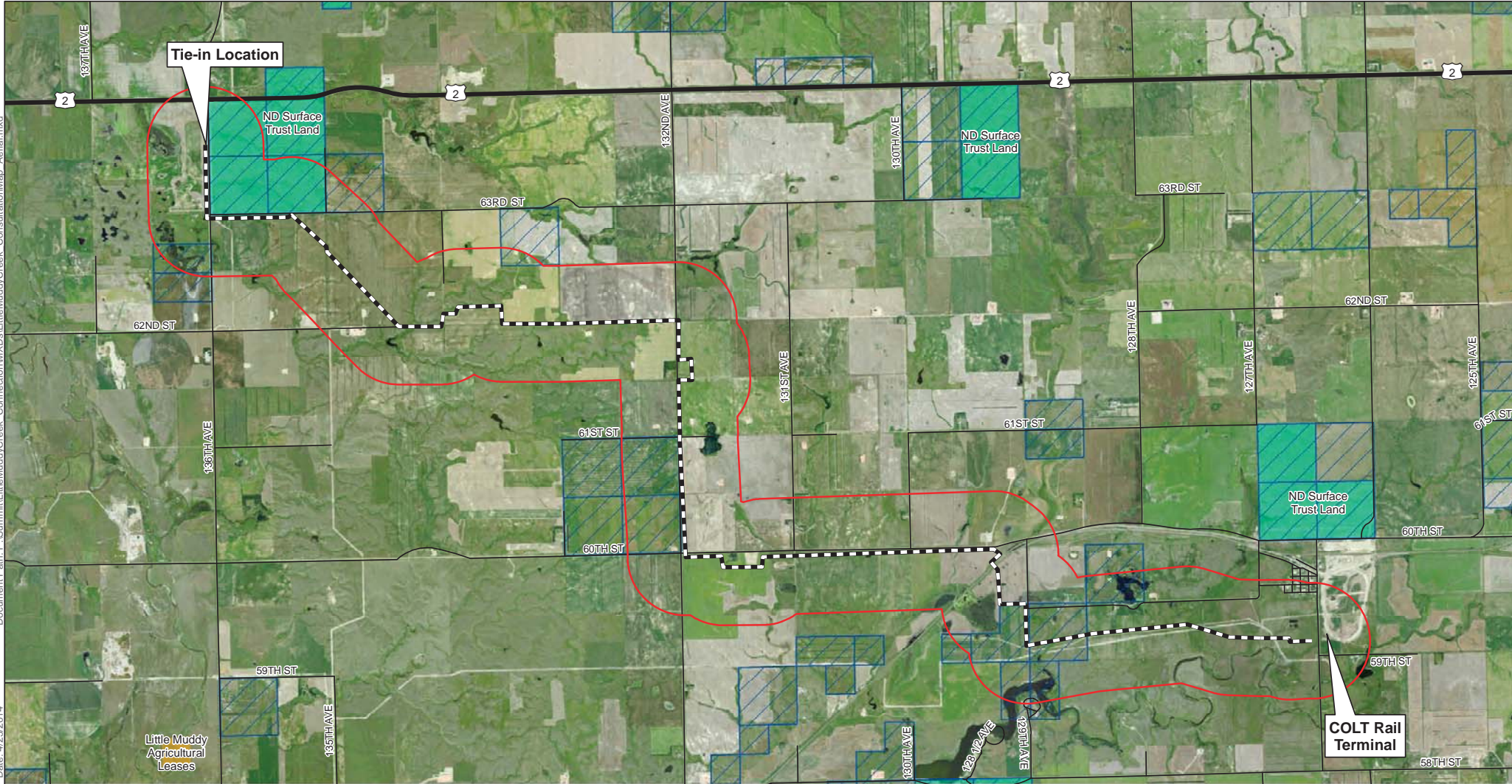
Enclosures: Project map

cc: E3 Project Files

Document Path: P:\Summit\LittleMuddyCreek_Connection\MXD\LittleMuddyCreek_ConsultationMap_Aerial.mxd

Date: 4/25/2014

Author: MEminger



- Pipeline
- Corridor (1 Mile)
- Mineral Trust Land
- Federal Land
- State Land

E3 ENVIRONMENTAL
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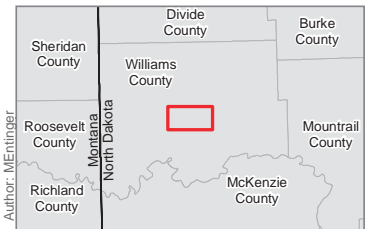
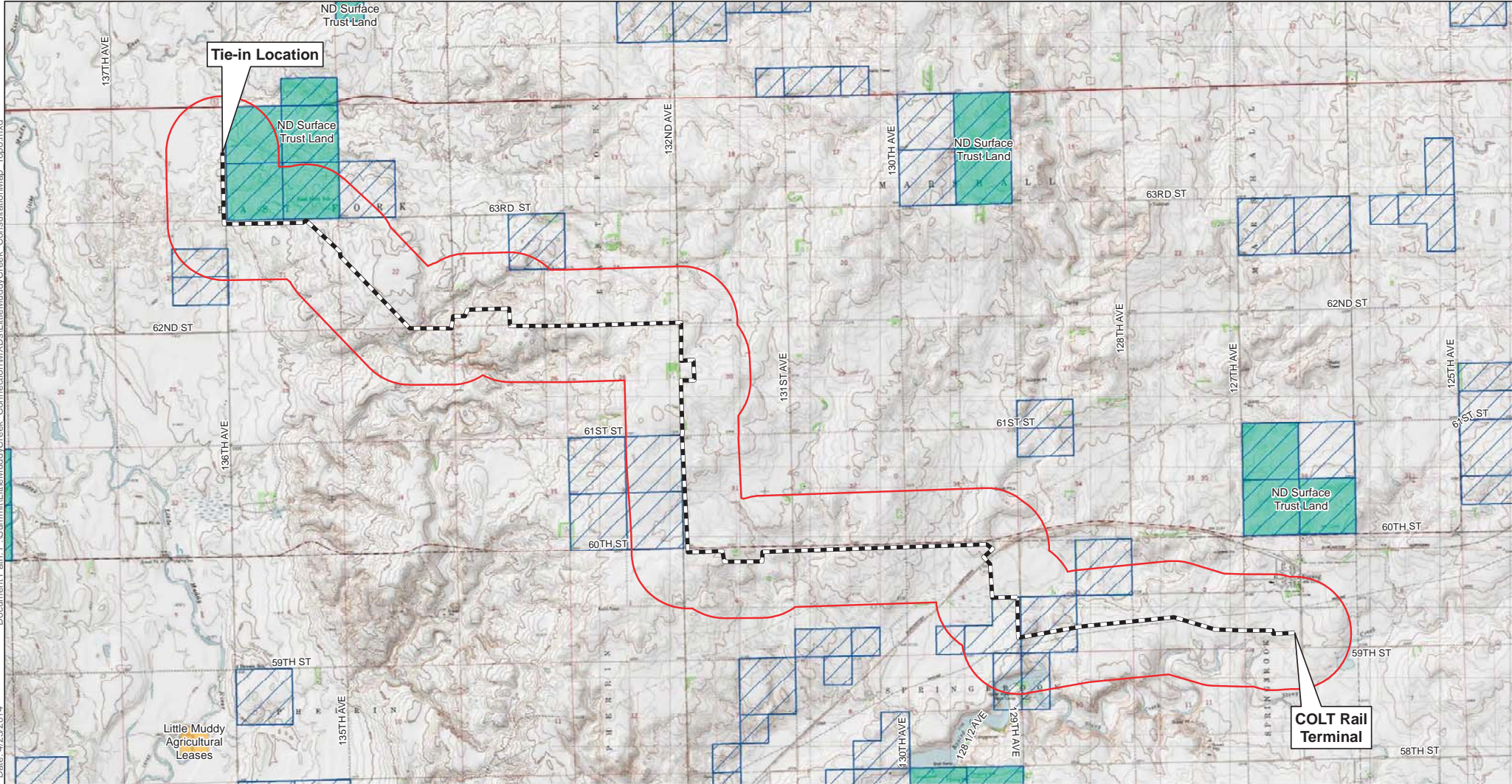
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Map not to scale, for environmental review purposes only.


Meadowlark Midstream Company, LLC

Little Muddy Creek Pipeline
Aerial Overview Map
Williams County, ND



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Date: 4/25/2014



- Pipeline
- Corridor (1 Mile)
- Mineral Trust Land
- Federal Land
- State Land



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Map not to scale, for environmental review purposes only.

**Meadowlark Midstream
Company, LLC**

Little Muddy Creek Pipeline
Topo Overview Map
Williams County, ND

North Dakota Parks and Recreation Department

Consultation



July 10, 2014

Ms. Kathy Duttonhefner, Coordinator
Natural Resources Division
North Dakota Department of Parks and Recreation
1600 East Century Avenue, Suite 3
Bismarck, ND 58503-0649

RE: Little Muddy Creek Pipeline and Epping Station expansion Project: Consultation Letter Amendment.

E3 Environmental, LLC (E3), on the behalf of Meadowlark Midstream Company (MMC), submitted a consultation letter for your review regarding the proposed Little Muddy Creek Pipeline Project (Project). This submittal was dated May 20, 2014. Typographical errors were noted in this original consultation request and the corrections are as follows:

- The pipeline will originate at the Epping Station not the Colt Rail Terminal as indicated on the original Project map;
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E3 has been retained by MMC/ETC to provide environmental consulting support for this Project. Should you have any questions or require additional information, please contact me at 651-282-0652 or kschmidt@go2e3.com.

Sincerely,

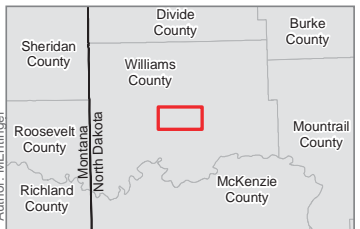
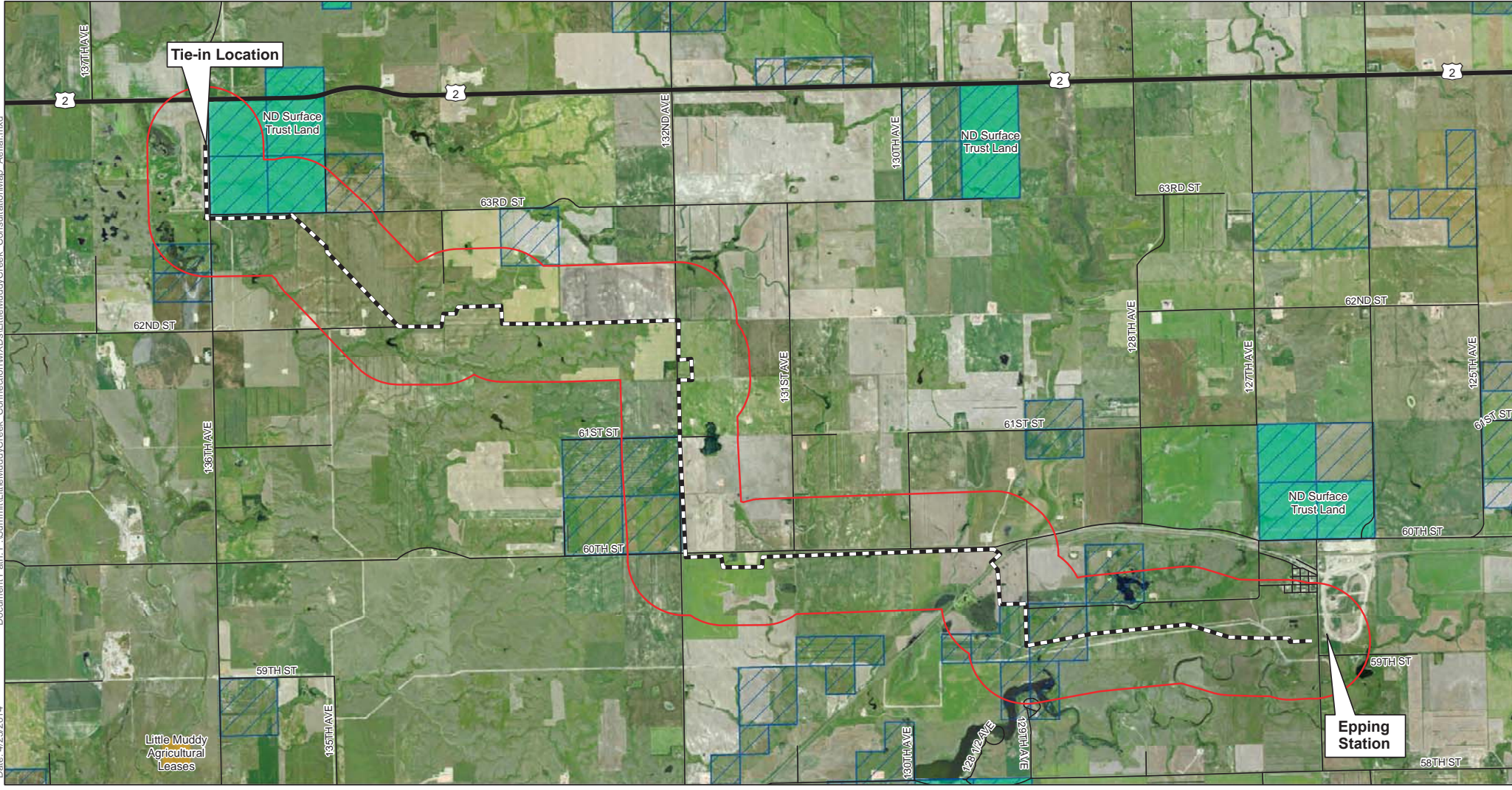
Katie Schmidt, Senior Consultant
E3 Environmental, LLC
871 Jefferson Ave
St. Paul, MN 55102

Enclosures: Project Maps

cc: E3 Project Files

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Date: 4/25/2014
Author: MEminger



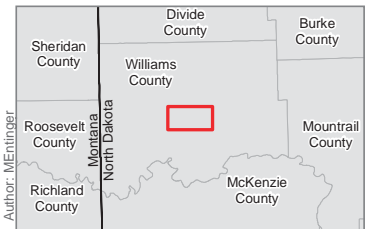
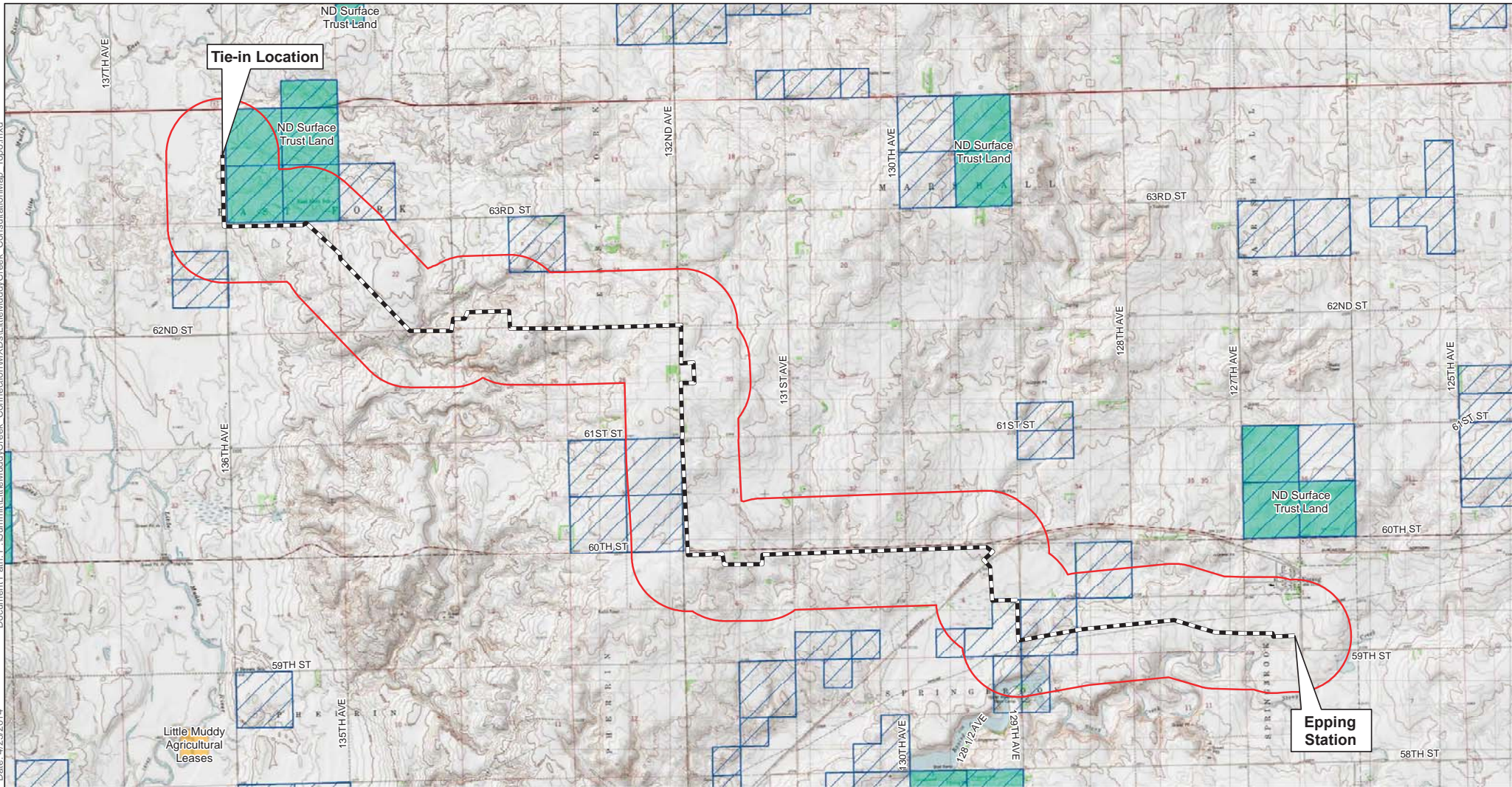
Pipeline
 Corridor (1 Mile)
 Mineral Trust Land
 Federal Land
 State Land

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 Map not to scale, for environmental review purposes only.

Meadowlark Midstream Company, LLC
 Little Muddy Creek Pipeline
 Aerial Overview Map
 Williams County, ND

Document Path: P:\Summit\LittleMuddyCreek_Connection\MXD\LittleMuddyCreek_ConsultationMap_Topo.mxd
Date: 4/25/2014



Pipeline
 Corridor (1 Mile)
 Mineral Trust Land
 Federal Land
 State Land



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Map not to scale, for environmental review purposes only.

**Meadowlark Midstream
Company, LLC**
 Little Muddy Creek Pipeline
 Topo Overview Map
 Williams County, ND



Jack Dalrymple, Governor
Mark A. Zimmerman, Director
1600 East Century Avenue, Suite 3
Bismarck, ND 58503-0649
Phone 701-328-5357
Fax 701-328-5363
E-mail parkrec@nd.gov
www.parkrec.nd.gov

June 2, 2014

Katie Schmidt
E3 Environmental LLC
871 Jefferson Ave., St Paul, MN 55102

Re: Meadowlark Midstream Company, LLV Little Muddy Creek Pipeline Project

Dear Katie Schmidt:

The North Dakota Parks and Recreation Department (the Department) has reviewed the above referenced proposed Little Muddy Creek Pipeline Project south of Epping, North Dakota.


Our agency scope of authority and expertise covers recreation and biological resources (in particular rare plants and ecological communities). The project as defined does not affect state park lands that we manage or Land and Water Conservation Fund recreation projects that we coordinate.

The North Dakota Natural Heritage biological conservation database has been reviewed to determine if any 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, there are no documented occurrences in our database within or adjacent to project area. Because this information is not based on a comprehensive inventory, there may be species of concern or otherwise significant ecological communities in the area that are not represented in the database. The lack of data for any project area cannot be construed to mean that no significant features are present. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

The Department recommends that the project be accomplished with minimal impacts and that all efforts be made to ensure that critical habitats not be disturbed in the project area to help secure rare species conservation in North Dakota. Regarding any reclamation efforts, we recommend that any impacted areas be revegetated with species native to the project area.

We appreciate your commitment to rare plant, animal and ecological community conservation, management and inter-agency cooperation to date. For additional information please contact me at (701-328-5370 or kgduttonhefner@nd.gov). Thank you for the opportunity to comment on this proposed project.

Sincerely,


Kathy Duttonhefner, Coordinator
Natural Resources Division

R.USNDNHI*2014_106KD6/3/2014DL6.7.2014

.....
Play in our backyard!



May 20, 2014

Ms. Kathy Duttonhefner, Coordinator
Natural Resources Division
North Dakota Department of Parks and Recreation
1600 East Century Avenue, Suite 3
Bismarck, ND 58503-0649

RE: Meadowlark Midstream Company, LLC – Little Muddy Creek Pipeline Project
State Conservation Priority Species Consultation, State Plots Land Review.

Meadowlark Midstream Company, LLC (MMC) has proposed the construction of the Little Muddy Creek Pipeline Project (Project). The proposed Project is a new 14.75-mile; 10-inch diameter Crude Pipeline that will originate at the Epping Station located approximately 10 miles south of Epping, ND and will tie-in to existing MMC assets located northwest of Epping, ND. Pipeline construction activities would typically occupy a 110-foot right-of-way. Following construction, the pipeline would be operated within a 25-foot permanent easement. Pipeline construction involves temporary impacts, with a post-construction restoration standard of restoring disturbed areas to their original pre-construction condition.

The location of the proposed Project is described below and depicted on the attached maps.

Williams County, North Dakota the pipeline crosses:

- Township 155N, Range 99W, Section 1, 2, 3, 4, 5, and 6
- Township 156N, Range 99W, Sections 19, 20, and 31
- Township 156N, Range 100W, Sections 17, 20, 21, 22, 23, and 24

The purpose of this request is to compile the North Dakota Parks and Recreation Department's (Department) comments on environmental topics that are relevant to the North Dakota Public Service Commission's siting requirements for Energy Transmission Facility Siting. It is our understanding that the Department administers the following state programs:

- State Park Lands
- Land and Water Conservation Fund
- Natural Heritage Inventory

We request a review of the proposed corridor and route (see attached map) for the presence or absence of any lands, projects and/or sensitive species that fall under the purview of these programs.

Meadowlark Midstream Company, LLC
Little Muddy Creek Pipeline Project
May 20th, 2014



E3 Environmental, LLC (E3) has been retained by MMC to provide environmental consulting support for this Project. Should you have any questions or require additional information, please contact me at 651-282-0652 or kschmidt@go2e3.com.

Sincerely,



Katie Schmidt, Senior Consultant
E3 Environmental, LLC
871 Jefferson Ave
St. Paul, MN 55102

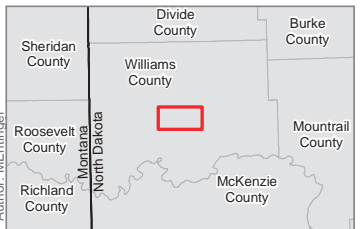
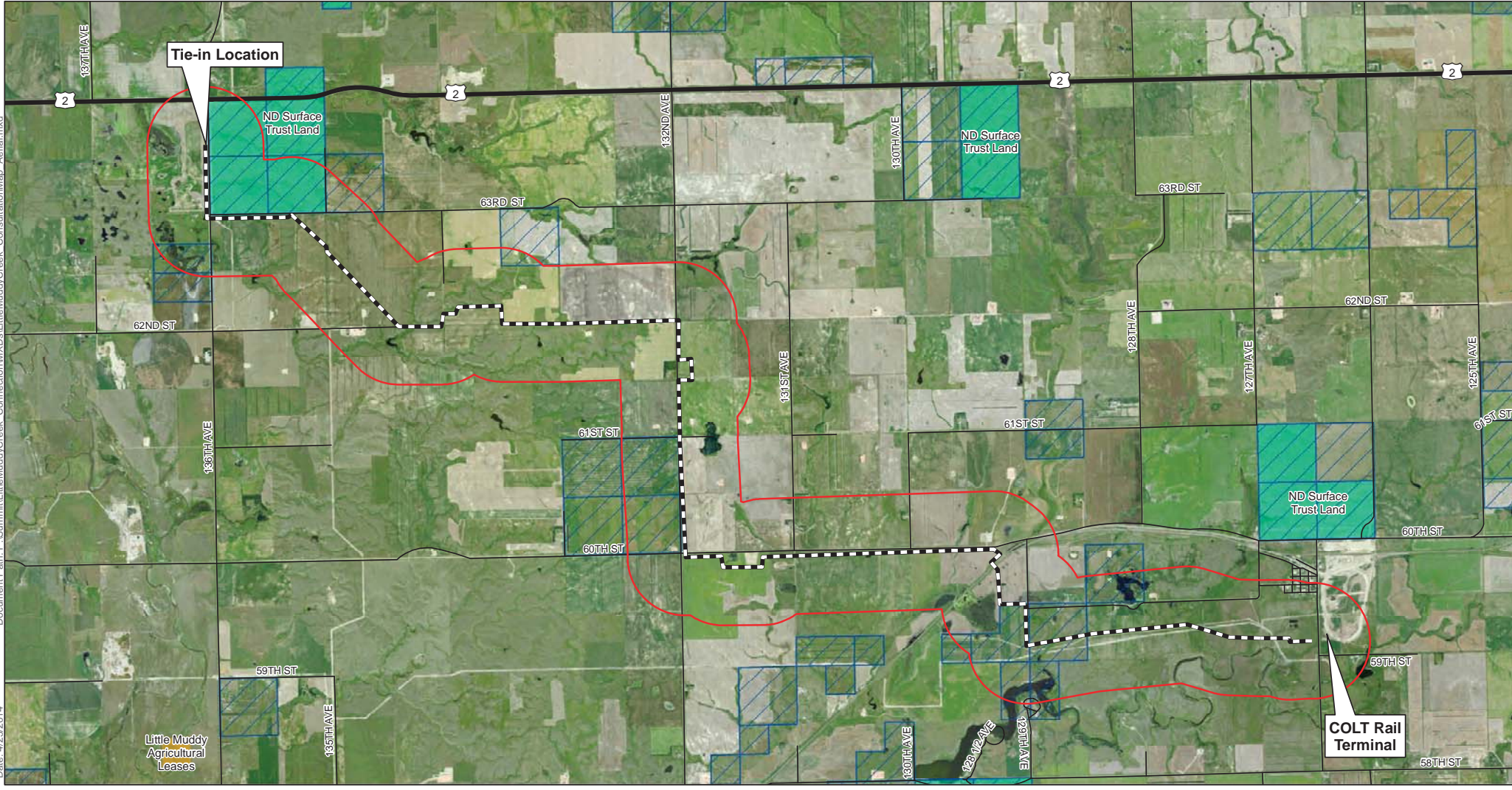
Enclosures: Project map

cc: E3 Project Files

Document Path: P:\Summit\LittleMuddyCreek_Connection\MXD\Aerial\LittleMuddyCreek_ConsultationMap_Aerial.mxd

Date: 4/25/2014

Author: MEminger



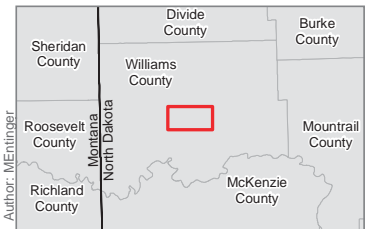
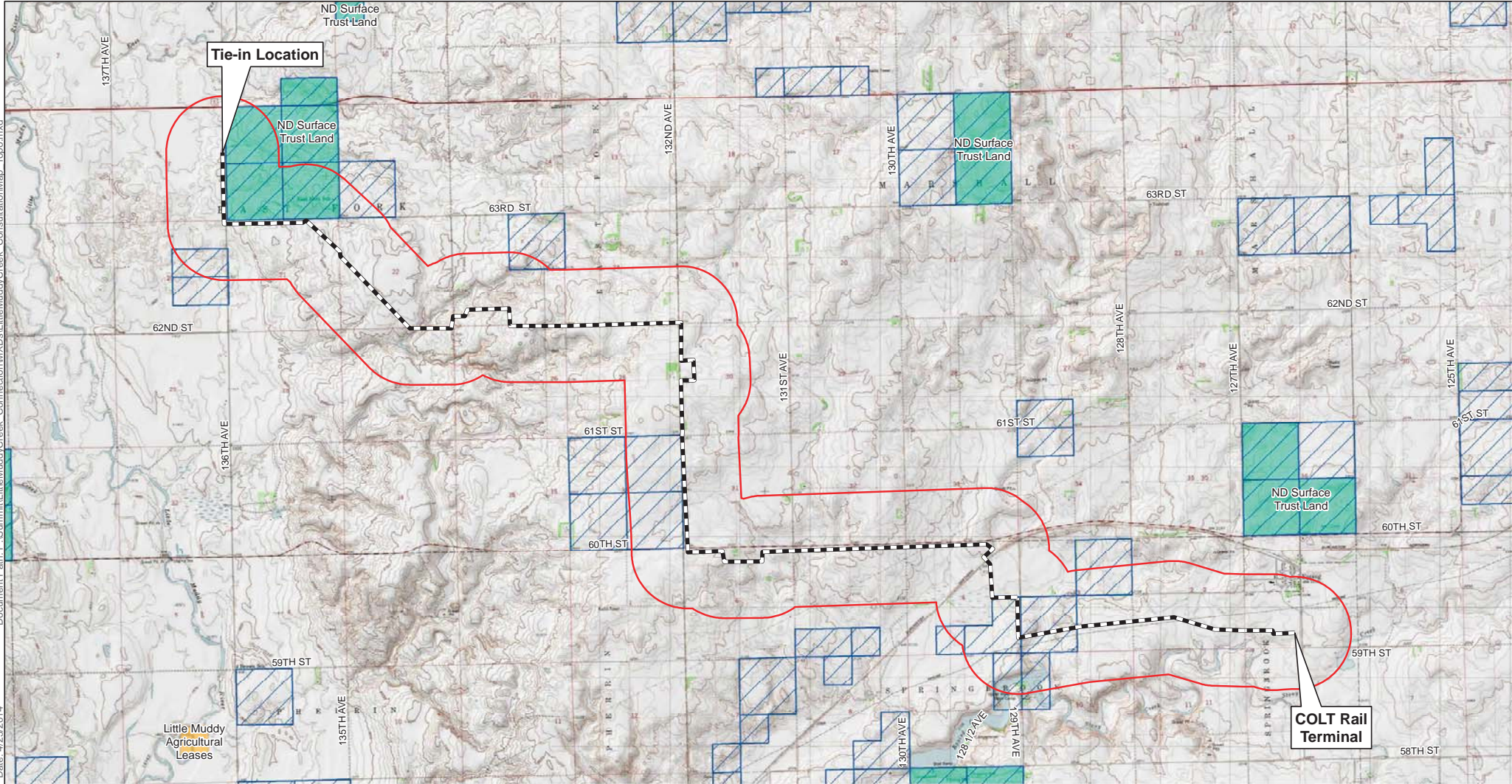
Pipeline
 Corridor (1 Mile)
 Mineral Trust Land
 Federal Land
 State Land

E3 ENVIRONMENTAL
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Meadowlark Midstream Company, LLC
 Little Muddy Creek Pipeline
 Aerial Overview Map
 Williams County, ND

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- Pipeline
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E3 ENVIRONMENTAL
Enhancing Execution with Experience

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**Meadowlark Midstream
Company, LLC**

Little Muddy Creek Pipeline
Topo Overview Map
Williams County, ND

North Dakota State Lands Department-School Trust Lands

Constulation

Chris Schmidt

From: Haupt, Michael L. <mhaupt@nd.gov>
Sent: Thursday, July 10, 2014 3:42 PM
To: Katie Schmidt
Cc: Chris Schmidt
Subject: RE: MMC-Little Muddy Creek Amended Consultation
Attachments: LittleMuddyCreek_ConsultationMap_Updated_06262014.pdf

Katie,

Good afternoon! We may have talked to Meadowlark already about a route on the Trust land in section 16. There is potential for gravel deposits and a request for a pipeline easement would require prospecting by Meadowlark and determination by the Trust of the amount of royalties Meadowlark would pay for the un-mineable gravel, in addition to the easement consideration. Let me know if you have questions. Thanks.

Michael L. Haupt

Land Management Professional P
North Dakota Department of Trust lands
1000 10th Street
Bismarck, ND 58103
mmhaupt@nd.gov

Note: You can track the real time status of your right-of-way application 24/7 at <http://www.land.nd.gov/surface/right-of-way.aspx> using either the ROW number or by entering at least the first three letters of the company name. By checking this site you can find the name, telephone number and email address of the person working on the application as well as its current status in real time.

From: Katie Schmidt [mailto:KSchmidt@go2e3.com]
Sent: Thursday, July 10, 2014 2:46 PM
To: Haupt, Michael L.
Cc: Chris Schmidt
Subject: MMC-Little Muddy Creek Amended Consultation

Mr. Haupt,

E3 Environmental, LLC (E3), on the behalf of Meadowlark Midstream Company (MMC), submitted a consultation letter for your review regarding the proposed Little Muddy Creek Pipeline Project (Project). This submittal was dated May 20, 2014. Typographical errors were noted in this original consultation request and the corrections are as follows:

- The pipeline will originate at the Epping Station not the Colt Rail Terminal as indicated on the original Project map;
- The Epping Station is approximately 1-mile south of Epping, North Dakota not 10-miles; and
- The Little Muddy Creek pipeline endpoint will tie-in to the North Dakota Pipeline Company, LLC's Little Muddy Creek Injection Station, not existing MMC assets.

The Project, as described in the previous submittal, includes the construction and operation of a 14.75 mile, 10-inch crude pipeline. In addition to the pipeline, MMC will be expanding the tank storage capacity at their existing Epping Station. This expansion will occur within the 1-mile corridor depicted on the original consultation maps.

MMC is a wholly owned subsidiary of Summit Midstream Partners, LLC. MMC will expand and currently operates the existing Epping Station. The Little Muddy Creek Pipeline will be constructed and operated by Epping Transmission Company, LLC (ETC). ETC is also a wholly owned subsidiary of Summit Midstream Partners, LLC.

E3 has been retained by MMC/ETC to provide environmental consulting support for this Project. Should you have any questions or require additional information, please contact me at 651-282-0652 or kschmidt@go2e3.com.

Sincerely,

Katie Schmidt, EIT
Senior Consultant

E3 Environmental, LLC

kschmidt@go2e3.com

O: 651.282.0652

M: 651.216.6881

871 Jefferson Avenue

St. Paul, MN 55102

www.go2e3.com



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Katie Schmidt

To: mhaupt@nd.gov
Cc: Chris Schmidt
Subject: MMC-Little Muddy Creek Amended Consultation
Attachments: LittleMuddyCreek_ConsultationMap_Updated_06262014.pdf

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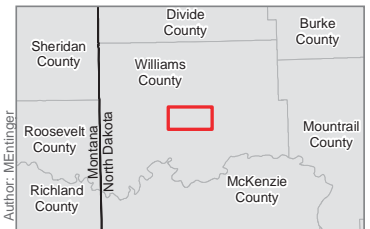
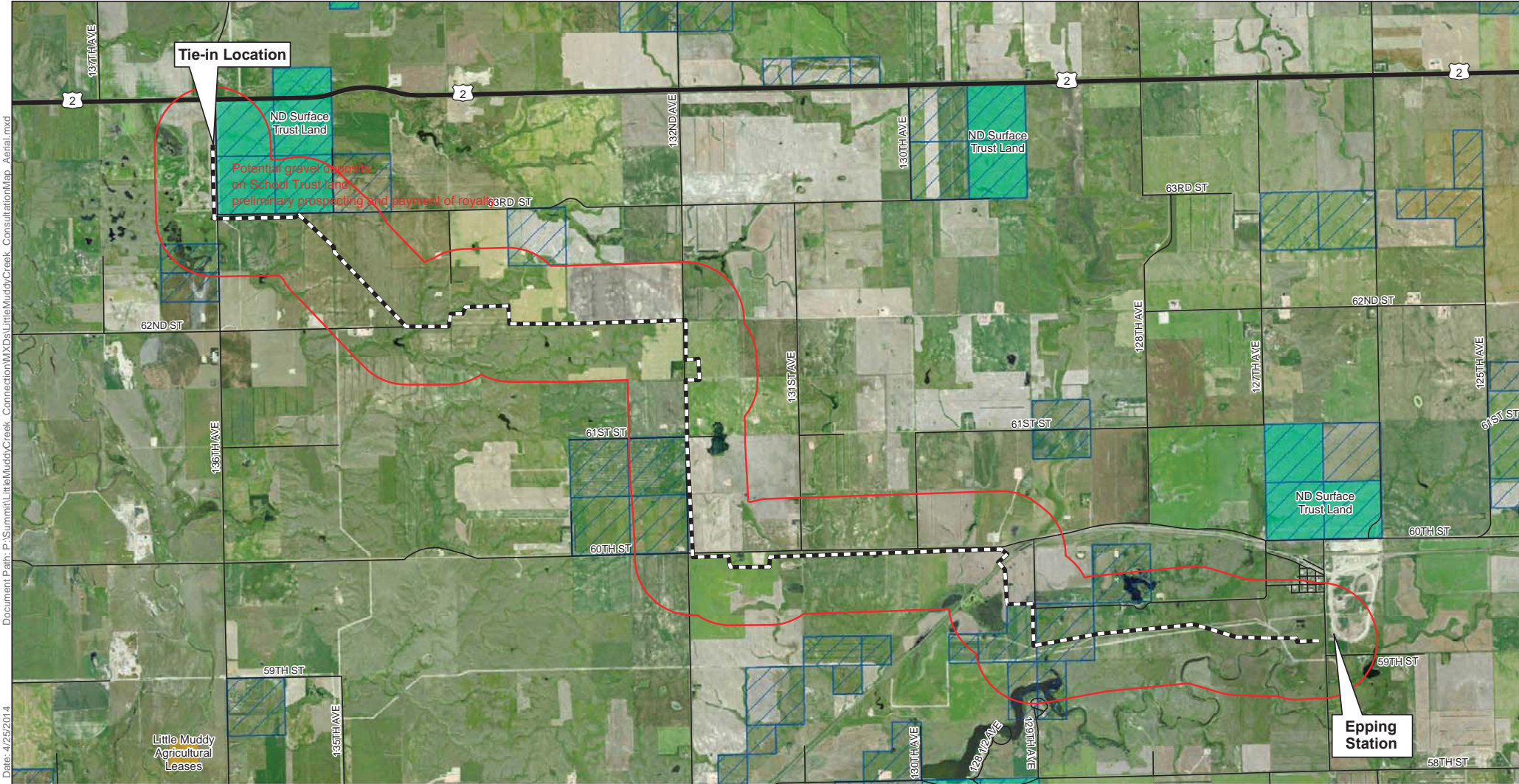
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Date: 4/25/2014



- Pipeline
- Corridor (1 Mile)
- Mineral Trust Land
- Federal Land
- State Land

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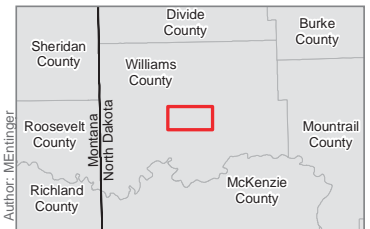
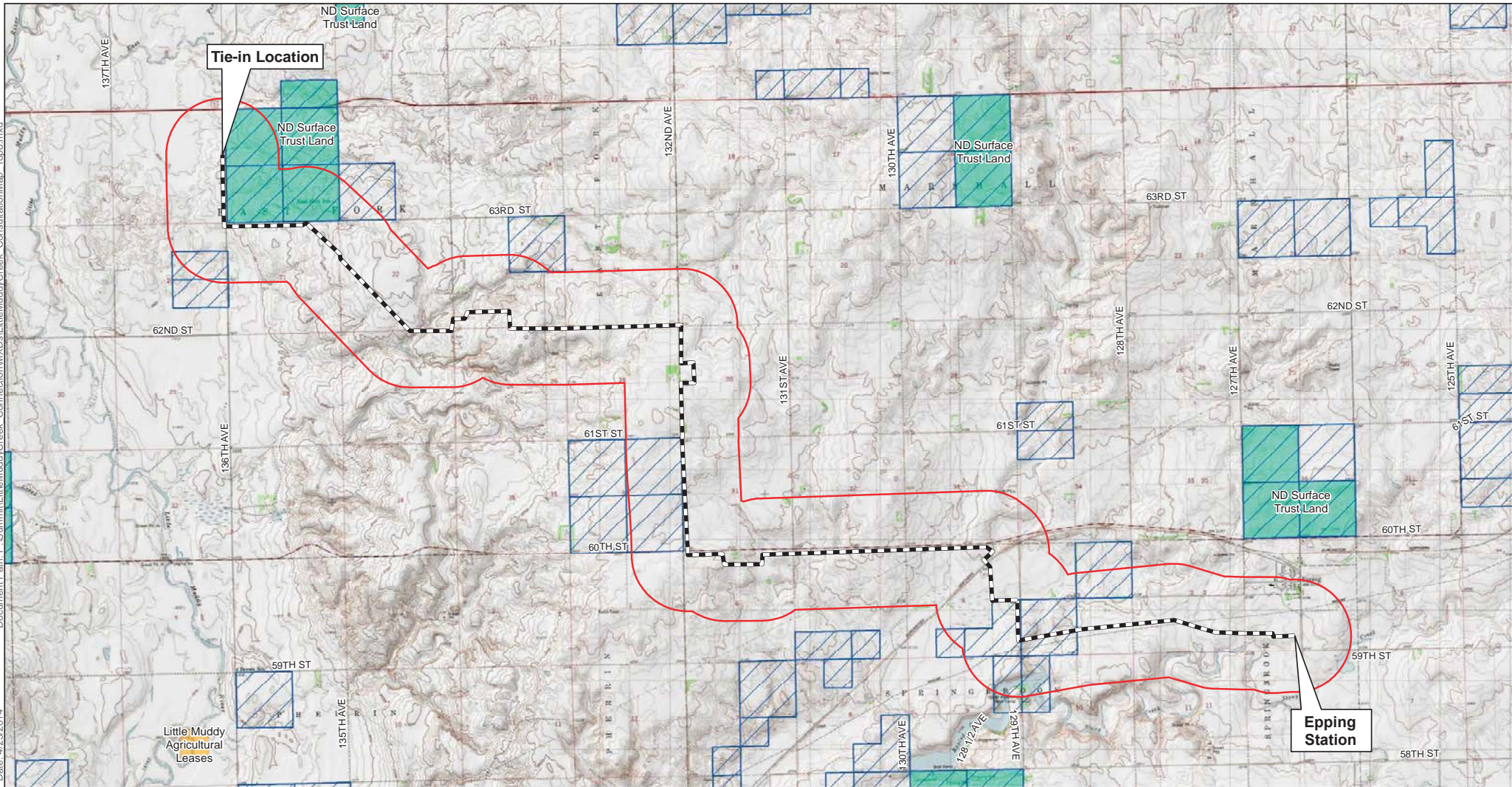
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Map not to scale, for environmental review purposes only.


**Meadowlark Midstream
Company, LLC**

Little Muddy Creek Pipeline
Aerial Overview Map
Williams County, ND



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Date: 4/25/2014



-  Pipeline
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1:51,657

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**Meadowlark Midstream
Company, LLC**

Little Muddy Creek Pipeline
Topo Overview Map
Williams County, ND

Chris Schmidt

From: Haupt, Michael L. <mhaupt@nd.gov>
Sent: Wednesday, May 21, 2014 3:10 PM
To: Chris Schmidt
Cc: Katie Schmidt
Subject: RE: Little Muddy Creek: North Dakota School Trust Lands Consultation

Follow Up Flag: Follow up
Flag Status: Flagged

Chris,

Good afternoon! There is School Trust land within the proposed corridor, including section 16-156-100 Williams County, but there are gravel deposits on this tract and pipeline easements across this tract are currently on hold, possibly until the gravel deposits are mined. If a pipeline were to cross this tract the company would have to test for gravel depth and pay royalties for lost gravel, in addition to easement consideration. Thanks.

Michael L. Haupt

Land Management Professional P
North Dakota Department of Trust Lands
1111 11th Street
Bismarck ND 58101
mhaupt@nd.gov

Note: You can track the real time status of your right-of-way application 24/7 at <http://www.land.nd.gov/surface/right-of-way.aspx> using either the ROW number or by entering at least the first three letters of the company name. By checking this site you can find the name, telephone number and email address of the person working on the application as well as its current status in real time.

From: Chris Schmidt [mailto:CSchmidt@go2e3.com]
Sent: Tuesday, May 20, 2014 2:23 PM
To: Haupt, Michael L.
Cc: Katie Schmidt
Subject: Little Muddy Creek: North Dakota School Trust Lands Consultation

Dear Mr. Haupt,

Meadowlark Midstream Company, LLC (MMC) has proposed the construction of the Little Muddy Creek Pipeline Project (Project). The proposed Project is a new 14.75-mile; 10-inch diameter Crude Pipeline that will originate at the Epping Station located approximately 10 miles south of Epping, ND and will tie-in to existing MMC assets located northwest of Epping, ND. Pipeline construction activities would typically occupy a 110-foot right-of-way. Following construction, the pipeline would be operated within a 25-foot permanent easement. Pipeline construction involves temporary impacts, with a post-construction restoration standard of restoring disturbed areas to their original pre-construction condition.

The location of the proposed Project is described below and depicted on the attached maps.

Williams County, North Dakota the pipeline crosses:

- Township 155N, Range 99W, Section 1, 2, 3, 4, 5, and 6
- Township 156N, Range 99W, Sections 19, 20, and 31
- Township 156N, Range 100W, Sections 17, 20, 21, 22, 23, and 24

The purpose of this correspondence is to request a review of the proposed project corridor (see attached) for the presence or absence of State School Trust Lands. This information will be included in a North Dakota Public Service Commission application for the Project.

E3 Environmental, LLC has been retained by MMC to provide environmental consulting support for this project. Should you have any questions or require additional information, please contact me at 651-282-0654 or cschmidt@go2e3.com.

Sincerely,

Chris Schmidt, GIT
Associate Consultant
E3 Environmental, LLC
cschmidt@go2e3.com
O: 651.282.0654
871 Jefferson Avenue
St. Paul, MN 55102
www.go2e3.com



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Chris Schmidt

From: Chris Schmidt
Sent: Tuesday, May 20, 2014 2:23 PM
To: 'mhaupt@nd.gov'
Cc: Katie Schmidt
Subject: Little Muddy Creek: North Dakota School Trust Lands Consultation
Attachments: LittleMuddyCreek_ConsultationMap.pdf

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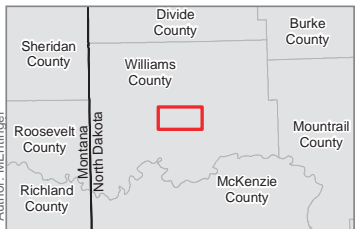
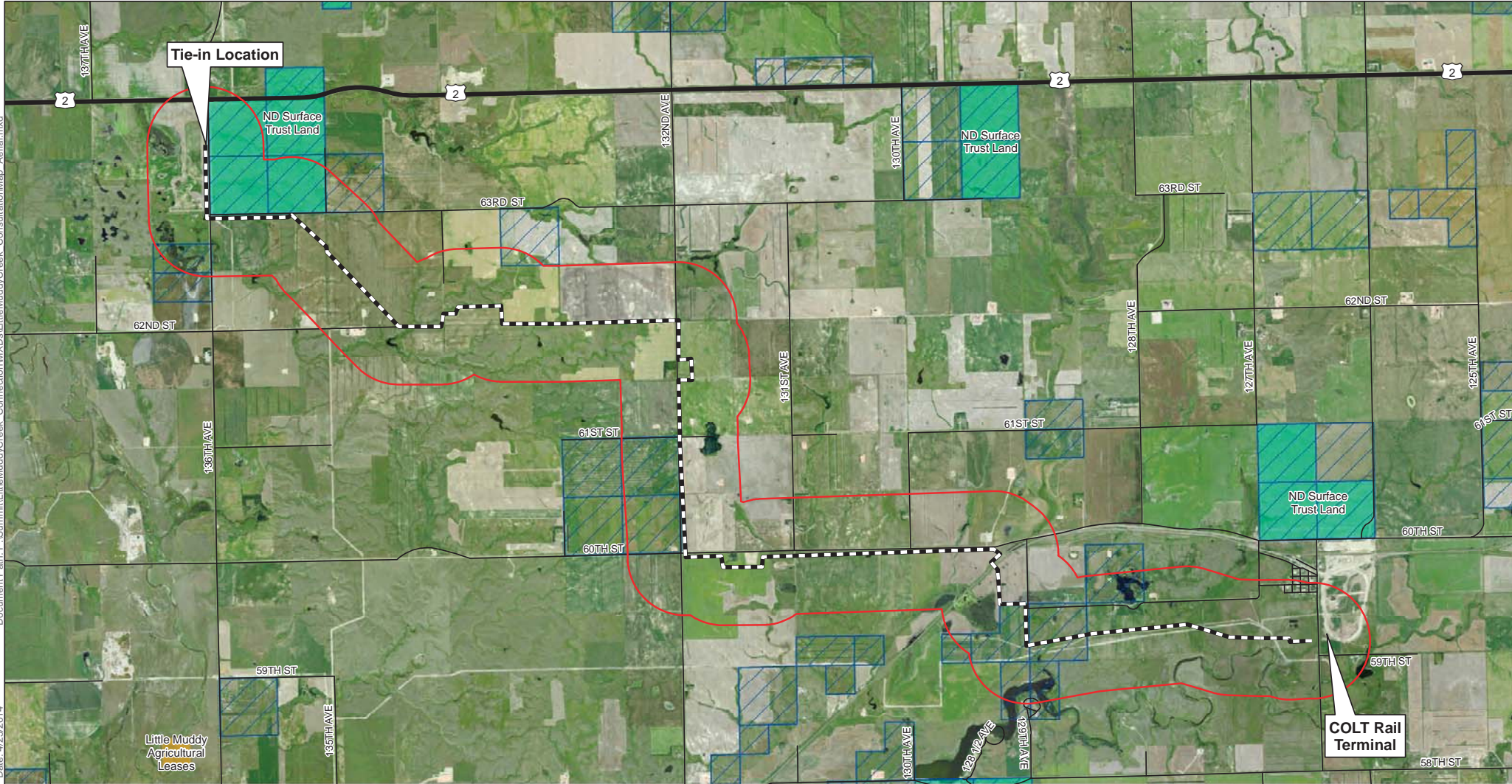
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Associate Consultant
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cschmidt@go2e3.com
O: 651.282.0654
871 Jefferson Avenue
St. Paul, MN 55102
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Date: 4/25/2014


Author: MEminger



-  Pipeline
-  Corridor (1 Mile)
-  Mineral Trust Land
-  Federal Land
-  State Land




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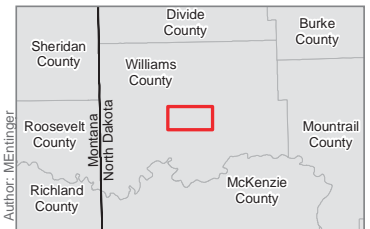
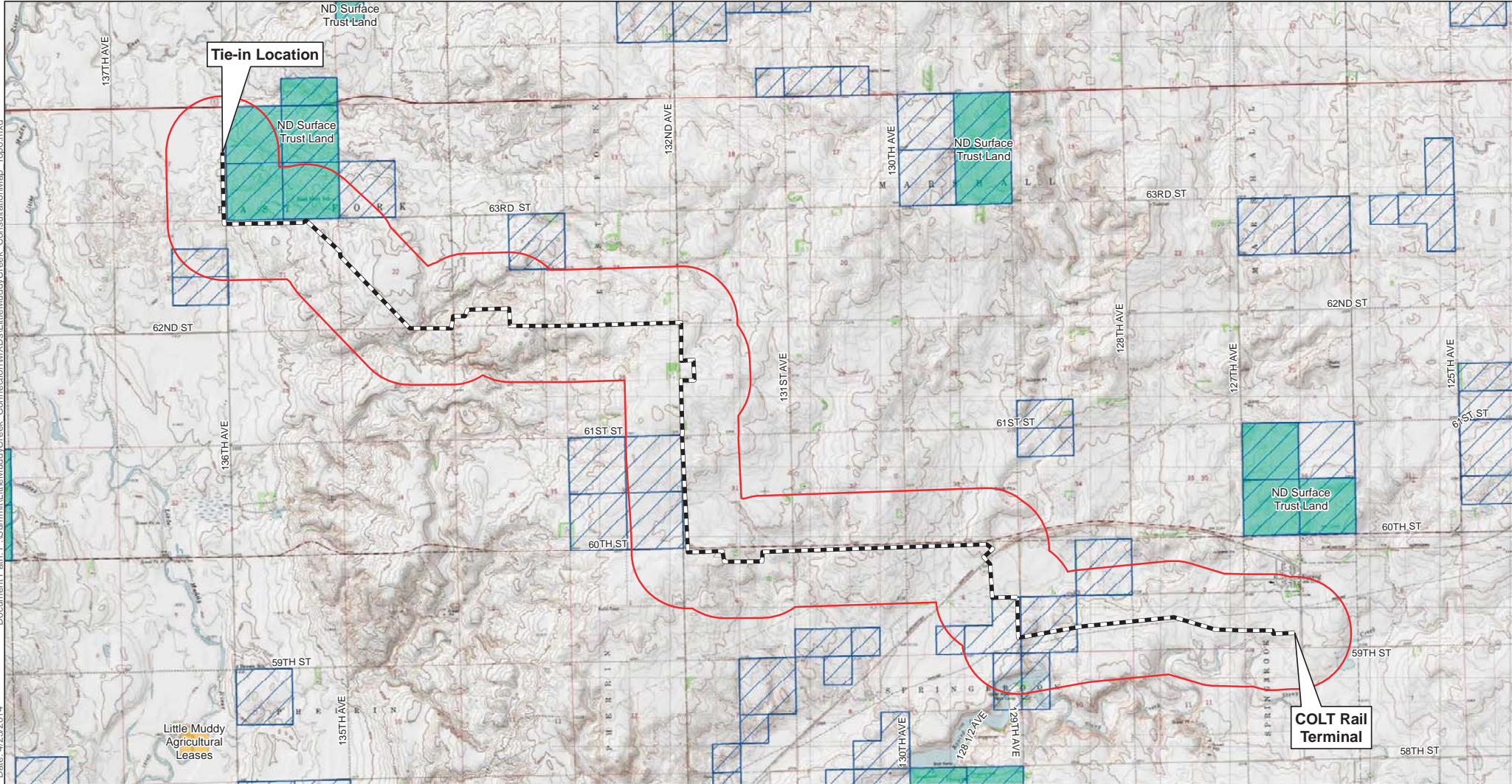


Map not to scale, for environmental review purposes only.

Meadowlark Midstream Company, LLC

Little Muddy Creek Pipeline
Aerial Overview Map
Williams County, ND

Document Path: P:\Summit\LittleMuddyCreek_Connection\MXD\LittleMuddyCreek_ConsultationMap_Topo.mxd
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- Pipeline
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0 0.5 1 2 Miles

1:51,657

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Meadowlark Midstream Company, LLC
 Little Muddy Creek Pipeline
 Topo Overview Map
 Williams County, ND

North Dakota State Lands Department-Mineral Trust Lands

Constulation

Katie Schmidt

To: Bayley, Keith W.
Cc: Chris Schmidt
Subject: MMC Little Muddy Creek Consultation Clarification/Amendment

Dear Mr. Bayley,

E3 Environmental, LLC (E3), on the behalf of Meadowlark Midstream Company (MMC), submitted a consultation letter for your review regarding the proposed Little Muddy Creek Pipeline Project (Project). This submittal was dated May 20, 2014. Typographical errors were noted in this original consultation request and the corrections are as follows:

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Sincerely,

Katie Schmidt, EIT
Senior Consultant

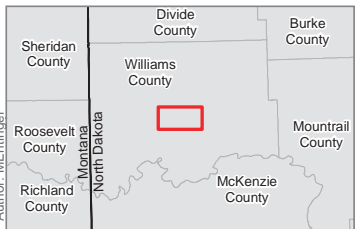
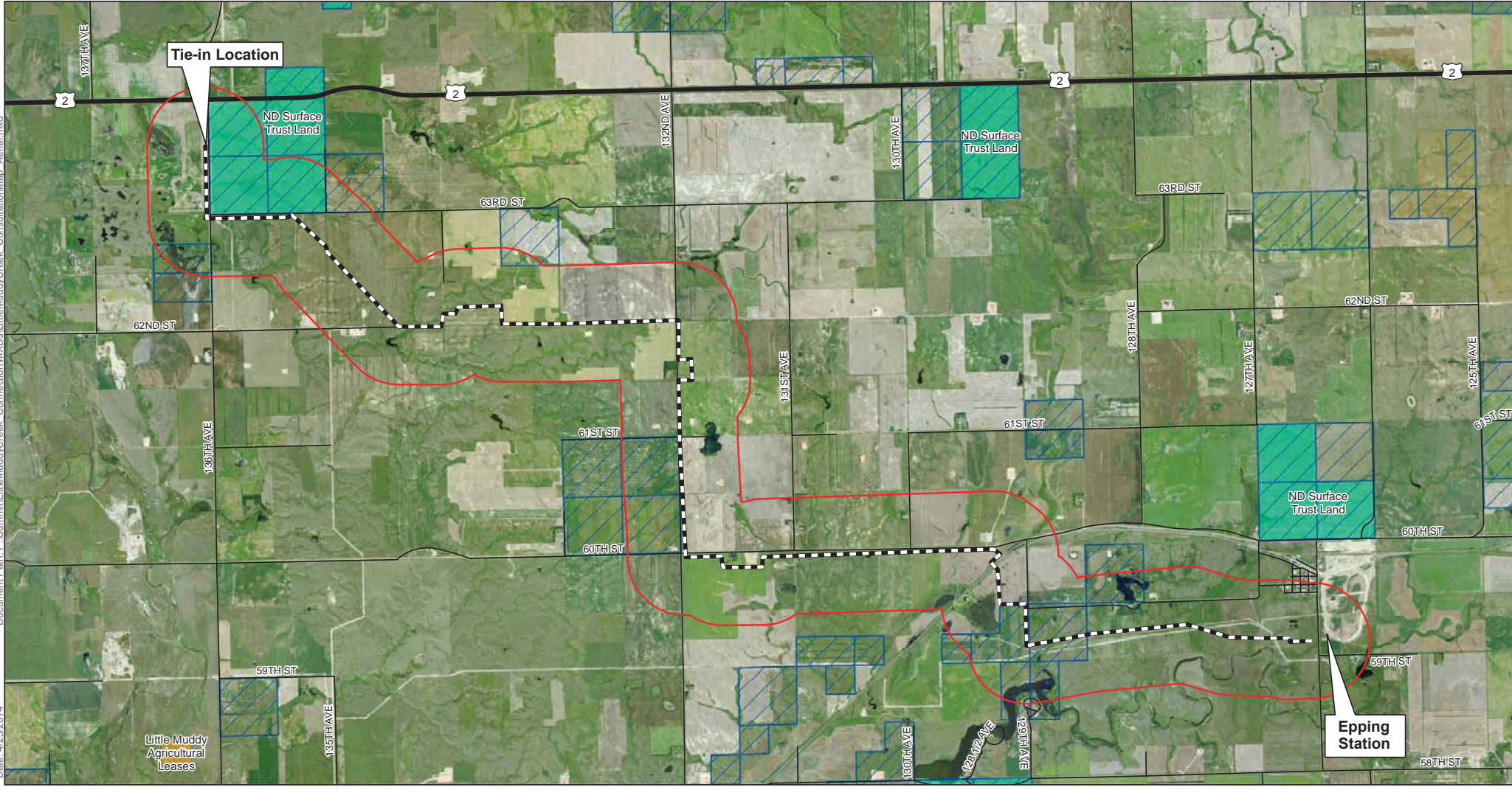
E3 Environmental, LLC
kschmidt@go2e3.com
O: 651.282.0652
M: 651.216.6881
871 Jefferson Avenue
St. Paul, MN 55102
www.go2e3.com



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Date: 4/25/2014

Author: MEminger



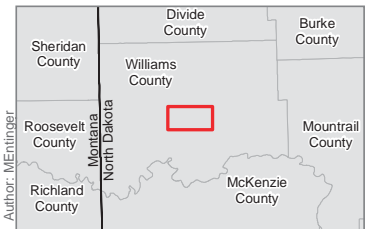
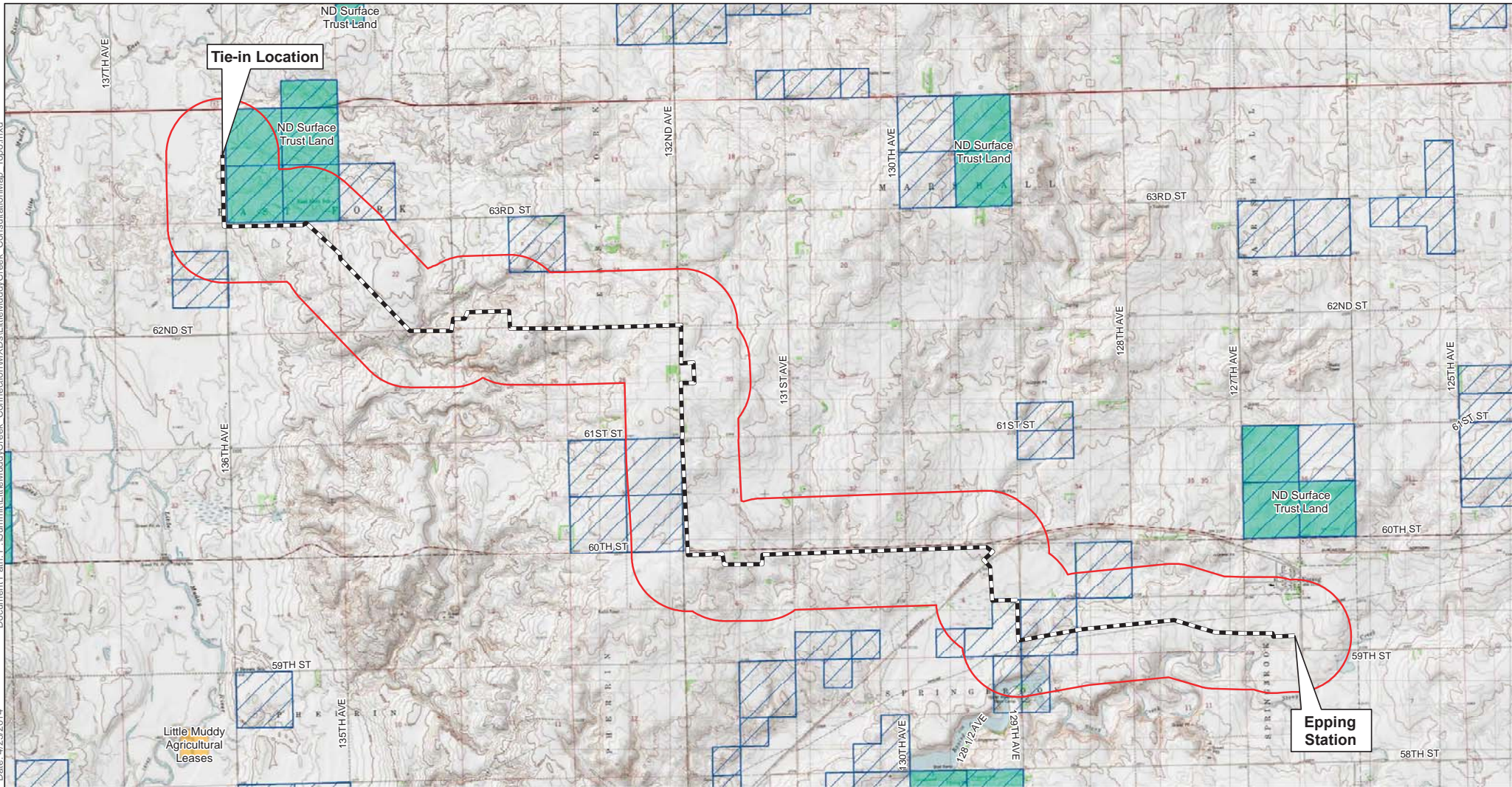
Pipeline
 Corridor (1 Mile)
 Mineral Trust Land
 Federal Land
 State Land

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0 0.5 1 2 Miles
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Meadowlark Midstream Company, LLC
 Little Muddy Creek Pipeline
 Aerial Overview Map
 Williams County, ND

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Meadowlark Midstream Company, LLC
 Little Muddy Creek Pipeline
 Topo Overview Map
 Williams County, ND

Chris Schmidt

From: Bayley, Keith W. <kbayley@nd.gov>
Sent: Thursday, May 22, 2014 9:22 AM
To: Chris Schmidt
Subject: RE: Little Muddy Creek: North Dakota Mineral State Trust Consultation
Attachments: LittleMuddyCreek.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Chris,

Attached is a plat of the Little Muddy Creek pipeline and corridor location from the data you provided to us. These plats show the location of our mineral interests along the routes. Our plat identifies 156-99-36 as outside of the corridor.

If you need anything further, let me know.

Keith Bayley
Land Professional
ND Department of Trust Lands
701.328.1912
kbayley@nd.gov

From: Chris Schmidt [mailto:CSchmidt@go2e3.com]
Sent: Tuesday, May 20, 2014 2:27 PM
To: Bayley, Keith W.
Cc: Katie Schmidt
Subject: Little Muddy Creek: North Dakota Mineral State Trust Consultation

Dear Mr. Bayley,

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- Township 156N, Range 99W, Sections 19, 20, and 31
- Township 156N, Range 100W, Sections 17, 20, 21, 22, 23, and 24

E3 has accessed www.land.nd.gov to review the proposed Project corridor for the presence of State Mineral Trust Lands. The results of this search concluded that the following sections intersect State Lands in Williams County:

- Township 155N, Range 99W Sections 3, 4, 9, and 10
- Township 156N, Range 99 W Section 36
- Township 156N, Range 100W Sections 15, 16, 20, 23, and 36

The purpose of this consultation is to seek your concurrence with this analysis. This information will be included in a North Dakota Public Service Commission application for the Project. For your convenience, please refer to the attached map and shapefiles, which depicts the Project corridor and State Mineral Trust Lands.

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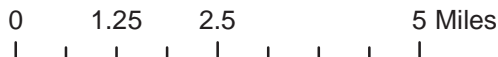
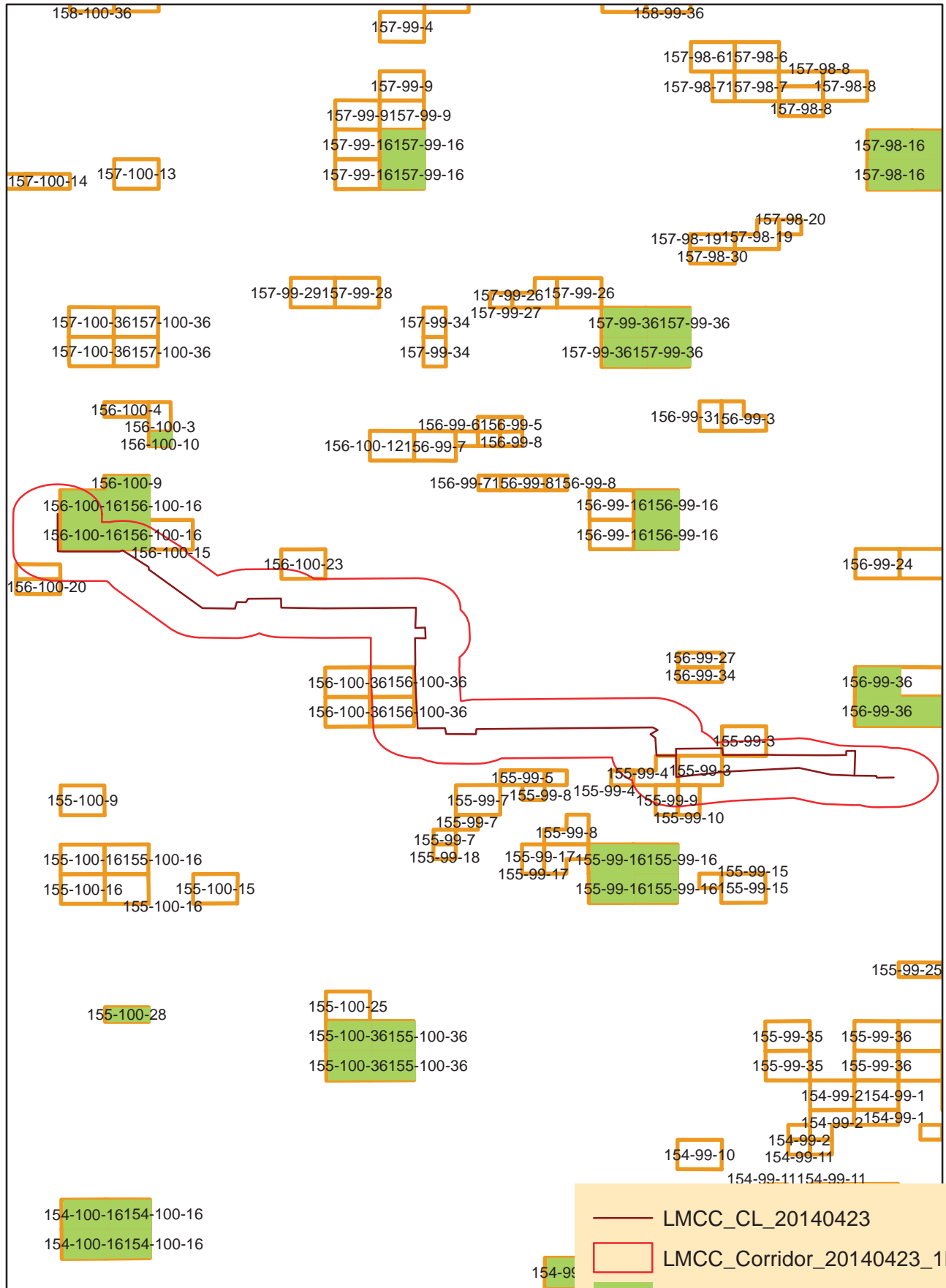
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Little Muddy Creek Pipeline Plat



- LMCC_CL_20140423
- LMCC_Corridor_20140423_1Mile
- Trustland_Surface
- Trustland_Minerals

Chris Schmidt

From: Chris Schmidt
Sent: Tuesday, May 20, 2014 2:27 PM
To: 'kbayley@nd.gov'
Cc: Katie Schmidt
Subject: Little Muddy Creek: North Dakota Mineral State Trust Consultation
Attachments: LittleMuddyCreek_MineralTrustLands.pdf; LMCC_CL_20140423.shx; LMCC_CL_20140423.dbf; LMCC_CL_20140423.prj; LMCC_CL_20140423.sbn; LMCC_CL_20140423.sbx; LMCC_CL_20140423.shp; LMCC_Corridor_20140423_1Mile.shx; LMCC_Corridor_20140423_1Mile.dbf; LMCC_Corridor_20140423_1Mile.prj; LMCC_Corridor_20140423_1Mile.sbn; LMCC_Corridor_20140423_1Mile.sbx; LMCC_Corridor_20140423_1Mile.shp; LMCC_Corridor_20140423_1Mile.shp.xml

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Sincerely,

Chris Schmidt, GIT

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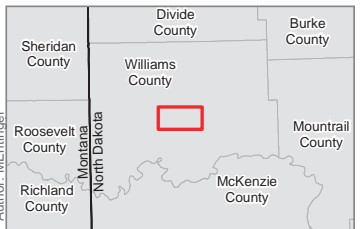
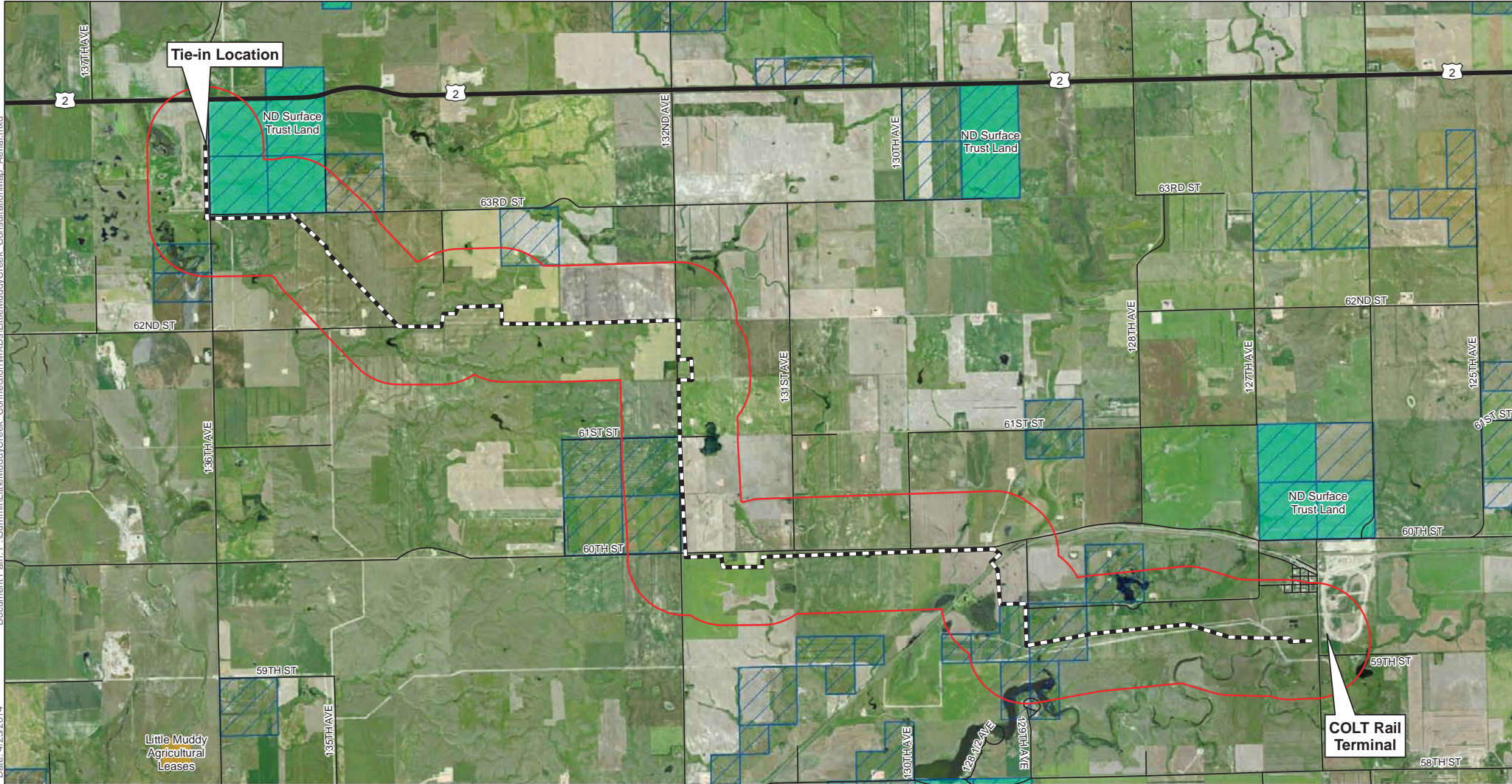
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Date: 4/25/2014

Author: MEminger



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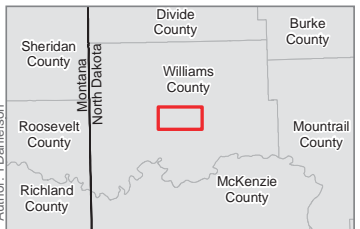
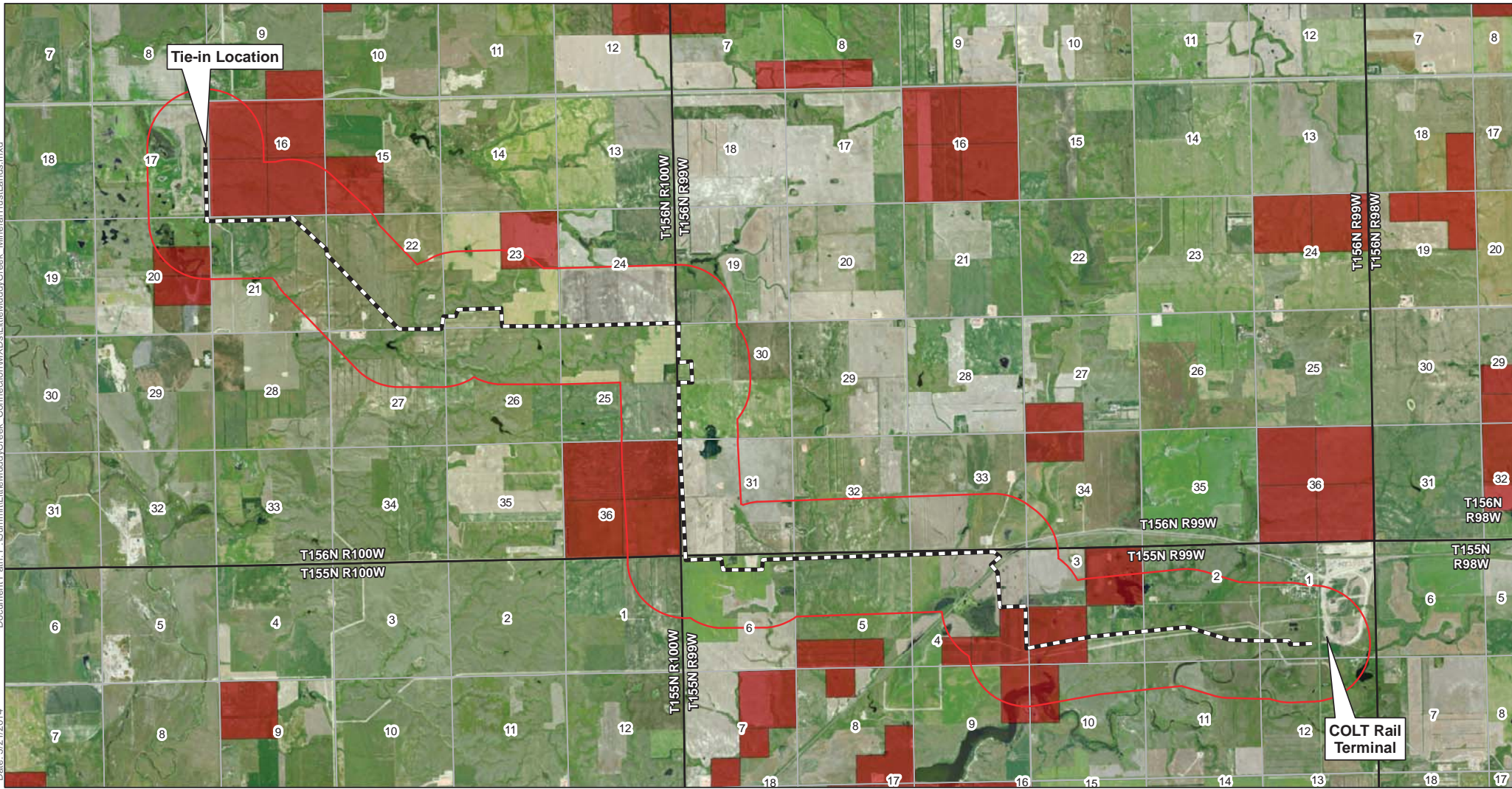
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Meadowlark Midstream Company, LLC

Little Muddy Creek Pipeline
Aerial Overview Map
Williams County, ND

Document Path: P:\Summit\LittleMuddyCreek_Connection\MXD\LittleMuddyCreek_MineralTrustlands.mxd
Date: 5/21/2014
Author: TDanielson



Legend

- Pipeline
- Corridor (1 Mile)
- Mineral Trust Land

N

0 0.5 1 2 Miles

1:50,000

Map not to scale, for environmental review purposes only.

E3 ENVIRONMENTAL
Enhancing Execution with Experience

Meadowlark Midstream Company, LLC
Little Muddy Creek Pipeline
ND Mineral Trust Lands
Williams County, ND

North Dakota State Historic Preservation Office

Constulation



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October 10, 2014

Katie Schmidt, Consultant
E3 Environmental, LLC
871 Jefferson Ave
St. Paul, MN 55102

NDSHPO REF.: 14-1221A PSC Case #PU-14-223 Meadowlark Midstream Company, LLC "Addendum to A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota, for Pipeline Alignment Reroutes and Two Potential Facility Sites"

Dear Ms. Schmidt,

We reviewed NDSHPO REF.: 14-1221A PSC Case #PU-14-223 Meadowlark Midstream Company, LLC "Addendum to A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota, for Pipeline Alignment Reroutes and Two Potential Facility Sites," and find the report acceptable. We concur with a "No Significant Sites" determination for the project, provided the project remains as described and mapped in the above-captioned SWCA report.

Thank you for the opportunity to review this project. If you have questions please contact Susan Quinnell at squinnell@nd.gov or (701) 328-3576.

Sincerely,

Merlan E. Paaverud, Jr.
Director, State Historical Society of North Dakota



October 1, 2014

Paul Picha
Chief Archaeologist
State Historical Society of North Dakota
Archeology & Historic Preservation Division
North Dakota Heritage Center
612 East Boulevard Avenue
Bismarck, ND 58505-0830

Re: Meadowlark Midstream Company, LLC
Little Muddy Creek Project: Addendum to A Class I and Class III Cultural
Resource Inventory

Dear Mr. Picha,

Meadowlark Midstream Company, LLC (MMC) is planning the Little Muddy Creek Pipeline Project. The Project will be wholly located in Williams County, North Dakota. E3 Environmental, LLC (E3), MMC's Environmental Consultant, is preparing the required application materials for the NDPSC; a cultural resource inventory is a required part of this filing. On June 10, 2014, the North Dakota State Historical Preservation Office (ND SHPO) provided concurrence with the findings and recommendations of the original Class I and Class III Cultural Resource Inventory for this Project (NDSHPO REF.: 14-1221). To meet the Project objectives, the alignment of the proposed Project has been altered resulting in the need for an additional Cultural Resource Inventory.

E3 submits the enclosed report titled *Addendum to a Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota, for Pipeline Alignment Reroutes and Two Potential Facility Sites* (Report). This Report, prepared by SWCA Environmental Consultants (SWCA) documents the results of the cultural resource inventory conducted for the proposed Project. Inventory results are summarized below; enclosed please find the Report.

Two (2) resources were recorded; site 32WI481, an undocumented segment of the Great Northern Railroad. This site has previously been determined eligible for the NRHP; avoidance via the implementation of a horizontal directional drill (HDD) is recommended. An isolated find (32WIX646) consisting of a Knife River

Flint biface, is recommended not eligible for the NRHP, and therefore no further work is necessary.

Should you have any project related questions or require additional information, please contact me at 651-282-0652 or by email at kschmidt@go2e3.com.

Sincerely,



Katie Schmidt, Consultant
E3 Environmental, LLC
871 Jefferson Ave
St. Paul, MN 55102

Enclosures:

Meadowlark Midstream Company, LLC – Addendum to A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline (1 Copy)

cc: Jason Panek, Meadowlark Midstream Company, LLC
Jolene Schleicher, SWCA Environmental Consultants
E3 Project Files



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*Director
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Merlan E. Paaverud, Jr.
Director

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June 10, 2014

Katie Schmidt, Consultant
E3 Environmental, LLC
871 Jefferson Ave
St. Paul, MN 55102

NDSHPO REF.: 14-1221 PSC Case #PU-14-223 Meadowlark Midstream Company, LLC "A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota"

Dear Ms. Schmidt,

We reviewed NDSHPO REF.: 14-1221 PSC Case #PU-14-223 Meadowlark Midstream Company, LLC "A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota" and find the report acceptable. We concur with a "No Significant Sites" determination for the project, provided the project remains as described and mapped in the above-captioned SWCA report.

Thank you for the opportunity to review this project. If you have questions please contact Susan Quinnell at squinnell@nd.gov or (701) 328-3576.

Sincerely,

Merlan E. Paaverud, Jr.
Director, State Historical Society of North Dakota



CERTIFIED MAIL

RETURN RECEIPT REQUESTED

June 4th, 2014

Paul Picha
Chief Archaeologist
State Historical Society of North Dakota
Archeology & Historic Preservation Division
North Dakota Heritage Center
612 East Boulevard Avenue
Bismarck, ND 58505-0830

Meadowlark Midstream Company, LLC: Little Muddy Creek Pipeline Project-Class III Cultural Resource Inventory Report

Dear Mr. Picha,

Meadowlark Midstream Company, LLC (MMC) is proposing the Little Muddy Creek Pipeline Project (Project). This Project includes the construction of a 14.75-mile crude oil transmission pipeline and associated facilities; as such the Project is subject to the North Dakota Public Service Commissions (PSC) Siting Act. The Project will be wholly located in Williams County, North Dakota. E3 Environmental, LLC (E3), MMC's Environmental Consultant, is preparing the required application materials for the NDPSC; a cultural resource inventory is a required part of this filing.

MMC submits the enclosed report titled *A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota* (Report). This Report, prepared by SWCA Environmental Consultants (SWCA) documents the results of the cultural resource inventory conducted for the proposed Project.

One previously recorded isolated find cultural resource was revisited for the Project. It is described below:

32WIX572: Isolated Chipped Stone; Not Eligible

One cultural resource was newly recorded isolated find and one previously recorded site; the sites are described below respectively:

32WIX627: Deering harvester; Isolated Find
32WI481: Great Northern Railroad; Eligible



Of the resources outlined above, 32WIX572 and 32WIX627 are recommended not eligible for the NRHP, and therefore no further work is necessary. Site 32WI481 has previously been eligible for the NRHP. Therefore, SWCA and E3 recommends that MMC avoids site 32WI481 through the use of a horizontal directional drill beneath the site.

Should you have any project related questions or require additional information, please contact me at 651-282-0652 or by email at kschmidt@go2e3.com.

Sincerely,

A handwritten signature in black ink that reads "Katie Schmidt". The signature is written in a cursive, flowing style.

Katie Schmidt, Consultant
E3 Environmental, LLC
871 Jefferson Ave
St. Paul, MN 55102

Enclosures:

Meadowlark Midstream Company, LLC – Little Muddy Creek Crude Petroleum Pipeline:
Class III Cultural Resource Inventory Report (1 Copy)

cc: Jason Panek, Meadowlark Midstream Company, LLC
Jolene Schleicher, SWCA Environmental Consultants
E3 Project Files

Appendix D

Natural Resource Report

**Natural Resources and Wetland
Delineation Report for the
Little Muddy Creek Pipeline and Epping
Station, Williams County, North Dakota**

Prepared for

E3 Environmental, LLC

Prepared by

SWCA Environmental Consultants

October 2014

**Natural Resources and Wetland Delineation Report for the
Little Muddy Creek Pipeline and Epping Station,
Williams County, North Dakota**

Prepared for:

**E3 Environmental, LLC
871 Jefferson Avenue
St. Paul, Minnesota 55102**

Prepared by:

**Kate Kenninger
Environmental Specialist**

Reviewed by:

**Tom Furgason
Sr. Principal, Rocky Mountain Plains Offices**

**SWCA Environmental Consultants
116 North 4th Street, Suite 200
Bismarck, North Dakota 58501
Phone (701) 258-6622, Fax (701) 258-5957**

SWCA Project No. 28755

October 7, 2014

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1.0 INTRODUCTION

1.1 BACKGROUND

SWCA Environmental Consultants (SWCA) conducted natural resources field surveys in order to identify exclusion and avoidance areas as specified in North Dakota Administrative Code 69-06-08-02 for the proposed Meadowlark Midstream Company, LLC (MMC) Little Muddy Creek pipeline (Little Muddy) project. MMC proposes to construct a pipeline beginning northeast of Williston, North Dakota, to the Epping station, located southwest of Epping, North Dakota.

The Little Muddy pipeline, as proposed, is approximately 14 miles long, spanning private lands entirely within Williams County, North Dakota (see maps in Appendix A). This pipeline project falls under the jurisdiction of the North Dakota Public Service Commission (NDPSC). E3 Environmental (E3) is assisting MMC with their application to the NDPSC for a certificate of corridor compatibility and route permit for the project. The pipeline was surveyed with a typical 150-foot-wide survey corridor centered on the proposed pipeline centerline. SWCA surveyed approximately 417 acres for the Little Muddy pipeline (including reroute areas) and the proposed Epping compressor station at the eastern terminus of the Little Muddy pipeline.

The proposed pipeline would be constructed within a 110-foot-wide temporary construction right-of-way (ROW). The ROW would be set on the centerline, with 50 feet of construction ROW on each side.

SWCA conducted field surveys on April 23–24 and September 2–3, 2014, to determine the potential presence and extent of wetlands and waterbodies, including jurisdictional waters of the U.S., commonly referred to as wetland and ordinary high water mark (OHWM) delineations, within the proposed survey area. Concurrently with the wetland delineation, SWCA conducted a cursory threatened and endangered species survey and habitat assessment; a tree, sapling, and shrub enumeration survey; a migratory bird/raptor survey; and a noxious weed survey. Site layout maps of the survey area and natural resource features identified during the field surveys are provided in Appendix A.

This report outlines the methodology used by SWCA’s biologists to complete each of the aforementioned surveys. Additionally, this report presents the results of the completed field surveys and regulatory recommendations to ensure compliance with the NDPSC and the U.S. Army Corps of Engineers (USACE) Nationwide Permit 12.

1.2 REGULATORY BACKGROUND

1.2.1 Clean Water Act, Section 404

Section 404 of the Clean Water Act prohibits the discharge of fill material into waters of the U.S., also known as jurisdictional waters, without a permit from the USACE.

1.2.2 USACE Nationwide Permit 12

The USACE Nationwide Permit 12 authorizes the construction of utility lines and associated facilities in waters of the U.S., provided the activity does not result in the permanent loss of greater than 0.5 acre of waters of the U.S., including wetlands.

Nationwide Permit 12 also authorizes the construction of access roads for utility lines, provided that the access road, in combination with all other activities included in one single and complete project:

- does not result in the permanent loss of greater than 0.5 acre of waters of the U.S.;
- is constructed to the minimum width necessary;
- is constructed so that the length of the road minimizes any adverse effects to waters of the U.S.;
- is as near as possible to pre-construction contours and elevations; and
- is properly bridged or culverted when constructed above pre-construction contours.

If the access roads are used exclusively for construction purposes, they must be temporary and removed upon project completion.

Nationwide Permit 12 requires that the permittee submit a pre-construction notification prior to commencing construction if any of the following criteria are met.

- The activity involves mechanized land clearing in a forested wetland.
- A Section 10 permit is required to cross a navigable waterbody (Rivers and Harbors Act).
- The utility line exceeds 500 feet in length through any single crossing of a water of the U.S.
- The utility line is placed within a jurisdictional area (i.e., water of the U.S.) and it runs parallel to a stream bed that is within that jurisdictional area.
- Discharges result in the permanent loss of greater than 0.1 acre of waters of the U.S.
- Permanent access roads are constructed above grade in waters of the U.S. for a distance of more than 500 feet.
- Permanent access roads are constructed in waters of the U.S. with impervious materials.

1.2.3 USACE Regional Conditions

The USACE has published several regional conditions for projects operating under Nationwide Permits in North Dakota. The regional conditions apply to wetlands classified as “fens,” waters adjacent to natural springs, the Missouri River, historic properties, and fish spawning areas.

2.0 METHODS

2.1 SURVEY AREA

Overall, northwest North Dakota is characterized by a moderate to cool climate, with cold, dry winters and mild to warm summers. Mean annual precipitation for the area is 14 to 16 inches (Bryce et al. 1998).

The proposed project is located in the Northwestern Glaciated Plains, which marks the westernmost extent of glacial activity (Bryce et al. 1998). The Northwestern Glaciated Plains have significant surface irregularity characteristic of a youthful morainal landscape, with hills and depressions and high concentrations of wetlands. Further, the proposed project is located in the Glaciated Dark Brown Prairie (level IV ecoregion) region. This ecoregion has a well-defined drainage system and fewer wetlands compared to the more recently glaciated ecoregions to the east (Bryce et al. 1998).

The project area is located on gently rolling plains (Figure 1) and active agricultural fields (Figure 2). The elevation ranges from approximately 1,930 to 2,300 feet above sea level, with the highest elevations in the middle portion of the project area, and the lowest elevations in the northwestern portion of the project area.



Figure 1. Project area overview depicting general topography towards southwest end of pipeline corridor, facing east.



Figure 2. Project area overview depicting general topography and agriculture disturbance near the middle section of the pipeline corridor, facing west.

The inventoried area for the project area discussed herein is situated on the U.S. Geological Survey Blacktail Lake SE (1961), Spring Brook (1979), and Epping (1979), North Dakota, quadrangles. The inventoried area includes parcels in Sections 1, 2, 3, 4, 5, and 6, Township (T) 155 North (N), Range (R) 99 West (W); Sections 19, 30, 31, 32, and 33, T156N, R99W; and Sections 17, 20, 21, 22, 23, 24, 25, 26, 27, and 36, T156N, R100W, entirely within Williams County, North Dakota (see Appendix A).

2.2 PRE-FIELD REVIEW

Prior to conducting field surveys, SWCA reviewed applicable U.S. Fish and Wildlife Service (USFWS) threatened and endangered species list for Williams County, North Dakota (USFWS 2014). Additionally, SWCA reviewed applicable National Wetland Inventory (NWI) data as well as preliminary National Weather Service climatological data.

2.3 WETLANDS

SWCA biologists conducted wetland delineations within the survey area based on the principles and guidelines provided in the 1987 *Corps of Engineers Wetlands Delineation Manual* (Manual) (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetlands Determination Manual: Great Plains Region Version 2.0* (Supplement) (USACE 2010). According to the Manual, an area is a wetland if three mandatory wetland indicators are present in a given area, with special exceptions. These

criteria include the presence of hydrophytic vegetation, wetland hydrology, and hydric soils. All wetlands and waterbodies geographically referenced within the survey area during field survey are depicted on the site layout maps in Appendix A.

2.3.1 Hydrophytic Vegetation

Biologists recorded all plants within the vegetative community based on the respective stratum in which each species was found. A tree is defined by the Supplement to be a woody-stemmed plant with a trunk diameter at breast height (DBH) of equal to or greater than 3 inches, regardless of height. The sapling and shrub stratum is defined by the Supplement to be composed of woody-stemmed plants with a trunk DBH of less than 3 inches, regardless of height. The herbaceous stratum includes all non-woody-stemmed plants regardless of height. Finally, the woody vine stratum includes all woody-stemmed vines, regardless of diameter.

SWCA recorded the binomial scientific name and percent cover of all plants within a 30-foot radius for the tree stratum, a 15-foot radius for the sapling/shrub stratum, a 5-foot radius for the herbaceous stratum, and a 30-foot radius for the woody vine stratum. SWCA biologists noted each plant species' respective USFWS indicator status (i.e., upland [UPL], facultative upland [FACU], facultative [FAC], facultative wetland [FACW], and obligate [OBL]). In some instances the size and shape of the vegetative sampling plot was manipulated to better encompass each wetland or upland area, though the overall area assessed remained unchanged.

2.3.2 Wetland Hydrology

A wetland was determined to contain wetland hydrology if at least one primary indicator or at least two secondary indicators of wetland hydrology were present, as defined by the Manual and Supplement. Common hydrologic indicators include the presence of surface water, high water table, soil saturation, water marks on trees or other objects, sediment deposits, water-stained leaves, and oxidized rhizospheres on living roots.

2.3.3 Hydric Soil

Biologists recorded detailed notes regarding soil profiles including the hue, value, and chroma (i.e., color) of the soil (using Munsell Soil Color Charts); the depth and extent of that soil color within the entire soil profile; the concentration of any redoximorphic concentrations or depletions; and the texture of the soil at each depth where a color change was observed. Soil pits were excavated to a minimum depth of 20 inches at each data point. During the April surveys, soils in some locations were frozen below the first 6 inches. Common hydric soil indicators of the Northern Great Plains subregion include the presence of hydrogen sulfide gas within the soil pit, redox depressions, redox dark surfaces, and a depleted matrix.

2.4 WATERBODIES

Waterbodies (i.e., ponds, creeks, streams, rivers) were identified by the presence of an OHWM. Common identifiable indicators of an OHWM include open water or evidence of a clear, natural line visible on the bank; shelving; changes in soil characteristics; the destruction of terrestrial vegetation; the presence of litter and debris; and watermarks on structures that

are inundated during normal high water conditions. The OHWM typically represents the potential limits of the USACE jurisdiction. Please note that the USACE has full discretion in determining the jurisdictional status of referenced wetlands and waterbodies.

SWCA classified streams as perennial, intermittent, or ephemeral based on field observations. During a typical year, a perennial stream contains flowing water year-round and the water table is located above the stream bed. Groundwater is the primary water source for stream flow while precipitation runoff is supplemental. Biologists classified streams that showed significant flow during the field survey as perennial. Additionally, the U.S. Geological Survey topographic maps were used as reference.

An intermittent stream has flowing water for only portions of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

2.5 NOXIOUS WEED SURVEYS

SWCA conducted a noxious weed survey of all populations of North Dakota state- or county-listed noxious weeds within the project area.

2.6 TREE, SAPLING, AND SHRUB COUNT

SWCA biologists determined the total number of trees, saplings, and shrubs present within the surveyed 150-foot-wide ROW by using several different techniques depending on the type of woody vegetation habitat (i.e., forested upland, shrubland, or shelterbelt) encountered and the overall extent of each habitat within the ROW. The boundary of all forested upland, shrubland, and shelterbelt habitat was geographically referenced using a Trimble GeoXT series handheld global positioning system (GPS) unit. In forested upland and shrubland habitat, SWCA counted the number of all woody-stemmed vegetation with at least a 1-inch DBH. In shelterbelt areas, all woody-stemmed vegetation, regardless of DBH, was inventoried via direct count. Biologists taxonomically identified all recorded individuals to the species level within each habitat type.

2.7 WILDLIFE INCLUDING THREATENED AND ENDANGERED SPECIES

Information regarding the presence of threatened or endangered species that may occur within the survey area was obtained from the USFWS list of threatened and endangered species by North Dakota county (USFWS 2014). This document does not represent a comprehensive survey, but rather acknowledges the past and/or current presence of listed species. The lack of discovery of threatened or endangered species does not signify their non-existence within the area, but only that no primary or secondary indications of these species were recorded.

SWCA completed a cursory survey for all listed species and suitable habitat that may be potentially impacted by construction activities within survey area. A line-of-sight survey for raptor species was also conducted for a distance of approximately 0.5 mile with the aid of binoculars. Unique wildlife habitats were closely inspected on foot. SWCA biologists noted all wildlife observed during the field survey. Wildlife sightings can involve primary observations (i.e., actual sighting of an animal) or secondary observations (i.e., observation of scat, tracks, or fur deposits).

2.8 MAPPING

The boundaries of each wetland, waterbody, woody vegetation habitat, and noxious weed assemblage were geographically recorded using a Trimble GeoXT GPS unit. The aforementioned GPS unit is capable of recording geographic data with sub-meter accuracy. SWCA used Universal Transverse Mercator Zone 13 North as the projected coordinate system and North American Datum 1983 as the datum. ArcGIS v10.0 (ESRI Redlands, California) was used to analyze collected features, calculate areas, and generate the maps provided in Appendix A. Please note that all data collected using the GPS unit, and displayed on the attached maps, are for review purposes only and do not represent a professional civil survey.

3.0 RESULTS

3.1 VEGETATION

During the field survey, SWCA biologists identified four general types of vegetative communities within the survey area. These vegetative communities were classified as herbaceous upland, shrubland and upland woody vegetation, cropland, and palustrine emergent (PEM) wetland. PEM wetlands are characterized by the presence of herbaceous hydrophytic or submergent aquatic macrophytes.

Vegetation communities met the hydrophytic vegetation criterion for wetlands if greater than 50% of dominant species had an indicator status of FAC, FACW, or OBL. The upland communities failed to meet at least one of the three assessed wetland criteria.

3.1.1 Herbaceous Upland

Herbaceous upland communities occurring throughout the survey area consisted of non-wetland areas dominated by non-woody vegetation such as grasses and forbs. The largest natural vegetation community within the construction corridor is remnant of Northwestern Great Plains Mixedgrass Prairie, although most areas have been degraded due to the presence and encroachment of non-native grass species such as smooth brome (*Bromis inermis*), Kentucky bluegrass (*Poa pratensis*), and crested wheatgrass (*Agropyron cristatum*). Several areas within the project area have been previously cultivated for agricultural purposes and have since transitioned to disturbed areas heavily dominated by these invasive grasses.

Species common to the Northwestern Great Plains Mixedgrass Prairie and confirmed during field surveys included western wheatgrass (*Agropyron smithii*), green needlegrass (*Nassella viridula*), and prairie junegrass (*Koeleria macrantha*). Other common species found within these herbaceous upland communities include fringed sagewort (*Artemisia frigida*), blue grama (*Bouteloua gracilis*), pasque flower (*Anemone patens*), goldenrod (*Solidago* sp.), purple coneflower (*Echinacea angustifolia*), prairie coneflower (*Ratibida columnifera*), prairie rose (*Rosa arkansana*), and little bluestem (*Schizachyrium scoparium*).

One area of Canada thistle (*Cirsium arvense*), a state-listed noxious weed, was recorded during the survey (BNX1; Appendix A).

3.1.2 Shrubland and Woody Vegetation

The shrubland communities occurring throughout the survey area consisted of upland areas dominated by woody-stemmed vegetation. A majority of these wooded areas were not naturally occurring, but rather planted species compromising single or multiple rows (shelterbelts). Species observed included Siberian elm (*Ulmus pumila*), eastern cottonwood (*Populus deltoides*), Russian olive (*Eleagnus angustifolia*), ponderosa pine (*Pinus ponderosa*), Rocky Mountain juniper (*Juniperus scopulorum*), Scots pine (*Pinus sylvestris*), Siberian peashrub (*Caragana arborescens*), and American elm (*Ulmus americana*). A photograph of the woody vegetation community types is provided in Appendix B.

3.1.3 Cropland

Field surveys indicate several types of agricultural occupation within the proposed ROW, which occupied a large portion of the construction corridor. Cropland vegetation was dominated by wheat (*Triticum* spp.).

3.1.4 PEM Wetland

The wetlands were found to mainly consist of herbaceous, non-woody vegetation such as sedges, spike-rushes, grasses, and forbs. Wetland vegetation species identified include reed canarygrass (*Phalaris arundinacea*), dock (*Rumex* spp.), foxtail barley (*Hordeum jubatum*), prairie cordgrass (*Spartina pectinata*), rush (*Juncus* spp.), sedge (*Carex* spp.), swamp smartweed (*Polygonum amphibium*), and cattail (*Typha* spp.).

3.2 HYDROLOGY

All wetland communities observed during the delineation effort displayed at least one primary or two secondary indicators of wetland hydrology, as defined by the USACE Manual and Supplement. Upland communities either failed to display hydrologic indicators or failed to meet the hydrophytic vegetation criterion, as defined by the Manual and Supplement. In some instances, during the survey completed in April, the spring snowmelt and subsequent runoff obscured the wetland/waterbody boundary and OHWM usually present during normal hydrologic conditions. Common indicators of wetland hydrology observed during field surveys include Surface Water (A1), High Water Table (A2), Saturation (A3), Water Marks (B1), Drift Deposits (B3), Algal Mat or Crust (B4), Inundation Visible on Aerial Imagery (B7), Drainage Patterns (B10), Saturation Visible on Aerial Imagery (C9), Geomorphic Position (D2), and FAC-Neutral Test (D5).

The Sloulin International Airport weather station located in Williston, North Dakota, was used to determine regional precipitation measurements prior to the April 2014 field survey. This location was selected due to its proximity to the project area (12 miles southwest). According to National Weather Service (NWS) preliminary climatological data for Williston, North Dakota, 8.45 inches of precipitation was recorded from January 2014 to September 3, 2014 (Table 1). This amount is 2.79 inches below normal for this time period.

Table 1. Monthly Recorded Rainfall at Weather Station in Williston, North Dakota.

Month	Recorded Precipitation (inches)	Normal Precipitation (inches)	Difference (inches)
January 2014	0.18	0.59	-0.41
February 2014	0.26	0.39	-0.13
March 2014	0.32	0.71	-0.39
April 2014	1.71	1.00	0.71
May 2014	1.62	1.92	-0.30
June 2014	1.44	2.52	-1.08
July 2014	0.66	2.54	-1.88
August 2014	2.24	1.45	0.79
September 1–3, 2014	0.02	0.12	-0.10
Total	8.45	11.24	-2.79

Source: National Oceanic and Atmospheric Administration 2014

3.3 WETLANDS

SWCA recorded nine PEM wetlands within the 150-foot survey area, totaling approximately 2.22 acres. In total, approximately 0.90 acre of PEM wetlands is proposed to be temporarily impacted in the 110-foot-wide construction ROW (Table 2). Although only the USACE has the final authority to determine if these PEM wetlands are jurisdictional, the field survey indicates that four wetlands may be jurisdictional, based on a significant nexus to waters of the U.S. See Appendix B for representative photographs of wetlands.

During the April surveys, AWET1 through AWET7 were delineated. During the September surveys, BWET1 and BWET2 were delineated. Feature AWET1 has an NWI signature and exhibits hydrophytic vegetation and wetland hydrology. However, due to the time of year, water levels extended into areas dominated by upland vegetation and non-hydric soils. Under normal circumstances, SWCA would expect the water levels to be lower and hydric soils would be observed farther into the wetland boundary. AWET2 is located in an area that has been disturbed by a previously constructed pipeline and is located directly adjacent to an NWI signature. Wetland hydrology and hydric soils were observed, however SWCA determined that due to recent construction of a pipeline, the vegetation has been heavily disturbed. Under normal circumstance, SWCA would expect that hydrophytic vegetation would be more prevalent and that this assumed wetland would meet all three criteria. Feature AWET6 has an NWI signature, is located in an agriculture field, and has been previously farmed through. Soils and vegetation in this area have been heavily disturbed. Under normal circumstance, SWCA assumes that hydric soils and hydrophytic vegetation would be observed for this feature. Features AWET3, AWET4, AWET5, AWET7, BWET1, and BWET2 all exhibited the three indicators used to determine a wetland.

Table 2. PEM Wetland Acreage within the Survey Area.

Feature ID	USACE Jurisdiction*	Total PEM Size (acres)	Temporarily Impacted Area within 110-foot-wide ROW (acres)	Length of Required Crossing (feet)
AWET1	Isolated	0.40	0.00	0.00
AWET2	Isolated	0.12	0.11	87.34
AWET3	Isolated	0.05	0.03	52.80
AWET4	Isolated	0.68	0.25	322.58
AWET5	Likely Jurisdictional	0.14	0.00	0.00
AWET6	Isolated	0.07	0.04	77.58
AWET7	Likely Jurisdictional	0.14	0.00	0.00
BWET1	Likely Jurisdictional	0.19	0.13	73.63
BWET2	Likely Jurisdictional	0.43	0.35	175.54
Total		2.22	0.90	

* The U.S. Army Corps of Engineers (USACE) has the final authority on the jurisdictional status of a waterbody.

PEM = palustrine emergent

ROW = right-of-way

3.4 WATERBODIES

SWCA did not identify any waterbodies during the field survey. However, three ephemeral drainages were recorded during the survey (ASTR1, ASTR2, ASTR3; Appendix A). No hydrophytic vegetation was noted within the ephemeral drainages and no evidence of an OHWM was observed. Because these drainages do not have a significant nexus to waters of the U.S., and were not intermittent or perennial, they would be considered non-jurisdictional.

3.5 SOILS

Twenty-two soil types are present in the project construction corridor, based on Natural Resources Conservation Service (NRCS) mapping (NRCS 2014). The project area analyzed for soils covers the 110-foot-wide construction corridor. Table 3 lists all soil units within the project area. The following soil component descriptions represent the most prevalent soil series found within the survey area (NRCS 2014).

Table 3. NRCS Derived Soil Series Present within the ROW.

Soil Series	Slopes (%)	Acres within 110-foot-wide ROW	Percent within Map Unit
Williams-Bowbells loams	3 to 6	70.97	37.85
Williams-Zahl-Zahill complex	6 to 9	25.67	13.69
Williams-Bowbells loams	0 to 3	19.28	10.28
Appam sandy loam	0 to 6	13.98	7.46
Livona fine sandy loam	0 to 6	13.56	7.23

Soil Series	Slopes (%)	Acres within 110-foot-wide ROW	Percent within Map Unit
Zahl-Williams loams	9 to 15	11.94	6.37
Livona-Zahl complex	6 to 9	10.39	5.54
Williams-Zahl loams	3 to 6	4.08	2.17
Vallers loam, saline	0 to 1	3.92	2.09
Arnegard loam	0 to 2	3.21	1.71
Lehr loam	2 to 6	3.01	1.61
Livona fine sandy loam	0 to 6	1.72	0.92
Lehr-Williams loams	0 to 6	1.64	0.87
Arnegard loam	2 to 6	1.47	0.78
Zahl-Max loams	15 to 25	0.86	0.46
Korchea-Divide loams, channeled	0 to 2	0.43	0.23
Lihen-Blanchard loamy fine sands	6 to 15	0.39	0.21
Wildrose silty clay	0 to 2	0.36	0.19
Wabek-Lehr complex	6 to 9	0.32	0.17
Hamerly-Tonka complex	0 to 3	0.18	0.09
Dooley fine sandy loam	0 to 6	0.13	0.07
Zahl-Williams loams	9 to 15	0.02	0.01
Total		187.52	100.00

Source: Natural Resources Conservation Service 2014.

3.5.1 Williams

The Williams series consists of very deep, well-drained, moderately slow or slowly permeable soils formed in calcareous glacial till. These soils are on glacial till plains and moraines and have slopes of 0 to 35 percent. Mean annual air temperature is about 40 degrees Fahrenheit (°F), and mean annual precipitation is about 14 inches. Cultivated areas are used for growing small grains, flax, corn, hay, or pasture. Native vegetation species common to this soil type include western wheatgrass, needle and thread (*Hesperostipa comata*), blue grama, green needlegrass, and prairie junegrass (NRCS 2014).

3.5.2 Bowbells

The Bowbells series consists of very deep, well- and moderately well-drained soils formed in glacial till and alluvium from glacial till on glacial till plains and moraines. These soils have moderate permeability in the upper part and moderately slow or slow in the substratum. Slopes range from 0 to 9 percent. Mean annual precipitation is about 14 inches, and mean annual air temperature is about 42°F. These soils are cropped to small grains; some areas are used for hay and pasture. Native vegetation species common to this soil type include green needlegrass, western wheatgrass, porcupinegrass (*Heterostipa spartea*), and big bluestem (*Andropogon gerardii*) (NRCS 2014).

3.5.3 Zahl

The Zahl series consists of very deep, well-drained, moderately slow or slowly permeable soils that formed in calcareous glacial till. These soils are on glacial till plains, moraines, and

valley side slopes and have slopes of 1 to 60 percent. Mean annual air temperature is 40°F, and mean annual precipitation is 14 inches. The native vegetation species most common to this soil type are little bluestem, western wheatgrass, and needle and thread (NRCS 2014).

3.5.4 Zahill

The Zahill series consists of very deep, well-drained soils that formed in till and are found on till plains, hills, moraines, and escarpments. Slopes are 0 to 65 percent. The mean annual precipitation is approximately 13 inches and mean annual air temperature is approximately 42°F. This soil type is used in mainly range and dryland crops. Native vegetation species common to this soil type include western wheatgrass, needle and thread, green needlegrass, little bluestem, prairie sandreed (*Calamovilfa longifolia*), bluebunch wheatgrass (*Pseudoroegneria spicata*), prairie junegrass, blue grama, sedges, and other forbs (NRCS 2014).

3.5.5 Appam

The Appam series consists of very deep, somewhat excessively drained soils that formed in glaciofluvial deposits. Permeability is moderately rapid in the upper part and very rapid in the substratum. These soils are on outwash plains and terraces and have slopes of 0 to 15 percent. Mean annual air temperature is about 41°F and mean annual precipitation is about 14 inches. Native vegetation species common to this soil type include needle and thread, prairie sandreed, prairie junegrass, sand sedge (*Carex arenaria*), threadleaf sedge (*Carex filifolia*), and a wide variety of forbs (NRCS 2014).

3.5.6 Livona

The Livona series consists of very deep, well-drained, moderately slowly permeable soils that formed in moderately coarse textured eolian material overlying till. These soils are on upland plains and have slopes ranging from 0 to 15 percent. Mean annual temperature is 42°F, and mean annual precipitation is 16 inches. Native vegetation species common to this soil type are needle and thread, prairie sandreed, and western wheatgrass (NRCS 2014).

3.6 TREE, SAPLING, AND SHRUB COUNT

During SWCA’s field survey, nine tree rows and 11 naturally occurring wooded areas were geographically referenced within the survey area. Table 4 indicates the number of trees estimated to be impacted by the project as currently proposed. The NDPSC requires a 2:1 post- to pre-construction mitigation for all trees, saplings, and shrubs impacted during the construction of the proposed pipeline. Therefore, SWCA estimates approximately 118 two-year-old sapling individuals would need to be replanted in order to fulfill the 2:1 mitigation requirement.

Table 4. Tree, Sapling, and Shrub Count.

Woody Vegetation (WV) ID	Species	Type	Number of Trees*		Estimated Mitigation Commitment
			150-foot-wide Survey Corridor	110-foot-wide Construction ROW	
AWV1	Eastern cottonwood (<i>Populus deltoides</i>)	Tree	107	0	0
AWV2	Ponderosa pine (<i>Pinus ponderosa</i>)	Tree	4	0	0
AWV3	Siberian elm (<i>Ulmus pumila</i>)	Tree	1	0	0
AWV4	Siberian elm	Tree	1	0	0
AWV5	Siberian elm	Tree	308	0	0
AWV6	Siberian elm Russian olive (<i>Elaeagnus angustifolia</i>)	Tree	702	14	28
		Tree	375	7	14
AWV7	Siberian elm	Tree	1	0	0
AWV8	Ponderosa pine	Tree	12	8	16
AWV9	Ponderosa pine	Tree	12	7	14
AWV10	Siberian elm; Russian olive	Tree	2	2	4
		Tree	1	1	2
AWV11	Siberian elm	Tree	3	3	6
AWV12	Siberian elm	Tree	3	0	0
AWV13	Siberian elm	Tree	107	0	0
AWV14	Siberian elm	Tree	149	0	0
AWV15	Siberian elm	Tree	8	0	0
BWV1 ⁺	Rocky Mountain juniper (<i>Juniperus scopulorum</i>); Scots pine (<i>Pinus sylvestris</i>); Siberian peashrub (<i>Caragana arborescens</i>)	Tree	-	0	0
		Tree			
		Shrub			

Woody Vegetation (WV) ID	Species	Type	Number of Trees*		Estimated Mitigation Commitment
			150-foot-wide Survey Corridor	110-foot-wide Construction ROW	
BWV2	Ponderosa pine	Tree	2	2	4
BWV3	American elm (<i>Ulmus americana</i>)	Tree	3	3	6
BWV4	American elm;	Tree	2	2	4
	Russian olive	Tree	2	2	4
BWV5	American elm	Tree	30	8	16
Total			1,835	59	118

* Estimated value based off of the observed density of trees.

+ Does not meet 1-inch diameter at breast height.

ROW = right-of-way

3.7 WILDLIFE

SWCA conducted cursory wildlife surveys (including a threatened and endangered species and habitat assessment, migratory bird survey, and a raptor 0.5-mile line-of-sight survey) concurrently with the wetland determination. Biologists did not observe any primary (i.e., actual sighting) or secondary (tracks, scat, fur) indication of the presence of threatened or endangered species. A Sprague’s pipit (*Anthus spragueii*), listed as a candidate species, was heard vocalizing during surveys near the northeast portion of the pipeline route. Although a Sprague’s pipit was heard in the vicinity of the proposed project, the surveyed areas did not contain suitable nesting habitat for this species. However, the survey area does contain suitable foraging and stopover habitat (wetland/agriculture field associations) for the whooping crane (*Grus americana*). Migratory bird nesting habitat is prevalent throughout the project area. SWCA biologists observed one migratory bird nest (horned lark – *Eremophila alpestris*), located in a harvested agriculture field during the surveys. The nest was determined to be active, as the female was flushed from the nest and two eggs were observed. This nest is indicated as ANST1 on the maps in Appendix A.

The proposed project was not found to contain any suitable habitat for any of the other listed species. The project would have no effect on the gray wolf (*Canis lupus*), northern long-eared bat (*Myotis septentrionalis*), rufa red knot (*Calidris canutus rufa*), or designated critical habitat for piping plover (*Charadrius melodus*). Interior least tern (*Sterna antillarum*), whooping crane, Sprague’s pipit, and piping plover have the potential to occur within the project area as migrants and as a result may be affected, but are not likely to be adversely affected by the proposed project. In the event of a large spill, pallid sturgeon (*Scaphirhynchus albus*) may be potentially impacted from impacts to water quality. As a result, this species may be affected, but is not likely to be adversely affected by the proposed project.

3.7.1 Endangered Species Act

3.7.1.1 Gray Wolf

Federal Status: Endangered

Affects Determination: No Effect

The gray wolf, listed as endangered in the United States in 1978, was believed extirpated from North Dakota in the 1920s and 1930s, with only sporadic reports from the 1930s to present (Licht and Huffman 1996; USFWS 1978). The presence of wolves in most of North Dakota consists of occasional dispersing animals from Minnesota and Manitoba (Licht and Fritts 1994; Licht and Huffman 1996). Most documented gray wolf sightings within western North Dakota are believed to be young males seeking to establish territory (Hagen et al. 2005). The Turtle Mountain region of north-central North Dakota provides marginal habitat that may be able to support a very small population of wolves. The closest known pack of wolves is the Minnesota population located approximately 17 miles (28 kilometers [km]) from the northeast corner of North Dakota.

The gray wolf uses a variety of habitats that support a large prey base, including montane and low-elevation forests, grasslands, and desert scrub (USFWS 2013a). Due to a lack of forested habitat and distance from Minnesota and Manitoba populations, as well as the troubled relationship between humans and wolves and their vulnerability to being shot in open habitats (Licht and Huffman 1996), the re-establishment of gray wolf populations in North Dakota is unlikely. Additionally, habitat fragmentation may further act as a barrier against wolf recolonization in western North Dakota. Therefore, the proposed project would have **no effect** on the gray wolf.

3.7.1.2 Whooping Crane

Federal Status: Endangered

Affect Determination: May Affect, Is Not Likely to Adversely Affect

The whooping crane was listed as endangered in 1970 in the United States by the USFWS and in 1978 in Canada. Historically, population declines were caused by shooting and destruction of nesting habitat in the prairies from agricultural development. Current threats to the species include habitat destruction, especially suitable wetland habitats that support breeding and nesting, as well as feeding and roosting during their fall and spring migration (Canadian Wildlife Service and USFWS 2007).

The July 2010 total wild population was estimated at 383 (USFWS 2013b). There is only one self-sustaining wild population, the Aransas-Wood Buffalo National Park population, which nests in Wood Buffalo National Park and adjacent areas in Canada, where approximately 83% of the wild nesting sites occur (Canadian Wildlife Service and USFWS 2007; USFWS 2013b). Williams County, including the project area, is within the primary migratory flyway of whooping cranes.

Whooping cranes probe the soil subsurface with their bills for foods on the soil or vegetation substrate (Canadian Wildlife Service and USFWS 2007). Whooping cranes are omnivores and foods typically include agricultural grains, as well as insects, frogs, rodents, small birds,

minnows, berries, and plant tubers. The largest amount of time during migration is spent feeding in harvested grain fields (Canadian Wildlife Service and USFWS 2007). Studies indicate that whooping cranes use a variety of habitats during migration, in addition to cultivated croplands, and generally roost in small palustrine (marshy) wetlands within 0.6 mile (1 km) of suitable feeding areas (Howe 1987, 1989). Whooping cranes have been recorded in riverine habitats during their migration, with eight sightings along the Missouri River in North Dakota (Canadian Wildlife Service and USFWS 2007:18). In these cases, they roost on submerged sandbars in wide, unobstructed channels that are isolated from human disturbance (Armbruster 1990).

Suitable whooping crane foraging habitat (i.e., cultivated cropland) and roosting habitat (shallow wetlands with low visual obstructions) were observed within and near the surveyed areas. The closest known sighting of whooping cranes was approximately 4.6 miles northwest of the project area (in 1979, when four adults were observed). Several other whooping crane sightings have been confirmed within 10 miles of the project area, so it is plausible that cranes could be present within the project area during spring and fall migrations. Therefore, the proposed project **may affect, but is not likely to adversely affect** the endangered whooping crane.

3.7.1.3 Piping Plover

Federal Status: Threatened

Affect Determination: May Affect, Is Not Likely to Adversely Affect

The piping plover is a small shorebird which breeds only in three geographic regions of North America: the Atlantic Coast, the Northern Great Plains, and the Great Lakes. Piping plover populations were federally listed as threatened and endangered in 1985, with the Northern Great Plains and Atlantic Coast populations listed as threatened, and the Great Lakes population listed as endangered (USFWS 1985a).

Plovers in the Great Plains make their nests on open, sparsely vegetated sand or gravel beaches adjacent to alkali wetlands, and on beaches, sand bars, and dredged material islands of major river systems (USFWS 2002, 2012). The shorelines of lakes of the Missouri River constitute significant nesting areas for the bird. Piping plovers nest on the ground, making shallow scrapes in the sand, which they line with small pebbles or rocks (USFWS 1988). Anthropogenic alterations of the landscape along rivers and lakes where piping plover nest have increased the number and type of predators, subsequently decreasing nest success and chick survival (USFWS 2002, 2012). The birds fly south by mid to late August to areas along the Texas coast and Mexico (USFWS 2002). The Northern Great Plains population has continued to decline despite federal listing, with population estimates of 1,500 breeding pairs in 1985 reduced to fewer than 1,100 in 1990. Low survival of adult birds has been identified as a factor (Root et al. 1992). Current conservation strategies include identification and preservation of known nesting sites, public education, and limiting or preventing shoreline disturbances near nests and hatched chicks (USFWS 1988, 2012).

Suitable shoreline habitat for breeding and nesting plovers does not occur within the project area and Lake Sakakawea is a minimum of 11.5 straight-line miles from the proposed survey

area. It is unlikely but possible that migrating plovers may traverse the project area during their migration. Therefore, the proposed project **may affect, but is not likely to adversely affect** piping plovers.

3.7.1.4 Designated Critical Habitat of Piping Plover

Federal Status: Threatened

Affect Determination: No Effect

The USFWS has designated critical habitat for the Great Lakes and Northern Great Plains populations of piping plover (USFWS 2002). Designated critical habitat for the piping plover includes 183,422 acres and 1,207.5 river miles of habitat along the shoreline of Lake Sakakawea in Williams County, North Dakota (USFWS 2002).

Since the proposed project would not modify, alter, disturb, or affect the shoreline of Lake Sakakawea or any other designated critical habitat, **no effect** to designated critical habitat of the piping plover would occur.

3.7.1.5 Interior Least Tern

Federal Status: Endangered

Affect Determination: May Affect, Is Not Likely to Adversely Affect

The interior population of the least tern is listed as endangered by the USFWS (1985b). This bird is the smallest member of the gull and tern family, measuring approximately 9 inches in length. Terns remain near flowing water, where they feed by hovering over and diving into standing or flowing water to catch small fish (USFWS 2013c).

The interior population of least terns breeds in isolated areas along the Missouri, Mississippi, Ohio, Red, and Rio Grande river systems, where they nest in small colonies. From late April to August, terns nest in a shallow hole scraped in an open sandy area, gravel patch, or exposed flat and bare sandbars along rivers, sand and gravel pits, or lake and reservoir shorelines. The adults continue to care for chicks after they hatch. Least terns in North Dakota will often be found sharing sandbars with the piping plover, a threatened species (USFWS 2013c).

Census data indicate over 8,000 least terns in the interior population. In North Dakota, the least tern is found mainly on the Missouri River from Garrison Dam south to Lake Oahe, and on the Missouri and Yellowstone Rivers upstream of Lake Sakakawea (USFWS 1990a, 2013c). Approximately 100 pairs breed in North Dakota (USFWS 2013c). Details of their migration are not known, but their winter range is reported to include the Gulf of Mexico and Caribbean Islands (USFWS 1990a, 2013c).

Loss of suitable breeding and nesting habitat for terns has resulted from dam construction and river channelization on major rivers throughout the Mississippi, Missouri, and Rio Grande river systems. River and reservoir changes have led to reduced sandbar formation and other shoreline habitats for breeding, resulting in population declines. In addition, other human shoreline disturbances affect the species (USFWS 1990a). Critical habitat has not been designated for the species (USFWS 2013c). Current conservation strategies include

identification and avoidance of known nesting areas, public education, and limiting or preventing shoreline disturbances near nests and hatched chicks (USFWS 2013c).

A suitable shoreline habitat for breeding and nesting terns does not occur in the project area, and Lake Sakakawea is a minimum of 11.5 straight-line miles away from the survey area. It is unlikely that terns would visit the upland or wetland habitats present in the survey area; however, it is possible that terns may transition through the project area during migration periods. Therefore, the proposed project **may affect, but is not likely to adversely affect** endangered least terns.

3.7.1.6 Pallid Sturgeon

Federal Status: Endangered

Affect Determination: May Affect, Is Not Likely to Adversely Affect

The pallid sturgeon was listed as endangered in 1990 in the United States by the USFWS (1990b). The primary factor leading to the decline of this species is the alteration of habitat through river channelization, creation of impoundments, and alteration of flow regimes (USFWS 1990b). These alterations within the Missouri River have blocked movements to spawning, feeding, and rearing areas; destroyed spawning habitat; altered flow conditions which can delay spawning cues; and reduced food sources by lowering productivity (USFWS 2007). The fundamental elements of pallid sturgeon habitat are defined as the bottom of swift waters of large, turbid, free-flowing rivers with braided channels, dynamic flow patterns, flooding of terrestrial habitats, and extensive microhabitat diversity (USFWS 1990b).

The pallid sturgeon populations occur in the Missouri River below Fort Peck Dam to the headwaters of Lake Sakakawea and the lower Yellowstone River up the confluence of the Tongue River, Montana (USFWS 2007). This population consists of approximately 136 wild adult pallid sturgeon (USFWS 2007). Hatchery-reared sturgeon have also been stocked since 1998. The pallid sturgeon has been found to utilize the 15.5 miles (25 km) of riverine habitat that would be inundated by Lake Sakakawea at full pool (Bramblett 1996 per USFWS 2007). Larval pallid sturgeons have also been found to drift into Lake Sakakawea. While the majority of pallid sturgeons are found in the headwaters of Lake Sakakawea, the North Dakota Game and Fish Department has caught and released pallid sturgeon in nets set in 80 to 90 feet of water between the New Town and Van Hook areas. Based on this information, pallid sturgeon could be found throughout Lake Sakakawea (personal communication, email from Steve Krentz, Pallid Sturgeon Project Lead, U.S. Fish and Wildlife Service, to SWCA Environmental Consultants, September 3, 2010).

Suitable habitat for pallid sturgeon is not present in the surveyed areas, and the closest habitat is Lake Sakakawea, which is a minimum of 11.50 straight-line miles and 21.75 river miles from the project area. Potential pollution occurring as a result of construction activities, hydrostatic testing, and pipeline operations are concerns for downstream populations of endangered pallid sturgeon. Activities associated with the proposed project are not anticipated to adversely affect the water quality of Lake Sakakawea and/or its tributaries, and subsequently the pallid sturgeon. However, in the event of a large leak or spill, the possibility

exists for contamination to reach Lake Sakakawea. Therefore, the proposed project **may effect, but is not likely to adversely affect** pallid sturgeon.

3.7.1.7 Sprague's Pipit

Federal Status: Candidate

Affect Determination: May Affect, Is Not Likely to Adversely Affect

The Sprague's pipit is a small passerine, 10 to 15 centimeters in length, endemic to the Northern Great Plains (USFWS 2011). The Sprague's pipit requires large tracts of native prairie habitat, unplowed, throughout their life cycle. Because native grasslands are disturbance-dependent, Sprague's pipit prefers grassland habitats that are regularly disturbed. The frequency of disturbance required for habitat maintenance depends on how quickly grasses grow to an intermediate height (4 to 12 inches) following a disturbance event.

In North Dakota, Sprague's pipit has been found in areas of moderate grazing. Sprague's pipits are sensitive to patch size and avoid edges between grasslands and other habitat features (USFWS 2011). They may avoid non-grassland features including roads, trails, oil wells, croplands, woody vegetation, and wetlands. The Sprague's pipit is reported to stay up to 350 meters away from anthropogenic features such as roads, oil wells, and wind turbines (USFWS 2011). The USFWS has estimated that each new oil well and associated road in North Dakota results in potential impacts to approximately 51 acres of pipit habitat due to avoidance and habitat fragmentation (USFWS 2011). Because of increasing habitat fragmentation, especially by energy development, throughout the Sprague's pipit range, and the loss of native prairie habitat, the Sprague's pipit was listed as a Candidate Species under the Endangered Species Act in 2010 (USFWS 2011).

In North Dakota, Sprague's pipit breeds throughout the state except for the easternmost counties. During the breeding season they prefer large patches of well-drained, open native grassland with a minimum size of 358.3 acres (range = 170 to 776 acres). They have not been observed in areas smaller than 71.6 acres on their breeding grounds (USFWS 2011).

Large areas with native prairie habitat containing grasses of intermediate height do not occur within the project area, and a majority of the habitat within and surrounding the project area has been previously disturbed by agriculture, roads, and oil and gas development. However, a Sprague's pipit was heard vocalizing near the northeast portion of the pipeline. The pipit was heard in a large pasture to the north of the survey area, which contained suitable nesting habitat. The survey area on this portion of the alignment was dominated by non-native grasses and had a thick litter layer. Therefore, this project is unlikely to directly affect habitat due to lack of habitat requirements necessary for the Sprague's pipit for breeding in the immediate project area, but may indirectly contribute to reduced use of any nearby suitable grassland habitat patches within 350 meters of the proposed project. Therefore, the proposed project **may affect, but is not likely to adversely affect** Sprague's pipit.

3.7.1.8 Rufa Red Knot

Federal Status: Proposed for Listing as Threatened

Affect Determination: No Effect

The rufa red knot is a robin-sized shorebird that migrates long distances annually between its breeding grounds in the Canadian Arctic and several wintering regions, including the southeast United States, the northeast Gulf of Mexico, northern Brazil, and Tierra del Fuego at the southern tip of South America (USFWS 2013d). During migration, rufa red knots use key staging and stopover areas to rest and feed. In North Dakota, the red knot is a very rare migrant (USFWS 2013d). There are no known records of rufa red knot in the project vicinity; however, this species could use habitat along Lake Sakakawea as a stopover during migration.

Potential habitat along the lake is approximately 11.5 straight-line miles from the proposed project area. Activities associated with the construction, production, or reclamation of the proposed project are not anticipated to adversely affect suitable stopover habitat for the rufa red knot. Therefore, the proposed project would have **no effect** on the rufa red knot.

3.7.1.9 Northern Long-eared Bat

Federal Status: Proposed for Listing as Endangered

Affect Determination: No Effect

On October 2, 2013, the USFWS proposed the northern long-eared bat for listing as endangered under the Endangered Species Act (USFWS 2013e). This medium-sized bat ranges across the eastern and north-central United States and all of the Canadian provinces (USFWS 2013e). Throughout most of this species' range, populations are patchily distributed. They emerge at dusk to fly through the understory of forested hillsides and ridges, feeding on moths, flies, leafhoppers, caddis flies, and beetles.

Most records of northern long-eared bats are from winter hibernacula surveys, with more than 780 hibernacula identified within the United States. No known hibernacula are located in North Dakota, due to either no suitable hibernacula present or a lack of survey effort (USFWS 2013f). This bat species occupies a wide range of rocky and forested habitats. Suitable winter habitat contains large caves and mines (USFWS 2013e). Summer day roosts include abandoned buildings, bridges, hollow trees, stumps, spaces under loose bark, and rock fissures (Jones and Choate 1978).

Northern long-eared bats are not known to occur in the project area. Suitable winter habitat for northern long-eared bats does not occur in the project area. Nearby trees and rocky outcrops can act as suitable summer day roosts. Due to the low likelihood of northern long-eared bat occurrence in the project area, the proposed project would have **no effect** on the northern long-eared bat.

3.7.2 Migratory Bird Treaty Act / Bald and Golden Eagle Protection Act

3.7.2.1 Bald Eagle

Federal Status: Delisted in 2007; protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act

Effects of Project: May impact individuals or their habitat but likely would not contribute to a trend toward federal listing or cause a loss of viability to the population or species

The bald eagle (*Haliaeetus leucocephalus*) feeds on fish and carrion and typically roosts in large trees near a water source. Bald eagle nesting habitat is typically any mature stands of conifer or cottonwood trees in association with rivers, streams, reservoirs, lakes, or any significant body of water. Bald eagles are uncommon in North Dakota and are usually observed along the Missouri River (Gomes n.d.) and Yellowstone River. Bald eagles frequently migrate through the grassland habitats; however, no bald eagles or nests were observed during the field surveys. Marginal nesting and roosting habitat exists near AWET1, which has a mature stand of cottonwoods. Due to heavy disturbance in the area and overall distance to preferred feeding areas (Lake Sakakawea), nesting or roosting in this area would be unlikely. Therefore, the proposed project **may impact individuals or their habitat but likely would not contribute to a trend toward federal listing or cause a loss of viability to the population or species.**

3.7.2.2 Golden Eagle

Federal Status: Unlisted; protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act

Effects of Project: No adverse effects anticipated

Golden eagles (*Aquila chrysaetos*) nest on steep cliff faces and in large cottonwood trees along intermittent creeks. Golden eagles have been documented near the project area year-round; however, the majority of golden eagles migrate. The breeding season for golden eagles is from mid-March through late July. No golden eagles or suitable nesting habitat was observed within the analysis area, and the closest known golden eagle nest is approximately 40 miles to the southeast of the project area. Therefore, the proposed project would have **no adverse impacts** on this species at this time.

3.7.2.3 Migratory Birds

Federal Status: Not listed, protected under the Migratory Bird Treaty Act

Effects of Project: No adverse effects anticipated

Suitable habitat for migratory birds exists within the entire project area. All types of migratory species including grassland nesting species and raptors can be expected to be observed within/near the project area, especially during the migratory bird breeding season between February 1 and July 15. Suitable woodland nesting habitat also occurs within the project area. Impacts to migratory birds can be mitigated by conducting all construction outside of the migratory bird breeding season or, if construction occurs during the bird breeding season, either mow, maintain, or completely remove vegetation within the project construction area, or conduct an avian survey of the project area no greater than 5 days before construction

begins, and if active nests are discovered, notify the USFWS. If migratory bird mitigation measures are conducted, the project is likely to cause **no adverse impacts** to migratory birds.

3.7.3 Wildlife Observed

During the field survey, SWCA biologists observed various wildlife species which use wetlands and other habitats within the survey area (Table 5). Common wildlife species may be affected both directly via incidents with construction equipment or indirectly through the temporary fragmentation of habitat as a result of construction activities. Migratory birds are protected by the Migratory Bird Treaty Act (16 United States Code 703 et seq.) which prohibits the “take” of individuals and nests.

Table 5. Wildlife Observed during Field Surveys at the Proposed Pipeline Route.

Common Name	Scientific Name	Observation Type	Comments
Northern harrier	<i>Circus cyaneus</i>	Primary	
Sprague’s pipit	<i>Anthus spragueii</i>	Secondary	
Ring-necked pheasant	<i>Phasianus colchicus</i>	Primary	
Killdeer	<i>Charadrius vociferus</i>	Primary	
Red-winged blackbird	<i>Agelaius phoeniceus</i>	Primary	
Western meadowlark	<i>Sturnella neglecta</i>	Primary	
Horned lark	<i>Eremophila alpestris</i>	Primary	ANST1
Mourning dove	<i>Zenaida macroura</i>	Primary	
American robin	<i>Turdus migratorius</i>	Primary	
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	Primary	
American crow	<i>Corvus brachyrhynchos</i>	Primary	
Grey partridge	<i>Perdix perdix</i>	Primary	
Mallard	<i>Anas platyrhynchos</i>	Primary	
Gadwall	<i>Anas strepera</i>	Primary	
Northern pintail	<i>Anas acuta</i>	Primary	
Northern shoveler	<i>Anas clypeata</i>	Primary	
Blue-winged teal	<i>Anas discors</i>	Primary	
Canvasback	<i>Aythya valisineria</i>	Primary	
Redhead	<i>Aythya Americana</i>	Primary	
Canada goose	<i>Branta canadensis</i>	Primary	
Raccoon	<i>Procyon lotor</i>	Secondary	
Richardson’s ground squirrel	<i>Spermophilus richardsonii</i>	Primary	
Northern leopard frog	<i>Rana pipiens</i>	Secondary	

Natural Resources and Wetland Delineation Report for the Little Muddy Creek Pipeline and Epping Station, Williams County, North Dakota
October 2014

Common Name	Scientific Name	Observation Type	Comments
Coyote	<i>Canis latrans</i>	Primary	
American badger	<i>Taxidea taxus</i>	Primary	
White-tailed deer	<i>Odocoileus virginianus</i>	Primary	
Grey partridge	<i>Perdix perdix</i>	Primary	

4.0 CONCLUSIONS AND RECOMMENDATIONS

1. SWCA biologists recorded approximately 2.22 acres of wetlands within the survey area. In total, approximately 0.90 acre of PEM wetland *may* be temporarily impacted by construction activities within the 110-foot-wide construction ROW.
2. No waterbodies (streams, lakes, etc.) were observed within the surveyed areas. Three ephemeral drainages were recorded. Two of them appeared to be human-made, and the other appeared to be natural. These features did not contain hydrophytic vegetation, and had no indicators of an OHWM.
3. SWCA estimates 59 trees, saplings, and shrubs may be impacted. Therefore, approximately 118 2-year-old saplings may need to be replanted to fulfill the 2:1 mitigation requirement.

According to the recommendations of the North Dakota Forest Service, tree species selection for replacement should be accomplished through collaboration with a reputable area nursery. This will allow for species to be selected based on various factors including species hardiness and area soil type.

4. No federally listed threatened or endangered species were observed during the field survey. Suitable roosting and foraging habitat exists within the project area for the whooping crane, and there have been several sightings within 10 miles of the project area. SWCA recommends that if construction is to occur within whooping crane spring and fall migration periods, and a whooping crane is observed within 1 mile of the project, to stop construction and coordinate with the USFWS.

The other listed threatened and endangered species and proposed species which occur in Williams County (piping plover, least tern, pallid sturgeon, gray wolf, northern long-eared bat, rufa red knot) are not likely to be detrimentally impacted by construction activities. One listed candidate species, Sprague's pipit, was observed near the project area, however suitable nesting habitat does not exist within surveyed areas and no direct impacts would be anticipated.

5. Migratory birds and habitat were observed throughout the entire project area. An active migratory bird nest (horned lark) was discovered in a harvested agriculture field. Other types of suitable migratory bird habitat (including raptor habitat) exists throughout the surveyed areas. A 0.5-mile line-of-sight survey was conducted throughout the survey area. A northern harrier was observed flying within the vicinity of the proposed pipeline.

No active raptor nests or other species of raptor were observed. In order to reduce impacts to migratory birds, SWCA recommends conducting all construction outside of the migratory bird breeding season. If construction occurs during the bird breeding season, SWCA recommends to either mow, maintain, or completely remove vegetation within the project construction area, or conduct an avian survey of the project area no greater than 5 days before construction begins. If active nests are discovered, notify the USFWS.

6. One isolated 0.74-acre area of noxious weeds, Canada thistle, was discovered within the surveyed areas, including the construction ROW. If additional areas of noxious weeds are confirmed during construction activities, actions should be taken to reduce the potential to spread any state-listed noxious weed species, especially to native areas.

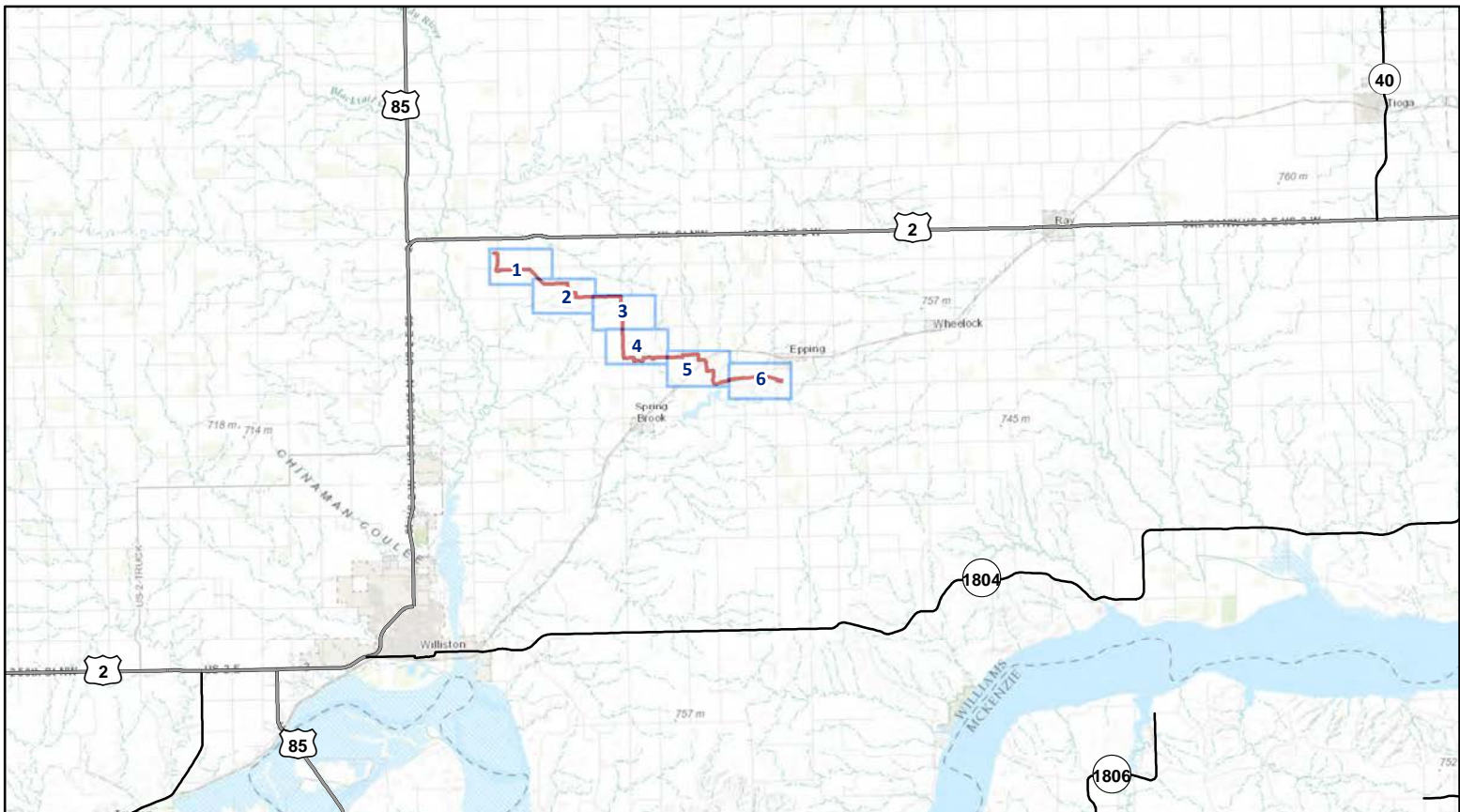
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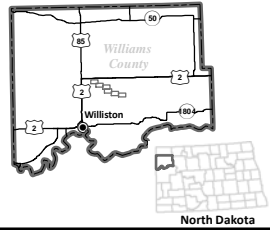
APPENDIX A
Vicinity Maps and Site Layout Maps



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Little Muddy Creek

- Proposed Gathering Pipeline
- State Highway
- U.S. Highway



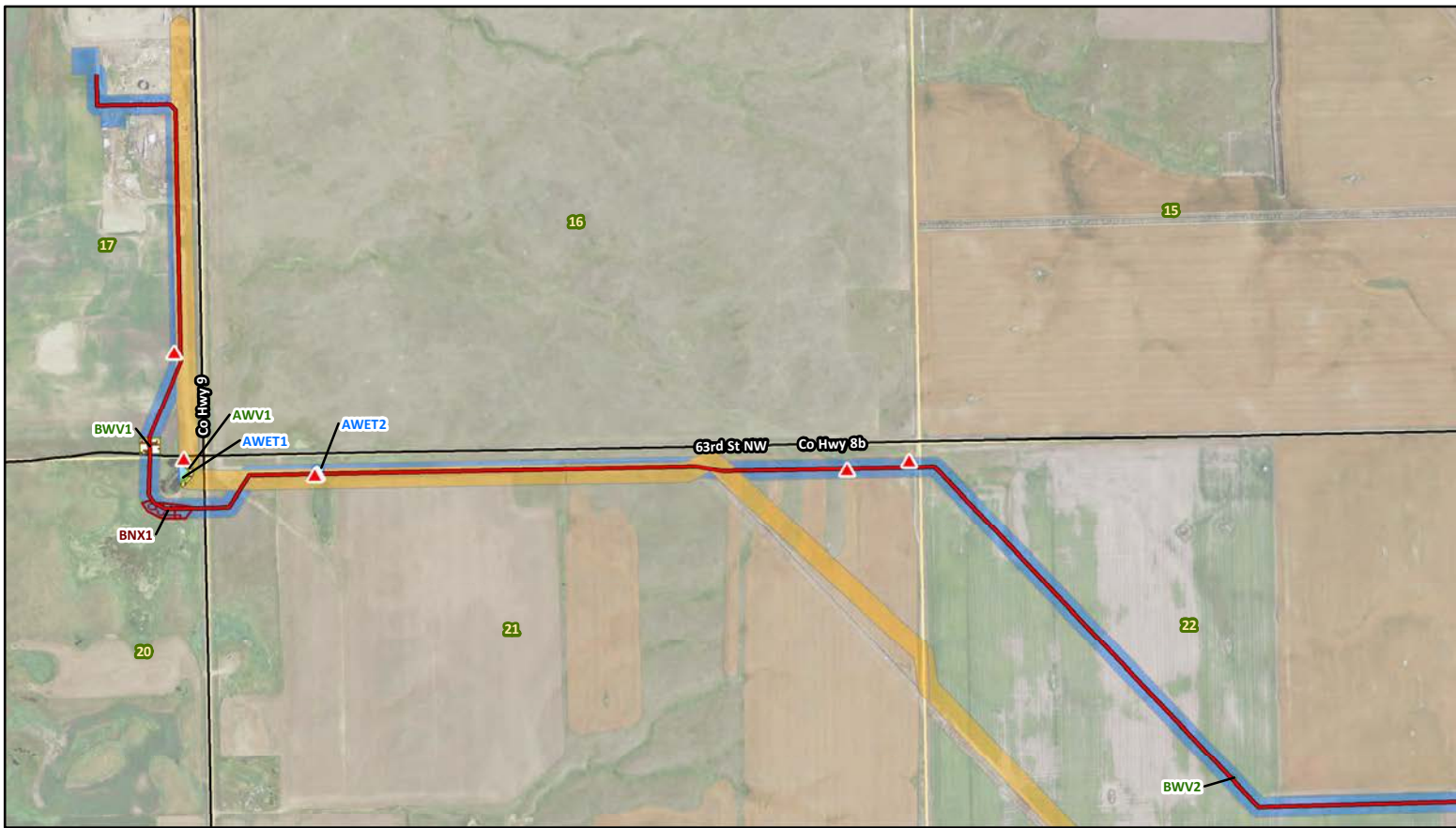
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Base Map: Topographic Map
 Source: ESRI ArcGIS online service
 Williams County, North Dakota

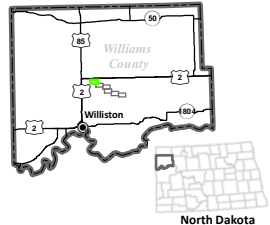
Projection: NAD 1983 UTM Zone 13N





Little Muddy Creek

- ▲ Upland Data Point
- ▲ Wetland Data Point
- Nest
- Proposed Gathering Pipeline
- Stream
- Existing Road
- Wetland
- Woody Vegetation
- Noxious Weed
- Survey Area
- Previously Inventoried Area
- Township/Range Boundary
- Section Boundary

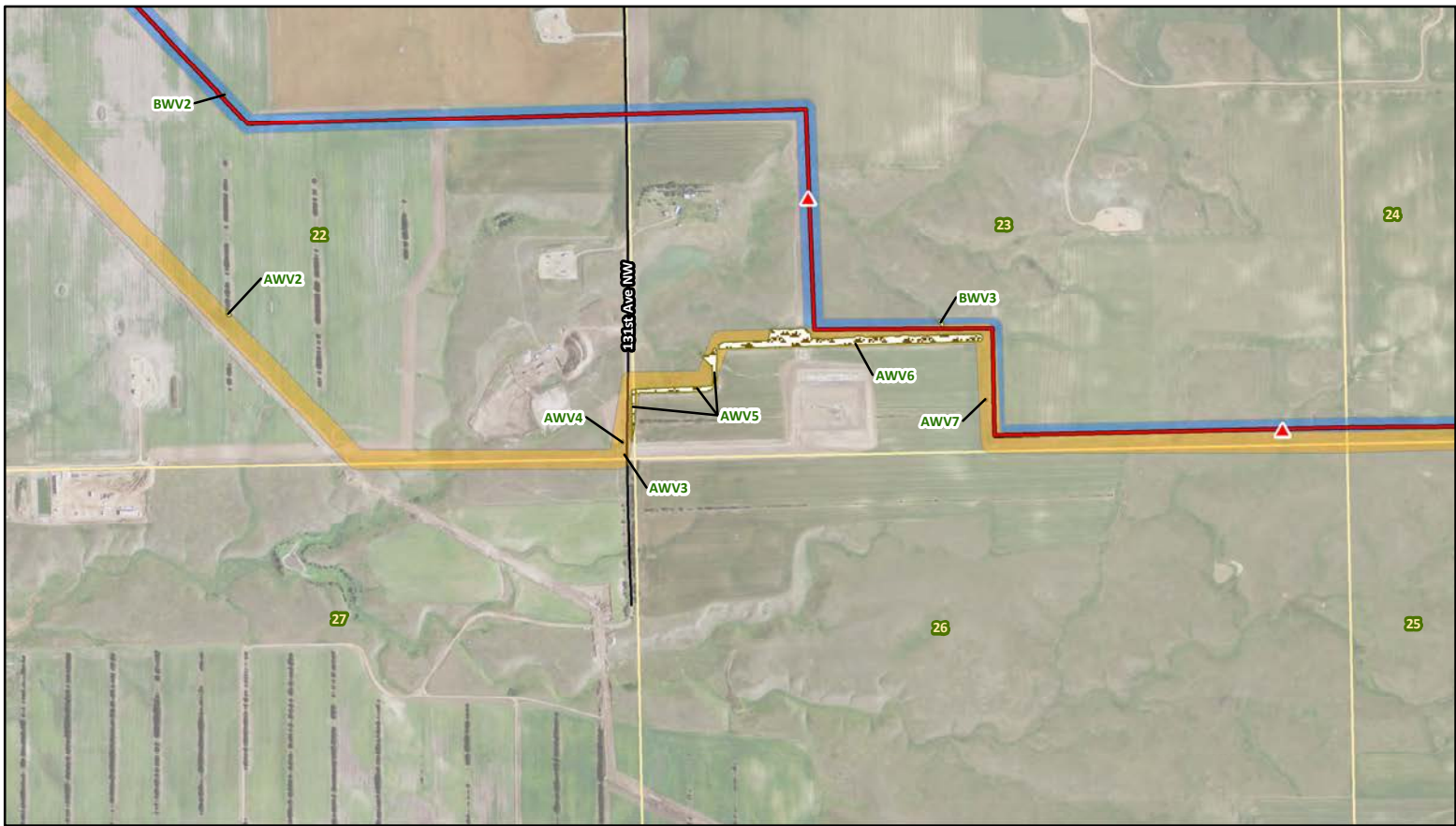


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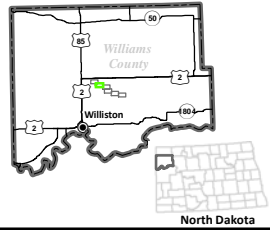
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 Township/Range: T156N, R100W
 Williams County, North Dakota

Projection: NAD 1983 UTM Zone 13N



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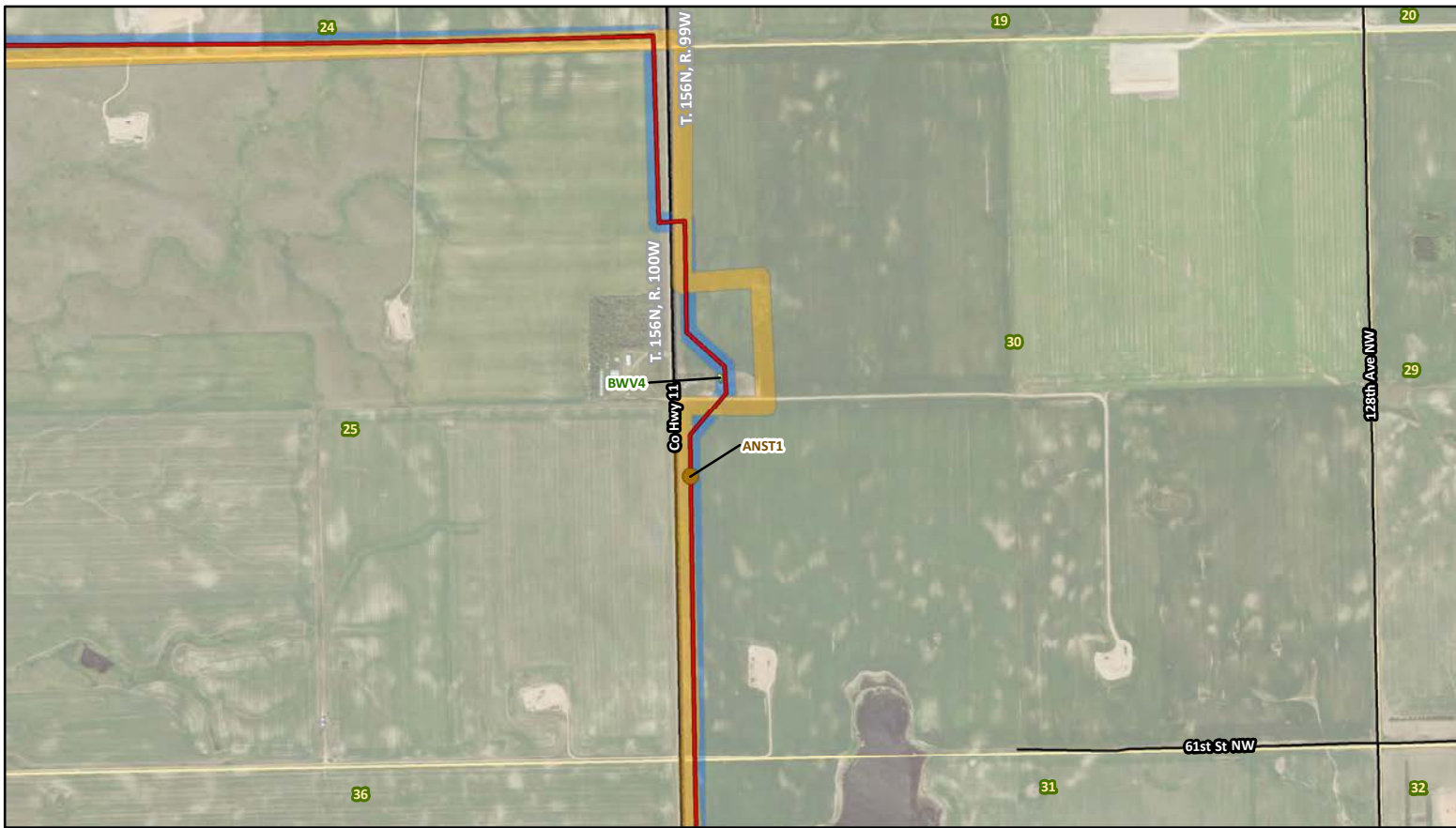


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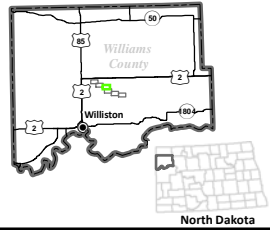
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 Williams County, North Dakota

Projection: NAD 1983 UTM Zone 13N



Little Muddy Creek

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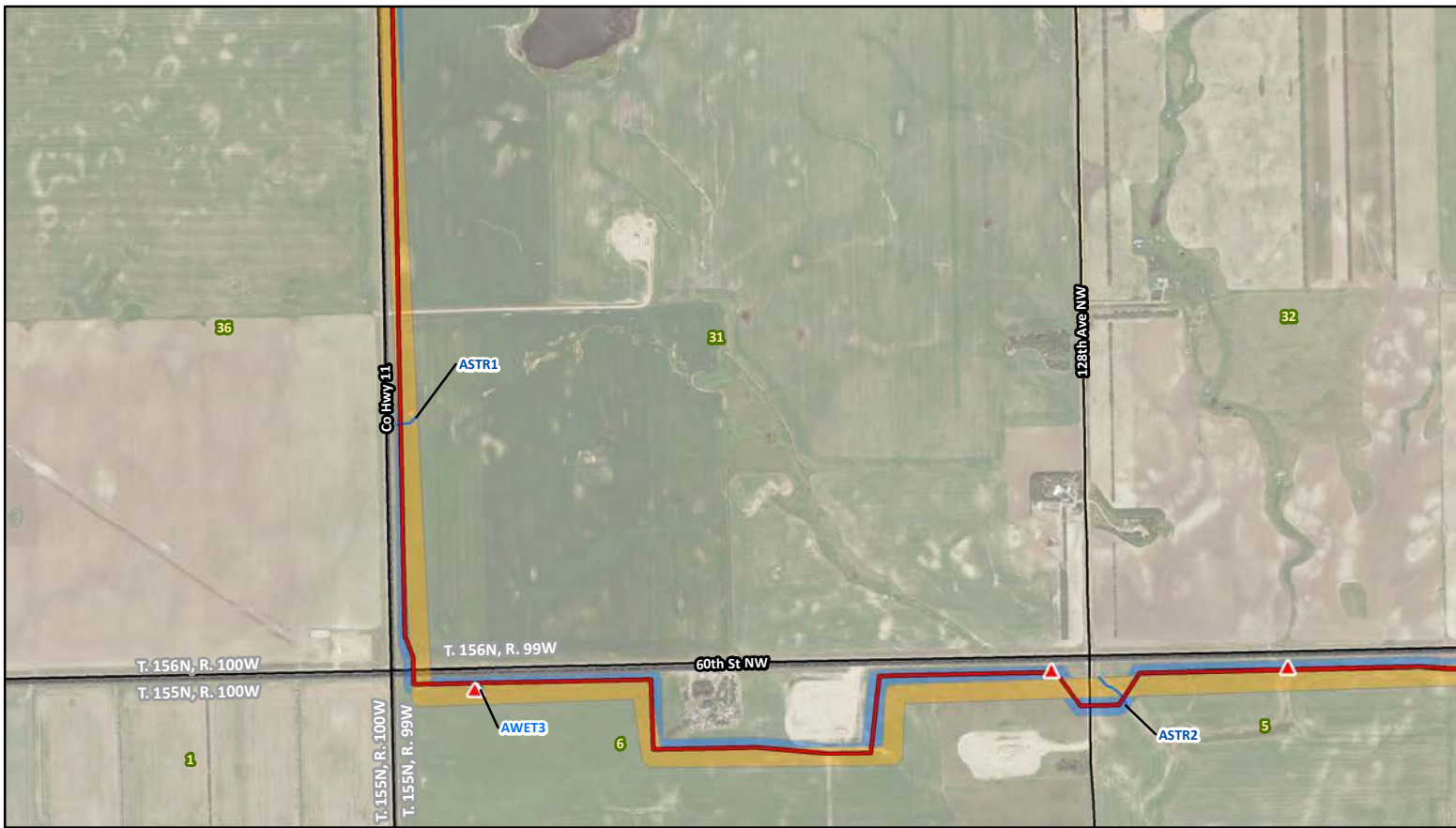
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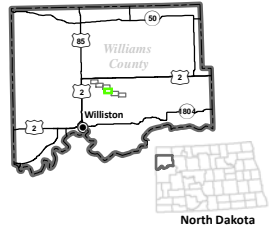
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Little Muddy Creek

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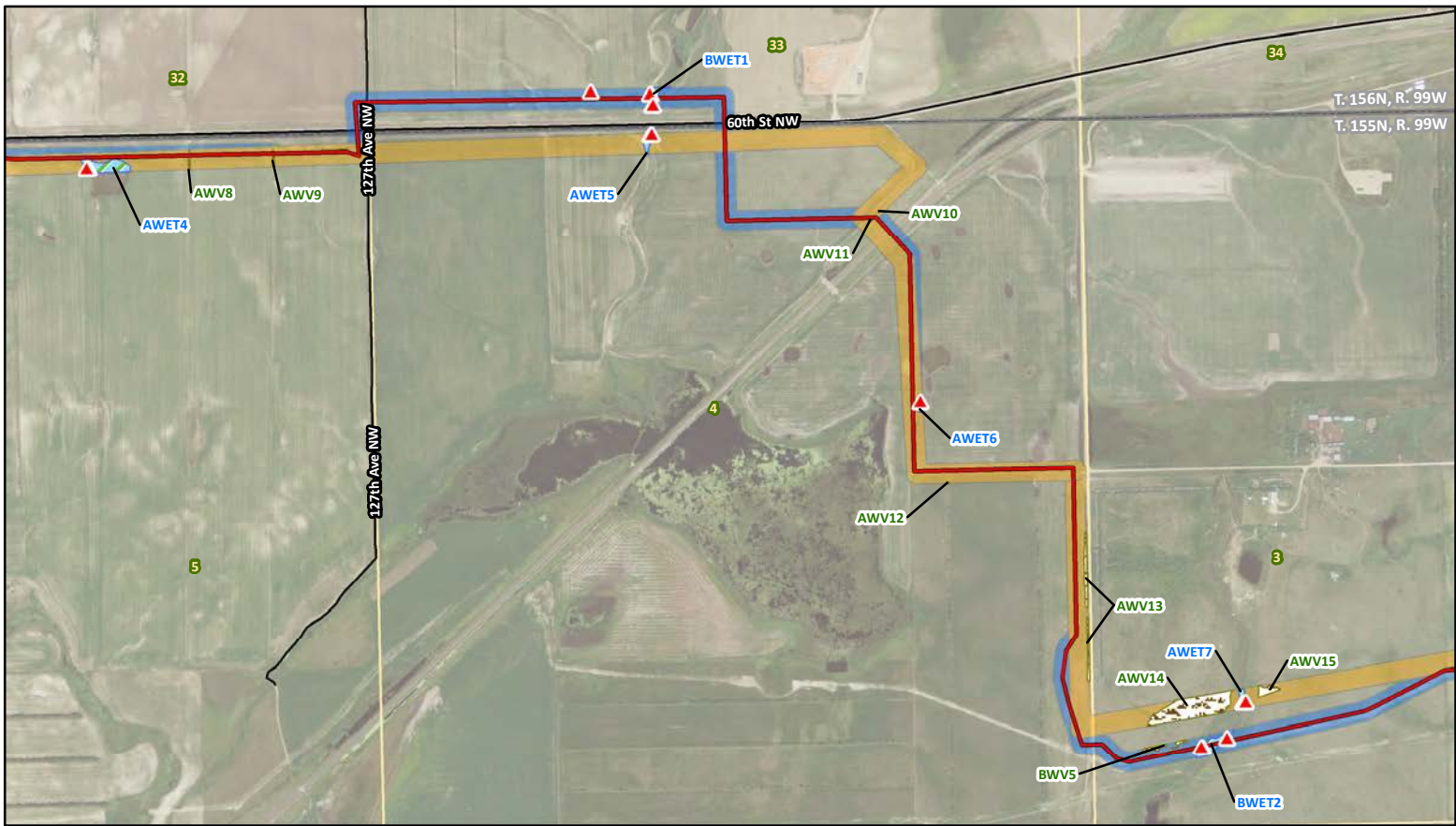
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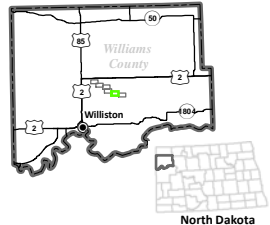
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T. 156N, R. 99W
T. 155N, R. 99W

Little Muddy Creek

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Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Spring Brook (1979)
Township/Range: T155N, R99W
Williams County, North Dakota

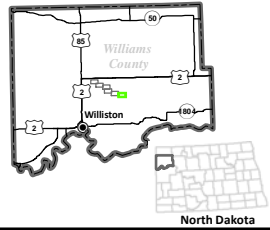
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Base Map: 2012 Aerial Imagery
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 Township/Range: T155N, R99W
 Williams County, North Dakota

Projection: NAD 1983 UTM Zone 13N

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APPENDIX B
Photographs of Project Area Corridor



Figure B.1. View of the project area. Note existing pipeline disturbance.



Figure B.2. View of AWW2, facing northwest.



Figure B.3. View of AWET1 and AWW1, facing southeast.



Figure B.4. View of AWET2, facing east.



Figure B.5. Representative photograph of dominant vegetation (non-native) within project area, facing northwest.



Figure B.6. View of the AWW6, facing northwest.



Figure B.7. View of ASTR1 (ephemeral drainage), facing northeast.



Figure B.8. View of AWET3, facing east.



Figure B.9. View of ASTR2 (ephemeral drainage), facing south. Note pipeline scar.



Figure B.10. View of ASTR2 (ephemeral drainage), facing south. Note that this portion of drainage has been mechanically altered.



Figure B.11. View of AWET4, facing east.



Figure B.12. View of AWET5, facing north.



Figure B.13. View of AWET6, facing south.



Figure B.14. View of AWW14, facing east.



Figure B.15. View of AWET7, facing west.



Figure B.16. View of ASTR3 (ephemeral drainage), facing south.



Figure B.17. View of ANST1, close-up of active horned lark nest.



Figure B.18. View of BWV1, facing southwest.



Figure B.19. View of BNX1, Canada thistle, facing west.



Figure B.20. Overview of BWV2, facing east.



Figure B.21. Overview of BWV3, facing west.



Figure B.22. Overview of BWV4, facing west.



Figure B.23. Overview of BWET1, facing northeast.



Figure B.24. Overview of BWV5, facing northwest.



Figure B.25. Overview of BWET2, facing northwest.

Appendix E

Cultural Resource Report

**Addendum to A Class I and Class III
Cultural Resource Inventory of the
Little Muddy Creek Pipeline, Williams
County, North Dakota, for Pipeline
Alignment Reroutes and Two Potential
Facility Sites**

Prepared for

E3 Environmental, LLC

Prepared by

SWCA Environmental Consultants

September 2014

MANUSCRIPT DATA RECORD FORM

1. Manuscript Number:
2. SHPO Reference #:
3. Author(s): Jolene Schleicher
4. Title: Addendum to A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota, for Pipeline Alignment Reroutes and Two Potential Facility Sites
5. Report Date: September 22, 2014
6. Number of Pages: 34
7. Type – I, T, E, O: I
8. Acres: 147.29
9. Legal Location(s) (no quarter sections) with Historic Context Study Unit(s):
Consult the township tables in *The North Dakota Comprehensive Plan for Historic Preservation: Archeological Component*, (SHSND 2008; available at <http://history.nd.gov/hp/hpforms.html>) for Study Unit assignments.
Study Units: LM, CB, KN, HE, SM, GA, JA, GR, NR, SR, SO, SH, YE

<u>COUNTY</u>	<u>TWP</u>	<u>RNG</u>	<u>SEC</u>	<u>SU</u>
Williams	156N	100W	17, 20–25	GA
Williams	156N	99W	30–33	GA
Williams	155N	99W	1–6	GA

**Addendum to A Class I and Class III Cultural Resource Inventory of the
Little Muddy Creek Pipeline, Williams County, North Dakota,
for Pipeline Alignment Reroutes and Two Potential Facility Sites**

Submitted to:

State Historical Society of North Dakota

Prepared for:

E3 Environmental, LLC
871 Jefferson Avenue
St. Paul, Minnesota 55102

Prepared by:

Jolene Schleicher

Principal Investigator:

William Harding

SWCA Environmental Consultants

116 North 4th Street, Suite 200

Bismarck, North Dakota 58501

SWCA Cultural Resource Report Number 14-494
Addendum to SWCA Cultural Resource Report Number 14-223
Addendum to NDSHPO Manuscript Number 015167

September 22, 2014

ABSTRACT

This report is an addendum to the Class I and Class III cultural resource inventory report for the proposed Little Muddy Creek pipeline (Cox and Picka 2014), and presents the results of a Class III cultural resource inventory conducted by SWCA Environmental Consultants (SWCA) on September 2 and 3, 2014, on behalf of E3 Environmental, LLC, in support of reroutes to the proposed Little Muddy Creek pipeline alignment and two proposed facility sites. An update to the Class I cultural resource inventory was conducted on August 25, 2014. Meadowlark Midstream Company, LLC, proposes to construct the Little Muddy Creek pipeline on privately owned lands in Williams County, North Dakota.

The project area for the pipeline reroutes and proposed potential facility sites is located in Sections 17 and 20–25, Township (T) 156 North (N), Range (R) 100 West (W); Sections 30–33, T156N, R99W; and Sections 1–6, T155N, R99W, and is situated on the Blacktail Lake SE (1961), Epping (1979), and Spring Brook (1979), North Dakota, U.S. Geological Survey 7.5-minute quadrangles. The inventory area consists of a non-overlapping linear survey corridor up to 150 feet wide, totaling 146.09 acres, to compensate for shifting the proposed centerline. Two block surveys totaling 1.20 acres were surveyed for the proposed facility sites. In total, 147.29 acres were inventoried for the project. Portions of the currently proposed Little Muddy Creek pipeline reroutes are located within areas previously inventoried for the original alignment of the Little Muddy Creek pipeline (Cox and Picka 2014).

During the inventory, SWCA newly recorded an undocumented segment of the Great Northern Railroad (32WI481) and one isolated Knife River Flint biface (32WIX646). 32WI481 was previously determined eligible for listing in the National Register of Historic Places (NRHP). SWCA recommends project disturbance avoid all potentially eligible and unevaluated resources by 50 feet. 32WI481 will be avoided through the use of a horizontal directional drill beneath the site. By definition, isolated finds are considered to lack integrity and are not eligible for the NRHP; therefore, 32WIX646 is not eligible for inclusion in the NRHP. No further work is recommended. With the above stipulations, it is recommended that a determination of *No Significant Sites Affected* and *No Historic Properties Affected* be granted for the project to proceed as planned.

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INTRODUCTION

This report is an addendum to the Class I and Class III cultural resource inventory report for the proposed Little Muddy Creek pipeline project (Cox and Picka 2014), and presents the results of a Class III cultural resource inventory conducted by SWCA Environmental Consultants (SWCA) on September 2 and 3, 2014, on behalf of E3 Environmental, LLC (E3), in support of reroutes to the proposed pipeline alignment along with two proposed potential facility sites. Meadowlark Midstream Company, LLC, proposes to construct the Little Muddy Creek pipeline on privately owned land in Williams County, North Dakota.

The only regulatory agencies to be involved are 1) the North Dakota Public Service Commission (NDPSC) under the North Dakota Energy Conversion and Transmission Facility Siting Act (excluding any applicable county or local requirements); and 2) the U.S. Army Corps of Engineers (USACE) through Section 404 of the Clean Water Act (CWA), which regulates discharge into waters of the U.S. regulated by the USACE. Therefore, SWCA's Class I and III inventory of the project area assists E3 in meeting the cultural resource requirements within the NDPSC's Certificate of Corridor Compatibility and Route Permit application. Additionally, SWCA's inventory assisted E3 in achieving compliance with Section 404 of the CWA, including the Nationwide Permit General Conditions pertaining to Section 106 of the National Historic Preservation Act and the Endangered Species Act.

The project area for the pipeline reroutes and potential facility sites is located in Sections 17 and 20–25, Township (T) 156 North (N), Range (R) 100 West (W); Sections 30–33, T156N, R99W; and Sections 1–6, T155N, R99W (Figure 1). Legal locations of the project area are presented in Table 1. The inventoried area is situated on the Blacktail Lake SE (1961), Epping (1979), and Spring Brook (1979), North Dakota, U.S. Geological Survey 7.5-minute quadrangles. The inventory area for the pipeline reroutes consists of a non-overlapping linear survey corridor up to 150 feet wide, totaling 146.09 acres, to compensate for shifting the proposed centerline. Two blocks totaling 1.20 acres were surveyed for the potential proposed facility sites. In total, 147.29 acres were inventoried for the project. Portions of the currently proposed Little Muddy Creek pipeline reroutes are located within areas previously inventoried for the original alignment of the Little Muddy Creek pipeline (Cox and Picka 2014).

For the cultural resource investigation, William Harding served as Principal Investigator. Cole Wandler and Paul Swader, SWCA archaeologists, conducted all fieldwork. All field notes and photographs are on file at SWCA's Bismarck, North Dakota, office under project number 28755.

Table 1. Project Area Legal Locations in Williams County, North Dakota

Township	Range	Section	Aliquots
155N	99W	1	N ¹ / ₂ SW ¹ / ₄ SW ¹ / ₄
		2	N ¹ / ₂ SE ¹ / ₄ SE ¹ / ₄ , SW ¹ / ₄ NE ¹ / ₄ SE ¹ / ₄ , S ¹ / ₂ NW ¹ / ₄ SE ¹ / ₄ , N ¹ / ₂ SW ¹ / ₄ SE ¹ / ₄ , N ¹ / ₂ SE ¹ / ₄ SW ¹ / ₄ , S ¹ / ₂ NE ¹ / ₄ SW ¹ / ₄ , N ¹ / ₂ SW ¹ / ₄ SW ¹ / ₄ , SE ¹ / ₄ NW ¹ / ₄ SW ¹ / ₄
		3	N ¹ / ₂ SE ¹ / ₄ SE ¹ / ₄ , N ¹ / ₂ SW ¹ / ₄ SE ¹ / ₄ , N ¹ / ₂ SE ¹ / ₄ SW ¹ / ₄ , SW ¹ / ₄ SE ¹ / ₄ SW ¹ / ₄ , NE ¹ / ₄ SW ¹ / ₄ SW ¹ / ₄ , S ¹ / ₂ SW ¹ / ₄ SW ¹ / ₄
		4	E ¹ / ₂ SE ¹ / ₄ SE ¹ / ₄ , SE ¹ / ₄ NE ¹ / ₄ SE ¹ / ₄ , NW ¹ / ₄ SE ¹ / ₄ NE ¹ / ₄ , SW ¹ / ₄ NE ¹ / ₄ NE ¹ / ₄ , S ¹ / ₂ NW ¹ / ₄ NE ¹ / ₄ , NW ¹ / ₄ NW ¹ / ₄ NE ¹ / ₄ , E ¹ / ₂ NE ¹ / ₄ NW ¹ / ₄
		5	N ¹ / ₂ N ¹ / ₂ N ¹ / ₂
		6	N ¹ / ₂ N ¹ / ₂ N ¹ / ₂
156N	99W	30	W ¹ / ₂ SW ¹ / ₄ NW ¹ / ₄ , W ¹ / ₂ W ¹ / ₂ SW ¹ / ₄
		31	W ¹ / ₂ W ¹ / ₂ W ¹ / ₂
		32	SE ¹ / ₄ SE ¹ / ₄ SE ¹ / ₄
		33	S ¹ / ₂ S ¹ / ₂ SW ¹ / ₄ , SW ¹ / ₄ SW ¹ / ₄ SE ¹ / ₄
156N	100W	17	E ¹ / ₂ E ¹ / ₂ SE ¹ / ₄
		20	NE ¹ / ₄ NE ¹ / ₄ NE ¹ / ₄
		21	N ¹ / ₂ N ¹ / ₂ N ¹ / ₂
		22	N ¹ / ₂ N ¹ / ₂ SE ¹ / ₄ , NE ¹ / ₄ NW ¹ / ₄ SW ¹ / ₄ , S ¹ / ₂ SE ¹ / ₄ NW ¹ / ₄ , NW ¹ / ₄ SE ¹ / ₄ NW ¹ / ₄ , NE ¹ / ₄ SW ¹ / ₄ NW ¹ / ₄ , S ¹ / ₂ NW ¹ / ₄ NW ¹ / ₄ , NW ¹ / ₄ NW ¹ / ₄ NW ¹ / ₄
		23	S ¹ / ₂ S ¹ / ₂ SE ¹ / ₄ , NW ¹ / ₄ SW ¹ / ₄ SE ¹ / ₄ , N ¹ / ₂ SE ¹ / ₄ SW ¹ / ₄ , W ¹ / ₂ NE ¹ / ₄ SW ¹ / ₄ , N ¹ / ₂ NW ¹ / ₄ SW ¹ / ₄
		24	S ¹ / ₂ S ¹ / ₂ S ¹ / ₂
		25	E ¹ / ₂ NE ¹ / ₄ NE ¹ / ₄ , NE ¹ / ₄ SE ¹ / ₄ NE ¹ / ₄

Addendum to A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota, for Pipeline Alignment Reroutes and Two Potential Facility Sites

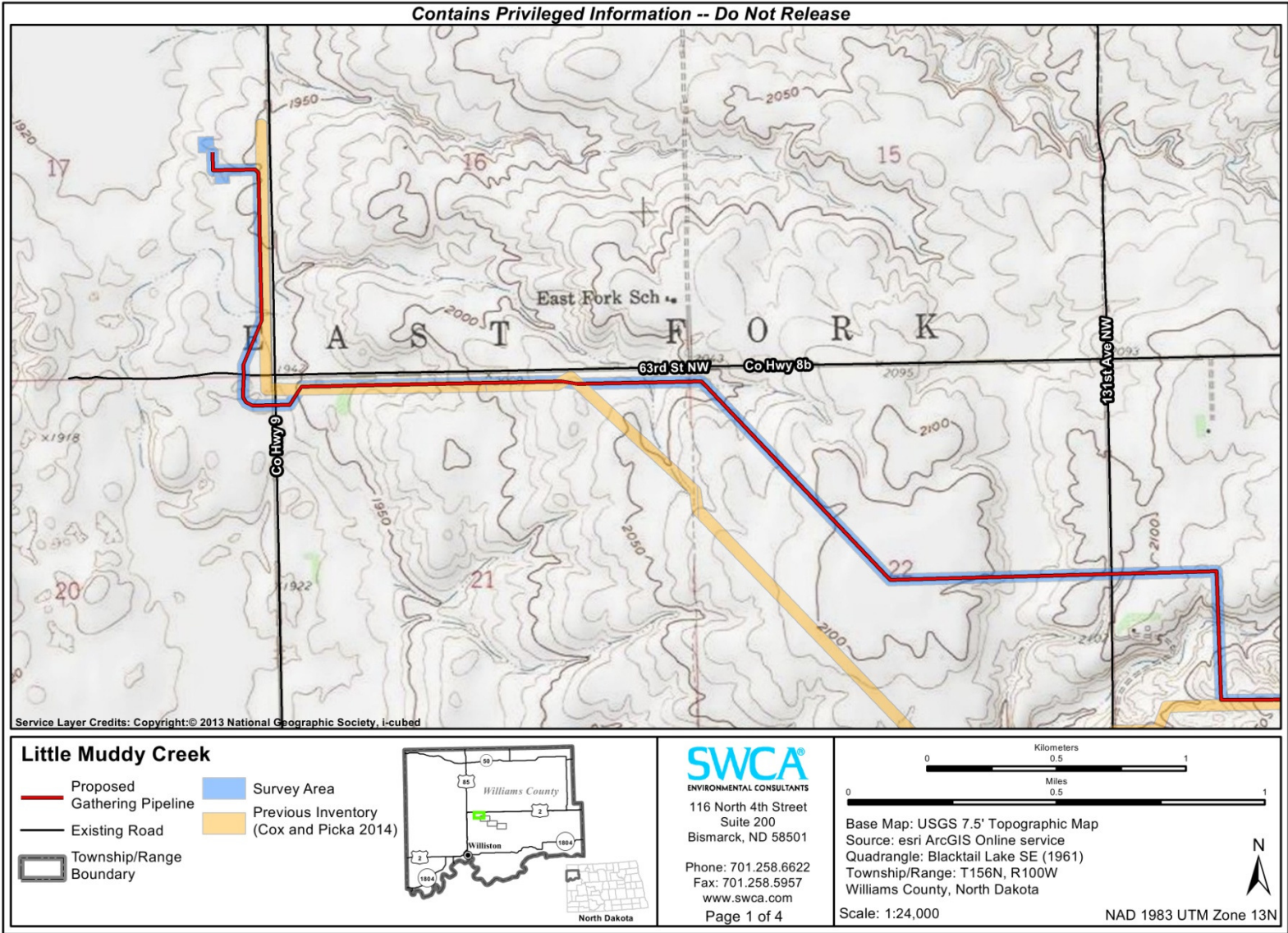


Figure 1a. Project area map, 1 of 4.

Addendum to A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota, for Pipeline Alignment Reroutes and Two Potential Facility Sites

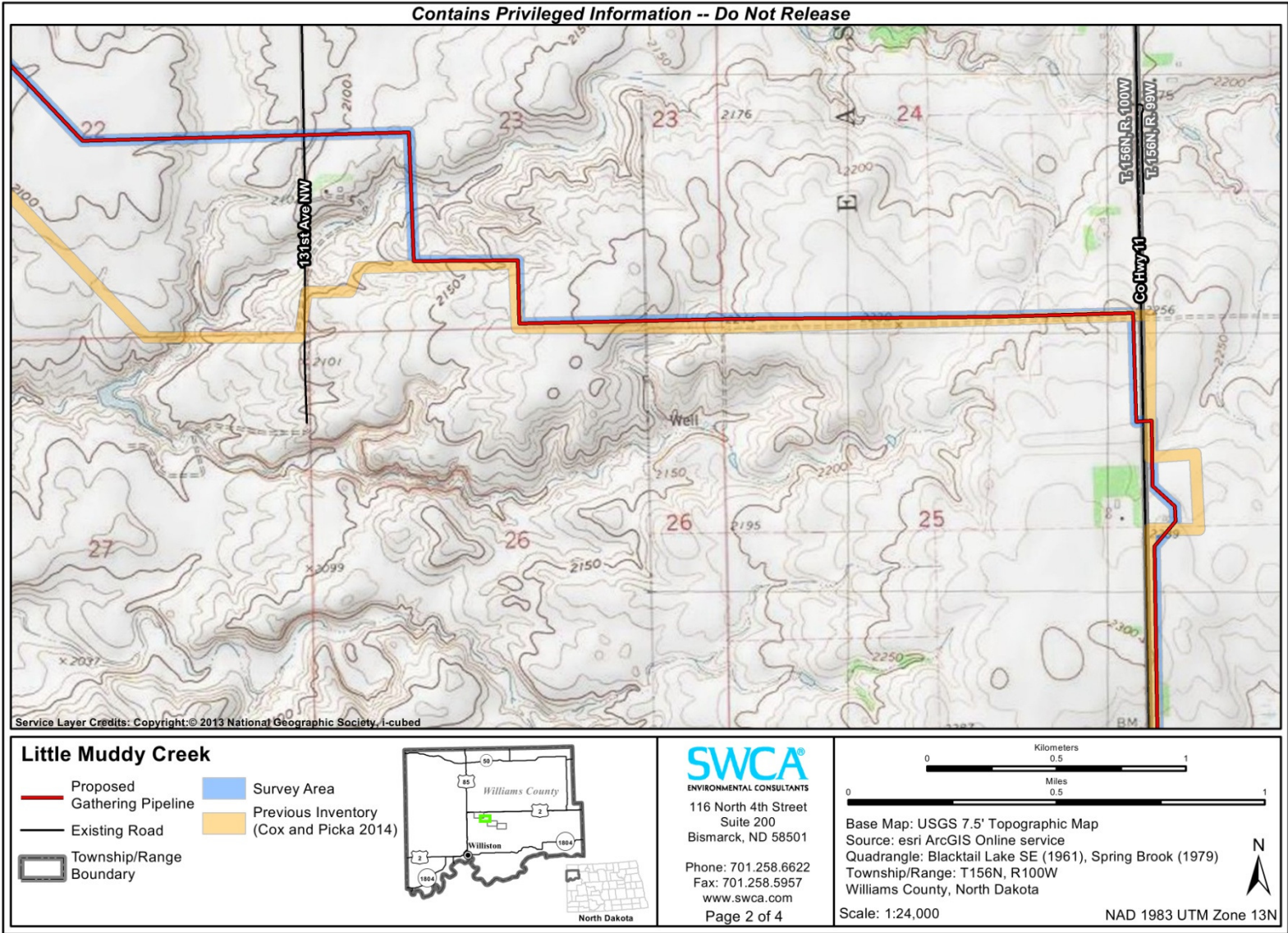


Figure 1b. Project area map, 2 of 4.

Addendum to A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota, for Pipeline Alignment Reroutes and Two Potential Facility Sites

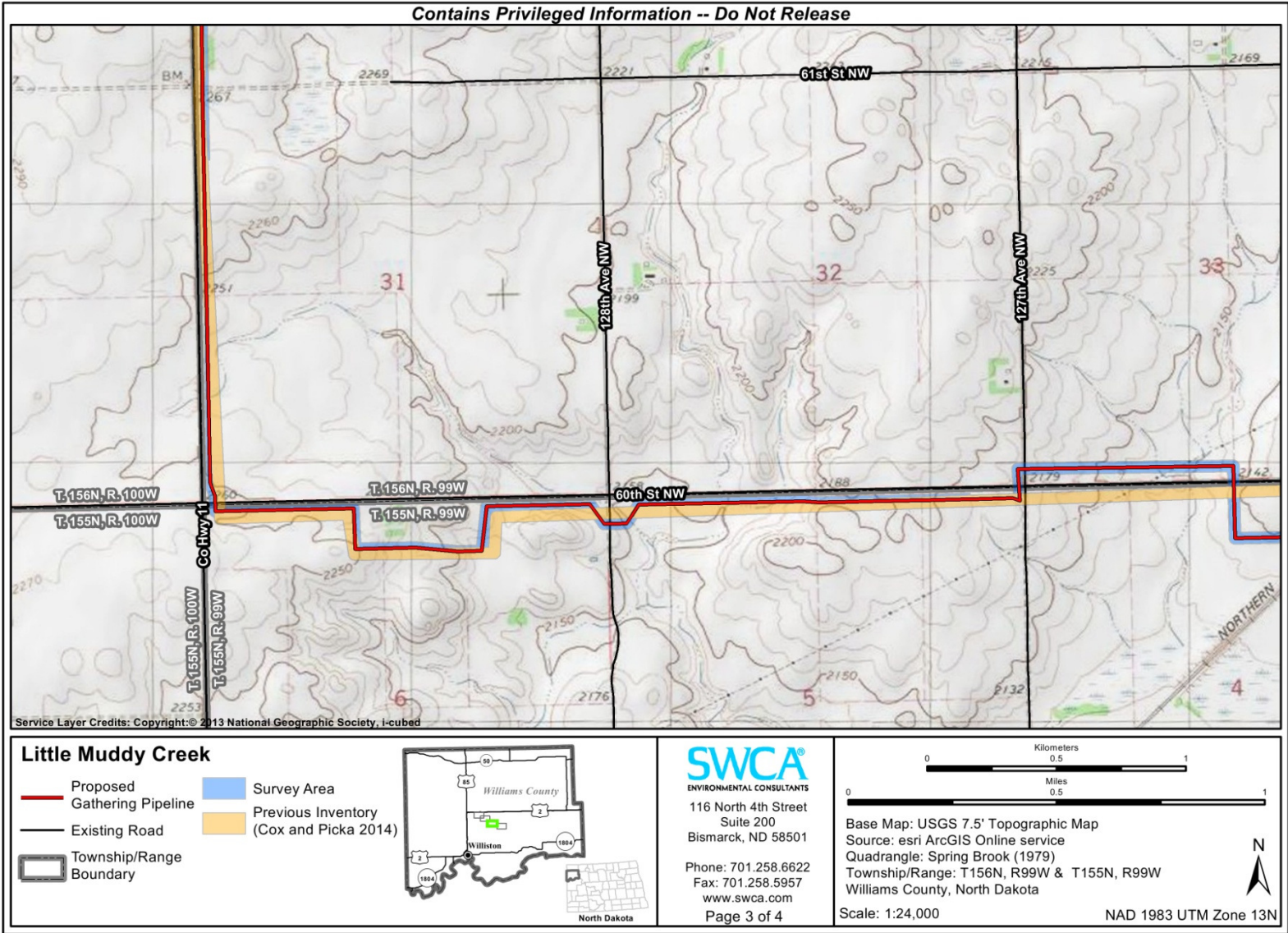


Figure 1c. Project area map, 3 of 4.

Addendum to A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota, for Pipeline Alignment Reroutes and Two Potential Facility Sites

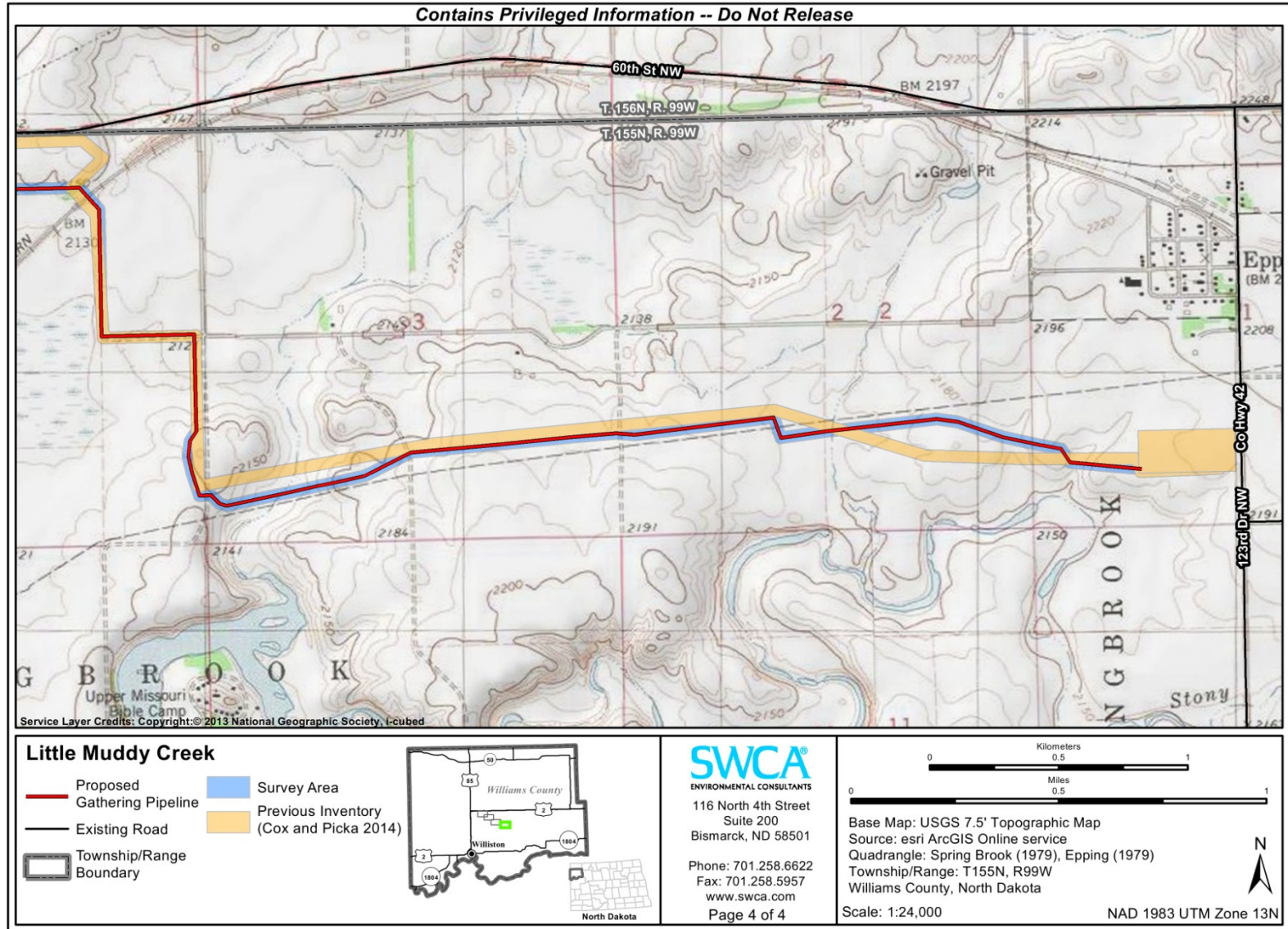


Figure 1d. Project area map, 1 of 4.

PROJECT SETTING AND BACKGROUND

The project setting, including discussions of the topography, climate, hydrology, geology, soils, and flora and fauna; environmental constraints; and cultural and historic overview are described in the original Class I and Class III report (Cox and Picka 2014).

BACKGROUND RESEARCH

As part of the initial phase of this investigation, SWCA conducted a background search of archaeological and historical literature and records for the project area and surrounding 1-mile area. Researchers searched relevant records holdings at the State Historical Society of North Dakota and other available sources for information regarding previously recorded historic and prehistoric sites located within the project area. Background research was conducted on April 22, 2014. The results of the search are detailed in Cox and Picka (2014). An updated background search was conducted on August 25, 2014.

The updated Class I search for the rerouted pipeline alignment indicated that, supplemental to those previously recorded sites summarized in Cox and Picka (2014), five additional previously recorded cultural resources are within the 1-mile study area (0.5-mile either side of the proposed project centerline) (Table 2). The additional previously recorded sites consist of one historic railway (32WI481); one historic trash dump (32WI1482); one prehistoric stone alignment (32WI1483); one cultural material scatter site lead of unknown cultural or temporal affiliation (32WIX136); and one historic machinery isolated find (32WIX627). None of the previously recorded sites are located within the project area

Two additional previous cultural resource inventories were performed within the 1-mile study area since the original Class I outlined in Cox and Picka (2014). The bibliographic listing of the additional previous archaeological and historic studies is provided in Table 3.

Table 2. Additional Previously Recorded Cultural Resources within the 1-mile Study Area

SITS Number	Location	Site Type(s)	Cultural Affiliation	NRHP Eligibility
32WI481	SE¼ NW¼ NE¼ Section 4, T155N, R99W	Railway	Historic	Eligible with Non-contributing portions
32WI1482	SE¼ SE¼ SE¼ Section 4, T155N, R99W	Trash Dump	Historic	Not Eligible
32WI1483	NW¼ SE¼ SW¼ Section 3, T153N, R99W	Stone Alignment	Prehistoric	Unevaluated
32WIX136	NE¼ SW¼ NW¼ Section 11, T155N, R99W	Site Lead – Cultural Material Scatter	Unknown	Unevaluated
32WIX627	NE¼ SW¼ SW¼ Section 23, T156N, R99W	Isolated Machinery	Unknown Historic	Not Eligible

SITS = Smithsonian Institute Trinomial System

NRHP = National Register of Historic Places

Table 3. Additional Previous Archaeological and Historic Studies within the 1-mile Study Area

Manuscript Number	Location	Title	Authors	Year
008670	Sections 16, 17, T156N, R100W	Cultural Resources Investigations Along U.S. Highway 2 in Ward, Mountrail, and Williams Counties, North Dakota	B. Perkl, B. Mitchell, J. Lindbeck, S. Buskey, R. Weddle, M. Beck, G. Bolling	2001
015167	Sections 17, 20–27, T156N, R100W; Sections 30, 31, T156N, R99W; Sections 1–6, T155N, R100W	A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota	M. Cox, C. Picka	2014

FIELDWORK METHODS

The inventory area consisted of a linear survey corridor, up to 150 feet wide, totaling 146.09 acres to compensate for the shifting of the centerline. Two block surveys totaling 1.20 acres were surveyed for the potential proposed facility sites. In total, 147.29 acres were inventoried for the project. Inventory was conducted by means of pedestrian survey transects spaced no more than 30 meters (m) apart. No subsurface testing was conducted. For a detailed discussion of the project survey methods and site evaluation, refer to Cox and Picka (2014).

INVENTORY RESULTS AND RECOMMENDATIONS

SWCA conducted a Class III inventory for the Little Muddy Creek pipeline reroute on September 2 and 3, 2014. Vegetation within the project area at the time of survey consisted of harvested wheat and canola fields with a few areas of mixed grass prairie, allowing for bare ground surface visibility of 0 to 40 percent. The surface soil across the project area is primarily brown silty loam residuum and glacial till. Impacts to the project area include heavy farming activities and oil and gas development, including the construction of a pipeline along the majority of the current survey area.

During the inventory, SWCA newly recorded an undocumented segment of the Great Northern Railroad (32WI481) and one isolated Knife River Flint biface (32WIX646). The resources are discussed in detail below. Copies of the North Dakota Cultural Resources Survey site forms are included in Appendix A (detached). Maps illustrating the location of the resources are included in Appendix B.

PREVIOUSLY RECORDED SITE

32WI481

Site Type:	Great Northern Railroad
Association:	1887–Present
Site Size:	74 by 33 feet (2,498.46 square feet)
NRHP Recommendation:	Eligible Non-Contributing
Management Recommendation/Project Effect:	Avoid, Horizontal Directional Drill/No Effect

Site Description and Previous Recording

32WI481 is a segment of the Great Northern Railroad, now owned and operated by Burlington Northern Santa Fe (BNSF), located on a gently rolling plain situated in an upland grassland ecosystem (Figures 2 and 3). Vegetation in the site area is sparse and consists only of small strands of wheatgrass on the berm, allowing for more than 95 percent bare ground surface visibility at the time of survey. However, the area surrounding the berm is heavily vegetated with mixed prairie grasses and forbs, allowing for less than 5 percent bare ground surface visibility. Surface soils consist of dark brown sandy clay loam overlain in most areas by granite gravels.



Figure 2. 32WI481 site overview, facing south.

Contains Privileged Information -- Do Not Release

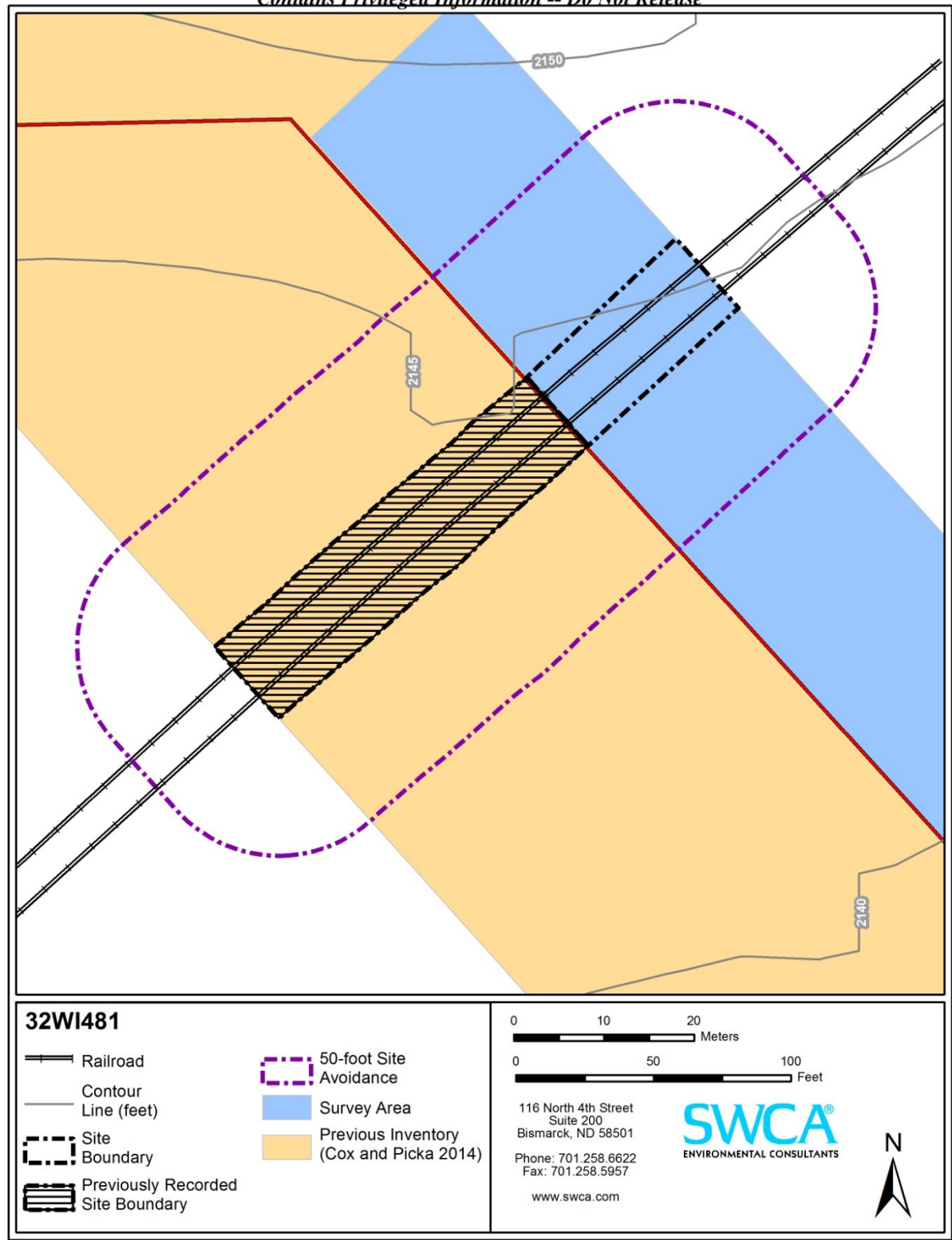


Figure 3. 32WI481 site sketch map.

A segment of the Great Northern Railroad, 32WI481, was first recorded in 2001 as part of the Williston to Charlie Creek 115-kilovolt transmission line project. Subsequent segments of 32WI481 were recorded in 2008, 2010, 2011, 2012, and 2013 for railroad improvements, additional transmission lines, and oil and gas development. Two segments of 32WI481 were previously recorded by SWCA in 2011, approximately 2.7 and 3.5 miles east of the new segment for the Colt Connector pipeline. In May 2014, SWCA recorded another segment of the railroad adjacent to the current segment for the initial survey for the Little Muddy Creek pipeline. That segment is described in Cox and Picka (2014).

Survey Results

SWCA newly recorded the segment of 32WI481 on September 3, 2014. It is immediately northeast of the segment recorded by SWCA in May 2014. The segment consists of a 74-foot northeast/southwest by 33-foot northwest/southeast section of railroad. The railroad itself is comprised of two sets of tracks set into a gravel ballasted berm. The ballast is made up of imported granite gravels and rises approximately 4 feet 6 inches above the surrounding ground surface. The crossties are treated lumber that measure 102 inches long by 9½ inches wide and are set into the gravel berm at approximately 1-foot intervals. The steel rails are 6½ inches tall with a 5½-inch web; the rail head is 3 inches wide and the rail foot is 6 inches wide. The rail sections are welded together (continuous welded rail) and attached to the crossties via rail spikes and baseplates set on top of the ties. The newly recorded portion of 32WI481 still follows its original alignment and retains excellent integrity in regard to setting, location, and feeling. Modernization and general maintenance of the berm, crossties, and rails have impacted the site's integrity with regard to materials, which, in turn, impacts the site's integrity of association and design.

Historical Background

An in depth history of the development of railroads in North Dakota, including the Great Northern Railroad, was compiled by Schmidt and Vermeer (2009) for North Dakota's NRHP railroad context and was used in the previous recordings of 32WI481. A review of Schmidt and Vermeer (2009) indicates that the segment of the Great Northern Railroad recorded by SWCA in 2014 was constructed in 1887. The rail line was part of the 545 miles of track laid from Minot, North Dakota, to Great Falls, Montana, completed in the latter part of 1887, as part of the Great Northern's transcontinental line.

NRHP Eligibility Recommendations

32WI481 is a previously recorded alignment consisting of the Williams County portion of the Great Northern Railroad main line and branch line corridors. In 2001, the site was recommended eligible for listing on the NRHP under Criterion A. Great Northern Railway operations in Williams County played an important role in opening up transportation to remote parts of the county and surrounding area. Additionally, the railroad did directly contribute to the development of the agricultural and livestock industries in the region and led to significant expansion of both industries. The Great Northern Railway played an important role in supporting the agriculture and cattle industry of northwestern North Dakota by providing access to both Euro-American and Canadian markets for goods. SWCA concurs with the previous findings and recommends 32WI481, as a whole, continue to be considered eligible for listing on the NRHP under Criterion A.

In accordance with established registration requirement (Schmidt and Vermeer 2009), North Dakota railroads are not typically considered eligible for nomination under Criterion B, because they were generally the product of corporations, rather than significant individuals (Schmidt and Vermeer 2009). SWCA found no exception to this guidance for 32WI481 and therefore recommends that the site be considered not eligible for nomination to the NRHP under Criterion B. Similarly, railroads in North Dakota are generally considered not eligible for nomination to the NRHP under Criterion C, because they are representative of existing technology well established in other parts of the country and therefore do not represent significant or distinguishable features that embody a distinct type of engineering or construction (Schmidt and Vermeer 2009). SWCA found no evidence that 32WI481 is an exception to this guidance and therefore recommends that the site be considered not eligible for nomination to the NRHP under Criterion C. The deposition on site and the lack of surface artifacts indicate that the site is unlikely to yield information important in history; therefore, the segment is recommended not eligible for inclusion to the NRHP under Criterion D.

Management Recommendations

The segment of 32WI481 is recommended as a contributing element to an NRHP-eligible resource; therefore, SWCA recommends that the site be avoided by 50 feet through the use of a horizontal directional drill beneath the site.

NEWLY RECORDED ISOLATED FIND

32WIX646

32WIX646 is a prehistoric isolated find located within a harvested wheat field in the Missouri Coteau region surrounded by a low, rolling plain. Little Muddy Creek is approximately 500 meters (m) to the north, and a small reservoir is approximately 100 m to the south. Within the harvested wheat field, ground surface visibility was approximately 80 percent at the time of recording. Surface soil is light brown silty loam residuum with abundant glacial till; however, deposition has been heavily disturbed by farming activities.

The isolated find consists of an early stage Knife River Flint biface measuring 80 by 70 by 25 millimeters (Figure 4). Heavy patination and cortex were observed. Flakes had only been removed along the edge of the tool; none extended into the middle. No evidence of use-wear or retouching was observed on the biface.

By definition, isolated finds are considered to lack integrity and are not eligible for the NRHP; therefore, 32WIX646 is not eligible for inclusion to the NRHP. No further work is recommended.



Figure 4. 32WIX646, biface.

CONCLUSIONS

SWCA conducted a Class III cultural resource inventory on September 2 and 3, 2014, in support of reroutes to the proposed Little Muddy Creek pipeline alignment. An update to the Class I cultural resource inventory was conducted on August 25, 2014. Meadowlark Midstream Company, LLC, proposes to construct the Little Muddy Creek pipeline on privately owned lands in Williams County, North Dakota.

The project area for the pipeline reroutes is located in Sections 17 and 20–25, T156N, R100W; Sections 30–33, T156N, R99W; and Sections 1–6, T155N, R99W. The inventory area consists of a non-overlapping linear survey corridor up to 150 feet wide, totaling 146.09 acres, to compensate for shifting the proposed centerline. Two blocks totaling 1.20 acres were surveyed for the potential proposed facility sites. In total, 147.29 acres were inventoried for the project. Portions of the currently proposed Little Muddy Creek pipeline reroute are located within areas previously inventoried for the original alignment of the Little Muddy Creek pipeline (Cox and Picka 2014).

During the inventory, SWCA newly recorded an undocumented segment of the Great Northern Railroad (32WI481) and one isolated Knife River Flint biface (32WIX646). 32WI481 was previously determined eligible for listing on the NRHP. SWCA recommends project disturbance avoid all potentially eligible and unevaluated resources by 50 feet. 32WI481 will be avoided through the use of a horizontal directional drill beneath the site. By definition, isolated finds are considered to lack integrity and are not eligible for the NRHP; therefore, 32WIX646 is not eligible for inclusion on the NRHP. No further work is recommended. With the above stipulations, it is recommended that a determination of *No Significant Sites Affected* and *No Historic Properties Affected* be granted for the project to proceed as planned.

REFERENCES CITED

Cox, Matthew, and Craig Picka

2014 *A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota*. Prepared by SWCA Environmental Consultants for E3 Environmental, LLC. Unpublished document submitted to the State Historical Society of North Dakota, Bismarck, North Dakota.

Schmidt, Andrew J., and Andrea C. Vermeer

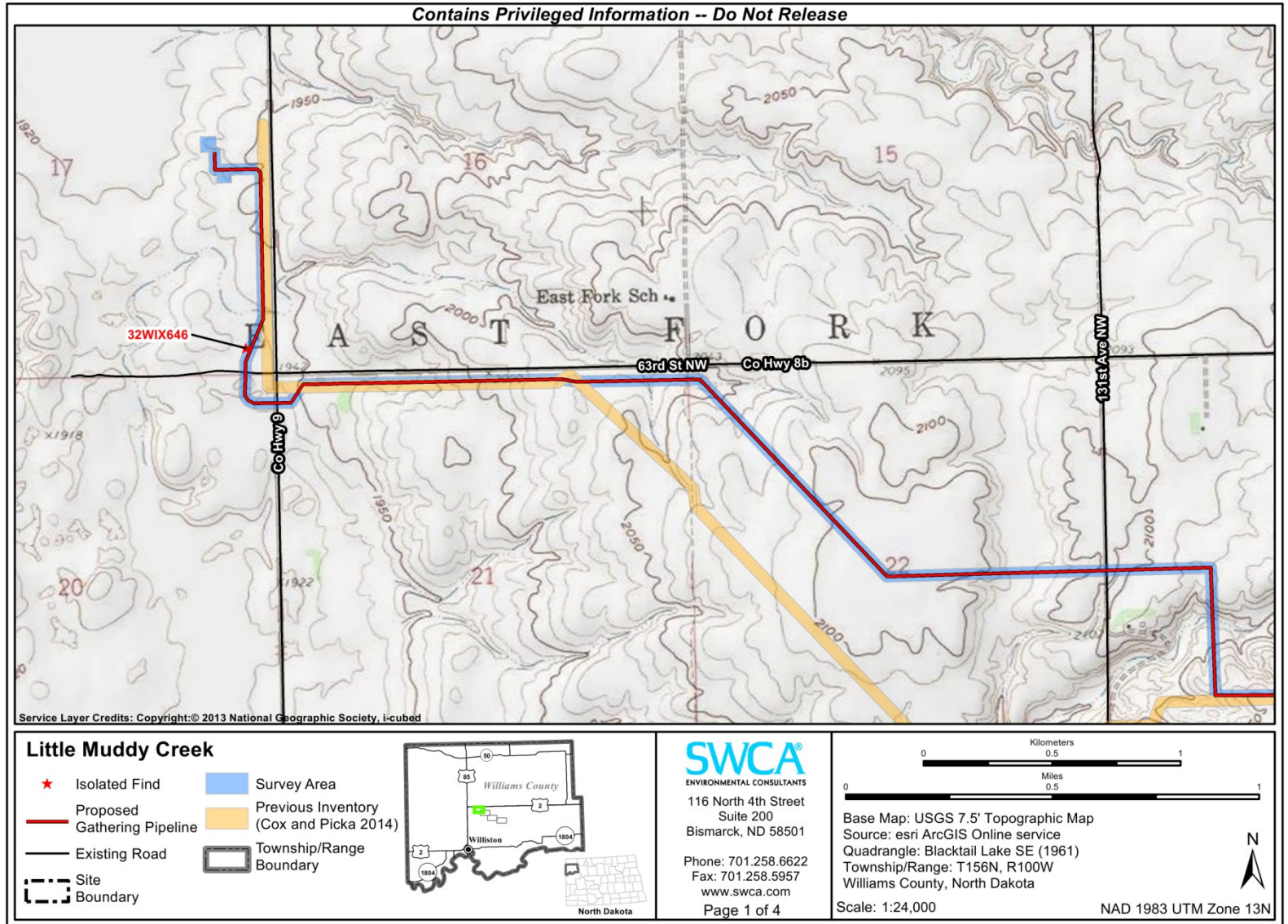
2009 *Railroads in North Dakota, 1872–1956*. Available at: <http://history.nd.gov/hp/historiccontexts.html>. Accessed September 9, 2014.

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**APPENDIX A
(Detached)
North Dakota Site Forms**

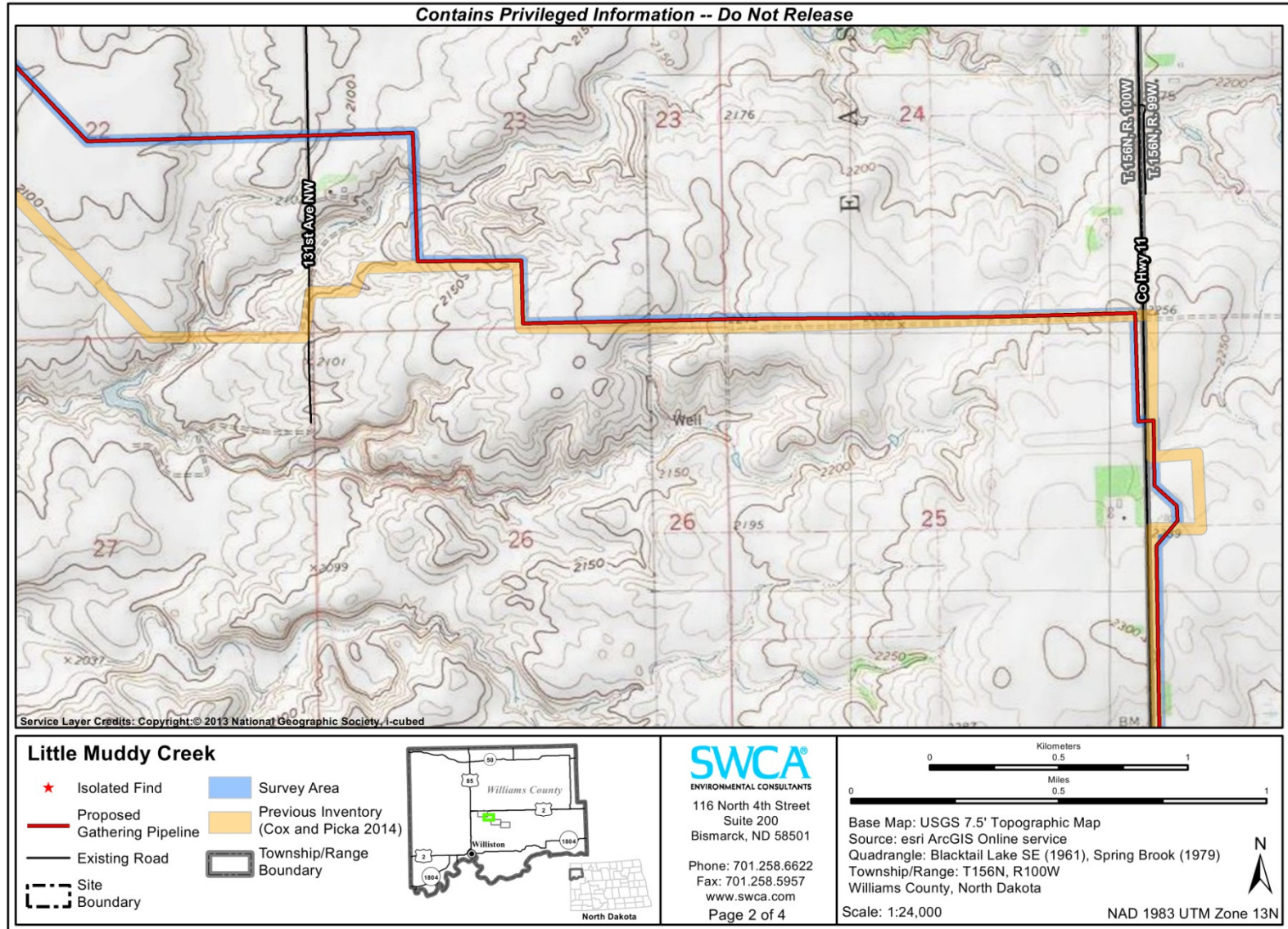
APPENDIX B
Resource Location Maps

Addendum to A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota, for Pipeline Alignment Reroutes and Two Potential Facility Sites



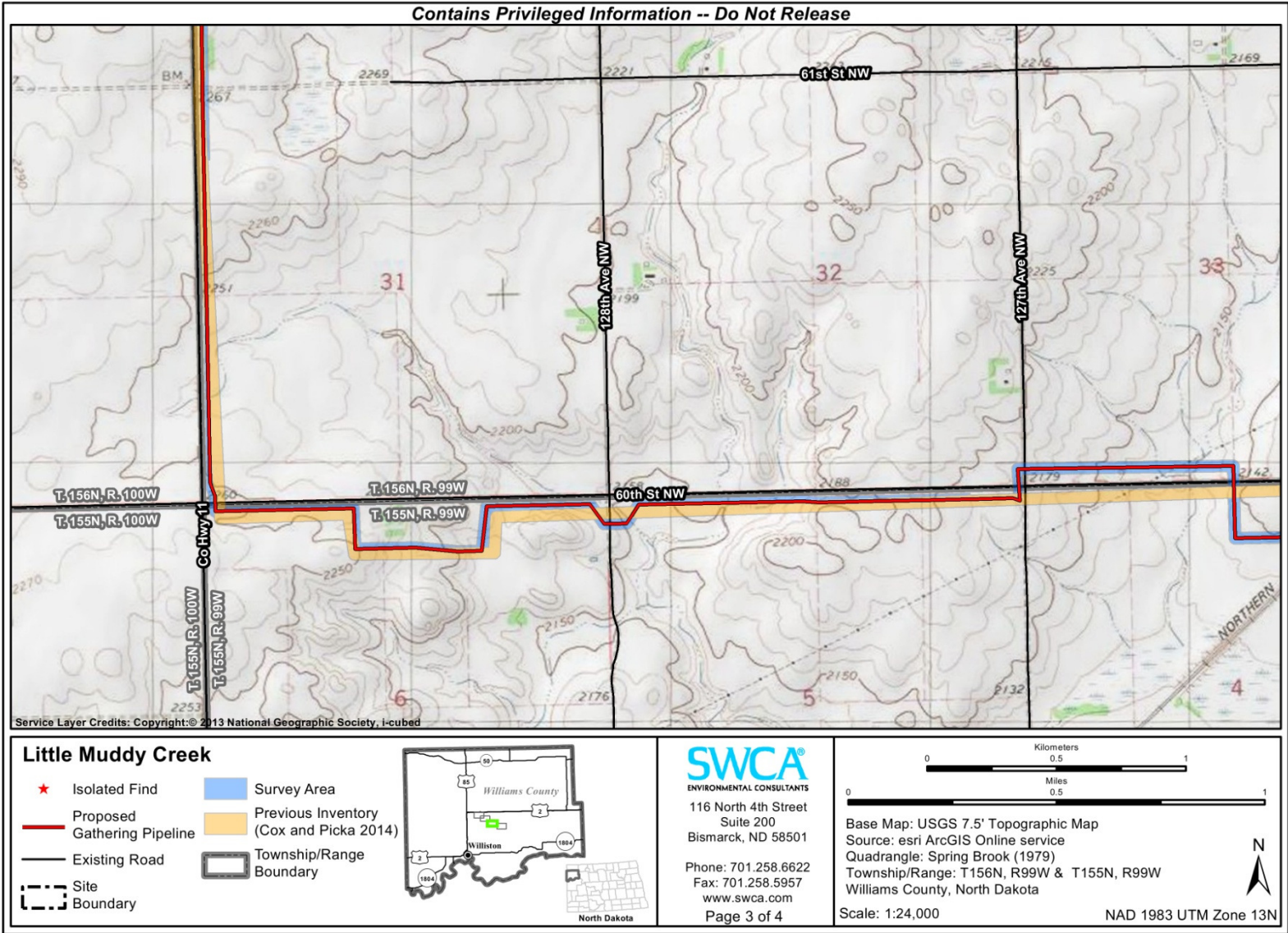
Resource location map at 1:24,000-scale, map 1 of 4.

Addendum to A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota, for Pipeline Alignment Reroutes and Two Potential Facility Sites



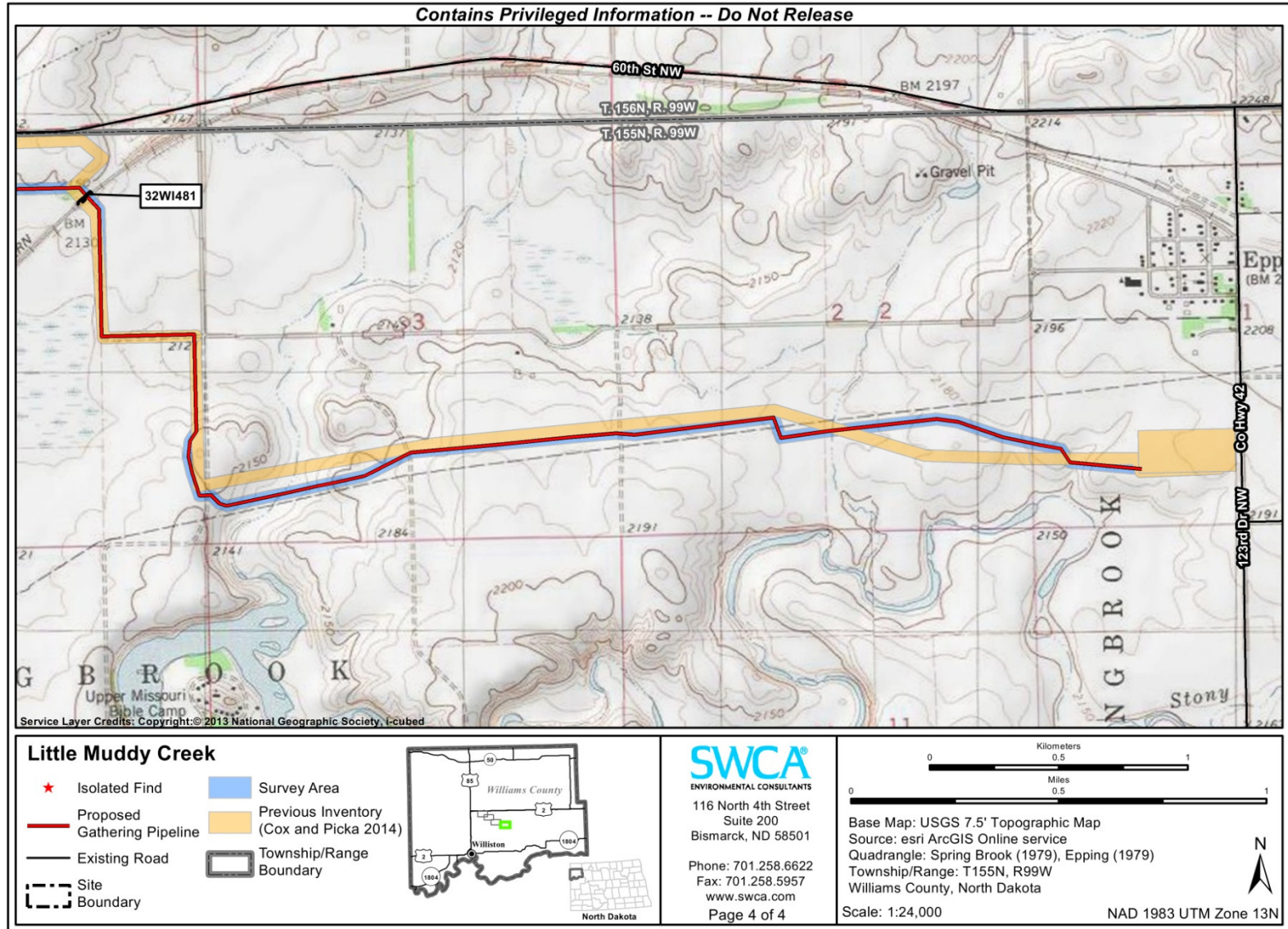
Resource location map at 1:24,000-scale, map 2 of 4.

Addendum to A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota, for Pipeline Alignment Reroutes and Two Potential Facility Sites



Resource location map at 1:24,000-scale, map 3 of 4.

Addendum to A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota, for Pipeline Alignment Reroutes and Two Potential Facility Sites



Resource location map at 1:24,000-scale, map 4 of 4.



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A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota

Prepared for

E3 Environmental, LLC

Prepared by

SWCA Environmental Consultants

May 2014



MANUSCRIPT DATA RECORD FORM

1. Manuscript Number:
2. SHPO Reference #:
3. Author(s): Matthew Cox and Craig Picka
4. Title: A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline, Williams County, North Dakota
5. Report Date: May 30, 2014
6. Number of Pages: 84
7. Type – I, T, E, O: I
8. Acres: 269.58
9. Legal Location(s) (no quarter sections) with Historic Context Study Unit(s):
Consult the township tables in *The North Dakota Comprehensive Plan for Historic Preservation: Archeological Component*, (SHSND 2009; available online at http://history.nd.gov/hp/stateplan_arch.html) for Study Unit assignments.
Study Units: LM, CB, KN, HE, SM, GA, JA, GR, NR, SR, SO, SH, YE

<u>COUNTY</u>	<u>TWP</u>	<u>RNG</u>	<u>SEC</u>	<u>SU</u>
Williams	155N	99W	1, 2, 3, 4, 5, 6	GA
Williams	156N	99W	30, 31	GA
Williams	156N	100W	17, 20, 21, 22, 23, 24, 25, 26, 27	GA

**A Class I and Class III Cultural Resource Inventory of the
Little Muddy Creek Pipeline, Williams County, North Dakota**

Submitted to:

State Historical Society of North Dakota

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SWCA Cultural Resource Report No. 14-223

May 30, 2014

ABSTRACT

SWCA Environmental Consultants (SWCA) conducted a Class I and Class III cultural resource inventory on behalf of E3 Environmental, LLC (E3) in support of the Little Muddy Creek Pipeline project. The proposed Little Muddy Creek Pipeline is approximately 14.6 miles long and would occur on privately owned and state trust lands in Williams County, North Dakota. The project is in Sections 17 and 20–27, Township (T) 156 North (N), Range (R) 100 West (W); Sections 30–31, T156N, R99W; and Sections 1–6, T155N, R99W.

The only regulatory agencies to be involved are 1) the North Dakota Public Service Commission (NDPSC) under the North Dakota Energy Conversion and Transmission Facility Siting Act (excluding any applicable county or local requirements), and 2) the U.S. Army Corps of Engineers (USACE) through Section 404 of the Clean Water Act (CWA), which regulates discharge into waters of the U.S. regulated by the USACE. Therefore, SWCA's Class I and III inventory of the project area assists E3 in meeting the cultural resource requirements within the NDPSC's Certificate of Corridor Compatibility and Route Permit application. Additionally, SWCA's inventory assisted E3 in achieving compliance with Section 404 of the CWA, including the Nationwide Permit General Conditions pertaining to Section 106 of the National Historic Preservation Act and the Endangered Species Act (ESA).

The Class I inventory was conducted for the Little Muddy Creek Pipeline on April 22, 2014. The Class III inventory was conducted for the Little Muddy Creek Pipeline on April 23–25, 2014. The pipeline was surveyed with a 150-foot-wide survey corridor centered on the proposed pipeline centerline. SWCA surveyed 14.15 miles (254.13 acres) for the Little Muddy Creek Pipeline. In addition to the proposed pipeline alignment, SWCA also conducted an inventory of the proposed Epping Compressor Station at the eastern terminus of the Little Muddy Creek Pipeline, consisting of a 15.45-acre survey block. In total, 269.58 acres were inventoried for the proposed pipeline location.

During the inventory, SWCA attempted to relocate one previously recorded isolated find (32WIX572); and newly recorded an isolated piece of farm equipment (32WIX627) and an undocumented segment of the Great Northern Railroad (32WI481). The newly recorded isolated find, 32WIX627, is the remains of a Deering harvester.

By definition, isolated finds are considered to lack integrity and are not eligible for the National Register of Historic Places (NRHP); therefore, 32WIX572 and 32WIX627 are not eligible for inclusion to the NRHP. 32WI481 had previously been determined eligible for listing to the NRHP. SWCA recommends project disturbance avoid all potentially eligible and unevaluated resources by 50 feet. 32WI481 will be avoided through the use of a horizontal directional drill beneath the site. With the above stipulations, it is recommended that a determination of *No Significant Sites Affected* and *No Historic Properties Affected* be granted for the project to proceed as planned.

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INTRODUCTION

SWCA Environmental Consultants (SWCA) conducted a Class I and Class III cultural resource inventory on behalf of E3 Environmental, LLC (E3) in support of the Little Muddy Creek Pipeline project, a 14.15-mile-long proposed pipeline and the associated Epping Compressor Station on private lands in Williams County, North Dakota (Figures 1a–1e). Legal locations of the project area are in Table 1.

The only regulatory agencies to be involved are the North Dakota Public Service Commission (NDPSC) under the North Dakota Energy Conversion and Transmission Facility Siting Act (excluding any applicable county or local requirements), and the U.S. Army Corps of Engineers (USACE) through Section 404 of the Clean Water Act (CWA), which regulates discharge into waters of the U.S. regulated by the USACE. Therefore, SWCA’s Class I and III inventory of the project area assists E3 in meeting the cultural resource requirements within the NDPSC’s Certificate of Corridor Compatibility and Route Permit application. Additionally, SWCA’s inventory assisted E3 in achieving compliance with Section 404 of the CWA, including the Nationwide Permit General Conditions pertaining to Section 106 of the National Historic Preservation Act (NHPA) and the Endangered Species Act.

The pipeline was surveyed with a 150-foot-wide survey corridor centered on the proposed pipeline centerline. SWCA surveyed 14.15 miles (254.13 acres) for the Little Muddy Creek Pipeline. In addition to the proposed pipeline alignment, SWCA also conducted an inventory of the proposed Epping Compressor Station at the eastern terminus of the Little Muddy Creek Pipeline, consisting of a 15.45-acre survey block. In total, 269.58 acres were inventoried for the proposed pipeline location.

For the cultural resource investigation, William Harding served as principal investigator. Fieldwork was conducted by Matthew Cox and Trey Dunagan (SWCA archaeologists) on April 23-25, 2014. All field notes and photographs are on file at SWCA’s Bismarck, North Dakota, office under project number 28755.

Table 1. Project Area Legal Locations in Williams County, North Dakota

Township	Range	Section	Aliquots
155N	99W	1	N ¹ / ₂ SW ¹ / ₄ SW ¹ / ₄ , SE ¹ / ₄ SW ¹ / ₄
		2	S ¹ / ₂ N ¹ / ₂ SW ¹ / ₄ , SW ¹ / ₄ NW ¹ / ₄ SE ¹ / ₄ , N ¹ / ₂ SW ¹ / ₄ SE ¹ / ₄ , N ¹ / ₂ SE ¹ / ₄ SE ¹ / ₄
		3	N ¹ / ₂ SW ¹ / ₄ SW ¹ / ₄ , N ¹ / ₂ SE ¹ / ₄ SW ¹ / ₄ , N ¹ / ₂ SW ¹ / ₄ SE ¹ / ₄ , SW ¹ / ₄ NE ¹ / ₄ SE ¹ / ₄ , NW ¹ / ₄ SE ¹ / ₄ SE ¹ / ₄ , S ¹ / ₂ NE ¹ / ₄ SE ¹ / ₄
		4	N ¹ / ₂ N ¹ / ₂ NW ¹ / ₄ , NW ¹ / ₄ NE ¹ / ₄ , NW ¹ / ₄ NE ¹ / ₄ NE ¹ / ₄ , E ¹ / ₂ SW ¹ / ₄ NE ¹ / ₄ , SE ¹ / ₄ NE ¹ / ₄ , E ¹ / ₂ E ¹ / ₂ SE ¹ / ₄
		5	N ¹ / ₂ N ¹ / ₂ N ¹ / ₂
		6	N ¹ / ₂ N ¹ / ₂ N ¹ / ₂
156N	99W	30	SW ¹ / ₄ SW ¹ / ₄ NW ¹ / ₄ , W ¹ / ₂ W ¹ / ₂ SW ¹ / ₄
		31	W ¹ / ₂ W ¹ / ₂ W ¹ / ₂
156N	100W	17	E ¹ / ₂ SE ¹ / ₄ NE ¹ / ₄ , E ¹ / ₂ SE ¹ / ₄ SE ¹ / ₄

*A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline,
Williams County, North Dakota*

Township	Range	Section	Aliquots
		20	NE ¹ / ₄ NE ¹ / ₄ NE ¹ / ₄
		21	N ¹ / ₂ N ¹ / ₂ NW ¹ / ₄ , N ¹ / ₂ NW ¹ / ₄ NE ¹ / ₄ , NE ¹ / ₄ NE ¹ / ₄ NE ¹ / ₄ , SE ¹ / ₄ NE ¹ / ₄
		22	SW ¹ / ₄ NW ¹ / ₄ , NE ¹ / ₄ NW ¹ / ₄ SW ¹ / ₄ , SW ¹ / ₄ NE ¹ / ₄ SW ¹ / ₄ , NE ¹ / ₄ SE ¹ / ₄ SW ¹ / ₄ , S ¹ / ₂ S ¹ / ₂ SE ¹ / ₄
		23	S ¹ / ₂ S ¹ / ₂ SW, S ¹ / ₂ S ¹ / ₂ SE ¹ / ₄
		24	S ¹ / ₂ S ¹ / ₂ S ¹ / ₂
		25	N ¹ / ₂ N ¹ / ₂ N ¹ / ₂
		26	NE ¹ / ₄ NE ¹ / ₄ NW ¹ / ₄ , N ¹ / ₂ N ¹ / ₂ NE ¹ / ₄
		27	N ¹ / ₂ N ¹ / ₂ NE ¹ / ₄

*A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline,
Williams County, North Dakota*

Contains Privileged Information -- Do Not Release

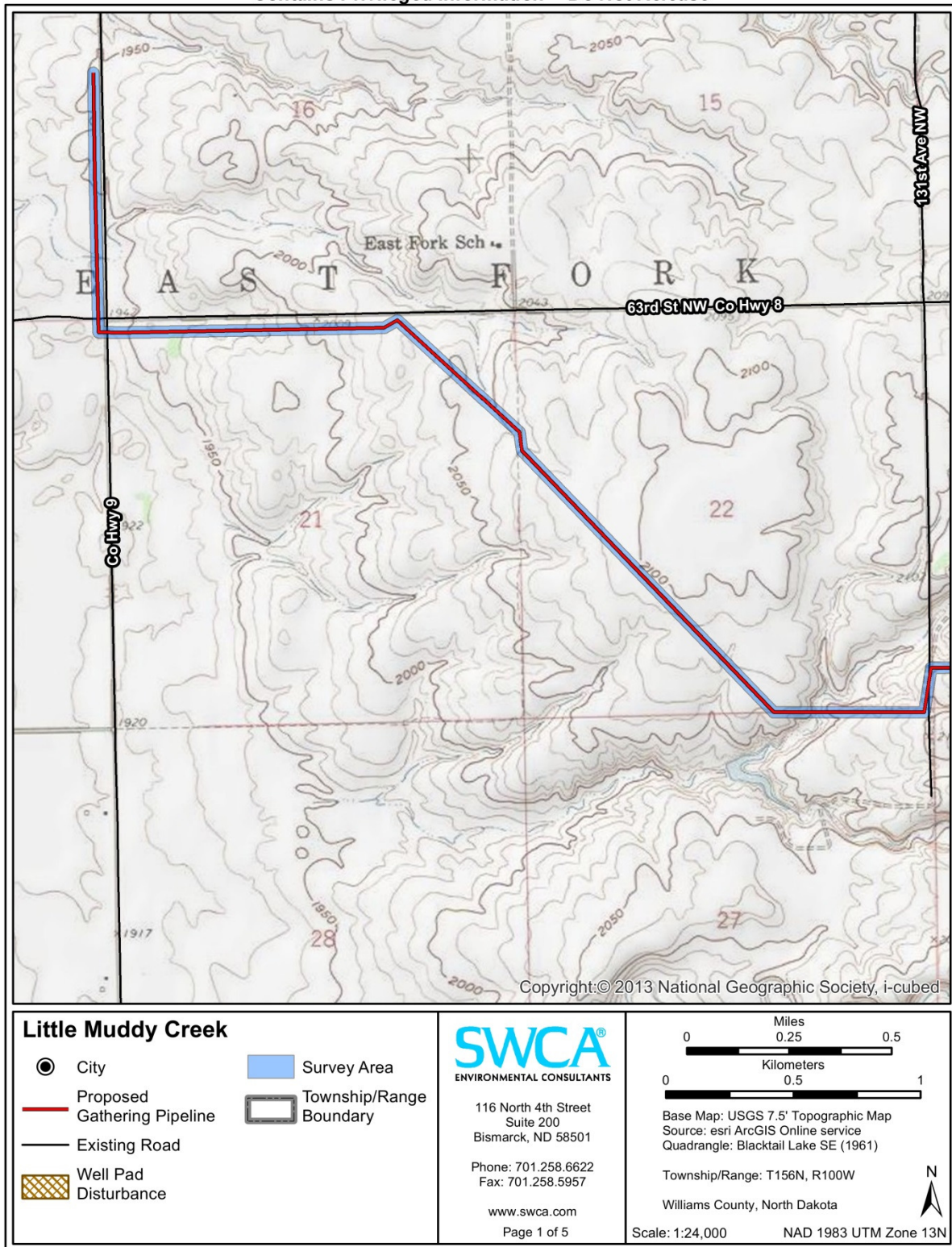


Figure 1a. Project area map 1 of 5 at 1:24,000 scale.

*A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline,
Williams County, North Dakota*

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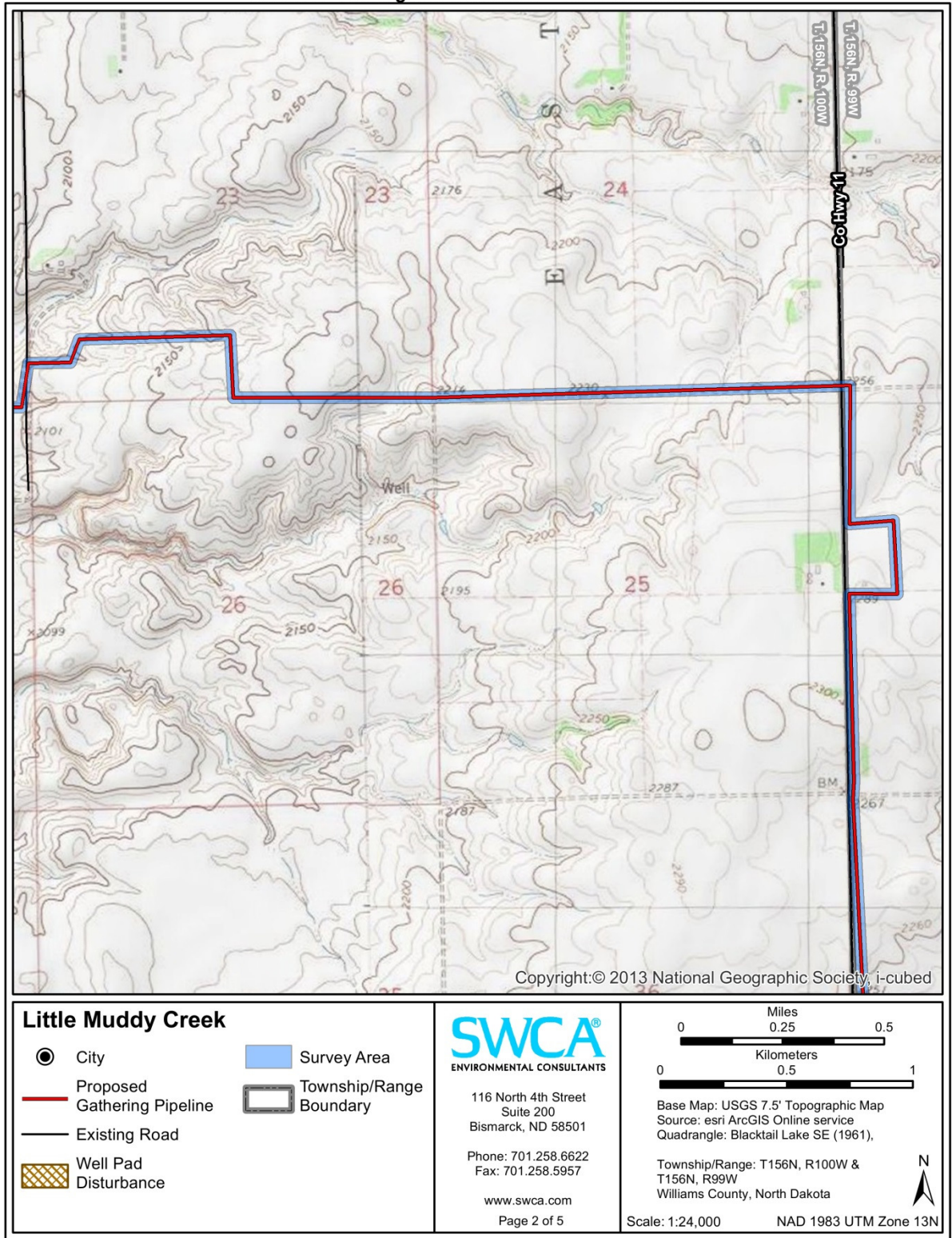


Figure 1b. Project area map 2 of 5 at 1:24,000 scale.

*A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline,
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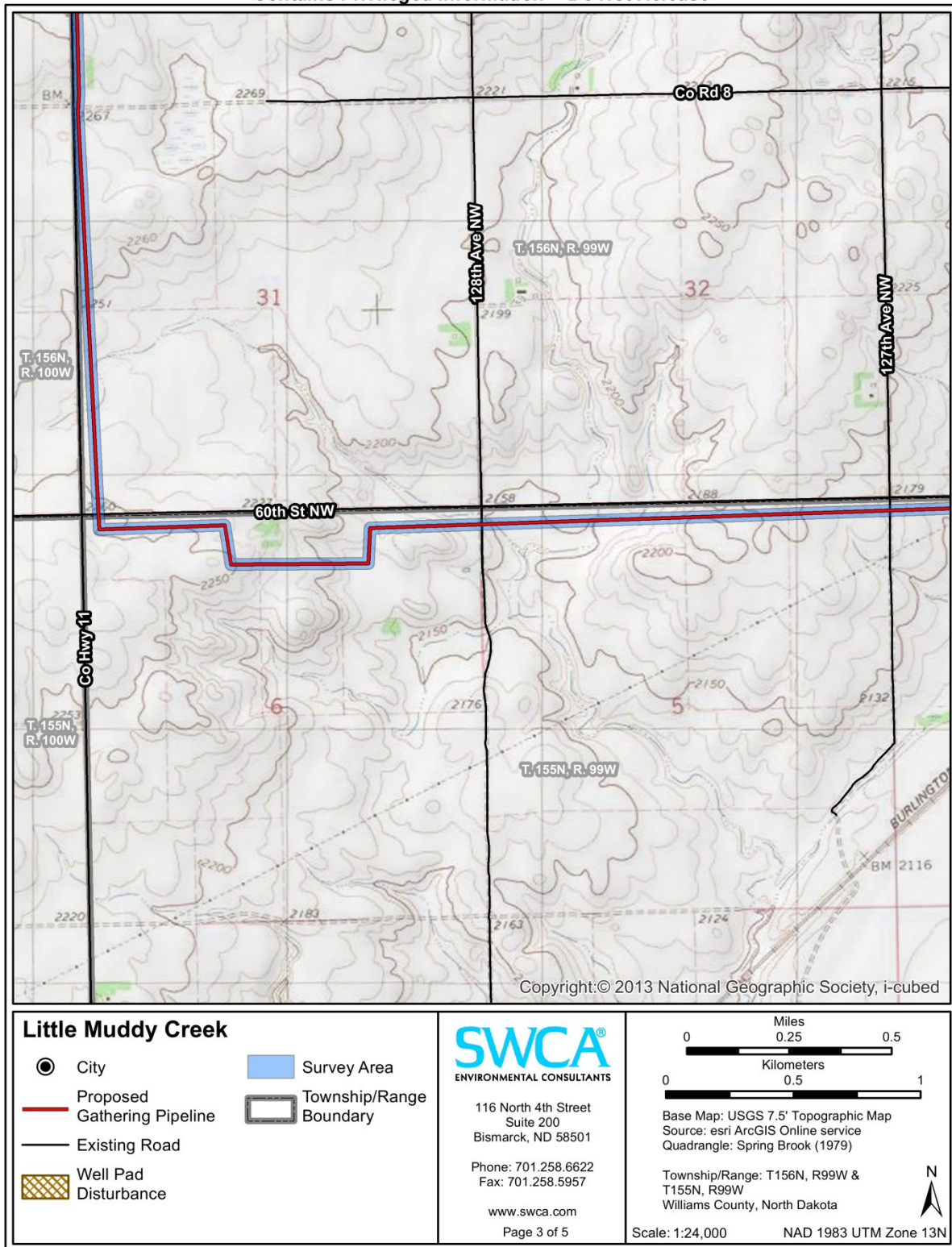


Figure 1c. Project area map 3 of 5 at 1:24,000 scale.

A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline,
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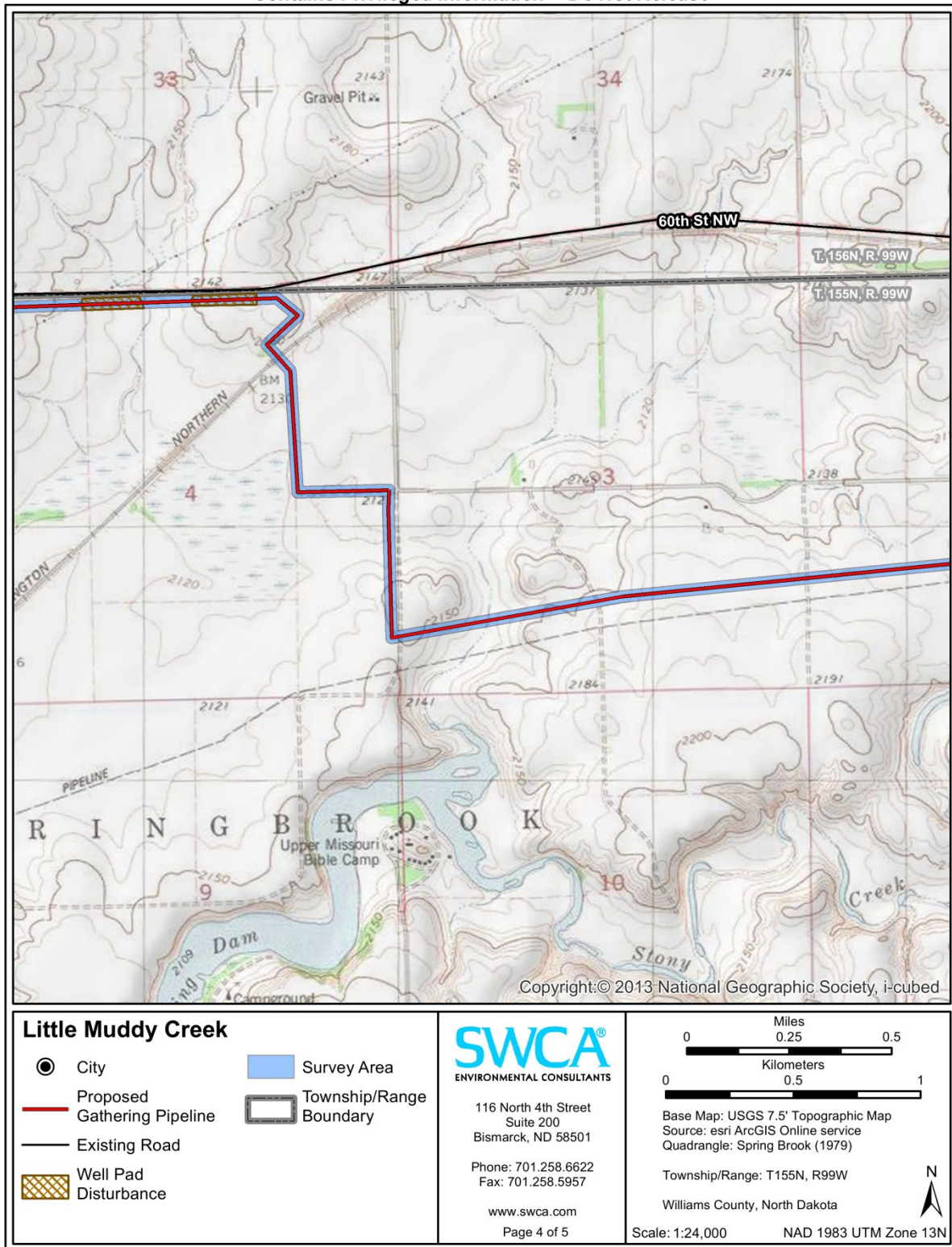


Figure 1d. Project area map 4 of 5 at 1:24,000 scale.

A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline,
Williams County, North Dakota

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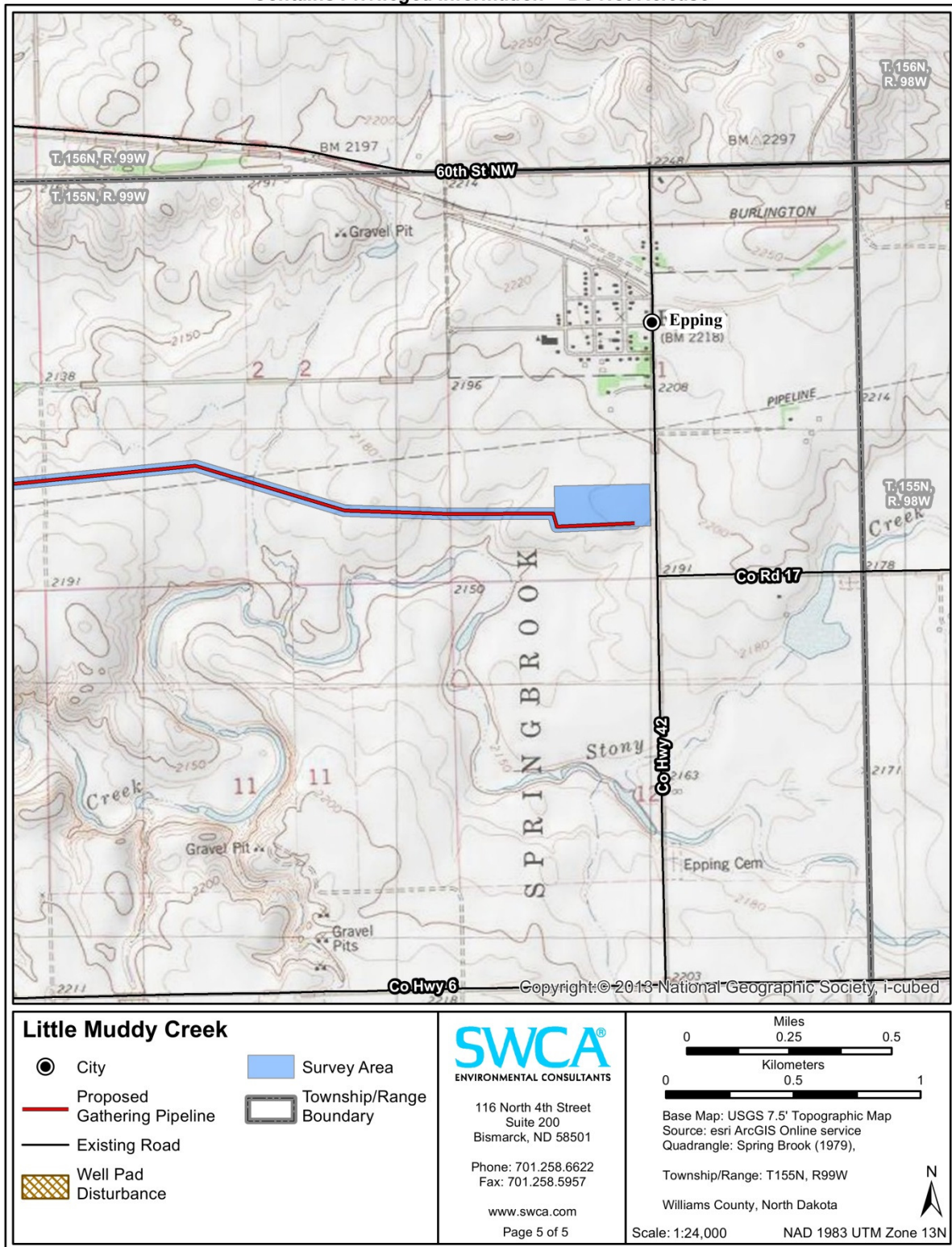


Figure 1e. Project area map 5 of 5 at 1:24,000 scale.

PROJECT SETTING

TOPOGRAPHY

The project area is in the Glaciated Dark Brown Prairie ecoregion of the Northwest Glaciated Plains in the Great Plains physiographic province in northwest North Dakota (Bryce et al. 1998). This physiographic province is characterized by glaciated old plateaus and isolated mountains (Fenneman 1931). The Glaciated Dark Brown Prairie is described as a level to gently rolling plain that descends to the Missouri River with established drainage patterns and a discernible lack of wetlands (Bryce et al. 1998). This ecoregion contains a high content of glacial till soils over tertiary sandstone and shale and a defined drainage pattern and is affected by Wisconsin stage glaciation (Bryce et al 1998). The project alignment is largely within cultivated agricultural fields, in flat to gently rolling uplands (Figure 2). The elevation in the project area ranges from approximately 1,950 to 2,300 feet, with the highest elevations in the central portions of the project area.



Figure 2. Project overview depicting general topography of the project area, facing west.

CLIMATE

The climate for northwest North Dakota is temperate. Based on climatic data collected from Williston Sloulin AP, North Dakota, between 1971 and 2000, January is the coldest month, with a mean daily temperature of 8.0 degrees Fahrenheit (°F), whereas July is the warmest month, with a mean daily temperature of 69.3°F (National Climatic Data Center [NCDC] 2014). Temperature extremes on record range from -50°F at the coldest to 109°F at the warmest. On average, 146 days are frost-free (28°F or above); the average date of the first fall frost is September 29 and the average date of the last spring frost is May 5 (North Dakota Agricultural Statistics Service 2011). Per annum, Williston Sloulin AP receives 14.16 inches

of precipitation (NCDC 2014). The wettest month is June, with an average of 2.36 inches of precipitation received; February is the driest, with only 0.39 inch of precipitation received on average. Forty-three inches of snow are received annually, on average, with the highest accumulations (8.3 inches, on average) received in January (NCDC 2014). The highest monthly snowfall on record occurred in April, at which time 30.9 inches of snow fell. Overall, northwest North Dakota, like much of the northwestern Great Plains, is characterized by a moderate to cool climate, with cold, dry winters and mild to warm, dry to moderately wet summers.

HYDROLOGY

Several very small, unnamed drainages crisscross the project area. The western portion of the project area drains into the Little Muddy River, approximately 2.5 miles west/southwest of the survey area. The eastern portion of the project area drains into Stony Creek, 1.4 miles south of the survey area. Stony Creek drains into the Little Muddy River approximately 12.6 miles southwest of the project area. In turn, the Little Muddy River empties into the Lake Sakakawea portion of the Missouri River approximately 13.5 miles from the project area.

GEOLOGY

In general, the geology of the project area is characterized by the Holocene- to Pleistocene-aged Glacial Sediment draped over pre-existing topography formation. The Glacial Sediment formation consists of an unbedded, unsorted mixture of clay, silt, sand, and pebbles, and a few cobbles and boulders, and is at least 100 feet (30 meters [m]) thick (Clayton 1980). The primary rock type is compacted clay or mud. Within drainage crossings, soils transition to a Coleharbor Formation River Sediment (Clayton 1980). These sediments are primarily sandy and are distributed by collapsing river banks and alluvial transport.

SOILS

Twenty-five soil series are present in the project area (Natural Resources Conservation Service 2014). The soil types found in the project area range from excessively drained sandy and gravelly glaciofluvial deposits found on hills, knolls, and ridges to very poorly drained alluvium found on depressions and flats. The project area is dominated by two soil types, Williams-Bowbells loams and Williams-Zahl-Zahill complex, both of which are well-drained fine loamy tills found on rises and knolls. Table 2 summarizes the soils within the project area in order of prevalence.

Table 2. Summary of Soil Series within the Project Area.

Soil Series	Parent Material	Drainage	Slope	Landform
Williams-Bowbells loams	Fine-loamy till	Well drained	0%–6%	Rises
Williams-Zahl-Zahill complex	Fine-loamy till	Well drained	6%–9%	Knolls
Williams-Zahl loams	Glacial till	Well drained	3%–9%	Ridges, knolls, till plains
Livona fine sandy loam	Eolian deposits over fine-loamy till	Well drained	0%–6%	Rises

*A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline,
Williams County, North Dakota*

Soil Series	Parent Material	Drainage	Slope	Landform
Zahl-Williams loams	Fine-loamy till	Well drained	9%–15%	Hills, ridges
Appam sandy loam	Sandy and gravelly glaciofluvial deposits	Somewhat excessively drained	0%–6%	Rises
Vallers loam saline	Fine-loamy till	Poorly drained	0%–1%	Depressions, flats
Wildrose silty clay	Clayey glaciolacustrine deposits	Well drained	0%–2%	Flats
Livona-Zahl complex	Eolian deposits over fine-loamy till	Well drained	6%–9%	Rises
Lehr loam	Glaciofluvial deposits	Somewhat excessively drained	2%–6%	Rises
Wabek-Lehr complex	Sandy and gravelly glaciofluvial deposits	Excessively drained	6%–9%	Knolls
Arnegard loam	Fine-loamy till	Well drained	0%–6%	Swales
Tally fine sandy loam	Coarse-loamy glaciofluvial deposits	Well drained	0%–6%	Terraces, alluvial flats
Parnell silty clay loam	Alluvium	Very poorly drained	0%–1%	Depressions
Lihen-Blanchard loamy find sands	Sandy alluvium derived from sedimentary rock	Excessively drained	6%–15%	Hills, ridges, knolls
Zahl-Max loams	Fine-loamy till	Well drained	15%–25%	Ridges
Wabek sandy loam	Sandy and gravelly glaciofluvial deposits	Excessively drained	6%–25%	Ridges
Lehr-Williams loams	Glaciofluvial deposits	Somewhat excessively drained	0%–6%	Rises
Dooley fine sandy loam	Eolian over glacial till	Well drained	0%–6%	Flats, rises
Livona-Zahl-Zahill complex	Eolian deposits over fine-loamy till	Well drained	6%–9%	Rises
Zahl-Max-Arnegard loams	Fine-loamy till	Well drained	15%–60%	Ridges
Williams-Zahl-Parnell complex	Fine-loamy till	Well drained	0%–9%	Rises
Parshall-Tally fine sandy loams	Coarse-loamy alluvium	Well drained	0%–6%	Swales
Shambo loam	Fine-loamy alluvium derived from sedimentary rock	Well drained	0%–2%	Stream terraces, alluvial flats
Hamerly-Tonka complex	Fine-loamy till	Somewhat poorly drained	0%–3%	Flats

Source: Natural Resources Conservation Service (2014).

FLORA AND FAUNA

The project area falls into the Glaciated Dark Brown Prairie ecoregion characterized by level to gently sloping rolling plains. Native vegetation in the area includes such species as western wheatgrass (*Pascopyrum smithii*), needle-and-thread grass (*Hesperostipa comata*), blue grama (*Bouteloua gracilis*), and green needlegrass (*Nassella viridula*), with little bluestem (*Schizachyrium scoparium*) and silver sagebrush (*Artemisia cana*) on thin and droughty soils (Bryce et al. 1998). Much of the inventory area is within cultivated agricultural fields containing mainly wheat stubble (Figure 3).



Figure 3. Overview of cultivated agricultural fields in the project area, facing northwest.

Approximately 160 wildlife species are resident or seasonal visitors to the Missouri River ecosystem, and hundreds of native fish species live in the mainstream and tributaries. Some of the animal species that would have been common and available for human use in the Missouri River Valley area—both prehistorically and historically—include fur-bearing mammals such as beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), eastern cottontail (*Sylvilagus floridanus*), elk (*Cervus canadensis*), moose (*Alces alces*), mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), pronghorn (*Antilocapra americana*), and bison (*Bison bison*), as well as bird and waterfowl species such as mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), sharp-tailed grouse (*Tympanuchus phasianellus campestris*), golden eagle (*Aquila chrysaetos*), and bald eagle (*Haliaeetus leucocephalus*) (Seabloom et al. 1978). At present, one federally listed threatened species resides in the area—piping plover (*Charadrius melodus*)—and three federally listed endangered species inhabit the area including the least tern (*Sternula antillarum*), whooping crane (*Grus americana*), and gray wolf (*Canis lupus*) (U.S. Fish and Wildlife Service 2014). Additionally, Sprague’s pipit (*Anthus spragueii*) resides in the area and is a federal candidate for endangered species listing (U.S. Fish and Wildlife Service 2014).

ENVIRONMENTAL CONSTRAINTS

Preservation of archaeological materials within in or adjacent to the project area has been affected largely by erosion, including ongoing aeolian and hydrological processes, and rodent burrowing. Secondary sources of impact to archaeological resources include agricultural development and livestock grazing. Some oil and gas development has occurred in the proximity of the project area, and is presently increasing as demand for domestic energy sources has grown in recent years. In some places, these varied land uses have resulted in increased ground visibility and removal of overburden, allowing for the identification of numerous sites and an interpretation of high site density. In other cases, though, it has simply removed the archaeological materials and resulted in an interpretation of low site densities. In combination, these factors may have disrupted the contexts of a moderate percentage of cultural materials.

CULTURAL/HISTORICAL OVERVIEW

PREHISTORIC CONTEXTS

The following discussion incorporates a variety of sources to develop a prehistoric overview for the work conducted for this project and includes information from the Garrison Study Unit (GSU) in which the project area is located (Gregg and Bleier 2008). As of 2007, 3,303 archaeological sites were identified in the GSU, the majority of which were identified on ridges (40.5 percent); hills, bluffs, and knolls (24.0 percent); and terraces (10.4 percent) (Gregg and Bleier 2008).

Paleoindian Tradition (ca. 11,500–7,900 years before present [B.P.]

Although speculation exists regarding the possibility of earlier habitation of the Great Plains, the Paleoindian tradition is the oldest of the region, and, in general, is associated with a hunting and gathering adaptation (Gregg 1985). The Paleoindian tradition is subdivided here into six main complexes: Clovis, Goshen, Folsom, Hell Gap/Agate Basin, Alberta/Cody, and Parallel Oblique Flaked. Fourteen Paleoindian archaeological resources have been identified in the GSU (Gregg and Bleier 2008). Paleoindian sites in the GSU include, but are not limited to, the Beacon Island site (32MN234A), the Beacon Island Agate Basin site (32MN234), the Moe site (32MN101), and 32ME946.

The Clovis complex (ca. 11,500–10,800 B.P.), defined by large, fluted lanceolate projectile points, is the earliest unequivocal complex in North America. Clovis artifacts have been found with megafauna, such as mammoth, in buried contexts in the Southwest and Great Plains (Grayson and Meltzer 2002); although megafauna were probably dietary constituents, it is debated to what degree Early Paleoindians pursued large game (Cannon and Meltzer 2004; Grayson and Meltzer 2002). In the South Dakota Badlands, the Lange-Ferguson site yields the best evidence for proboscidean exploitation (Hannus 1990). Here, modified mammoth bones are directly associated with a flake, and three projectile points were recovered from deposits similar to those containing mammoth, indicating that Clovis hunter-gatherers either killed the animals or scavenged their carcasses (Hannus 1990). Skeletal remains from a single mammoth were unearthed during building construction in 1988 near Powers Lake within the GSU. These remains were shallowly buried, were not radiocarbon dated, and were not

appraised for the potential of associated cultural remains (Gregg and Bleier 2008). Few Clovis sites have been recorded in the region. Clovis artifacts were recovered from two sites; a single Clovis point base was recovered from 32ME946 (Floodman 1988), and Clovis points have been recovered from the Beacon Island Agate Basin site (Ahler 2003).

Goshen (ca. 10,900–10,100 B.P.) is a technological complex first identified at Hell Gap, Wyoming (Irwin 1967, 1971), but it is also found at Mill Iron, Montana, Carter-Kerr/McGee, Wyoming, and the Jim Pitts site, located in the South Dakota Black Hills (Sellet 2001). Goshen is poorly understood—the basally thinned, unfluted projectile points share affinities with both Clovis and Folsom, but are also similar to Southern Plains Plainview points. In stratified deposits, Goshen materials typically underlie Folsom (Frison et al. 1996). Plainview or Goshen points were recovered from the Moe site in the GSU (Gregg and Bleier 2008).

The Folsom complex (ca. 10,900–10,200 B.P.) is typified by distinctive fluted lanceolate projectile points. With most large grazers extinct by Folsom times and grasslands dominating the Great Plains, bison populations flourished, providing resources for Folsom hunters (Frison 1991). However, many high-elevation Folsom sites also demonstrate broad diets of diverse small prey (Hill 2007). Probable structures recorded at the Mountaineer and Barger Gulch sites in Colorado suggest long-term occupations in mountain settings (Stiger 2006; Surovell and Waguespack 2007). In North Dakota, there are numerous documented Folsom sites (Gregg 1985), including the Bobtail Wolf (32DU955A), Big Black (32DU955C), and Young-Man-Chief (32DU955D) sites (Root 2000; Shifrin 2000; William 2000). These sites are interpreted as camps, quarries, and lithic workshops where Knife River flint was procured and used for tool production. In the GSU, Folsom points were recovered from the Moe (32MN101) and Beacon Island Agate Basin (32MN234) sites (Gregg and Bleier 2008).

Both the Agate Basin (ca. 10,500–10,000 B.P.) and Hell Gap (ca. 10,000–9,500 B.P.) technocomplexes are typified by lanceolate projectile points with thick lenticular cross-sections (Frison 1991). Based on morphological similarities and stratigraphic evidence, Hell Gap is technologically descended from Agate Basin. Agate Basin and Hell Gap hunter-gatherers were probably specialized bison hunters. Sites like Agate Basin II (Hill 2001) and Casper (Todd et al. 1997) indicate more frequent extraction of marrow and within-bone nutrients, suggesting a greater focus on planning than previously evident. Some sites associated with this tradition have been recorded in North Dakota and South Dakota, but these mainly consist of isolated and surface finds (Gregg 1985). One of the most significant Paleoindian sites in the GSU is the Beacon Island Agate Basin site (Ahler 2003). Agate Basin points have also been recovered from the Moe site, and an isolated Knife River flint Agate Basin point was recorded at 32ME946 (Gregg and Bleier 2008).

Alberta (9800–9000 B.P.) is a poorly dated technology that probably descends from Hell Gap and is documented at the Hell Gap, Wyoming, and Hudson-Meng, Nebraska, sites (Agenbroad 1978; Frison 1991). Hudson-Meng is one of the largest documented bison kill sites and suggests that Alberta people focused on bison hunting (Agenbroad 1978); however, more recent work suggests that humans were not responsible for killing the bison and that they died of a natural event (Todd and Rapson 1999). The Cody Complex (9200–8800 B.P.), which includes stemmed/shouldered Eden and Scottsbluff projectile points and the distinctive Cody knife, apparently arose from Alberta (Frison 1991). These sites are widespread across

the northwestern and central Great Plains, with components at the Wyoming Horner I, Finley, and Medicine Lodge Creek sites (Frison and Todd 1986; Frison and Walker 2007) and the Mammoth Meadows, Myers-Hindman, and MacHaffie sites in Montana (Davis 1993). Such sites indicate that Cody adaptations were diverse and utilized large fauna as well as small prey and floral resources (Frison et al. 1996; Galvan 2007). Alberta/Cody sites have been recorded in North Dakota and South Dakota. In fact, Hudson-Meng contains extensive Knife River flint, showing a strong connection to the Missouri River region. A single Scottsbluff point was recorded at the Moe site, and Metcalf et al. (1988) recorded a probable Alberta point as an isolated find near Scorio Creek.

The Parallel Oblique Flaked complex is a catch-all grouping of Paleoindian projectile point types (Gregg 1985) including Angostura, Milnesand, Browns Valley, Lusk, Allen, and Frederick; these range in age from around 9400 to 7900 B.P. All types are lanceolate with parallel oblique flaking. Bison kill-butcherries became rare on the northwestern and northern Great Plains after approximately 8000 B.P. (Frison 1998), perhaps due to severe ecological deterioration that could no longer support large bison populations. Complex excavated and surface sites have been recorded in the Dakotas, including sites on the Missouri River. In the GSU, six archaeological resources defined under the general “Plano” category have been identified (Gregg and Bleier 2008).

Plains Archaic Tradition (ca. 8000–1500 B.P.)

The transition from Paleoindian to Archaic is archaeologically visible as an abrupt shift to large notched projectile points (Frison 1991), perhaps indicating a shift to atlatl propelled darts from hand-thrown spears. This transition is also associated with warming/drying trends that prompted diverse subsistence adaptations among hunter-gatherers (Carlson 1994). Ground stone appears in the Archaic, suggesting a greater focus on processing floral resources. In conjunction with the appearance of pithouses and storage pits in the western intermontane basins, this suggests a shift in subsistence base, a reduction in overall residential mobility, and more predictable seasonal rounds (Frison 1991). In the GSU, 96 Archaic archaeological resources have been identified. Thirty-one of these are from unspecified associations (Gregg and Bleier 2008). Important Archaic-age sites in the GSU include the Mondrian Tree site (32MZ58) and the Moe site (32MN101).

The Logan Creek/Mummy Cave complex (5600–4000 B.P.) is the earliest example of large side-notched projectile points on the northern Great Plains. The blending of the Logan Creek and Mummy Cave for this complex is due to regionally varied nomenclature used among archaeologists for similar archaeological complexes (Gregg 1985). Settlement types associated with this complex include bison kills, transient camps, and some stone circle sites. Four archaeological resources containing large side-notched projectile point varieties have been identified in the GSU (Gregg and Bleier 2008).

The Oxbow complex (5000–4000 B.P.), typified by side-notched, deeply concave-based projectile points, is concentrated in northern Montana, Alberta, and Saskatchewan (Hannus 1994:180) but is also quite common in North and South Dakota, with numerous sites along the Missouri River and its tributary system. Oxbow subsistence apparently centered on bison and sites include bison impoundments and jumps, encampments on stream terraces, stone

circles, and processing areas (Hannus 1994; Reeves 1969). However, numerous birds and small mammals were probably exploited (Aaberg et al. 2006:174). Some northern Great Plains sites further yield evidence of complex cultural behavior including bundle burials with elaborate grave goods (Bryan 1991). Four Oxbow archaeological resources have been identified in the GSU (Gregg and Bleier 2008).

The McKean complex (ca. 4500–3400 B.P.) encompasses three distinct sub-phases—the McKean lanceolate, Duncan, and Hannah. The McKean complex is widespread across the Great Plains, and sites from this period can be found associated with bison kills, stone circles, lithic caching, and seasonal settlements (Frison 1991). Slab-lined pit hearths are common, as are ground stone artifacts suggesting a greater reliance on plant resources (Carlson 1994; Frison 1991). McKean complex sites often demonstrate evidence of lithic raw material exchange, including Swan River chert, Tongue River silicified sediment, and Knife River flint (Gregg 1985). In the GSU, 23 archaeological resources dating to the McKean complex have been identified (Gregg and Bleier 2008).

Pelican Lake (ca. 3000–2700 B.P.), typified by broad, thin corner-notched projectile points, is likely a descendant of McKean and is found across the northern and central Great Plains (Frison 1991). This wide spatial distribution may indicate significant population growth in response to the favorable moist conditions of the Sub-Atlantic episode (Reeves 1983). Numerous communal bison kills, such as Head-Smashed-In (Frison 1991), indicate communal bison hunting, but this does not suggest it was an exclusive feature of their subsistence. Rather, Pelican Lake populations probably relied on a broad-based economy across diverse ecozones (Hannus 1994). Thirty-four Pelican Lake archaeological resources have been identified in the GSU (Gregg and Bleier 2008).

Plains Woodland Tradition (ca. 2000–450 B.P.)

Temporally overlapping with the northwestern Great Plains Late Archaic, the Plains Woodland tradition is characterized by increased sedentism, garden horticultural activity, expanding regional exchange networks with eastern Woodland populations (Adena and Hopewell), and the elaboration of ceremonial activities and mortuary practices, specifically mound burials (Griffin 1967). Significant technological advances such as bow and arrow and ceramics-use are also apparent (Gregg 1985); however, the fundamental subsistence strategies of the Plains Woodland did not drastically differ from their Archaic predecessors (Zimmerman 1985). It is assumed that this tradition saw the beginning of horticultural practices in the region. For the purposes of this study the complexes that are classed as belonging to the Plains Woodland include Besant, Sonota, Laurel, Avonlea, Old Woman's, and Blackduck. The Besant and Sonota components are well represented in the GSU (Gregg and Bleier 2008). Of the 184 Woodland sites in the GSU, 119 are unspecified, and 37 are Besant and/or Sonota age sites (Gregg and Bleier 2008).

The Besant complex (ca. 2000–1500 B.P.), typified by small to medium-sized side-notched triangular projectile points, represents the earliest presence of ceramics in North Dakota, probably resulting from eastern woodland influence (Walde 2006). Besant ceramics are more common in the eastern half of the Dakotas; the vessels show a basic conoidal shape and suggest lump modeling manufacture with some coarse cording (Wood and Johnson 1973).

Besant sites show extensive use of Knife River flint (Reeves 1970). Site types include stone circle sites, habitations on stream and river terraces, and bison kills. Numerous communal kill sites, including the Ruby bison pound in Wyoming (Frison 1991), suggest that Besant people were sophisticated bison hunters. The Sonota complex (1850–1350 B.P.) appears to be a possible sub-complex of Besant, but differs in that burial mounds are common at Sonota sites (Reeves 1983; Wood 1967). These mounds include rectangular subfloor pits/tombs with dismembered bodies and, commonly, articulated bison remains (Johnson and Johnson 1998). The presence of associated exotic artifacts is often cited as evidence of Hopewell influence on Middle Plains Woodland populations (Johnson and Johnson 1998). In the GSU, 37 Besant/Sonota archaeological resources have been identified, including at 32DU2, the Twin Buttes site (32DU32/32ME617), and 32ME254.

Sites from the Laurel complex (2100–850 B.P.) are generally found in the eastern portions of North Dakota, northern Minnesota, and southern Canada. Laurel pottery and mound building are fairly distinct, but lithics associated with this complex tend to be various and lack a particular style (Gregg 1985).

Avonlea complex (ca. 1800–1000 B.P.) sites occur across the northern Great Plains and are contemporaneous with Besant. This complex includes a variety of site types, including stone circles, bison kills, and rock shelter habitations (Reeves 1970). Avonlea represents the first regional complex to produce arrow points exclusively, suggesting a transition to bow and arrow technology (Frison 1988). Avonlea point types are small and indistinctly side-notched. Saskatchewan Basin Complex: Early Variant pottery has been found at Avonlea sites (Byrne 1973). Avonlea subsistence in the north relied heavily on communal bison procurement, but in their southern range bison hunting was supplemented by smaller game (e.g., pronghorn), fish, and seasonal plant exploitation (Smith and Walker 1988). Avonlea sites are relatively rare in the Dakotas (Vickers 1994). In North Dakota, the Evans site (32MN301) contained Avonlea projectile points and ceramics (Schneider and Kinney 1978). Only one Avonlea-aged archaeological resource was identified in the GSU.

Rare in North Dakota is the Old Woman's complex (A.D. 700–1300). This complex is contemporary with the Plains Village tradition, so it would seem likely that many associated sites would be granted the latter designation (Gregg 1985).

The Blackduck complex (A.D. 1150–450) derives from northern Minnesota and was concentrated in southern Manitoba. It is contemporary with both Avonlea and Old Woman's complexes, and with Extended and Terminal Middle Missouri traditions. Some evidence of possible Blackduck pottery has been found along the Missouri River, which suggests trade between the Missouri River villagers and the Blackduck people to the north (Joyes 1970).

Plains Village Tradition (ca. 1050–350 B.P.)

Lehmer (1971) defined the Plains Village tradition as possessing the following diagnostic traits: equal reliance on horticulture and hunting and gathering strategies; semi-permanent villages near the Missouri River floodplain; earthlodges; large storage and refuse pits; distinctive ceramics; abundant end scrapers and arrow points; bison scapula hoes; and a well-developed bone tool industry. The Plains Village Tradition is divided into the Middle

Missouri tradition (A.D. 969–1500) and the Coalescent tradition (A.D. 1300–1650), discussed below. Fifteen Plains Village archaeological resources have been identified in the GSU (Gregg and Bleier 2008).

Three primary Middle Missouri variants are recognized: Initial Middle Missouri (A.D. 969–1297), Extended Middle Missouri (A.D. 1075–1443), and Terminal Middle Missouri (A.D. 1300–1500) (Eighmy and LaBelle 1996). These represent a continuation and intensification of Northern Plains Woodland lifeways and their appearance coincides with the onset of the Medieval Warm Period (Bryson et al. 1970) when a moisture increase likely permitted horticulture in areas previously characterized by tenuous farming conditions (Wood 2001).

The Initial Middle Missouri Variant (IMMV) is thought to have developed as an outgrowth of the Great Oasis (Tiffany 2007) or via the arrival of eastern populations already exploiting a Plains Village lifeway (Lehmer 1971). The IMMV was concentrated in the southern portions of the Middle Missouri region and characterized by highly fortified villages of large, semi-subterranean rectangular houses (Lehmer 1971; Winham and Calabrese 1998).

The Extended Middle Missouri Variant (EMMV) is concentrated in the northern portions of the Middle Missouri region (Lehmer 1971). EMMV groups resided in small villages of semi-subterranean rectangular houses; southern villages were more often fortified than those in the north (Wood 2001). It is unclear whether the EMMV replaced the IMMV or represents a contemporaneous offshoot of the IMMV. Origins aside, it is assumed that IMMV populations were eventually absorbed into EMMV populations. The final expression of this tradition was the Terminal Middle Missouri (Winham and Calabrese 1998:282). These sites were concentrated in a smaller geographic area along the Missouri River in southern North Dakota and characterized by fewer but much larger villages (Wood 2001). Sites again contained long, rectangular semi-subterranean houses but were highly fortified (Wood 2001). A continuation of the Middle Missouri Tradition is recognized historically as the Siuwan-speaking Mandan and Hidatsa (Wood 2001).

The Coalescent period is temporally divided into Initial (650–350 B.P.), Extended (500–300 B.P.), and Post-Contact Coalescent (300 B.P.–Historic period) (Johnson 1998; Lehmer 1971). The Coalescent Tradition is thought to represent a geographic movement of Central Plains Tradition village-dwelling populations to the Missouri River Valley in South Dakota (Blakeslee 1993). Central Plains Traditions might have migrated from Nebraska and Kansas in response to drought brought on by the Pacific climatic episode (Lehmer 1971). Similar to Middle Missouri Tradition groups, Coalescent populations practiced an economy split between mixed cultigen horticulture and bison hunting (Johnson 1998).

Initial Coalescent Variant sites are located on bluffs overlooking the Missouri River and its drainages in southern South Dakota. Populations lived in fortified villages consisting of subrectangular to circular/oval earthlodges and often surrounded by complex fortifications (Johnson 1998). Violence amongst Coalescent groups is evidenced at the Crow Creek site (39BF11) where approximately 486 individuals were killed in the village fortification ditch around 625 B.P. (Willey and Emerson 1993). Crow Creek is interpreted as evidence of internecine warfare amongst Initial Coalescent groups over land competition (Zimmerman and Bradley 1993) or, conversely, as evidence of warfare between immigrant Coalescent

groups and resident Middle Missouri Tradition peoples (Johnson 1998). The Extended Coalescent Variant apparently descended from the Initial Coalescent sometime in the fifteenth century A.D. Sites are concentrated along the Missouri River and its tributaries in central and northern South Dakota (Krause 2001). Extended Coalescent sites are far more abundant than during the Initial Coalescent and are characterized by a dispersed, unfortified village structure of circular earthlodges (Johnson 1998; Krause 2001; Lehmer 1971). The Extended Coalescent Variant evolved into the Post-Contact Coalescent during the Protohistoric and Historic periods; the Coalescent Tradition is recognized as the Arikara (Krause 2001). The last post-contact village was Like-a-Fishhook Village, occupied by the Arikara, Mandan, and Hidatsa; it was abandoned in 1886 when groups relocated to the Fort Berthold Indian Reservation (Smith 1972).

HISTORIC CONTEXTS

European Trade and Exploration (1738–1858)

Perhaps the earliest attempts at exploring the northern Great Plains came as a result of the ventures of Pierre Gaultier de Varennes Siure de la Verendrye (Dill 1983). His travels from New France into North Dakota led him as far as the Missouri River (somewhere near Bismarck), then led to subsequent expeditions by his sons, who went farther south into South Dakota (near Pierre) and west towards the Black Hills. While the elder la Verendrye met the Mandan, his sons encountered the Arikara and other tribes in South Dakota. Their reports heightened interest in the region and the possibilities that existed for trade with its inhabitants.

Following the la Verendryes, a modest fur trade developed in the region, but until the expedition of Captains Meriwether Lewis and William Clark returned successfully from their voyage up the Missouri, the region was considered a wild unknown (Schulenberg 1957). Lewis and Clark established winter quarters with the Hidatsa and Mandan near the Knife River (near present-day Stanton), founding Fort Mandan, the first permanent U.S. settlement in North Dakota. It was at their winter quarters that the pair secured the services of Charbonneau and his wife Sakakawea as guides to lead them through the Rocky Mountains (Works Progress Administration [WPA] 1938).

In 1807, Manuel Lisa established a short-lived post at the mouth of the Bighorn, and by 1809 his St. Louis Missouri Fur Company was building posts among most of the tribes all along the Missouri River. Other notable companies, such as the Northwest Company, Hudson Bay Company, the Columbia Fur Company, and the American Fur Company, soon followed suit (Schulenberg 1957). The life of these posts tended to be short, but they did much to influence the tribes who frequented the Missouri River in both North and South Dakota. Fort Union—at the confluence of the Yellowstone and Missouri Rivers—was the last of the great posts, and its waning during the late 1850s saw the fur trade in the Dakotas in its last throes.

In addition to the tribes that arose from the Middle Missouri and Coalescent traditions (Mandan, Hidatsa, and Arikara), countless other tribes used the northern Great Plains and the Missouri River since before European contact.

The Assiniboine were known to frequent the northern Missouri River (mainly near the confluence with the Yellowstone), and were active in the fur trade throughout the eighteenth

and nineteenth centuries. As well, the Cheyenne were pushed westward by the Chippewa during the middle of the eighteenth century and took up at least a temporary settlement period on the Missouri River. At least one earthlodge village has been attributed to the Cheyenne in eastern North Dakota, and some Cheyenne villages on the Missouri River were located between the Mandan to the north, and the Arikara to the south, where they built earthlodges and pursued horticulture and buffalo hunting (Schlesier 1968).

The Plains Cree and Plains Chippewa also frequented the northern Missouri—mainly near the confluence with the Yellowstone, but also near Fort Clark. Both tribes traded actively with the Mandan and Hidatsa. The Crow, although more westerly in their territory, were related to the Hidatsa and would often trade and visit with the Missouri River tribes (Schulenberg 1957).

Based on linguistic evidence, the Sioux (or Dakota) originated from the southwest Great Lakes region (DeMallie 2001a). The timing of the migration is unclear, but ceramic evidence suggests that the Dakota were living on the plains several centuries before the arrival of Europeans (Hanson 1998). Based on linguistics, it is thought that the Assiniboine split from the Sioux sometime before the mid-seventeenth century (Hanson 1998). The Teton Dakota are divided into seven sub-tribes, including comprising the Oglala, Brule, Sans Arc, Hunkpapa, Blackfeet, Miniconjou, and Two Kettles (Hanson 1998). According to DeMallie (2001a), by the mid-eighteenth century, the Teton Dakota hunted bison in the area east of the Missouri River, their movements limited in part by the Arikara stronghold along the Missouri River. However, a series of smallpox epidemics from 1771 to 1781 devastated the Arikara villages (Johnson 1998) and permitted the Teton Dakota to move west of the Missouri River. Like the Teton Dakota, the Yankton and Yanktonai Dakota occupied the prairies east of the Missouri River and north into Minnesota in the mid-seventeenth century (DeMallie 2001a). By the mid-nineteenth century, the Yankton and Yanktonai occupied the prairies east of the Missouri River from the mouth of the Big Sioux River in the south to the Red River in the north (DeMallie 2001b).

Native American Reservations, Allotment, and Reorganization

The Reservation Period began in the 1860s and continues into today. This time period contains numerous accounts of government actions to stop tribal ceremonialism, forced boarding school education of Native American children, and attempts at termination and relocation to solve the “Indian Problem” in the Dakotas. Disease, traders, missionaries, and new technology had significant impacts on the Native American people living in the region. Populations declined dramatically due to the introduction of infectious diseases, such as smallpox (Limerick 1987). Many Americans, hungry for land, believed that the Native Americans did not need the vast expanses of prairie that were under their control, and wanted to see the government open up the land for settlement. This sentiment was in many ways echoed by the federal government which also believed it was appropriate for native peoples to learn skills and adopt lifestyles familiar to Euro-Americans (e.g., large-scale farming, blacksmithing, and construction) (Hoxie et al. 2001). Native Americans within and near the project area were no exception to this general trend, which resulted in circumscription of Native American peoples onto bounded reservations, which opened up lands for Euro-American settlement of previously native-occupied territory (Limerick 1987).

Relocation of Native American peoples to the new reservations followed treaty ratification, but was a slow process. With the passage of the Fort Laramie Treaty in 1851, the U.S. Government established several forts along the Missouri River. One of these forts, Fort Berthold, was occupied by U.S. Cavalry from 1864, until its destruction by Sioux Warriors in 1867 (North Dakota Department of Public Instruction [NDDPI] 2002). The fort was then re-established 18 miles downriver and become known as Fort Stevenson, located in the modern day town of Garrison, North Dakota. The Three Affiliated Tribes and other Native American societies were transformed by the presence of the U.S. military and steamboats carrying settlers and supplies into this region (NDDPI 2002). The presence of Indian agency personnel residing on the reservation after 1868, day schools being opened on reservations, and the establishment of the Fort Berthold Indian Reservation under the Executive Order of 1870 forever changed the Three Affiliated Tribes (NDDPI 2002). By 1888, under the policy of allotment in severalty, most of the residents of Like-A-Fishhook Village were encouraged to set up residences elsewhere on the reservation, one of them becoming Elbowoods. Elbowoods was located on the northeast side of the river and served as the center for the reservation until its destruction during the construction of the Garrison Dam (NDDPI 2002).

The result of the debate over the “Indian Problem” continued, and not just in North Dakota, but across the United States. At the end of the nineteenth Century, the United States formally adopted a policy of allotment in severalty, a policy epitomized in the General Allotment Act of 1887 (also known as the Dawes Act). With the pressure on government officials from settlers who wanted reservation land open for settlement and social groups promoting the “civilization” of Native Americans, allotment in severalty was a solution that seemed to please all parties (with the exception perhaps of the Indians themselves who were not often consulted on Indian Policy). For expansionists, it allowed for additional Euro-American settlement by freeing up non-allotted lands for homesteading. For those sympathetic to the Indian cause, the belief in the civilizing effect of private property and commercial enterprise made allotment seem like a favorable way to end the “savage” ways of the western Indian (Limerick 1987).

Others were less favorable towards the idea of allotment. A delegation of Creek Indians was sent to address the House of Representatives in 1882, with regards to the U.S. allotment policy. The Creek delegation presented evidence that among many tribes for whom allotment in severalty had already taken place, populations had decreased, the amount of land being farmed had diminished, and overall the lives of the Indians had been worsened (U.S. House of Representatives 1882). Although voices of dissent were present, they were too few, when compared to the strong voices of allotment supporters. The Dawes Act was initially seen as a great success, and the policy soon began to spread to the other tribes across the country.

The concept of allotment and the “civilizing” of the American Indian preceded the Dawes Act by several centuries. The discourse of some of the earliest treaties, enacted under colonial governments in the seventeenth century, includes the idea of introducing Native Americans to a sedentary lifestyle, Christianity, and agriculture (Miles 1999). Although mention of individually allotted land did appear in discussions of Indian Policy in both colonial governments and in early United States Policy, it was not until the middle of the nineteenth century that allotment was included in any treaties or acts with Indian groups. The earliest treaties to include allotment policies were formed in the 1830s, during President Andrew

Jackson's administration. Initially, these policies were voluntary, with title to the land being offered with brief trust periods during which the land was tax exempt. In most cases, these treaties included language allowing the government to revoke the patents, should the holder break certain conditions associated with their "Americanization," such as excessive drinking, or practicing traditional religious practices (Froehling 1993).

The act establishing allotments on the Fort Berthold Indian Reservation was signed on December 14, 1886, almost 2 months before the passing of the Dawes Act. The Act of December 14, 1886, signed by federal representatives, and representatives of the Gros Ventres, the Mandan, and the Arikara, states that the tribes had:

...vastly more land in their present reservation than they need or will make use of, and are desirous of disposing of a portion thereof in order to obtain the means necessary to enable them to become wholly self-supporting by the cultivation of the soil and other pursuits of husbandry" (Kappler 1904).

Under the articles of the Act of December 14, 1886, the Arikara, Gros Ventres, and the Mandan ceded large portions of their reservation to the U.S. Government for an annuity to help support the tribes. The Act also called for the survey of the former reservation and the allotment of the land to individuals and families of the three tribes. The distribution of the allotments provided 160 acres to each head of family, 80 acres to each single person over 18 years of age, 80 acres to every orphan child under 18 years of age, and 40 acres to each other person under 18 years of age (Kappler 1904). Each head of household chose the location of their allotment and the allotments of their children. The allotments of orphans were selected by an Indian Agent. Unlike many allotment acts which opened all non-allotted land to immediate non-native settlement, the Act of December 14, 1886, left all non-allotted lands in trust for a period of 25 years. The purpose of this trust was to provide for future generations of Mandan, Arikara, and Gros Ventres to receive allotments on their former reservation (Kappler 1904).

The titles to the allotted lands were also held in trust by the U.S. Government. While allotments were chosen by, and under the control of, the individual head of household, the actual land patent was held in trust by the U.S. Government for 25 years. At the end of the 25-year trust period, a fee patent would be issued to the allottee and the land would officially become taxable private property. This trust period was meant to allow the Native Americans to establish themselves on their land before it became taxable property, and to prevent the immediate sale of the land to Euro-American settlement. If the head of household passed away before the end of the trust period, the allotted land would be divided evenly amongst his or her heirs (Kappler 1904).

Though the trust period was meant to prevent the dispossession of the allotted lands, additional legislation regarding allotment lands was passed beginning in the early twentieth century that allowed land to be removed from trust before the 25-year trust period had elapsed. The first of these acts was passed on May 27, 1902. This act allowed for the sale of inherited land, which required the removal of the land from the trust. Inheritance was not determined by the will of the deceased, but by territorial law, which stated that inherited land was divided evenly among the heirs (Froehling 1993; Kappler 1904). The death of the original

allottee sometimes resulted in more than 10 heirs to a property. Dividing this land evenly among the heirs resulted in parcels so small that they were useless for farming, or for leasing. Even when considered together, the land was rarely sufficient to meet the needs of the family, and so land sale was the most economic option for the use of the land. In the short term, the sale of inherited land was a favorable solution for both the government and the allottees, but it resulted in further alienation of Native American land, and scattered families far afield, as the loss of the land forced them to leave the area in search of employment.

A second act that impact Native American land sales was the Burke Act, passed in 1906. The Burke Act allowed an allottee to remove land from the trust and be issued a fee patent if the allottee was proven to be “competent” (Froehling 1993). There were no set standards or guidelines to measure “competency,” leaving the agent in charge, or the “boss farmer” to determine competency based on whatever criteria they saw fit. Like many of the regulations regarding allotment, the idea was intended (at least on the surface) to be beneficial to the Native Americans. The Burke Act would allow the allottees to free themselves of any government restrictions on their land, and become free farmers like their neighbors. The result, similar to the inherited land act, was that large acreages of land were sold off for quick cash, often to pay off debts incurred to local merchants.

In 1907, an additional decision by congress allowed for the sale of land of allottees determined to be “non-competent” by the Indian Agent (Froehling 1993). The land would be sold, and an annuity provided for the original allottee. As with the determination of competency, there were no set criteria for determining someone as non-competent and the decision was left entirely at the discretion of the agent.

In 1910, another act was passed to create allotments of the remaining open lands within the boundaries of the former reservation. This act made provisions for the establishment of additional allotments based on the non-surveyed lands held in trust by the U.S. Government within the former Fort Berthold Indian Reservation. New allotments were established as well as additional land added to already existing allotments. The area selected for these new allotments was limited to the area south and west of the Missouri River or located in select townships north and east of the Missouri River. The Act of 1910 allowed the U.S. Government the right to remove some land from allotment for establishing schools, a government operated ranch to provide for the three tribes, and any land containing coal deposits. The Act of 1910 removed the last of the non-allotted land held in trust by the government. After the new allotments were established, all remaining land was open to U.S. settlement under the various Homestead Acts (Kappler 1929).

Between 1895 and 1929, 3,401 allotments were made as part of the various allotment policies affecting the Mandan, the Arikara, and the Gros Ventres. Although the allotment of Fort Berthold was initiated under the Act of 1886, the first allotments were not distributed until 1900. In 1900, 949 allotments were established, almost all of which were located along the Missouri River. In 1910, another 765 were established, both along the river, and in the neighboring foothills. In 1912 and 1913, under the revised allotment Act of 1910, 1,131 allotments were established. Most of these were located on open range land rather than along the river. Although U.S. settlement was allowed under the Act of 1910, an additional 556 allotments were established in the 1920s, mostly for children who had not previously received

allotments (McCullough 1948). The United States Policy of Allotment in Severalty officially ended with passing of the Indian Reorganization Act in 1934.

The Mandan, the Arikara, and the Gros Ventres reorganized in 1936 as the “Three Affiliated Tribes.” The tribes live in different portions of the reservation, but act under a single governing council. During the 1930s and 1940s, agriculture and stock raising were the two largest industries on the Fort Berthold Indian Reservation. Many Native Americans living on Fort Berthold supplemented ranching and farming with the hunting of wild game, working for the Indian Agency, or leasing lands to non-native ranchers and farmers. Renting and leasing land was an important source of income for most households on the reservation. Lease agreements took a variety of forms but included both sharecropping and fee rentals. Between 1942 and 1945 more than one-third of the annual income for households on the reservation was generated through rental and lease agreements.

In the GSU, 5 Hidatsa, 1 Arikara, 1 Chippewa, 1 Mandan, and 21 unspecified historic Native American archaeological resources have been identified (Gregg and Bleier 2008).

The Homestead Boom and the Ethnic Settlement of North Dakota (1868–1915)

Even outside of the reservation lands, where open public land was available for settlement, the true rush for homesteads in North Dakota did not take place until 1885 and was spurred by the extension of the Northern Pacific Railroad across the Red River from Minnesota (WPA 1938). The first homestead in North Dakota was filed in 1868, which was the only homestead filed until 1871. The earliest settlers in were a mixture of American-born settlers from diverse locations across the United States. Midwestern farmers, struggling on small rented lands in the Midwest, eyed the open plains, looking for the opportunity to claim their own lands. Single men, looking for an escape from hard labor in mines, oil fields, and factories, looked to the plains for new opportunities for work on farms, ranches, or the railroads (Hudson 1976).

The Great Dakota Boom from 1878 to 1885 represented the first wave of large-scale settlement in North Dakota. The “boom” was driven by several factors including the expansion of the railroad into the state, increased industrialization and population pressure in the eastern states, and improved technologies in processing “spring wheat,” a crop that was well adapted to conditions on the northern plains. In 1873, the bankruptcy of Northern Pacific forced them to sell off most of their land holdings in the state, which, combined with the land available through the Homestead Act, made the northern Great Plains an enticing location for settlers from the East Coast and the Midwest (Wilkins and Wilkins 1977).

The land west of the Missouri River did not see much settlement prior to the 1890s, and the major settlement of this region did not start in any great numbers until between 1900 and 1910. In general, those homesteaders who selected lands along the Missouri River were able to do some crop farming, but the majority of homesteads were arranged as ranch operations for sheep or cattle. These areas were far from uninhabited, with many of the Plains Indians settled on reservations near the river, stage lines extending to mining operations in the Black Hills and Montana, and cowboys and cattlemen driving herds from Texas to pasture on the plains grassland. Initially, settlement in the western part of the state was limited to areas along the river, where steamboat access could provide supplies, and a means of transporting crops and herds for sale in larger markets. When the railroads crossed the Missouri into the western

part of the state, North Dakota saw a second homestead boom, from 1898 to 1915, driven by settlers seeking the last available free homestead land.

In addition to the homesteading, which brought an increasing number of people to western North Dakota, the discovery of large deposits of lignite coal further boosted interest in the development of northwestern North Dakota, and the surrounding area (WPA 1938). Although slow at first, the mining industry started to flourish during the 1930s; to this day it remains a major focus of activity that drives the economy of both the county and the state.

Ethnic Settlement

Unlike the first wave of settlement (1878–1885), which consisted primarily of Americans and Canadians of British, Scottish, and French descent resettling from the midwestern and eastern states, the second wave (1898–1915) was dominated by foreign-born settlers arriving in large numbers from across Europe. Motivated by the lack of available land in most European countries, along with economic systems that equated land with status, the United States and their new liberal land policies attracted many Europeans to immigrate to the United States. Helping fuel this immigration, U.S. railroad companies actively advertised in Europe to entice settlers to purchase available land grants and settle along newly created rail lines (Hoover 2005; Hudson 1976). Environmental conditions in the northern Great Plains were not attractive to all European immigrants, but immigration from across northern Europe resulted in many communities dominated by large ethnic populations, bringing with them their traditional agricultural practices, architecture, and cultural traditions. Unlike the first wave of settlers, the immigrants from eastern Europe tended to settle in cultural homogenous communities preserving the language and cultural practices of their homeland.

German-Russians

One of the largest ethnic groups in the Great Plains, the German-Russians established communities across the Great Plains, including the Dakotas, Nebraska, Colorado, and Montana. The German-Russians immigrated to the United States from two different regions of eastern Russia: the Volga region and the region to the north of the Black Sea (Hudson 1976). Originally from large agricultural communities in Germany, these groups first immigrated to Russia in 1763, when the German-born Empress Catherine the Great invited the Germans to develop the largely empty Russian Steppes, granting them limited autonomy and exemption from military service. The Germans established small close-knit communities in Russia, which allowed them to retain many of their cultural traditions (Baltensperger 1983; Hoover 2005).

In 1871, Czar Alexander II withdrew many of the privileges granted to the German settlers including exemption from military service. As a result, many of the Germans chose to leave Russia to settle in the newly opened American West. The German-Russians attempted to create the same close-knit communities they had left in Russia, establishing small towns across the American West. The Volga Germans mostly settled in Kansas and Nebraska, while the Black Sea Germans settled in North Dakota and South Dakota (Koop 1986). Within their close communities, the German-Russians maintained many of their traditions, something that occasionally set them apart from neighboring communities.

Although ethnically German, the German-Russian settlers were religiously diverse, including Catholics, Lutherans, Mennonites, and Hutterites (Hoover 2005). The German-Russians represent the largest European ethnic group to settle in Dunn County, North Dakota. German-Russian settlers moved into North Dakota in large numbers after 1880, although it took them somewhat longer to settle as far northwest as Dunn County. Settlers would often relocate several times throughout the Midwest and even in eastern or southern North Dakota before finally moving to permanent homesteads in the northwestern part of the territory. The strong sense of community felt by the German-Russians and the frequent re-migration across North Dakota meant that most German-Russians had families and friends in all of the neighboring communities (Hudson 1976).

The similar environment of the Russian steppe provided a level of experience most ethnic groups in the area did not have. This can be seen in their architectural styles, which made use of available resources to build sturdy homes without an ample supply of lumber. The German-Russian architecture used a combination of clay mixed with straw and manure, rammed earth blocks, and timber, when available, to build strong, multiple-room homes. Another method used clay bricks known as Batsa. The use of Batsa continued even after the German-Russians adopted American architectural styles, using the clay bricks as wall insulation between wood-framed walls (Koop 1986).

Scandinavians

Settlers from Sweden, Denmark, and Norway were present in large numbers in northwestern North Dakota. By 1910 there were nearly 30,000 Swedes in North Dakota, and four times as many Norwegians (Hudson 1976). Scandinavian immigration after 1850 was driven by overcrowding in the rural parts of those countries, and encouraged by United States commercial interests, specifically by railroad companies looking to populate towns in the ever expanding American West. Most Scandinavians moved first to the Midwest, settling in Wisconsin or Illinois, before moving on to establish homesteads in North Dakota during the “Dakota Boom” of the 1870s and 1880s (Hoover 2005; Hudson 1976). Unlike the German-Russians, who settled in large groups forming whole communities, most Scandinavian settlements grew over time, with a few settlers moving to an unsettled area, and writing letters to friends and family to encourage additional settlers (Hudson 1976).

The single-pen gable roofed style was common for both Norwegian and Swedish settlers, who prior to coming to America were united under one crown, as the United Kingdoms of Sweden and Norway, from 1814 to 1905. Availability of materials often dictated the form that Scandinavian homes took in North Dakota; in areas lacking timber resources, sod built structures were often constructed, and even in areas with limited timber, sod roofs were common features on both log and wood-framed houses. The quality of timber available for home construction made some types of traditional log notching difficult, and dovetail notching, with the spaces between logs filled with some type of mortar, dominated Scandinavian-American homes was dovetail notching with the spaces between logs filled with some type of mortar.

Other Ethnic Groups

While Scandinavian and German-Russians represented the two largest ethnic groups in western North Dakota, ethnic groups from other parts of the world were present, albeit in smaller numbers. Canadian immigrants, particularly from Ontario, moved to North Dakota in large numbers between 1875 and 1880, with the largest groups settling in the northeast and north-central portions of the state along the Canadian border. Most of these settlers were the children of immigrants themselves, their families having arrived from Great Britain a generation before. Germans, Bohemians, Luxembourgiens, and Icelanders also settled in North Dakota, though most never settled in concentrated communities (Hudson 1976).

Agricultural Development and the Growth of North Dakota Farming (1890–1920)

The dominant crop grown in North Dakota during the early years of settlement was spring wheat. Spring wheat is a dark, coarse grain that was easy to grow in drier climates, but was difficult to process for use in a form appealing to most consumers (Danborn 1998). Towards the end of the nineteenth century, a new way of processing spring wheat into what was known as Minnesota patent flour was developed. This new process significantly increased demand for this hardy crop. Many of the agricultural practices used to develop the crop were similar to growing other forms of wheat, and the farming practices already in place across the Midwest were adopted by new settlers in North Dakota. Distinctive to spring wheat farming, many believed that using broadcast seeders was more favorable to the crop than using the more traditional grain drills. Other equipment used to produce spring wheat was similar to equipment used for other crops in the region, including plows, cultivators, seeders and harvesters (Coulter 1910).

Demand for wheat and other agricultural products increased dramatically across the country during the first decades of the twentieth century. Between 1910 and 1914, increased demand fueled by the growth of urban populations across the United States and increased immigration and settlement due to the westward expansion led to dramatic increases in prices on agricultural products. Declining production in Europe during World War I encouraged the federal government to heavily promote increases in agricultural production (Opie 2004; Wilkins and Wilkins 1977). The government fixed wheat prices during the war, which encouraged farmers to expand their holdings and increase their crop yields. By the 1920s, North Dakota was one of the largest producers of wheat in the United States (Etulain and Malone 1989). These practices would come to haunt the American farmer in the 1920s, when dramatic decreases in crop values would result in harsh economic conditions across the Great Plains (Wilkins and Wilkins 1977).

Confined-Range Ranching on Fort Berthold (1891–1953)

While agriculture played an important role across the state, the land west of the Mississippi was dominated by ranching and livestock production. Following the Civil War, the growth of urban populations in the east resulted in an increased demand for beef production. The restriction of Native American tribes to reservations opened up vast tracts of grassland in the Great Plains and the expansion of the railroad into these areas facilitated the transportation of livestock to larger markets (McLaughlin 1994; Wilkins and Wilkins 1977). Taking advantage of these favorable conditions, several large ranches were established in central and western

North Dakota. Two of the largest operations along the Missouri River in North Dakota were the Birdhead Ranch and the Long X Ranch (McLaughlin 1994).

By the turn of the century, the expansion of homestead settlement had reached the areas west of the Missouri. Homesteaders and ranchers were immediately at odds over the use of land, with homesteaders fencing off and restricting access to what was once open range land. Between 1900 and 1910, the number of farms west of the Missouri increased from 5,096 to 28,826. With open range land in diminishing quantity, the undeveloped lands on the Fort Berthold Indian Reservation that had access to water, abundant grasses, and trees for shelter along the Missouri River, became increasingly attractive to the eyes of American ranchers; however, the boundaries of the reservation were protected, and not open to Euro-American settlement (McLaughlin 1994).

Some ranchers had begun illegally grazing livestock on reservation lands during the nineteenth century, but by the end of the century, ranchers had found a way of legally grazing their livestock on the reservation. The Act of February 28, 1891 (26 Stat.794) was an amendment of the Dawes Act which allowed Indian allottees who were unable to use lands due to age or disability to lease their lands with the approval of the tribal authority. Over the next few years, some of the restrictions on the use of this land were relaxed, but the leasing was still managed by the BIA with the funds used to support government programs on the reservation (McLaughlin 1994; Parker 2011). Ranchers took advantage of these leased lands to continue the practice of open ranching, a method that was becoming impossible outside of the reservation boundaries.

The grazing of livestock on the Fort Berthold Indian Reservation by Euro-American ranchers was not the same as the open range ranching of the past. In many ways the methods used in what is referred to as “confined-range ranching” borrowed elements from both open range grazing and ranch farming. Similar to open range ranching, seasonal crews were used to herd and tend livestock on the leased reservation lands; and livestock was allowed to graze in common lands, with several round-ups a year to keep track of cattle for breeding, and for sale (McLaughlin 1994). During round-ups, cattle were kept in large corrals established at seasonal line camps on the reservation. Unlike the open range ranching of the past, grazing was limited to broad leasing areas on the reservation; leasing areas that were fenced to avoid livestock from wandering onto privately owned land.

In 1916, the Office of Indian Affairs divided the Fort Berthold Indian Reservation into three grazing units and changed the leasing costs to a rate per acre, rather than per head of cattle. This type of ranching continued until the Office of Indian Affairs made changes in the mid-1930s and persisted in a similar fashion until the 1950s. Over the years, ranchers saw many benefits of using leased reservation lands. The use of cheap leases on prime grassland on the reservation allowed many ranchers to better weather the difficult years of the 1920s and 1930s, with many of the original ranchers becoming successful and prominent businessmen in the state. Leased grazing, while certainly beneficial to Euro-American cattlemen, and to the Office of Indian Affairs and BIA offices that provided for Fort Berthold, was not entirely favorable for those living on the reservation. Overgrazing became a serious concern for those on the reservation, and while they had limited means to control overgrazing through restrictions on herd sizes, many of these were overlooked by Euro-American ranchers and the

government (McLaughlin 1994; Parker 2011). The Native Americans themselves grazed livestock on their reservation lands, kept separate from the lands leased by Euro-American ranchers, and conflicts between the two occasionally occurred. The construction of Garrison Dam in 1953 flooded most of the prime grazing lands along the river, and put a stop to confined-ranged grazing on leased lands. What little pasture land remained along the river was subdivided and allocated to Native American stockmen to compensate for losses caused by flooding (McLaughlin 1994).

Depression, Recovery, and the Damming of the Missouri River (1921–1953)

Economic decline came early to North Dakota, with many farmers seeing troubles as early as 1921. North Dakota farmers were heavily dependent on wheat production, which led to great prosperity during World War I when the price of wheat was fixed by the federal government. During these prosperous years, many farmers mortgaged their properties and invested their prosperous earnings on expanding the land they had under cultivation. Following World War I, with demand low and the federal government releasing control of wheat prices, the price of wheat plummeted, falling from more than \$2.00 per bushel in 1920 to less than \$1.00 per bushel in 1921 (Opie 2004). Prices continued to fall during the 1920s and farmers across the Midwest and Great Plains states found themselves in deep financial distress. With farmers unable to pay their mortgages, banks across the state began to fail, adding to the economic turmoil. By the time drought and the effects of the Great Depression began to ravage the rest of the United States, the situation in North Dakota was already dire (Wilkins and Wilkins 1977).

During the years of early settlement across North Dakota, farmers formed cooperatives. Cooperatives helped farmers pool their resources to purchase or rent expensive equipment, share the use of grain elevators, and to help stabilize prices. While these cooperatives had helped support farmers during the first decade of the twentieth century, they were incapable of buoying the losses caused by the falling prices in the 1920s. Many established cooperatives that had thrived during the boom years, but failed during the 1920s and 1930s, including the Equity Cooperative Exchange which went bankrupt in 1923 and the North Dakota Wheat Growers Association which closed in 1931 (Wilkins and Wilkins 1977). Many farmers were forced to abandon their lands, moving to urban areas to find work. Other farmers, anticipating better times ahead, purchased failing farms to expand their holdings. Fearing a mass acquisition of farming land by outside corporate interests, the state government passed the Anti-Corporate Farming Act of 1932, which prohibited corporations from engaging in farming and agriculture in the state. While this act prevented outside corporate farms from acquiring these failed farms, it did not prevent family farms from acquiring massive holdings (Hoffman and Libecap 1990; Leahy 2003; Wilkins and Wilkins 1977). North Dakota's agricultural industry did not recover until the 1940s when wartime demand for crops increased prices, creating resurgence in agricultural activity.

Pick Sloan and the Development of the Missouri River (1940–Present)

Following the Great Depression, new demands for power, irrigation, economic development, and flood control in the northern Great Plains focused greater attention on the Missouri River. Starting in the early 1940s, a series of legislative measures and agency plans were developed to address the difficult task of harnessing the Missouri River. Initial efforts were directed

towards establishing a Missouri Valley Authority (MVA), similar to the successful Tennessee Valley Authority which had created dams that provided rural electrification for the southern states. The concept of an MVA did not meet with a favorable response from the local citizens or government officials, who feared losing control of the Missouri River to the federal government. After several attempts to resurrect the plan, the idea of an MVA was lost (Harvey 1996; Linenberger 1998). Nevertheless, continued flooding along the river and the lack of electricity on rural farms eventually drove the communities on the river to embrace some kind of federal actions to manage the river. Two separate plans were proposed to legislation.

The first plan presented to legislation was the Pick Plan, named after Lewis Pick, the director of the Missouri River Office of the U.S. Army Corps of Engineers. It focused on flood control and navigation improvement, calling for the U.S. Army Corps of Engineers to construct 1,500 miles of levees, five multi-purpose dams and reservoirs along the mainstem of the river, and other dams on various tributaries of the river (Harvey 1996; Linenberger 1998). Pick's plan conflicted with the alternate plan proposed by William Glenn Sloan, director of the Billings, Montana, office of the U.S. Bureau of Reclamation. Sloan's Plan, which had been several years in the making, was initially created in response to the severe droughts during the 1930s. Following the droughts, the Dakotas, Wyoming, and Montana appealed to the U.S. Bureau of Reclamation to construct irrigation works. Sloan created a plan, focusing primarily on providing irrigation and hydroelectric power, calling for the creation of dams and reservoirs on tributaries in the upper Missouri Basin (Harvey 1996).

In October 1944, representatives from the U.S. Army Corps of Engineers and the U.S. Bureau of Reclamation met and agreed on a combined plan, called the Pick-Sloan Plan. Six intents for the management of the Missouri River were created under this plan. These intents included providing hydroelectric power, flood control, and surplus water supply; facilitating navigation; and supplying areas for public use, including fish and wildlife and recreation (Ferrell 1993). President Franklin D. Roosevelt signed the act on December 22, 1944. Under this plan, both agencies would have influence over hydroelectric power; the U.S. Bureau of Reclamation would have responsibility for all irrigation issues, and the U.S. Army Corps of Engineers would have responsibility over the mainstem dams (Billington et al. 2005). The development of the mainstem system of dams was authorized under the Pick-Sloan Flood Control Act of 1944 (Public Law 78-534) (Ferrell 1993). Along with the previously constructed Fort Peck Reservoir in Montana, five dams were to be constructed and overseen by the U.S. Army Corps of Engineers. The dams to be constructed included Gavin's Point (located immediately west of Yankton, South Dakota), Fort Randall (located just north of the Nebraska-South Dakota border), Big Bend (located immediately upstream from the tail waters of Fort Randall), Oahe (located upstream from Pierre, South Dakota), and Garrison (located north of Stanton, North Dakota (Figure 4).

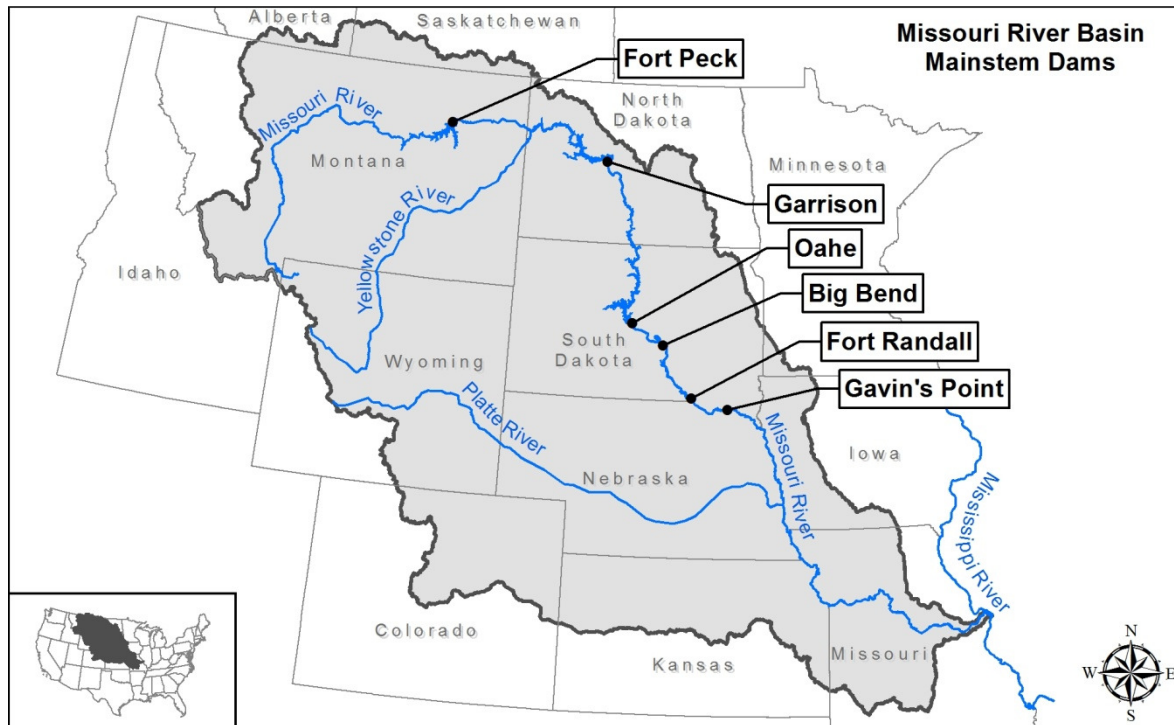


Figure 4. Missouri River mainstem dams.

The creation of the Pick-Sloan reservoirs displaced thousands of Native Americans from their lands along the Missouri River. By some counts, the five mainstem dams displaced approximately 900 Native American families. All the mainstem dams in North and South Dakota (except Gavin's Point Dam) flooded some of the most productive tribal lands. Garrison Dam/Lake Sakakawea, completed in 1953, inundated more than 152,360 acres, a quarter of the Fort Berthold Indian Reservation, and forced the relocation of over half of the reservation population (Morris 1990). The BIA reported in 1948 that 257 of the 357 homes in the Fort Berthold Indian Reservation would be destroyed by the project (McCullough 1948). The inundation also cost the tribe the majority of its timber and wild game resources—most of which relied on the natural bottomlands of the Missouri River. Similarly, the Oahe Reservoir inundated hundreds of thousands of acres at the Standing Rock and Cheyenne River Reservations. The Big Bend and Fort Randall Dams were also significant in impacting Native American families on the Yankton, Lower Brule, and Crow Creek Reservations; the dams flooded over 20,000 acres of tribal land, with the majority (approximately 17,000 acres) of those acres on the Crow Creek and Lower Brule Reservations, where over 120 families were displaced against their will (Lawson 1982).

Although the Three Affiliated Tribes living on the Fort Berthold Indian Reservation were not included in the initial discussions about the dam, they demanded that the federal government compensate them for the land that would be lost when the dam was completed. They requested that the government provide them with an equivalent acreage of land to what would be lost from the flooding, permission to graze their cattle on U.S. Army Corps of Engineers lands along the banks of the lake, 20,000 kilowatt/hours per year of electricity generated by the dam, and first right to collect timber felled during the flooding (Griffen 1996). Their

requests were rejected, although the federal government provided some compensation for their loss. They were given \$5,105,625 for lost lands (approximately \$33 per acre), were denied grazing access to the lands adjacent to the lakes, did not receive any free electricity, and were not allowed to collect fallen timber (Griffen 1996). The tribes would eventually get an additional 7.5 million dollars in compensatory funds, but overall, the deal fell far short of what they had requested.

The U.S. Army Corps of Engineers has continued to develop its relationship with the tribes. In 1987, the Joint Tribal Advisory Committee released its final report concerning the impact that the Pick-Sloan Plan had on the tribes. The tribes within the Omaha district soon afterward requested an “Indian Desk” at the U.S. Army Corps of Engineers. In 1992 this request was fulfilled and the U.S. Army Corps of Engineers developed a position for a full-time Native American liaison (U.S. Army Corps of Engineers 2013).

Development of Transportation (1864–Present)

Early settlement in North Dakota followed along the expansion of the rail lines, with the railroad companies establishing towns to support the settlement of the vast expanse of the Great Plains. By the early twentieth century, little had changed, and the railroad continued to dominate settlement and transportation across the state, with settlers reliant upon the railroads for importing supplies, and for exporting products of their farms and ranches to more lucrative markets. At the same time, the system of roads and trails, in place before a single track of rail was placed in North Dakota, continued to operate, albeit marginalized by the expanding rail networks (Wilkins and Wilkins 1977).

As early as 1848, officials in Washington were beginning to consider the possibility of creating a network of railroads across the country. Three routes were initially proposed for alignments crossing from the Atlantic Ocean to the Pacific Ocean. The northernmost route proposed crossed the Great Plains from Minnesota to Oregon crossing through Fort Union in the Dakota Territory. Congress authorized the northern route and in 1864, President Lincoln signed a charter for the Northern Pacific Railroad (Northern Pacific). To help fund the railroad project, the Northern Pacific received a massive land grant from the government, amounting to 40 sections per mile through the Dakota Territory (Tweton and Jelliff 1976).

Although Washington had interest in completing the northern route, finding investors to back the 2,000-mile journey proved more difficult. Northern Pacific was unable to secure sufficient financial backing until 1869, the same year that the Union Pacific Railroad completed their transcontinental route. Financial troubles continued to plague the railroad and by 1873, with the line completed from Duluth to Bismarck, the investment company funding the construction was bankrupt. In 1875, the Northern Pacific reorganized under the leadership of Frederick Billings, and with strong revenues from the completed part of the line, the Northern Pacific was able to secure the financial support to continue construction, completing its path to the Pacific in 1881. Between 1881 and 1887, the Northern Pacific continued to expand its operations in North Dakota building several branch lines to reach the important agricultural and population centers across the state (Tweton and Jelliff 1976).

The second major railroad to begin construction in North Dakota was the Great Northern Railroad. Starting as the St. Paul and Pacific Railroad in 1857, Congress supplied a similar grant to the railroad company and construction began heading west from St. Paul, Minnesota. Like the Northern Pacific, the St. Paul and Pacific had trouble securing the financial support for the project, going bankrupt in 1872. Under the direction of James J. Hill, the St. Paul and Pacific began construction again in 1878. Rather than building straight west, Hill expanded branch lines across North Dakota and Minnesota and by the 1890s, Hill's railroad had more miles of track in North Dakota than the Northern Pacific. The railroad finally reached the Pacific Ocean in 1893 and the name was changed to the Great Northern Railroad (Tweton and Jelliff 1976).

A third railroad, the Minneapolis, St. Paul & Sault St. Marie, or the "Soo," built a track across North Dakota in 1883. The primary focus of the Soo was to access grain farmers in the northern part of the state, providing connections for agricultural goods to both the Northern Pacific and the Great Northern rail lines. With the three railroads completed, North Dakota settlers had a means to transport wheat crops to milling centers in Minnesota or to larger markets across the country. The railroad also supplied a means to support expanded settlement across the state, with important depots at Grand Forks, Bismarck, and Fargo becoming prominent buildings driving economic activity (Tweton and Jelliff 1976; Wilkins and Wilkins 1977).

Although railroads supported the expanded settlement during the Dakota Boom, the state was also crossed by a series of roads and trails that expanded into a broad network during the twentieth century. Some of the earliest roads in the state were developed by the military, connecting forts established to monitor the activities of Native Americans, and to protect Euro-American interests in the area. These roads were heavily travelled by the military, by postal carriers, and by early settlers. In the winter months, when snow covered much of the state, these trails were often travelled by sled (Carlson and Sprunk 1979). When North Dakota became a state in 1889, the state constitution made it a requirement to have a two-thirds majority for the approval of state road construction. This meant that the responsibility for road construction was mostly left to the counties. Early roads mostly followed the local topography, providing the most direct route between destinations. Later roads, established during the settlement booms, generally followed section lines. In 1899 in an effort to regulate road construction and provide some standards, the state legislature declared that section roads would be considered public land and that the roads should measure at least 33 feet (2 rods) wide (Carlson and Sprunk 1979).

Leaving the counties responsible for road construction proved sufficient until the arrival of the automobile in the early twentieth century. The automobile increased the demand for roads across the state, and demand for existing roads to be better maintained to remain passable. Access to funding became the determining factor in road construction, with roads often built disproportionately to the actual demand. Lack of funding in some areas led to lapses in maintenance, which in turn led to washouts, collapsed bridges, and heavy rutting. The poor conditions of roads across the state attracted the attention of A. L. Fellows, the state engineer, who voiced his concern about road conditions in 1906. However, it would take several years before that concern turned into action (Carlson and Sprunk 1979).

In 1909, State Senator George A. Welch introduced a bill that would allow North Dakota to receive federal funding for the construction of “demonstration” roads. These roads were federally funded experiments that tested new road building materials and engineering methods. These demonstration roads were only constructed in Bismarck, but it was the beginning of a state-level interest in road conditions that would continue throughout the early twentieth century (Carlson and Sprunk 1979). In 1911, the state authorized the State Engineer’s office to provide plans for road construction to any county that requested it, and in 1913, the State Engineer was tasked with approving all bridge designs prior to construction. The year 1913 also marked the creation of the South Dakota State Highway Commission. The Commission was established to give the State Engineer the authority to oversee all road construction. It also required that maps be created that showed the location of all roads, culverts, and bridges (Carlson and Sprunk 1979).

The federal government also took steps to assist the states in road construction. In 1916, the Federal Aid Road Act made funding available for creating and maintaining roads. Funding through this act was limited at first, but in the 1920s, interest in developing a federal highway system resulted in additional federal allocations. Due to an ambitious and perhaps exaggerated assessment of the number of roads in North Dakota, it received a disproportionate amount of federal funding in the 1920s (Carlson and Sprunk 1979). The state ranked 36th (out of 48) in population, but 16th in road funding. As a result of this funding, the state proposed the creation and improvement of an extensive series of paved, graveled, and graded roads. Most of these roads were concentrated in the eastern and central portions of the state. In the western counties such as Dunn, Mercer, and McKenzie, most roads remained little more than rutted two-tracks.

In 1924, the Rand McNalley Company created an Auto-trails map, attempting to provide an easier means of navigating the highway systems across the country. The Auto-trails used blazed markers to identify highways that could be followed between destinations. To many early twentieth century motorists, driving was as about recreation as it was transportation, and as such, the early auto trails were intended to enhance the driving experience. Roads did not always take the most direct routes between cities, but would wind through scenic locations and historical landmarks. The intent was also to improve tourism across the country. The Auto-trail system was quickly replaced in 1925 when congress passed the Federal Highway Act which established a numbered highway system, most of which followed similar alignments to the old Auto-trail system (Wilkerson 2000). Several of the numbered highways continued to use their Auto-trail names.

During the Great Depression, road projects at the local level dropped significantly. Federal assistance helped buoy the losses of local funding with New Deal Programs continuing to provide support for road and bridge projects. The lack of local funding for road projects continued through World War II. Coupled with the lack of available labor during the war, many of North Dakota’s roads fell into disrepair. During the 1940s, the government began to crack down on several states, including North Dakota, for the conditions of its roads, threatening to cut off funding if the existing roads were not better maintained. In an effort to assert more control over road projects across the country, Congress passed the Federal Highway Act in 1944, which changed the approach to funding road construction, setting aside money specifically to maintain a federal highway system (Carlson and Sprunk 1979).

BACKGROUND RESEARCH

SWCA conducted a background search of archaeological and historical literature and records for the project area and surrounding 1-mile area on April 22, 2014, as part of the initial phase of this investigation. Researchers searched relevant records holdings at the State Historical Society of North Dakota and other available sources for information regarding previously recorded historic and prehistoric sites located within the project area. A search of General Land Office (GLO) maps and records did not return any results within the study area (North Dakota State Water Commission 2014).

Results of the background search identified 11 previous cultural resource inventories conducted within the project area between 1982 and 2013. Of the 11 previous cultural resource inventories, seven were in support of oil and gas projects, two were conducted in support of transportation projects, one for highway improvements, and one for a residual development. A bibliographic listing of the previously conducted cultural resource inventories is provided in Appendix A.

Based on the file search results, 42 previously recorded cultural resources are located within 1 mile of the project area (Table 3). Of the 42 previously recorded cultural resources, 37 are historic architectural sites (buildings) associated with the town of Epping, North Dakota. The remaining five cultural resources consist of one historic bridge, one historic foundation/depression site, two historic farmstead site leads, and one prehistoric chipped stone isolate. The 37 Epping architectural sites, the historic bridge, and 32WIX611 are currently unevaluated with regard to their NRHP eligibility. The historic foundation/depression site and 32WIX433 have been recommended not eligible for listing to the NRHP. By definition, isolated finds are considered to lack integrity; therefore, the prehistoric chipped stone isolate is not eligible for listing to the NRHP.

Results of the Class I inventory identified one previously recorded cultural resource (32WIX572) within the proposed project area. 32WIX572 is a prehistoric chipped stone isolate and is not eligible for listing on the NRHP.

**Table 3. Previously Recorded Cultural Resources Identified within
1 Mile of the Project Area.**

Site Number	Legal Location	Site Type(s)	Cultural Affiliation	NRHP Eligibility
32WI776	SW¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI777	SE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI778	SE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI779	SE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI780	SE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI781	SE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI782	SE¼ SW¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI783	SW¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI784	NE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI785	NE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI786	NE¼ SE¼ NW¼, SE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI792	SE¼ SE¼ NW¼, NE¼ NE¼ SE¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI793	SE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI794	SE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI795	NE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI796	NE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI797	NE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI798	NE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI799	NE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI800	NE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI802	NE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated

*A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline,
Williams County, North Dakota*

Site Number	Legal Location	Site Type(s)	Cultural Affiliation	NRHP Eligibility
32WI803	NE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI804	SE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI805	SE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI806	SE¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI807	SW¼ NE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI808	NW¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI810	NW¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI811	NW¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI812	NW¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI813	SW¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI814	SW¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI815	SW¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI816	SW¼ SE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI817	SE¼ NE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI818	SW¼ NE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI819	SW¼ NE¼ NW¼, Section 1, T155N, R99W	Architectural building	Unknown Historic	Unevaluated
32WI920	SE¼ SE¼ SE¼, Section 1, T155N, R99W; NE¼ NE¼ NE¼, Section 2, T155N, R99W	Bridge	Historic (1930–Present)	Unevaluated
23WI1064	NE¼ SE¼ SE¼, Section 16, T156N, R100W	Foundation, depression	Unknown Historic	Not eligible
32WIX433	SE¼ NW¼, Section 1, T155N, R99W	Site lead, farmstead	Historic (1905–1995)	Not eligible
32WIX572	NE¼ NW¼ NW¼, Section 21, T156N, R100W	Isolated chipped stone	Unknown Prehistoric	Not eligible
32WIX611	NE¼ NE¼ SE¼, Section 31, T156N, R99W	Site lead, farmstead	Unknown Historic	Unevaluated

NRHP = National Register of Historic Places

FIELDWORK METHODS

Fieldwork was designed so that project archaeologists could collect all appropriate and necessary data for the completion of the project report of results and recommendations, and to ensure accurate completion of site forms for all resources encountered.

In accordance with the scope of work, archaeologists surveyed the 150-foot-wide inventory corridor using parallel linear transects with spacing not exceeding 30 m. The ground surface was examined for artifacts, features, or other evidence of cultural occupation. Eroded surfaces, rodent burrows, and other areas with significant exposure were examined intensively throughout fieldwork, especially where previously recorded cultural resources existed. In areas with a high probability of cultural resources, survey transects were reduced to 10 m to maintain adequate visibility. Bare ground surface visibility during the project varied from 5 to 40 percent across most portions of the project area, increasing up to 90 percent in some agricultural fields.

Where cultural resources were located, project archaeologists made an intensive effort to fully and accurately establish the extent and boundaries of newly recorded sites. As such, sites were mapped using sub-meter accurate Trimble global positioning system (GPS) units. When detailed mapping or remapping was required, all linear site features, such as site boundaries, roads, and fence lines, as well as point features, such as the site datum, cultural features, artifact concentrations, diagnostic artifacts and tools, and other necessary data, were mapped with the Trimble GPS unit for post-processing into ArcMap 10.0 shapefiles, and for plotting onto associated USGS 7.5-minute quadrangles to ensure accuracy and to produce required location maps of all sites and resources.

In addition to site mapping, associated features and diagnostic artifacts were described, measured, recorded using a handheld GPS unit, and photographed as appropriate. Field personnel noted environmental setting, context, topography, and geographical location for each cultural resource. No collection or subsurface testing was conducted during the inventory.

SITE EVALUATION

SWCA evaluated sites and their significance, as defined by criteria set forth in Title 36 Code of Federal Regulations 60.4 (National Park Service 1991), which states:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- A) That are associated with events that have made a significant contribution to the broad patterns of our history; or
- B) That are associated with the lives of persons significant in our past; or
- C) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high

artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

- D) That have yielded, or may be likely to yield, information important in prehistory or history.

A site may meet one or more of the four eligibility criteria listed above, but if it is considered to not retain sufficient integrity, it may be recommended not eligible for inclusion on the NRHP.

Prehistoric Archaeological Sites

Prehistoric lithic scatters/campsites (sites without any structures or association with known significant events or persons) recorded for the project generally are not considered eligible for NRHP inclusion under Criteria A, B, and C. Instead, for NRHP recommendation purposes, these properties will be discussed for their potential to yield information significant to prehistory or the archaeological record under NRHP Criterion D. Special cases generally apply to Criterion A, where a prehistoric site type (such as a stone circle site) may not be recommended eligible for listing in the NRHP from an archaeological perspective, but may be considered important to cultures of Native American peoples.

Evaluation of archaeological site significance under Criterion D considers general characteristics such as the nature, size, and diversity of the site assemblage; the potential presence or absence of subsurface cultural deposits; the nature of any features within the site (construction techniques, building materials, structural integrity); and the age range reflected by the site assemblage. Sites considered significant generally contain an assemblage of cultural remains that reflects sufficient diversity to permit identification of activities and to allow confirmation of the period of site use. Sites with the most potential to address research questions about human lifeways contain associated features, structures, and/or relatively intact and dateable artifacts.

Historic Archaeological Sites or Components

Historic sites containing or consisting of preserved features or structures are evaluated primarily under Criteria A, B, and C. Historic trash scatters lacking associated features or structures are primarily evaluated under Criterion D. In general, these types of sites represent ephemeral prospecting or stock management activities, but they lack identifiable or important association with specific persons or events of regional or national history (Criteria A and B), and they lack the formal and structural attributes necessary to qualify as eligible under Criterion C. The evaluation of significance of historic archaeological sites under Criterion D focuses on the capacity of the sites or components to yield significant information regarding knowledge of history during the period(s) of site significance. Evaluation of the significance of historic sites considers general characteristics such as the nature, size, and diversity of the site assemblage; the potential presence or absence of subsurface cultural deposits; the nature of any features within the site; construction techniques; building materials; structural integrity; and the age range reflected by the site assemblage.

Historic sites considered to be significant under Criterion D generally contain an assemblage of cultural remains that reflects sufficient diversity to permit identification of activities and to

allow confirmation of the period of site use. Sites with the most potential to address research questions contain associated features, structures, and relatively intact and datable artifacts. Significant sites are those that could impart information not available solely from historical documents. Although archival research may provide an essential form of information, often historical records are inaccurate or incomplete. For example, examination of construction techniques or household assemblages can provide information on economic slumps, reuse of structures for other than original purposes, and re-occupation cycles. As a result, insight may be gained into questions about human lifeways that are often asked in archaeology, but rarely specified directly in historical documentation.

Non-Archaeological Historic Sites or Components

Non-archaeological historic sites or sites with non-archaeological components are those primarily assessed for NRHP eligibility under Criteria A, B, and C, rather than Criterion D and typically are not subject to subsurface testing. Individual segments of significant historic sites are evaluated as contributing or non-contributing in terms of physical and environmental integrity. Examples of historic site types include linear historic features, such as transportation routes and water conduits, standing building and structure sites, and potentially extend to any historic feature on an otherwise archaeological site, such as traditional cultural property features. Historic and ethnographic sites evaluated for potential contribution to history or cultural traditions for reasons beyond their possible future research value tend to have different evaluation and management considerations than archaeological sites. Typically, the integrity of historic sites is addressed using the guidelines presented in National Register Bulletin 15 (National Park Service 1991), which defines the seven elements of integrity as location, design, setting, materials, workmanship, feeling, and association. As such, properties are basically evaluated in consideration of their physical integrity and the integrity of their surroundings. Traditional cultural properties are also considered under the guidelines of National Register Bulletin 38 (Parker and King 1998).

INVENTORY RESULTS

SWCA conducted a Class III inventory for the Little Muddy Creek Pipeline on April 23, 24, and 25, 2014. Vegetation within the project area consisted of wheat stubble, brome, and wheatgrass, allowing for approximately 5 to 40 percent bare ground surface visibility at the time of survey; ground surface visibility increased up to 90 percent in some fallow agricultural fields. Surface soils across the site were primarily dark brown silty clay loam. Impacts to the project area include agricultural use, vehicle travel on numerous roads crossing the project area, and oil and gas development.

During the current inventory, SWCA personnel attempted to revisit one previously recorded isolated find (32WIX572). SWCA personnel newly recorded an undocumented segment of the previously recorded Great Northern Railroad (32WI481) and one isolated find (32WIX627). Copies of the North Dakota Site Forms are provided in the detached Appendix B, and resource location maps are provided in Appendix C.

PREVIOUSLY RECORDED SITES

32WI481

Site Type:	Great Northern Railroad
Association:	1887–Present
Site Size:	150 by 35 feet (5250 square feet)
NRHP Recommendation:	Eligible Non-Contributing
Management Recommendation/Project Effect:	Avoid, horizontal directional drill/no effect

Site Description and Previous Recording

32WI481 is a segment of the Great Northern Railroad, now owned and operated by Burlington Northern Santa Fe (BNSF), located on a gently rolling plain situated in an upland grassland ecosystem (Figures 5 and 6). Vegetation in the site area is sparse and consists only of small strands of wheatgrass, allowing for 99 percent bare ground surface visibility at the time of survey. Vegetation in the surrounding area consists of wheatgrass, brome, wheat stubble, and green needlegrass. Surface soils consist of dark brown sandy clay loam overlain by in most areas by granite gravels.

A segment of the Great Northern Railroad, 32WI481, was first recorded in 2001 as part of the Williston to Charlie Creek 115-kV transmission line. Subsequent segments of 32WI481 were recorded in 2008, 2010, 2011, 2012, and 2013 for railroad improvements, additional transmission lines, and oil and gas development. Two segments of 32WI481 had previously been recorded by SWCA in 2011, approximately 2.7 and 3.5 miles (respectively) east of the new segment for the Colt Connector Pipeline.

Contains Privileged Information -- Do Not Release

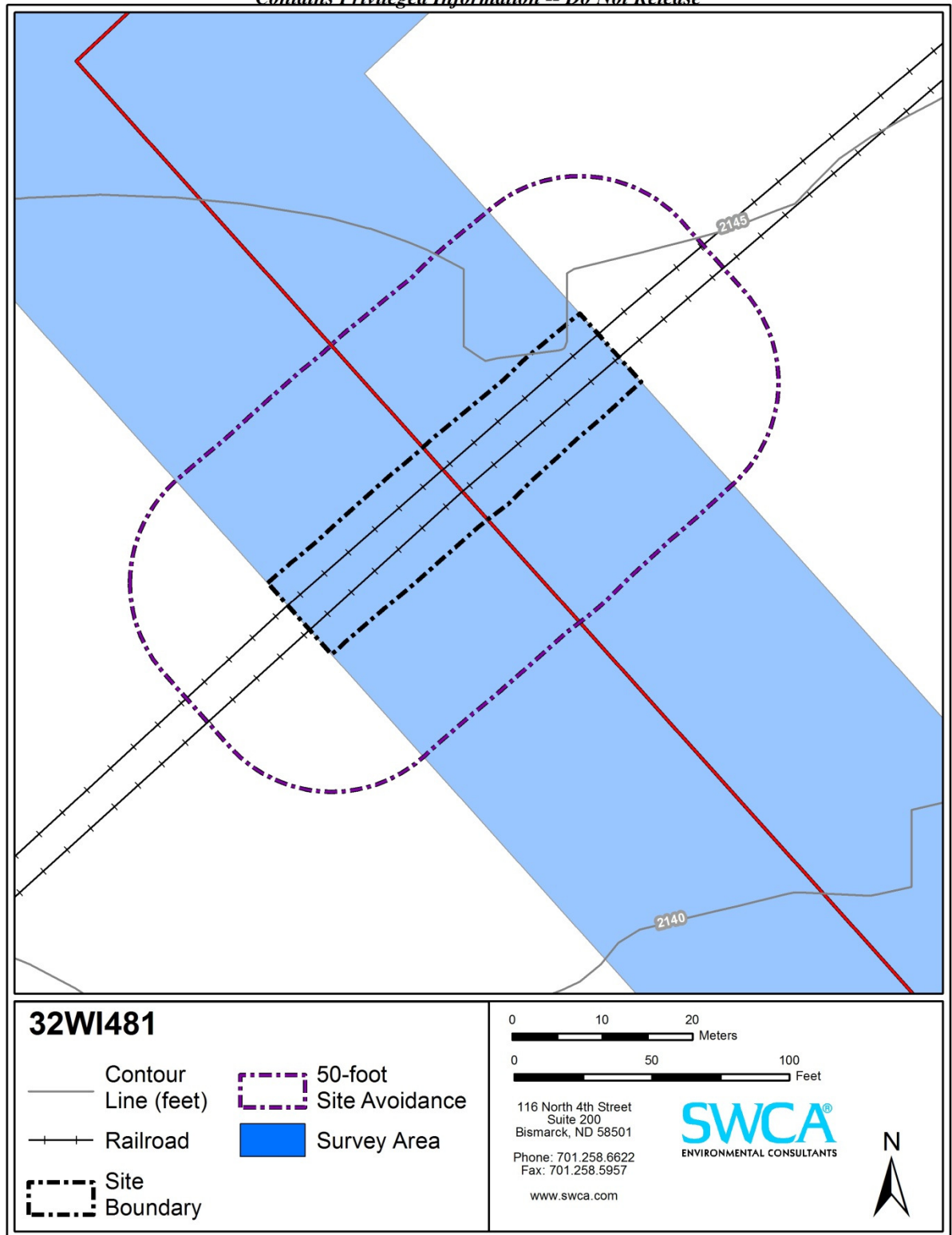


Figure 5. 32WI481 site sketch map.



Figure 6. 32WI481 site overview, facing southwest.

Survey Results

SWCA recorded the new segment 32WI481 on April 24, 2014. The segment consists of a 150-foot northeast/southwest by 35-foot northwest/southeast section of railroad. The railroad itself is comprised of two sets of steel rails attached to wooden crossties set into a gravel ballasted berm. The ballast is made up of imported granite gravels and rises approximately 4.5-feet above the surrounding ground surface. The crossties are treated lumber that measure 102-inches long by 9.5-inches wide and are set into the gravel berm at approximately one foot intervals. The steel rails are 6.5-inches tall with a 5.5-inch web; the rail head is 3-inches wide and the rail foot is 6-inches wide. The rail sections are welded together (continuous welded rail) and attached to the crossties via rail spikes and baseplates set on top of the ties. The rails are embossed with “141 RE VT PMSM 2006” indicating the rail was rolled in 2006; the rail was most likely installed at the site shortly after it was rolled. The newly recorded portion of 32WI481 still follows its original alignment and retains excellent integrity in regard to setting, location, and feeling. Modernization and general maintenance of the berm, crossties, and rails have impacted the site’s integrity with regard to materials, which, in turn, impacts the site’s integrity of association and design.

Historical Background

An in depth history of the development of railroads in North Dakota, including the Great Northern Railroad, has previously been compiled by Schmidt and Vermeer (2009) and was used in the previous recordings of 32WI481. A review of Schmidt and Vermeer indicates that the segment of the Great Northern Railroad recorded by SWCA in 2014 was constructed in 1887. The rail line was part of the 545 miles of track laid from Minot, North Dakota, to Great Falls, Montana, completed in the latter part of 1887, as part of the Great Northern’s transcontinental line.

NRHP Eligibility Recommendations

32WI481 is a previously recorded alignment consisting of the Williams County portion of the Great Northern Railroad main line and branch line corridors. In 2001, the site was recommended eligible for listing on the NRHP under Criterion A. Great Northern Railway operations in Williams County played an important role in opening up transportation to remote parts of the county and surrounding area. Additionally, the railroad did directly contribute to the development of the agricultural and livestock industries in the region and led to significant expansion of both industries. The Great Northern Railway played an important role in supporting the agriculture and cattle industry of northwestern North Dakota by providing access to both Euro-American and Canadian markets for goods. SWCA concurs with the previous findings and recommends 32WI481, as a whole, continue to be considered to be eligible for listing on the NRHP under Criterion A.

North Dakota railroads are not typically considered eligible for nomination under Criterion B, because they were generally the product of corporations, rather than significant individuals (Schmidt and Vermeer 2009). SWCA found no exception to this guidance for 32WI481 and therefore recommends that the site be considered not eligible for nomination to the NRHP under Criterion B. Similarly, railroads in North Dakota are generally considered not eligible for nomination to the NRHP under Criterion C, because they are representative of existing technology well established in other parts of the country and therefore do not represent significant or distinguishable features that embody a distinct type of engineering or construction (Schmidt and Vermeer 2009). SWCA found no evidence that 32WI481 is an exception to this guidance and therefore recommends that the site be considered not eligible for nomination to the NRHP under Criterion C. The deposition on site and the lack of surface artifacts indicate that the site is unlikely to yield information important in history; therefore, the segment is recommended not eligible for inclusion to the NRHP under Criterion D.

Management Recommendations

The segment of 32WI481 is recommended as a contributing element to an NRHP-eligible resource; therefore, SWCA recommends that the site be avoided through the use of a horizontal directional drill beneath the site.

NEWLY RECORDED ISOLATED FIND

32WIX627

32WIX627 is an historic isolated find located at the edge of a shelter belt separating two agricultural fields amongst rolling grasslands converted into agricultural fields. Located approximately 200 m west of 131st Ave NW, the isolate has an active gravel pit located approximately 100 m west and an abandoned homestead located approximately 500 m north. The isolated find consists of the remains of a Deering harvester with DEERING CHICAGO USA embossed on the harvester (Figure 7). The harvester most likely dates to the early 20th century, potentially before the merger of McCormick-Deering. Vegetation in the area consists of mixed grasses, including brome and crested wheatgrass, resulting in a bare ground surface visibility of 5 percent at the time of survey. Soils in the area consist of a dark yellowish brown sandy clay loam. Impacts to the area include agricultural activity, gravel mining, and erosional processes.

By definition, isolated finds are considered to lack the historic integrity to be determined eligible for nomination to the NRHP. Therefore, no further work is recommended for this resource.



Figure 7. 32WIX627, a Deering harvester, facing east.

ISOLATED FIND NOT RELOCATED

One previously recorded isolated find (32WIX572) is located within the current survey area (see attached Appendix C). 32WIX572 is a prehistoric chipped stone isolated find consisting of a single Knife River Flint utilized flake. Although attempts were made to relocate the previously recorded isolated find, it was not relocated during the current inventory. Isolated finds are considered to lack sufficient historical integrity to be eligible for listing to the NRHP. Therefore, no further work is recommended for 32WIX572.

CONCLUSIONS

The Class III inventory for the Little Muddy Creek Pipeline project was conducted on April 23-25, 2014. The pipeline was surveyed with a 150-foot-wide survey corridor centered on the proposed pipeline centerline. SWCA surveyed 14.15 miles (254.13 acres) for the Little Muddy Creek Pipeline. In addition to the proposed pipeline alignment, SWCA also conducted an inventory of the proposed Epping Compressor Station located at the eastern terminus of the Little Muddy Creek Pipeline, consisting of a 15.45-acre survey block for each. In total, 269.58 acres were inventoried for the proposed pipeline location.

During the inventory, SWCA attempted to relocate one previously recorded isolated find (32WIX572); and newly recorded an isolated piece of farm equipment (32WIX627) and an undocumented segment of the Great Northern Railroad (32WI481). The newly recorded isolated find, 32WIX627, is the remains of a Deering Harvester.

By definition, isolated finds are considered to lack integrity and are not eligible for the NRHP; therefore 32WIX572 and 32WIX627 are not eligible for the NRHP. 32WI481 had previously been determined to be eligible for the NRHP. SWCA recommends project disturbance avoid all potentially eligible and unevaluated resources by 50 feet. E3 intends to avoid 32WI481 through the use of a horizontal directional drill beneath the site. With the above stipulations, it is recommended that a determination of *No Significant Sites Affected* and *No Historic Properties Affected* be granted for the project to proceed as planned.

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APPENDIX A

Previous Cultural Resource Inventories within 1 Mile of the Project Area

*A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline,
Williams County, North Dakota*

*A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline,
Williams County, North Dakota*

**Bibliographic Listing of Previous Cultural Resource Inventories within 1 Mile of the
Project Area in Williams County, North Dakota**

Manuscript Number	Title	Authors	Year
002528	Cultural Resource Inventory for Identified Locations Along U.S. Highway 2 Between Junctions of Highways 2 and 85 and Highways 2 and 52 in Mountrail, Ward, and Williams Counties, North Dakota	K. Good	1982
003251	Archaeological Investigations Along the Portal Beaver Lodge to Alexander Pipeline, Williams and McKenzie Counties, North Dakota	D. Kuehn, J. Borchert	1984
003436	Arco Oil and Gas Company ARCO #1-26 Harmon, Williams County, North Dakota	M. Floodman	1984
003450	Arco Oil and Gas Company Arco 3-27 Irgens, Williams County, North Dakota	M. Floodman	1984
009856	Enbridge Pipelines (North Dakota) LLC, North Dakota Pipeline Expansion Project: A Class II and III Cultural Resource Inventory and Evaluative Testing of Three Sites, Williams County, North Dakota	J. Harty, P. Heiner, J. Morrison	2006
010798	Williston to Tioga: A Class III Cultural Resource Inventory for a Proposed 230kV Transmission Line in Williams and Mountrail Counties, North Dakota	D. Hiemstra, A. Barth	2008
011097	Williston to Tioga: A Class III Cultural Resource Inventory for a Proposed 230kV Transmission Line in Williams and Mountrail Counties, North Dakota, Addendum 1	D. Engel	2009
012664	Enbridge Pipelines (North Dakota), LLC's Little Muddy Station and Pipeline Project: A Class III Cultural Resources Inventory in Williams County, North Dakota	W. Bluemle	2011
012856	Enbridge Pipelines (North Dakota), LLC's Little Muddy Station and Pipeline Project Addendum: A Class III Cultural Resources Inventory in Williams County, North Dakota	L. France	2011
013844	A Class I and Class III Cultural Resource Inventory of the Epping Industrial and Residential Development Project, Williams County, North Dakota	D. Reinhart	2012
014475	Class III Intensive Cultural Resource Inventory for the Market Center Pipeline in Mountrail, McKenzie, and Williams Counties, North Dakota (Volumes I-VII)	B. Brooks	2013

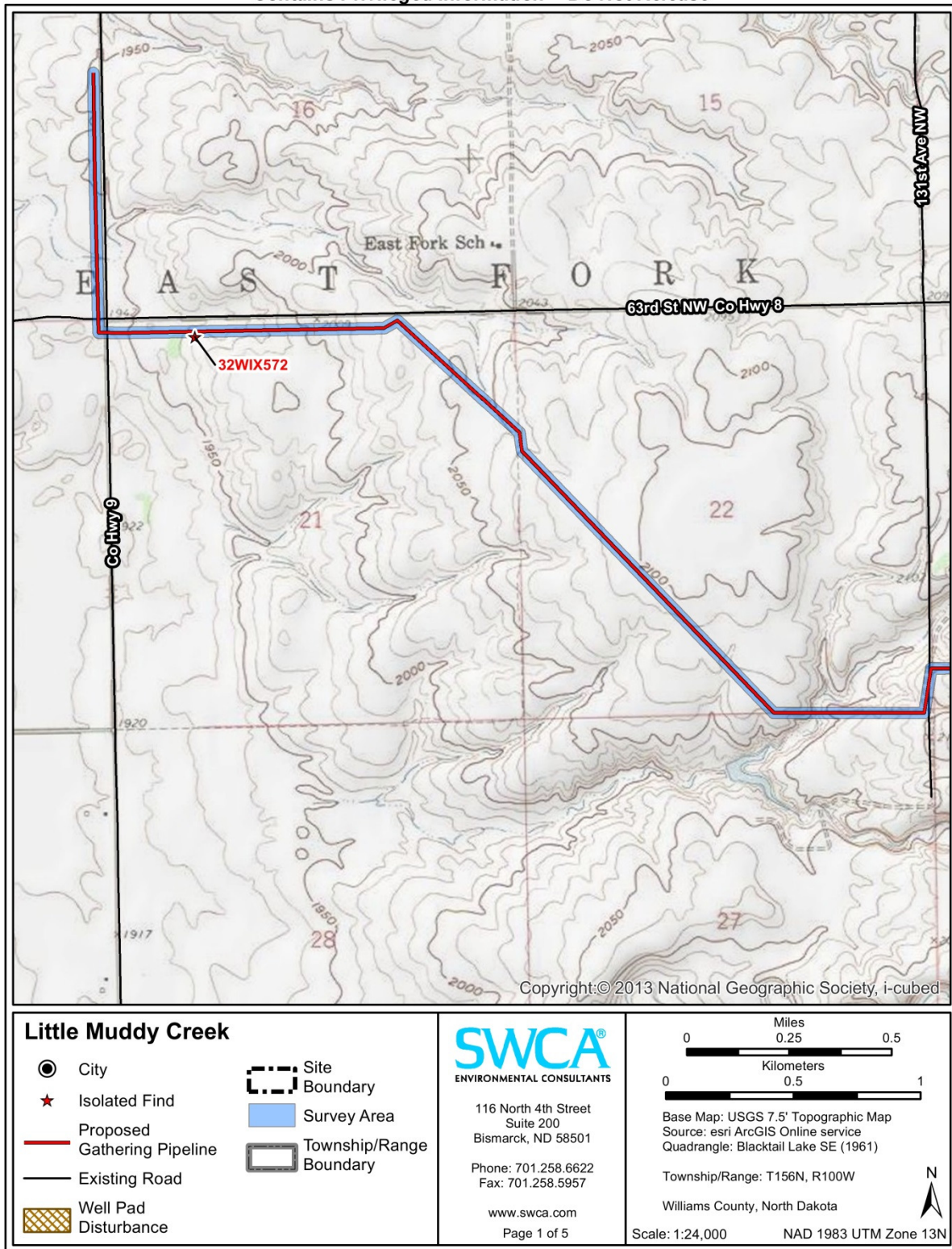
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APPENDIX B
(Detached)
North Dakota Site Forms

APPENDIX C
Resource Location Maps

A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline,
Williams County, North Dakota

Contains Privileged Information -- Do Not Release

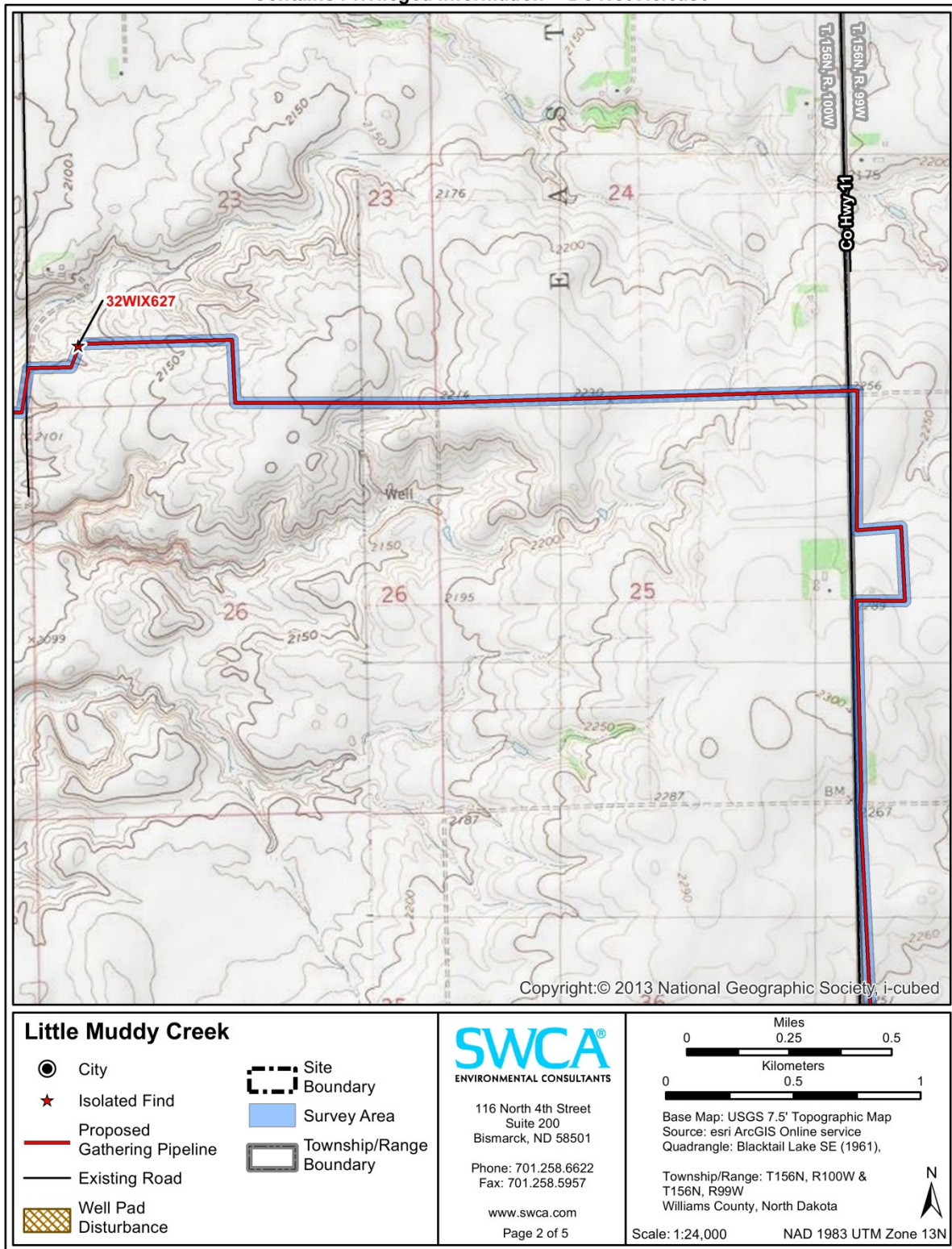


<p>Little Muddy Creek</p> <ul style="list-style-type: none"> ● City ★ Isolated Find — Proposed Gathering Pipeline — Existing Road ▨ Well Pad Disturbance 		<ul style="list-style-type: none"> ▭ Site Boundary ▭ Survey Area ▭ Township/Range Boundary 		<p>SWCA ENVIRONMENTAL CONSULTANTS</p> <p>116 North 4th Street Suite 200 Bismarck, ND 58501</p> <p>Phone: 701.258.6622 Fax: 701.258.5957</p> <p>www.swca.com Page 1 of 5</p>		<p>Miles 0 0.25 0.5</p> <p>Kilometers 0 0.5 1</p> <p>Base Map: USGS 7.5' Topographic Map Source: esri ArcGIS Online service Quadrangle: Blacktail Lake SE (1961)</p> <p>Township/Range: T156N, R100W Williams County, North Dakota</p> <p>Scale: 1:24,000 NAD 1983 UTM Zone 13N</p>	
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Resource location map 1 of 5, at 1:24,000 scale.

A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline,
Williams County, North Dakota

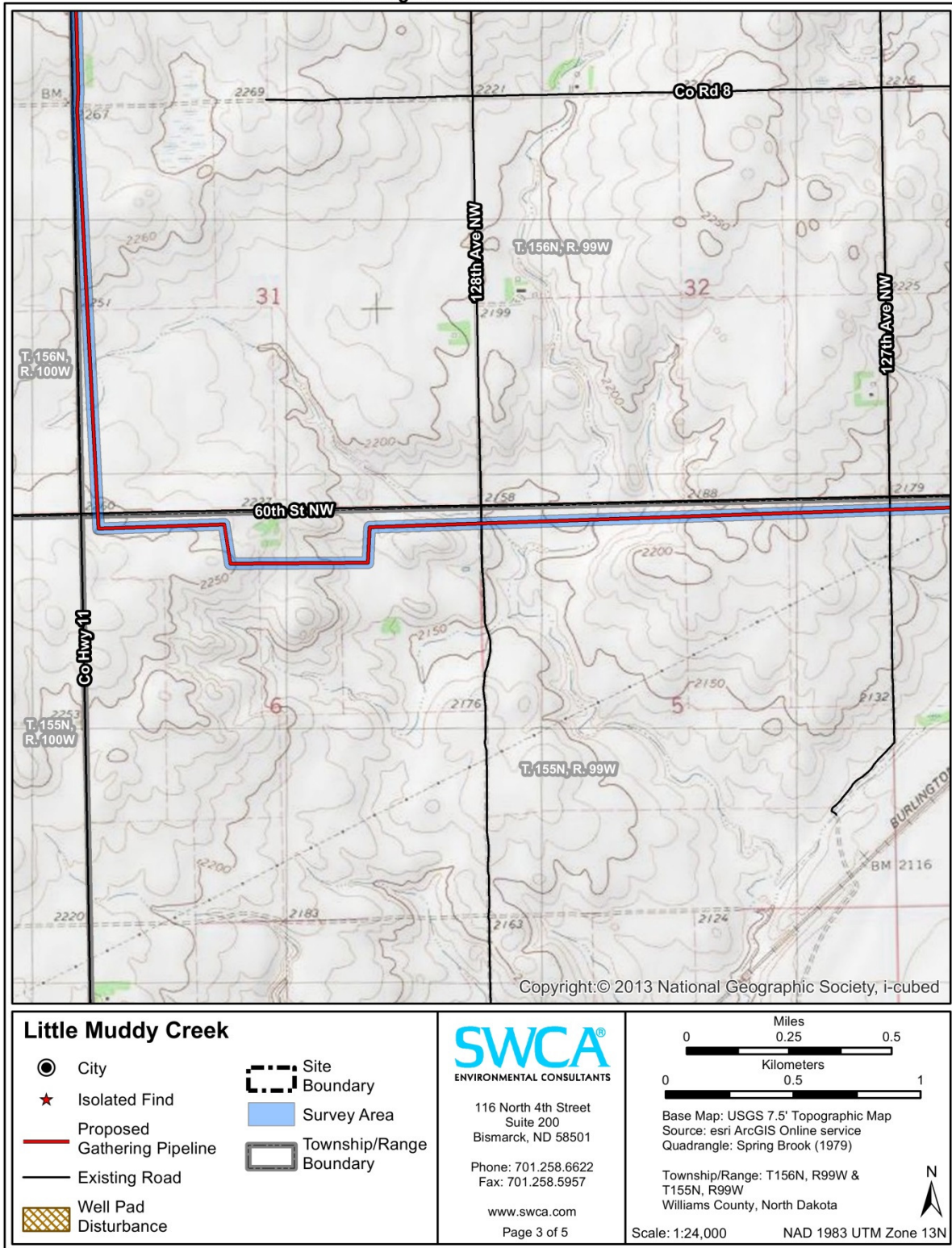
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Resource location map 2 of 5, at 1:24,000 scale.

A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline,
Williams County, North Dakota

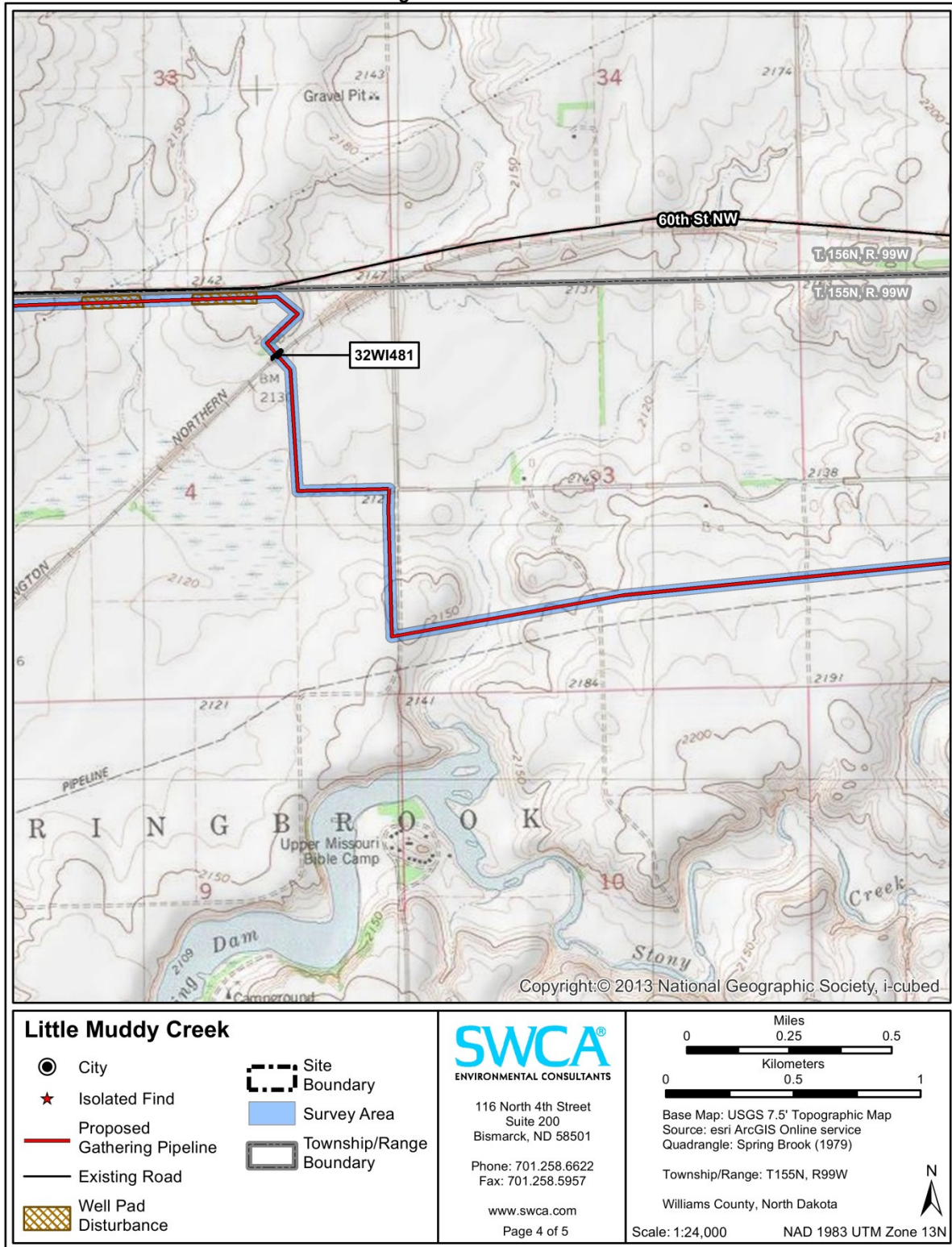
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Resource location map 3 of 5, at 1:24,000 scale.

A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline,
Williams County, North Dakota

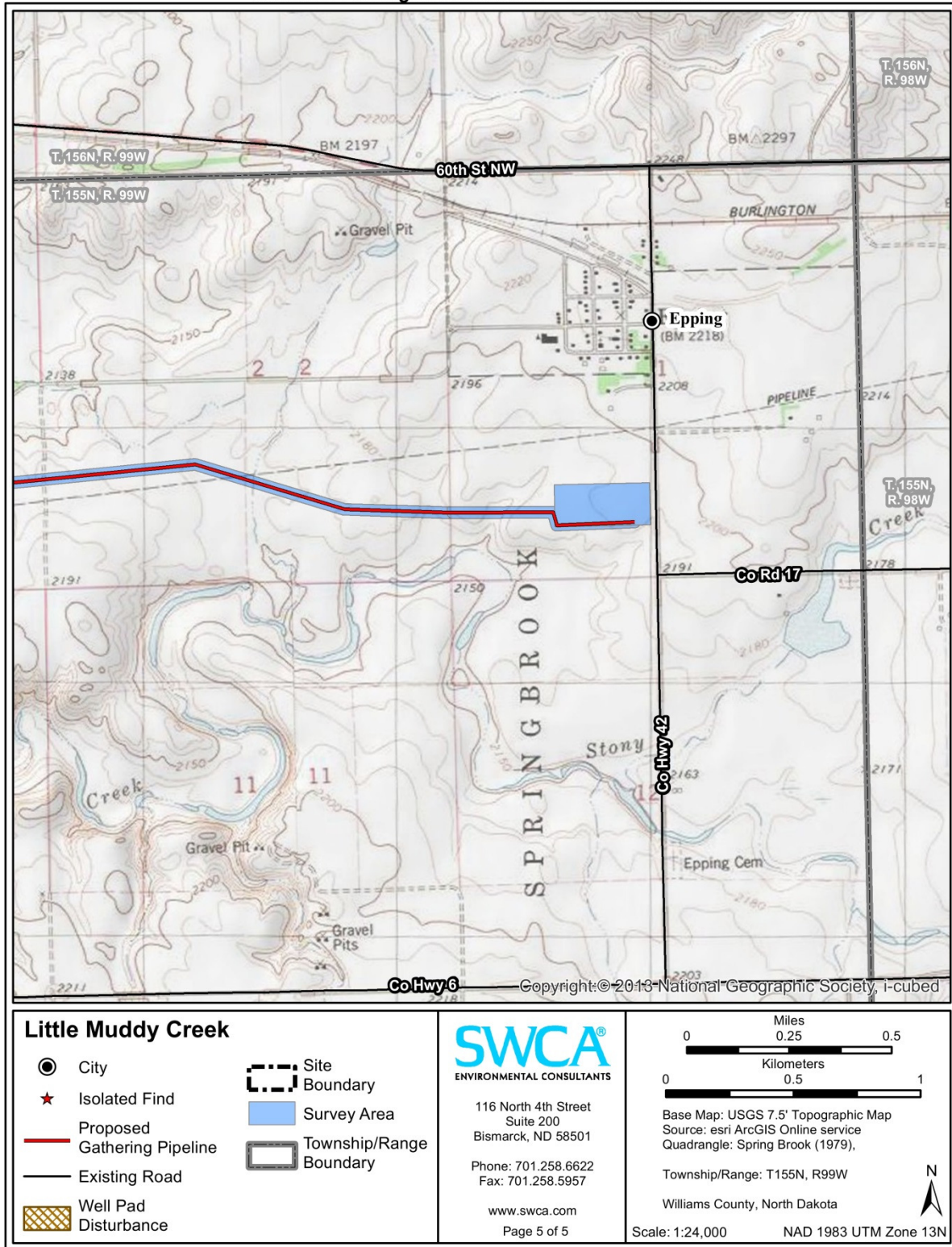
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Resource location map 4 of 5, at 1:24,000 scale.

A Class I and Class III Cultural Resource Inventory of the Little Muddy Creek Pipeline,
Williams County, North Dakota

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Resource location map 5 of 5, at 1:24,000 scale.

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Appendix F

10-Year Plan

Meadowlark Midstream Company, LLC (“Meadowlark”) hereby submits its ten-year plan pursuant to North Dakota Century Code § 49-22-04.

Introduction

Meadowlark plans to convert the existing Divide Lateral Oil Pipeline (described below) from a gathering pipeline to a transmission pipeline in conjunction with the addition of the Divide Pump Station (described below) to the Divide Lateral Oil Pipeline, which will cause the length of the Divide Lateral Pipeline downstream of the new Divide Pump Station to be a liquid transmission facility under North Dakota Century Code § 49-22-03.12. Installation of the Divide Pump Station is necessary to address demands for service from new customers by increasing the volume of crude oil that can be transported via the Divide Lateral Oil Pipeline. Once the Divide Pump Station is installed, the Divide Lateral Oil Pipeline will be Meadowlark’s first transmission facility in North Dakota subject to the provisions of North Dakota Century Code § 49-22-04.

SECTION A: Existing Facilities¹

Divide Lateral Oil Pipeline

1. **Location:** Originates in Divide County at the Divide Pump Station site, which is approximately 17 miles northwest of Alamo, North Dakota. From that location, the Divide Lateral Oil Pipeline extends in a south/southeasterly direction into Williams County to its terminus at the existing Colt Rail Terminal (“Colt Hub”) located north of Epping, North Dakota. A map showing the location of the Divide Lateral Oil Pipeline is attached hereto as **EXHIBIT “A.”**

2. **Type and Capacity:**
 - a. Product Type: Crude oil
 - b. Length of Facility: 43.5 miles
 - c. Pipe Size: 8.625” diameter, 0.322” wall thickness
 - d. Maximum Design Operating Pressure: 1440
 - e. Maximum Design Flow Rate: 45,000 barrels per day
 - f. Pump Station Specifications: Field gathering injection pumps move product to Colt Hub.
 - g. Minimum Cover Over Pipe: 36”
 - h. In Service Date: October 2013.

The Divide Lateral Oil Pipeline is not committed to be retired in the next ten years.

SECTION B: Intended Construction of Transmission Facilities During the Next Five Years

Little Muddy Interconnection Pipeline

¹ The Divide Lateral Oil Pipeline currently exists, but will not qualify as a transmission facility under North Dakota Century Code § 49-22-03.12 until installation of the Divide Pump Station.

1. **Location:** Meadowlark intends to construct, and will seek a route permit for, an approximately 15 mile long pipeline (the “Little Muddy Interconnection Pipeline”) beginning in close proximity to the Colt Hub and ending at North Dakota Pipeline Company LLC’s (“NDPC”) Little Muddy Station located approximately 10.5 miles northwest of Epping, North Dakota, where it will interconnect with NDPC’s interstate pipeline. A map showing the anticipated location of the Little Muddy Interconnection Pipeline is attached hereto as **EXHIBIT “A.”**

SECTION C: Proposed Transmission Facilities During the Next Ten-Year Time Period

See Section B, above.

SECTION D: Regional Coordination

While Meadowlark coordinates with producers in North Dakota by discussing potential connections with planned and existing wells, Meadowlark has very limited regional coordination with other midstream companies in North Dakota due to confidentiality concerns and potential antitrust issues.

SECTION E: Environmental Information

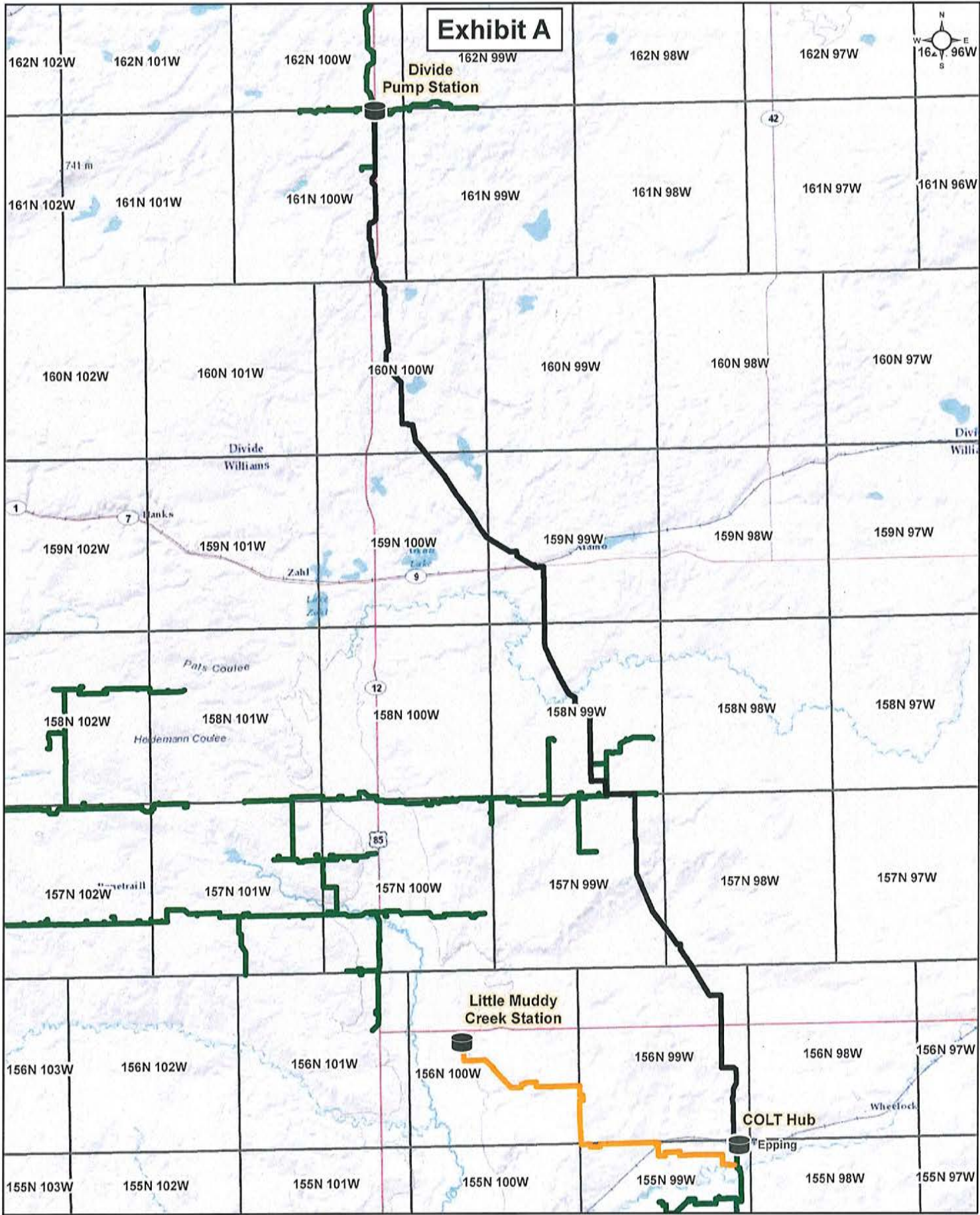
Meadowlark monitors regulatory developments and has developed working relationships with the U.S. Fish and Wildlife Service, the Bureau of Land Management, the North Dakota Industrial Commission, the North Dakota Public Service Commission, and the North Dakota Department of Health, in an effort to ensure regulatory compliance. Meadowlark continues to develop detailed risk collaborations with local emergency planning groups.

Meadowlark selects pipeline corridors and routing to minimize impact as required by the statutes and rules and regulations of the Public Service Commission. When desirable, Meadowlark may employ local environmentalists and archaeologists to assist with planning. Meadowlark is well prepared to meet any emergency and mitigate the impact of a pipeline failure.

SECTION F: Projected Demand for Service

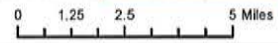
Drilling activity in the counties where Meadowlark has gathering facilities (Williams and Divide Counties) has dramatically increased, and Meadowlark estimates that gas and crude oil production will increase, resulting in an increased demand for both gas and crude oil gathering services.

Exhibit A



Legend

- Little Muddy Interconnection Pipeline
- Divide Lateral Oil Pipeline
- Meadowlark Gathering Lines



Appendix G

Landowner Waivers



Meadowlark Midstream Company, LLC
999 18th Street, Suite 3400S
Denver, CO 80202

Phone: 720.452.6225
Fax: 720.452.6232
www.summitmidstream.com

Sep 24th, 2014

Craig and Danielle Moen
12565 59th St NW
Epping, ND 58843

RE: Meadowlark Midstream Company, LLC and Epping Transmission Company, LLC – Little Muddy Pipeline

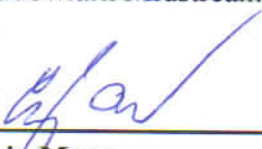
Mr. and Mrs. Moen,

Please review the attached site map noting the proposed location of an underground pipeline and associated facilities that are included in the Little Muddy Pipeline Application that Meadowlark Midstream Company, LLC and Epping Transmission Company, LLC intend to jointly file with the North Dakota Public Service Commission (“Pipeline Project”). The Pipeline Project involves installation of a 14.75 mile long 10 inch crude oil pipeline as well as construction of an aboveground tank on the eastern end of the pipeline. Of the 14.75 miles of underground pipeline, approximately 10 miles will involve modifications to various portions of crude oil gathering lines that will already be in service at the time of modification. The remaining approximately 5 miles will consist of entirely new construction. The attached site map indicates that the Pipeline Project will be located within 500 feet of your residence or business.


By signing below you are confirming that you have no objection to the Pipeline Project, or the future operation and maintenance of the Pipeline Project. Your cordial cooperation in this manner is greatly appreciated.

Respectfully,

Brad French
Contract ROW Agent
Meadowlark Midstream Company, LLC



Craig Moen
Date: 9-24-14



Danielle Moen
Date: 9-24-14