WBI ENERGY TRANSMISSION, INC.

Wahpeton Expansion Project

Resource Report 7
Soil Resources

Draft

Docket No.
PF21-4-000

March 2022

WBI ENERGY TRANSMISSION, INC.
WAHPETON EXPANSION PROJECT
RESOURCE REPORT 7 – SOIL RESOURCES

Minimum Filing Requirements:	**Addressed in:**
1. List, by milepost, the soil associations that would be crossed and describe the erosion potential, fertility, and drainage characteristics of each association. – Title 18 of the Code of Federal Regulations (CFR) Part (§) 380.12(i)(1)	Appendices 7A and 7B
2. If an aboveground facility site is greater than 5 acres: i. List the soil series within the property and the percentage of the property comprised of each series; ii. List the percentage of each series which would be permanently disturbed; iii. Describe the characteristics of each soil series; and iv. Indicate which are classified as prime or unique farmland by the United States Department of Agriculture, Natural Resources Conservation Service. – 18 CFR § 380.12(i)(2)	Section 7.2 and 7.3.2
3. Identify, by milepost, potential impact from: Soil erosion due to water, wind, or loss of vegetation; soil compaction and damage to soil structure resulting from movement of construction vehicles; wet soils and soils with poor drainage that are especially prone to structural damage; damage to drainage tile systems due to movement of construction vehicles and trenching activities; and interference with the operation of agricultural equipment due to the probability of large stones or blasted rock occurring on or near the surface as a result of construction. – 18 CFR § 380.12(i)(3)	Section 7.3.1 and appendix 7A
4. Identify, by milepost, cropland and residential areas where loss of soil fertility due to trenching and backfilling could occur.– 18 CFR § 380.12(i)(4)	Section 7.3.1 and appendix 7A
5. Describe proposed mitigation measures to reduce the potential for adverse impact to soils or agricultural productivity. Compare proposed mitigation measures with the staff's current "Upland Erosion Control, Revegetation, and Maintenance Plan," which is available from the Commission Internet home page or from the Commission staff, and explain how proposed mitigation measures provide equivalent or greater protections to the environment. – 18 CFR § 380.12(i)(5)	Section 7.3
Additional Information:	
If the applicant generally proposes to adopt the Federal Energy Regulatory Commission staff's *Upland Erosion Control, Revegetation, and Maintenance Plan* except at certain locations, identify on a site-specific basis locations where alternative measures are proposed, and describe the alternative measures that will ensure an equal or greater level of protection.	Resource Report 1, section 1.3
Provide documentation of consultation with the U.S. Department of Agriculture's Natural Resources Conservation Service or other applicable agencies regarding seed mixes, erosion control, and invasive species/noxious weeds.	Appendix 7C

WBI ENERGY TRANSMISSION, INC.
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ACRONYMS AND ABBREVIATIONS

EI	environmental inspector
FERC	Federal Energy Regulatory Commission
MLRA	Major Land Resource Areas
MP	milepost
NRCS	Natural Resources Conservation Service
Plan	*Upland Erosion Control, Revegetation, and Maintenance Plan*
Procedures	*Wetland and Waterbody Construction and Mitigation Procedures*
Project	Wahpeton Expansion Project
RFFA	reasonably foreseeable future action
SSURGO	Soil Survey Geographic database
USDA	U.S. Department of Agriculture
WBI Energy	WBI Energy Transmission, Inc.
WEG	wind erodibility group

WBI ENERGY TRANSMISSION, INC.
WAHPETON EXPANSION PROJECT

7.0 RESOURCE REPORT 7 – SOIL RESOURCES

WBI Energy Transmission, Inc. (WBI Energy) proposes to construct, modify and operate the Wahpeton Expansion Project (Project) in Cass and Richland Counties, North Dakota. The Project will include the construction and operation of approximately 60.6 miles of 12-inch-diameter natural gas pipeline from WBI Energy's existing Mapleton Compressor Station near Mapleton, North Dakota, to a new delivery station near Wahpeton, North Dakota. The Project will also include minor modifications at the Mapleton Compressor Station, a new delivery station near Kindred, North Dakota, new block valve settings, and new pig launcher/receiver settings. The Project may also include newly constructed farm taps along the pipeline route. The proposed Project facilities will be located in Cass and Richland Counties, North Dakota (see Figure 1.1.2-1 of Resource Report 1).

In accordance with Title 18 of the Code of Federal Regulations Part 380.12(i), Resource Report 7 describes soils and soil resources that may be affected, directly or indirectly, by construction and operation of the proposed Project facilities. Mitigation measures to avoid or minimize these impacts are also discussed.

7.1 INTRODUCTION

Soil characteristics at the proposed Project facilities were identified and assessed using the Soil Survey Geographic (SSURGO) database (Soil Survey Staff, 2022a). This database is a digital version of the county soil surveys developed by the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) for use with geographic information systems. It provides detailed soils information and is used for natural resource planning and management. SSURGO is linked to an attribute database that gives the proportionate extent of the component soils and their properties for each soil map unit.

SSURGO attribute data consist of physical properties, chemical properties, and interpretive groupings. Attribute data can apply to the whole soil (e.g., prime farmland, slope class) or to layer data for soil horizons (e.g., texture, permeability). The soil attribute data can be used in conjunction with spatial data to describe soils in a particular area.

The SSURGO database was queried for attribute data pertaining to prime farmland, hydric soils, compaction prone soils, water and wind erodible soils, soils with revegetation concerns, rocky soils, and shallow bedrock, as described below. These are designations and characteristics that present potential construction limitations as discussed further in section 7.3. Additional information about soils and associated land uses was obtained from the Official Soil Series Descriptions (Soil Survey Staff, 2022b).

7.2 EXISTING SOIL RESOURCES

Soil interpretations at the broadest scale in the United States are based on Major Land Resource Areas (MLRA). MLRAs are geographically associated land resource units delineated by the NRCS and characterized by physiography, geology, climate, water, soils, biological resources, and land use. The Project will be located in the Red River Valley of the North MLRA

(USDA, 2006). The Red River Valley of the North MLRA is characterized as a flat glacial lake plain bisected by the Red River.

The dominant soil orders in the Red River Valley of the North MLRA are Mollisols and Vertisols. The soils in this MLRA are characterized as very deep, somewhat poorly drained to very poorly drained, and loamy to clayey in texture (USDA, 2006).

The majority of land use within the Red River Valley of the North MLRA is private dry-farming cropland accounting for almost 80 percent of land use. The major soil resource concerns are surface compaction, erosion, sediment deposition from floodwater, maintenance of the content of organic matter and productivity of the soils, salinity in select areas, and aggregate stability (USDA, 2006).

7.3 GENERAL CONSTRUCTION IMPACTS AND MITIGATION

Soils within the Project workspace were evaluated to identify prime farmland and major soil characteristics that could affect construction or increase the potential for construction-related soil impacts. Table 7.3-1 provides a summary of the significant soil characteristics for soils that will be affected by the proposed Project. Project facility type, individual soil characteristics, and potential mitigation measures that will be employed for each characteristic are discussed separately below.

7.3.1 Pipeline Facilities

Pipeline construction activities that have the potential to affect soils and revegetation efforts include clearing of vegetation, topsoil stripping, grading, trenching, backfilling, and restoration. Potential soil impacts include:

- loss of soil due to water or wind erosion;
- reduction of soil quality by mixing topsoil with subsoil or by bringing excess rocks to the surface;
- soil compaction due to traffic by heavy construction equipment; and
- disruption of surface and subsurface drainage systems.

In addition, the presence of certain soil conditions along the pipeline route (e.g., well drained soils) could result in poor revegetation of the right-of-way, which has the potential to increase invasive plant species.

TABLE 7.3-1

Wahpeton Expansion Project
Acres of Soil Characteristics Affected by the Proposed Project [a]

Facility	Total Acres	Prime Farmland [b]	Hydric [b]	Compaction Prone [c]	Highly Erodible Water [d]	Highly Erodible Wind [e]	Revegetation Concerns [f]	Rocky [g]	Shallow Bedrock [h]
Pipeline Right-of-Way									
Permanent Easement	366.3	273.5	233.1	332.8	17.5	8.6	6.8	0.0	0.0
Temporary Workspace	180.4	134.9	115.9	165.4	8.4	4.3	3.0	0.0	0.0
Subtotal	**546.7**	**408.4**	**349.0**	**498.2**	**25.9**	**12.9**	**9.8**	**0.0**	**0.0**
Additional Temporary Workspace	**82.2**	**64.4**	**48.1**	**74.1**	**2.0**	**0.6**	**0.5**	**0.0**	**0.0**
Contractor Yards									
Temporary Workspace									
Kost Yard	49.9	49.9	49.9	49.9	0.0	0.0	0.0	0.0	0.0
Kindred Yard	4.1	1.2	4.1	4.1	0.0	0.0	0.0	0.0	0.0
Comstock Yard	23.9	19.7	23.9	23.9	0.0	0.0	0.0	0.0	0.0
Wahpeton City Yard	32.1	32.1	0.0	32.1	0.0	0.0	0.0	0.0	0.0
Wahpeton Yard	10.4	0.0	3.7	3.7	0.0	0.0	0.0	0.0	0.0
Subtotal	**120.5**	**103.0**	**81.6**	**113.8**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Access Roads									
Permanent Access Roads	2.6	**0.6**	2.2	2.5	0.0	0.0	0.0	0.0	0.0
Temporary Access Roads	13.5	**10.5**	6.1	8.7	0.2	1.1	0.7	0.0	0.0
Subtotal	16.0	**11.1**	8.3	11.2	0.2	1.1	0.7	0.0	0.0
Aboveground Facilities									
Permanent Workspace									
Mapleton Compressor Station	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MDU border stations	3.3	2.0	2.0	3.3	0.0	0.0	0.0	0.0	0.0
Block valves [i]	0.3	0.2	0.2	0.3	0.0	0.0	0.0	0.0	0.0
Pig launchers/receivers [i]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temporary Workspace									
Mapleton Compressor Station	2.9	2.9	2.8	2.8	0.0	0.0	0.0	0.0	0.0
MDU border stations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Block valves [i]	2.3	1.4	1.1	2.3	0.0	0.0	0.0	0.0	0.0

TABLE 7.3-1

Wahpeton Expansion Project
Acres of Soil Characteristics Affected by the Proposed Project [a]

Facility		Total Acres	Prime Farmland [b]	Hydric [b]	Compaction Prone [c]	Highly Erodible Water [d]	Highly Erodible Wind [e]	Revegetation Concerns [f]	Rocky [g]	Shallow Bedrock [h]
Pig launchers/receivers [i]		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	**8.8**	**6.5**	**6.1**	**8.8**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Total		**774.2**	**593.5**	**493.1**	**706.0**	**28.0**	**14.6**	**11.0**	**0.0**	**0.0**

Sources: Soil Survey Staff, 2020a and 2020b

[a] The area affected includes all permanent and temporary workspace (including additional temporary workspace). The numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the sum of the addends. The values in each row may not add up to the total acreage for each facility because the soils may occur in more than one characteristic class or may not occur in any class listed in the table. The soils in the table do not include areas of open water.

[b] As designated by the NRCS. Prime farmland includes those soils that are considered prime if a limiting factor is mitigated (e.g., through artificial drainage) and soils designated as farmland of statewide importance. Hydric soils are soils is poor to very poor drainage classes.

[c] Soils in somewhat poor to very poor drainage classes with surface textures of sandy clay loam and finer.

[d] Soils in land capability subclasses 4E through 8E and soils with an average slope greater than 8 percent.

[e] Soils with a Wind Erodibility Group classification of 1 or 2.

[f] Soils with a surface texture of sandy loam or coarser that are moderately well to excessively drained, and soils with an average slope greater than 8 percent.

[g] Soils with one or more horizons that have a cobbley, stony, bouldery, channery, flaggy, very gravelly, or extremely gravelly modifier to the textural class and/or contain greater than 5 percent by weight rocks larger than 3 inches.

[h] Soils identified as containing bedrock within 60 inches of the soil surface.

[i] Pig launcher/receiver settings will be collocated with block valve settings and are accounted for in the block valve impact acreage. Three of the block valve sites and the associated pig launcher/receiver are collocated with and accounted for in the Mapleton Compressor Station or the border stations impact acreage.

To minimize or avoid impacts on soils, WBI Energy will implement the soil mitigation measures described in the Federal Energy Regulatory Commission's (FERC) *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) and *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures).

7.3.1.1 Prime Farmland and Farmland of Statewide Importance

The USDA defines prime farmland as "land that is best suited to food, feed, fiber, and oilseed crops" (Soil Survey Division Staff, 1993). This designation includes cultivated land, pastureland, woodland, or other lands that are either used for food or fiber crops or are available for these uses. Urbanized land and open water are excluded from prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods, and is not subject to frequent, prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., if a flooding tendency is mitigated by artificial drainage). In some areas, land that does not meet the criteria for prime farmland is considered farmland of statewide importance for the production of food, feed, fiber, forage, and oilseed crops. The appropriate state agencies determine the criteria for defining and delineating farmland of statewide importance, which generally includes areas that economically produce high yields of crops when treated and managed according to acceptable farming methods. Impacts on prime farmland are of general concern because of the potential for decreases in long-term agricultural productivity.

Prime farmland and farmland of statewide importance designations are direct attributes in the SSURGO database. Percentages and acreages of prime farmland were determined by a simple query of the database. Approximately 593.5 acres (77 percent) of land that will be affected by Project construction is prime farmland or farmland of statewide importance. Topsoil and subsoil will be disturbed as a result of topsoil removal, grading, trench excavation, and heavy equipment moving along the right-of-way. These activities could cause mixing of topsoil or surface soil with the subsoil and potentially result in a loss of soil productivity. To prevent mixing of the soil horizons or incorporation of additional rock into the topsoil, topsoil segregation will be performed pursuant to the FERC's Plan and Procedures in non-saturated wetlands, cultivated or rotated croplands, managed pastures, hayfields, residential areas, and in other areas requested by the landowner or land managing agency. Topsoil will be segregated, as appropriate, from the subsoil and will be replaced in the proper order during backfilling and final grading. Implementation of proper topsoil segregation will help promote post-construction revegetation success, thereby minimizing loss of crop productivity and the potential for long-term problems with erosion.

Drain Tiles

Drain tiles are subsurface structures used in agricultural areas to improve the productivity of the land by increasing drainage of the soils. Excavation of the pipeline trench as well as rutting due to operation of heavy construction equipment in wet soils can damage tiles. A considerable portion of the pipeline route crosses fields containing agricultural drain tile systems. WBI is working with landowners to identify parcels crossed by the Project that have drain tiles. A table summarizing the location of existing and future drain tile systems crossed by the Project will be provided to FERC prior to construction.

As described in Section 1.3.2.4 of Resource Report 1, where drain tile systems are identified, WBI Energy will work with landowners and drain tile experts to move, restructure, or replace existing drain tiles and minimize impacts. Identified tile lines will be flagged prior to construction to alert construction crews. WBI Energy will install the pipeline under existing drain tiles unless the drain tiles are located deep enough to maintain sufficient clearance between the tile and the pipeline. During construction, tile lines that are damaged, cut, or removed will be marked. If water is flowing through a damaged drain tile line, WBI Energy will install screens to prevent entry of soil or other foreign materials and implement temporary repairs prior to the end of the workday to maintain water flow until permanent repairs are made. Where water is not flowing, the exposed opening of cut or damaged drain tile lines will be screened and temporarily repaired within 24 hours.

Permanent drain tile line repairs will be made by a qualified drain tile specialist, the landowner, or a landowner's representative. Prior to completion of the permanent repairs, tile lines will be inspected within the entire width of the right-of-way length within the work area to check for tile damaged by construction equipment. Damaged, broken, or cracked drain tiles will be replaced with new tiles. The quality, size, and flow of replacement tiles will equal or exceed that of the damaged tile. The drain tile will be permanently repaired so that its original gradient and alignment are restored.

Irrigation Systems

WBI has not identified any irrigation systems along the pipeline route.

7.3.1.2 Hydric Soil and Compaction Potential

Hydric soils are soils that formed under conditions of saturation for a long enough period of time during the growing season to develop anaerobic conditions in the upper layer of the soil column. Soils that are artificially drained or protected from flooding (e.g., by drain tiles) are still considered hydric if the soil in its undisturbed state would meet the definition of a hydric soil. Generally, hydric soils are those soils that are classified as poorly drained or very poorly drained. Approximately 493.1 acres (64 percent) of the soils that will be affected by pipeline construction are hydric soils.

Soil compaction modifies the structure and reduces the porosity and moisture-holding capacity of soils. Construction equipment traveling over wet soils could disrupt the soil structure, reduce pore space, increase runoff potential, or cause rutting. The degree of compaction depends on moisture content and soil texture. Fine-textured soils with poor internal drainage and/or that are moist or saturated during construction are most susceptible to compaction and rutting.

Compaction-prone soils were identified by querying the SSURGO database for soil components that have (1) a surface texture of sandy clay loam or finer, and (2) a drainage class of somewhat poorly, poorly, or very poorly drained. Approximately 706.0 acres (91 percent) of the soils that will be affected by pipeline construction are prone to compaction. During construction, WBI Energy will implement measures outlined in the FERC Plan and Procedures to minimize compaction and rutting. In addition, environmental inspectors (EIs) could recommend restricting construction activities in areas with unfavorable conditions (e.g., saturated soils) to further reduce compaction and rutting. WBI Energy will further mitigate compaction by using a paraplow or similar implement to conduct deep tillage operations during restoration. In areas

where topsoil segregation occurs, plowing to alleviate subsoil compaction will be conducted before replacement of the topsoil.

7.3.1.3 Erosion Potential

Erosion is a continuing natural process that can be accelerated by human disturbance. Factors that influence the degree of erosion include soil texture, structure, length and percent of slope, vegetation cover, and rainfall or wind intensity. Soils most susceptible to erosion by water are typified by bare or sparse vegetation cover, non-cohesive soil particles with low infiltration rates, and moderate to steep slopes. Wind erosion processes are less affected by slope angles, and more affected by grain size. Medium textured soils (e.g., very fine sandy loams, fine sandy loams, and silt loams) are most susceptible to wind erosion. Topsoil removal, clearing, grading, and equipment movement could accelerate the erosion process and, without adequate protection, result in discharge of sediment outside approved workspace boundaries. Soil loss due to erosion could also reduce soil fertility and impair revegetation.

Map units with a land capability subclass designation of 4E through 8E, which are considered to have severe to extreme erosion limitations for agricultural use and/or an average slope greater than 8 percent, were identified as susceptible to water erosion. Approximately 28.0 acres (4 percent) of the soils that will be affected by pipeline construction are considered susceptible to erosion by water.

Wind erodibility was assessed based on wind erodibility group (WEG) designations. A WEG is a grouping of soils that has similar surface-soil properties affecting its resistance to soil blowing, including texture, organic matter content, and aggregate stability. Soils in WEG 1 and 2 include sandy-textured soils with poor aggregation that are particularly susceptible to wind erosion. Approximately 14.6 acres (2 percent) of the soils that will be affected by pipeline construction have a WEG classification of 2 or less and are considered highly wind erodible. Should it be necessary to control fugitive dust emissions, WBI Energy will apply water, mulch, or tackifiers to exposed work areas and/or topsoil storage piles during construction.

WBI Energy will utilize erosion and sedimentation control devices in accordance with the FERC Plan and Procedures. Specific measures WBI Energy will employ to minimize erosion are described below.

Temporary Sediment Barriers

WBI Energy will install and maintain temporary sediment barriers (e.g., silt fences or straw bales and straw logs) in accordance with the FERC Plan and Procedures to protect surface waters and roadways by controlling the flow of sediment on the construction right-of-way and by preventing the flow of sediment off the construction right-of-way. These devices will be installed at the base of slopes adjacent to waterbody crossings, wetlands, and road crossings, as appropriate, and in other areas as necessary, until permanent revegetation measures have been judged successful and the potential for siltation has been minimized.

Slope Breakers

WBI Energy will install temporary slope breakers during construction and permanent slope breakers during restoration that will consist of mounded and compacted soil extending across the pipeline construction right-of-way to slow the velocity of runoff and move water off the right-of-

way. The location and need for slope breakers will be determined by WBI Energy and its EIs based on the FERC Plan and field conditions.

Permanent Trench Breakers

WBI Energy will install permanent trench breakers consisting of stacked sandbags or foam around the pipe in the trench to prevent subsurface channeling of water along the trench in areas as determined by WBI Energy and its EIs. Topsoil will not be used for trench breakers. Trench breakers will be installed on applicable slopes prior to backfilling. Trench breaker spacing will be determined in accordance with the FERC Plan and Procedures. Trench breakers will also be installed on slopes greater than 5 percent that are adjacent to waterbodies and wetlands in areas determined by WBI Energy and its EIs.

Timing of Restoration

WBI Energy will complete final grading, topsoil replacement, and installation of permanent erosion control measures in an area within 20 days after backfilling the trench, weather and soil conditions permitting.

Revegetation

Following final grading and cleanup, WBI Energy will work to achieve rapid, successful establishment of vegetation on areas requiring revegetation as described in the FERC Plan and Procedures. During the appropriate season, WBI Energy will condition the construction right-of-way for planting, prepare a seedbed, and incorporate soil amendments, where necessary, at rates agreed to by the landowner or as specified in writing by an appropriate soil conservation authority. While WBI Energy does not anticipate the need for additional mitigation, should it be required based on field conditions, WBI Energy may elect to incorporate soil amendments (e.g., hydrated lime) to saturated upland soils to achieve target moisture levels prior to seeding. Application rates, material storage, and handling will be conducted in accordance with the manufacturer's recommendation. In accordance with the FERC Procedures, WBI Energy will not use soil amendments in wetlands unless required in writing by the appropriate land-managing agency. In addition, WBI Energy will not use hydrated lime within 100 feet of wetlands or waterbodies in order to reduce the potential for downgradient water quality impacts. Seeding (and mulching) in cultivated areas will conform to the adjacent off right-of-way area unless otherwise requested in writing by the landowner.

Mulch

Mulch consisting of straw, erosion-control fabric, or other equivalent is intended to protect the soil surface from water and wind erosion and to optimize the soil moisture regime necessary for successful revegetation. Where deemed necessary, WBI Energy will uniformly spread mulch over at least 75 percent of the ground surface in disturbed areas to minimize erosion and preserve moisture in areas requiring revegetation. Implementation of proper topsoil segregation will help post-construction revegetation success, thereby minimizing the potential for long-term erosion due to lack of vegetation cover.

During construction and restoration, WBI Energy and EIs will monitor the effectiveness of temporary erosion control devices. During long-term operation and maintenance of the pipeline, WBI Energy operations and environmental personnel will monitor the effectiveness of

revegetation and permanent erosion control devices. Erosion control devices will be maintained until the right-of-way is revegetated successfully and final stabilization is achieved. Following successful revegetation of construction areas, temporary erosion control devices will be removed.

7.3.1.4 Revegetation Concerns

Droughty soils that have a coarse surface texture and are somewhat excessively to excessively drained may prove difficult to revegetate. Drier soils have less water to aid in the germination and eventual establishment of new vegetation. Coarser textured soils also have a lower water holding capacity following precipitation, which could result in moisture deficiencies in the root zone creating unfavorable conditions for many plants. In addition, steep slopes may make the establishment of vegetation difficult.

Soils with revegetation concerns were identified by querying the SSURGO database for soil components that (1) have a surface texture of sandy loam or coarser, (2) are moderately well to excessively drained, and (3) have an average slope greater than or equal to 9 percent. Approximately 11.0 acres (1 percent) of the soils that will be affected by pipeline construction are considered to have revegetation concerns. Successful restoration and revegetation are important for maintaining agricultural productivity and to protect the underlying soil from potential damage, such as erosion. In accordance with the FERC Plan and landowner specifications, WBI Energy will apply soil amendments in areas with poor revegetation potential, as necessary, to create a favorable environment for the re-establishment of vegetation.

In December 2021, WBI Energy contacted regional NRCS and Farm Service Agency offices to request comments on the proposed seed mixes for the Project and review of any lands crossed by the Project enrolled in the Conservation Reserve Program or Agriculture Conservation Easement Program. As of January 2022, WBI Energy has received comments from one NRCS office. WBI Energy will continue to consult with the NRCS and Farm Service Agency and provide any additional responses and incorporated recommendations as they are available. Copies of the correspondence related to seed mixes are included in appendix 7C. A discussion of lands enrolled in Conservation Reserve or Agricultural Conservation Easement programs is included in Resource Report 8. Based on recommendation from the NRCS, WBI Energy proposes to use seed mixes designed for reseeding land in accordance with the North Dakota Department of Transportation *2020 Standards and Specifications for Road and Bridge Construction*.

7.3.1.5 Rocky Soils and Shallow Bedrock

Introducing stones or rocks to surface soil layers may reduce soil moisture-holding capacity, resulting in a reduction of soil productivity. Additionally, some agricultural equipment may be damaged by contact with large rocks and stones. Rock fragments and stones at the surface and in the surface layer may be encountered during grading, trenching, and backfilling.

Shallow-to-bedrock soils were investigated by querying the SSURGO database for soil components that have bedrock within 60 inches of the soil surface. The analysis also identified whether the near-surface bedrock was lithic (consolidated crystalline rock) and would require blasting to excavate, or paralithic (unconsolidated weathered rock) and could likely be ripped and dug without blasting (see Resource Report 6 for more information regarding bedrock and blasting). No soils with shallow bedrock (bedrock within 60 inches of the surface) were identified within the Project workspace.

Soils with significant quantities of rock were identified by querying the SSURGO database for component soil series that have either (1) a cobbley, stony, bouldery, shaly, very gravelly, or extremely gravelly modifier to the textural class, or (2) contain greater than 5 percent (by weight) of rocks larger than 3 inches. No soils with significant quantities of rock were identified within the Project workspace.

If soil with excess rock is encountered during construction, WBI Energy will remove excess rock from surface soils disturbed by construction so that the size, density, and distribution of rock on the construction right-of-way is similar to adjacent undisturbed areas. If bedrock is encountered, WBI Energy will take necessary precautions to minimize the mixing of excavated bedrock with backfill and will replace rock in the trench to a level that is consistent with the original bedrock profile. If necessary, excess rock will be hauled off the right-of-way or else disposed of on the right-of-way, subject to landowner approval and any applicable permit conditions.

7.3.2 Aboveground Facilities

The proposed Project will require construction of border stations, block valves,[1] pig launcher and receiver facilities, and associated appurtenances. Each of these facilities will be fenced and retained for Project operations.

Construction of piping modifications, Valve Site #1, and a pig launcher/receiver will occur within the Mapleton Compressor Station fence line but would not result in any conversion of land use, including prime farmland or farmland of statewide importance.

Construction of the MDU – Kindred Border Station and the MDU – Wahpeton Border Station will permanently convert approximately 3.3 acres of land to commercial/industrial use. Approximately 2.0 acres of the land retained for permanent operation of the border stations is prime farmland and is currently being used for agricultural purposes.

Construction of the valve sites and associated pig launchers and receivers that are not collocated with other aboveground facilities will temporarily impact approximately 2.3 acres and permanently convert approximately 0.3 acre of land to commercial/industrial use. Approximately 0.2 acre of land retained for permanent operation of the valve sites is prime farmland or farmland of statewide importance and is currently being used for agricultural purposes.

Additionally, installation of farm taps along the pipeline route will permanently impact soil resources within the farm tap foot print. The location and number of farm taps have not yet been determined.

7.3.3 Access Roads

WBI Energy will use existing public and private access roads on a temporary basis to transport personnel, equipment, vehicles, and materials to the proposed Project work areas during construction. New permanent roads will be required for access to the new MDU – Kindred

[1] Construction and operation of the three of the block valves and the associated pig launcher and receiver facilities that occur within the Mapleton Compressor Station, MDU-Kindred Border Station, and the MDU-Wahpeton Border Station are included in the pipeline facilities section.

and MDU – Wahpeton Border Stations and to each valve setting or pig launcher/receiver site. The new roads to the MDU – Kindred and MDU – Wahpeton border stations will be gravel. The new roads to the valve setting and pig launcher/receiver sites will likely be gravel and/or dirt.

Use of temporary access roads will affect approximately 13.5 acres. Permanent access roads will affect approximately 2.6 acres, and will be retained during operation to provide access to the aboveground facilities. Use of the permanent access roads will affect approximately 0.6 acre of prime farmland or farmland of statewide importance, approximately 0.3 acre of which is currently being use for agricultural purposes.

7.3.4 Contractor Yards

WBI Energy anticipates the need for approximately 120.5 acres of land for use for five temporary contractor yards. Preparation of the contractor yards will consist of topsoil segregation and minor grading and leveling. Topsoil stockpiles will be stabilized in accordance with the FERC Plan to minimize wind and water erosion. Once construction is complete, the land within the contractor yards will be restored to preconstruction conditions in accordance with the FERC Plan and landowner agreements. As a result, there will be no permanent impacts on the soils in these areas.

The Kost Yard is approximately 3.7 miles east of milepost (MP) 5.5. Use of the yard will temporarily affect approximately 49.9 acres of land, all of which is mapped as prime farmland, hydric soils, and prone to compaction.

The Kindred Yard is approximately 2.6 miles west of MP 23.3. Use of the yard will temporarily affect approximately 4.1 acres of land, approximately 1.2 acres of which is mapped as prime farmland. The entire Kindred Yard is mapped as hydric soils and prone to compaction.

The Comstock Yard is approximately 2.3 miles southeast of MP 60.5. Use of the yard will temporarily affect approximately 23.9 acres of land, approximately 19.7 acre of which is mapped as prime farmland. The entire Comstock Yard is mapped as hydric soils and prone to compaction.

The Wahpeton City Yard is approximately 2.6 miles southeast of MP 60.5. Use of the yard will temporarily affect approximately 32.1 acres of land, all of which is mapped as prime farmland and prone to compaction.

The Wahpeton Yard is approximately 5.1 miles southeast of MP 60.5. Use of the yard will temporarily affect approximately 10.4 acres of land, none of which is mapped as prime farmland. Approximately 3.6 acres is prone to compaction.

7.4 CUMULATIVE IMPACTS

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

The cumulative impact assessment focuses on impacts from RFFAs that could reasonably extend into the area of direct soil disturbance associated with the Project. Soil impacts are expected to occur during construction and continue until the soils have been restored.

As described above, pipeline construction activities for the proposed Project could result in soil erosion, reduction in topsoil quality, compaction, and removal of prime farmland or farmland of statewide importance from cultivation. Construction of aboveground facilities and permanent access roads will permanently convert approximately 6.2 acres of land (including approximately 2.8 acres of prime farmland or farmland of statewide importance) to commercial/industrial use.

The cumulative impact assessment focuses on impacts from RFFAs that could reasonably extend into the area of direct soil disturbance associated with the Project. Soil impacts are expected to occur during construction and continue until the soils have been restored. The following eight projects fall within the Project's geographic scope for soil resources:

- MDU Distribution System for Kindred: The distribution system will be built to provide natural gas to industrial and residential customers in Kindred that want to convert to natural gas service. The area of overlap between the distribution system and the Project is anticipated to occur within the workspace required to construct the MDU – Kindred Border Station. The distribution system would be constructed in 2024 and may cause the soil surface to become more prone to wind and water erosion in the areas affected by both projects, may also result in additional soil compaction, and mixing of topsoil with subsoil.

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

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

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

- Ongoing agricultural activities: Agricultural activities are expected to continue throughout the life of the Project. The Project would contribute to a cumulative

impact on soils by disturbing lands that are also commonly disturbed by agricultural activities.

- NDDOT 9, NDDOT 10, and NDDOT 19: These North Dakota Department of Transportation highway construction and maintenance projects cross the Project at MP 6.0, MP 0.7, and MP 5.9, respectively. Although each of these road crossings will occur within the scope for cumulative impacts, the Project will cross each of these paved roads using a bore method, effectively eliminating the potential for cumulative impacts on soils in this area.

With implementation of the mitigation measures described in section 7.3, the Project will result in limited and temporary impacts to soils crossed by temporary workspace. While both the Project and the RFFAs could contribute to soil impacts within the overlapping construction areas during pipeline construction and restoration, these impacts will be temporary and highly localized, except in agricultural areas where ground disturbance already occurs on a periodic basis. Permanent impacts on soils will be limited to aboveground facility footprints. While the Project will result in some soil impacts, significant cumulative impacts are not expected when combined with the impacts of the abovementioned RFFAs due to the localized nature of the soil impacts, as well as the relatively short duration when soils will be disturbed in any given area.

7.5 REFERENCES

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APPENDIX 7A Soil Characteristics by Milepost for Each Soil Map Unit Along the Proposed Pipeline Route

APPENDIX 7A

Wahpeton Expansion Project
Characteristics of the Soil Map Units at the Proposed Pipeline

Milepost In	Milepost Out	Map Unit Symbol	Component Percent	Component Name	Total Length (miles)	Prime Farmland [a]	Hydric Soils [a]	Compaction Prone [b]	Highly Erodible		Revegetation Concerns [e]	Rocky [f]	Shallow Bedrock [g]
									Water [c]	Wind [d]			
Cass County													
0.00	0.09	I233A	100%	Fargo	0.09	Prime	Y	Y	N	N	N	N	N
0.09	0.12	I238A	41%	Hegne	0.01	Prime	Y	Y	N	N	N	N	N
			59%	Fargo	0.02	Prime	Y	Y	N	N	N	N	N
0.12	0.31	I233A	100%	Fargo	0.19	Prime	Y	Y	N	N	N	N	N
0.31	0.64	I235A	100%	Fargo	0.33	Prime	Y	Y	N	N	N	N	N
0.64	0.96	I233A	100%	Fargo	0.31	Prime	Y	Y	N	N	N	N	N
0.96	1.13	I229A	100%	Fargo	0.17	Prime	Y	Y	N	N	N	N	N
1.13	1.21	I233A	100%	Fargo	0.08	Prime	Y	Y	N	N	N	N	N
1.21	1.26	I248A	100%	Wahpeton	0.05	Prime	N	N	N	N	N	N	N
1.26	2.12	I229A	100%	Fargo	0.85	Prime	Y	Y	N	N	N	N	N
2.12	2.28	I473A	38%	Fargo	0.06	Prime	Y	Y	N	N	N	N	N
			63%	Hegne	0.10	Prime	Y	Y	N	N	N	N	N
2.28	2.35	I229A	100%	Fargo	0.07	Prime	Y	Y	N	N	N	N	N
2.35	2.44	I235A	100%	Fargo	0.09	Prime	Y	Y	N	N	N	N	N
2.44	2.55	I229A	100%	Fargo	0.11	Prime	Y	Y	N	N	N	N	N
2.55	2.63	I235A	100%	Fargo	0.08	Prime	Y	Y	N	N	N	N	N
2.63	2.72	I229A	100%	Fargo	0.08	Prime	Y	Y	N	N	N	N	N
2.72	2.85	I119A	100%	Bearden	0.13	Prime	N	Y	N	N	N	N	N
2.85	3.13	I238A	41%	Hegne	0.12	Prime	Y	Y	N	N	N	N	N
			59%	Fargo	0.17	Prime	Y	Y	N	N	N	N	N
3.13	3.15	I473A	38%	Fargo	0.01	Prime	Y	Y	N	N	N	N	N
			63%	Hegne	0.01	Prime	Y	Y	N	N	N	N	N
3.15	3.28	I235A	100%	Fargo	0.14	Prime	Y	Y	N	N	N	N	N
3.28	3.95	I371A	47%	Kindred	0.31	Prime	N	Y	N	N	N	N	N
			53%	Bearden	0.35	Prime	N	Y	N	N	N	N	N
3.95	4.72	I492A	47%	Lindaas	0.36	Prime	Y	Y	N	N	N	N	N
			53%	Bearden	0.42	Prime	N	Y	N	N	N	N	N
4.72	4.76	I238A	41%	Hegne	0.01	Prime	Y	Y	N	N	N	N	N
			59%	Fargo	0.02	Prime	Y	Y	N	N	N	N	N

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Milepost In	Milepost Out	Map Unit Symbol	Component Percent	Component Name	Total Length (miles)	Prime Farmland [a]	Hydric Soils [a]	Compaction Prone [b]	Highly Erodible		Revegetation Concerns [e]	Rocky [f]	Shallow Bedrock [g]
									Water [c]	Wind [d]			
4.76	4.86	I492A	47%	Lindaas	0.05	Prime	Y	Y	N	N	N	N	N
			53%	Bearden	0.05	Prime	N	Y	N	N	N	N	N
4.86	4.97	I231A	100%	Dovray	0.11	Prime	Y	Y	N	N	N	N	N
4.97	5.49	I119A	100%	Bearden	0.52	Prime	N	Y	N	N	N	N	N
5.49	5.59	I233A	100%	Fargo	0.10	Prime	Y	Y	N	N	N	N	N
5.59	5.72	I492A	47%	Lindaas	0.06	Prime	Y	Y	N	N	N	N	N
			53%	Bearden	0.07	Prime	N	Y	N	N	N	N	N
5.72	5.87	I229A	100%	Fargo	0.15	Prime	Y	Y	N	N	N	N	N
5.87	5.94	I906F	20%	Urban land	0.01	N	N	N	N	N	N	N	N
			25%	Aquents	0.02	N	Y	Y	N	N	N	N	N
			25%	Orthents	0.02	N	N	N	Y	N	Y	N	N
			30%	Orthents	0.02	N	N	N	Y	N	Y	N	N
5.94	6.09	I119A	100%	Bearden	0.15	Prime	N	Y	N	N	N	N	N
6.09	6.15	I229A	100%	Fargo	0.05	Prime	Y	Y	N	N	N	N	N
6.15	6.22	I119A	100%	Bearden	0.07	Prime	N	Y	N	N	N	N	N
6.22	6.39	I238A	41%	Hegne	0.07	Prime	Y	Y	N	N	N	N	N
			59%	Fargo	0.10	Prime	Y	Y	N	N	N	N	N
6.39	6.57	I229A	100%	Fargo	0.18	Prime	Y	Y	N	N	N	N	N
6.57	6.63	I238A	41%	Hegne	0.02	Prime	Y	Y	N	N	N	N	N
			59%	Fargo	0.04	Prime	Y	Y	N	N	N	N	N
6.63	6.68	I231A	100%	Dovray	0.04	Prime	Y	Y	N	N	N	N	N
6.68	7.54	I238A	41%	Hegne	0.35	Prime	Y	Y	N	N	N	N	N
			59%	Fargo	0.51	Prime	Y	Y	N	N	N	N	N
7.54	7.93	I229A	100%	Fargo	0.39	Prime	Y	Y	N	N	N	N	N
7.93	8.79	I238A	41%	Hegne	0.35	Prime	Y	Y	N	N	N	N	N
			59%	Fargo	0.51	Prime	Y	Y	N	N	N	N	N
8.79	9.03	I482A	40%	Bearden	0.10	Prime	N	Y	N	N	N	N	N
			60%	Overly	0.15	Prime	N	N	N	N	N	N	N
9.03	9.59	I229A	100%	Fargo	0.56	Prime	Y	Y	N	N	N	N	N
9.59	9.94	I233A	100%	Fargo	0.35	Prime	Y	Y	N	N	N	N	N

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Milepost In	Milepost Out	Map Unit Symbol	Component Percent	Component Name	Total Length (miles)	Prime Farmland [a]	Hydric Soils [a]	Compaction Prone [b]	Highly Erodible		Revegetation Concerns [e]	Rocky [f]	Shallow Bedrock [g]
									Water [c]	Wind [d]			
9.94	10.01	I482A	40%	Bearden	0.03	Prime	N	Y	N	N	N	N	N
			60%	Overly	0.04	Prime	N	N	N	N	N	N	N
10.01	10.05	I231A	100%	Dovray	0.04	Prime	Y	Y	N	N	N	N	N
10.05	10.10	I482A	40%	Bearden	0.02	Prime	N	Y	N	N	N	N	N
			60%	Overly	0.03	Prime	N	N	N	N	N	N	N
10.10	10.39	I233A	100%	Fargo	0.30	Prime	Y	Y	N	N	N	N	N
10.39	11.84	I229A	100%	Fargo	1.45	Prime	Y	Y	N	N	N	N	N
11.84	12.09	I235A	100%	Fargo	0.25	Prime	Y	Y	N	N	N	N	N
12.09	12.61	I238A	41%	Hegne	0.21	Prime	Y	Y	N	N	N	N	N
			59%	Fargo	0.31	Prime	Y	Y	N	N	N	N	N
12.61	13.05	I229A	100%	Fargo	0.44	Prime	Y	Y	N	N	N	N	N
13.05	13.14	I238A	41%	Hegne	0.04	Prime	Y	Y	N	N	N	N	N
			59%	Fargo	0.05	Prime	Y	Y	N	N	N	N	N
13.14	14.65	I229A	100%	Fargo	1.51	Prime	Y	Y	N	N	N	N	N
14.65	14.79	I235A	100%	Fargo	0.14	Prime	Y	Y	N	N	N	N	N
14.79	15.45	I229A	100%	Fargo	0.65	Prime	Y	Y	N	N	N	N	N
15.45	15.53	I235A	100%	Fargo	0.08	Prime	Y	Y	N	N	N	N	N
15.53	15.63	I229A	100%	Fargo	0.10	Prime	Y	Y	N	N	N	N	N
15.63	15.72	I235A	100%	Fargo	0.10	Prime	Y	Y	N	N	N	N	N
15.72	17.06	I229A	100%	Fargo	1.34	Prime	Y	Y	N	N	N	N	N
17.06	17.24	I473A	38%	Fargo	0.07	Prime	Y	Y	N	N	N	N	N
			63%	Hegne	0.12	Prime	Y	Y	N	N	N	N	N
17.24	17.55	I373A	38%	Bearden	0.11	Prime	N	Y	N	N	N	N	N
			63%	Kindred	0.19	Prime	N	Y	N	N	N	N	N
17.55	17.57	I233A	100%	Fargo	0.02	Prime	Y	Y	N	N	N	N	N
17.57	18.06	I482A	40%	Bearden	0.20	Prime	N	Y	N	N	N	N	N
			60%	Overly	0.30	Prime	N	N	N	N	N	N	N
18.06	18.24	I233A	100%	Fargo	0.18	Prime	Y	Y	N	N	N	N	N
18.24	18.46	I238A	41%	Hegne	0.09	Prime	Y	Y	N	N	N	N	N
			59%	Fargo	0.13	Prime	Y	Y	N	N	N	N	N

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Characteristics of the Soil Map Units at the Proposed Pipeline

Milepost In	Milepost Out	Map Unit Symbol	Component Percent	Component Name	Total Length (miles)	Prime Farmland [a]	Hydric Soils [a]	Compaction Prone [b]	Highly Erodible		Revegetation Concerns [e]	Rocky [f]	Shallow Bedrock [g]
									Water [c]	Wind [d]			
18.46	18.53	I235A	100%	Fargo	0.07	Prime	Y	Y	N	N	N	N	N
18.53	18.58	I238A	41%	Hegne	0.02	Prime	Y	Y	N	N	N	N	N
			59%	Fargo	0.03	Prime	Y	Y	N	N	N	N	N
18.58	18.79	I233A	100%	Fargo	0.21	Prime	Y	Y	N	N	N	N	N
18.79	18.87	I235A	100%	Fargo	0.08	Prime	Y	Y	N	N	N	N	N
18.87	19.00	I238A	41%	Hegne	0.05	Prime	Y	Y	N	N	N	N	N
			59%	Fargo	0.07	Prime	Y	Y	N	N	N	N	N
19.00	19.08	I235A	100%	Fargo	0.08	Prime	Y	Y	N	N	N	N	N
19.08	19.30	I238A	41%	Hegne	0.09	Prime	Y	Y	N	N	N	N	N
			59%	Fargo	0.13	Prime	Y	Y	N	N	N	N	N
19.30	19.41	I229A	100%	Fargo	0.11	Prime	Y	Y	N	N	N	N	N
19.41	19.88	I371A	47%	Kindred	0.22	Prime	N	Y	N	N	N	N	N
			53%	Bearden	0.25	Prime	N	Y	N	N	N	N	N
19.88	19.92	I601A	100%	Bearden	0.05	N	N	Y	N	N	N	N	N
19.92	20.12	I371A	47%	Kindred	0.09	Prime	N	Y	N	N	N	N	N
			53%	Bearden	0.10	Prime	N	Y	N	N	N	N	N
20.12	20.32	I373A	38%	Bearden	0.08	Prime	N	Y	N	N	N	N	N
			63%	Kindred	0.13	Prime	N	Y	N	N	N	N	N
20.32	20.43	I371A	47%	Kindred	0.05	Prime	N	Y	N	N	N	N	N
			53%	Bearden	0.06	Prime	N	Y	N	N	N	N	N
20.43	20.58	I373A	38%	Bearden	0.06	Prime	N	Y	N	N	N	N	N
			63%	Kindred	0.10	Prime	N	Y	N	N	N	N	N
20.58	20.62	I371A	47%	Kindred	0.02	Prime	N	Y	N	N	N	N	N
			53%	Bearden	0.02	Prime	N	Y	N	N	N	N	N
20.62	20.89	I601A	100%	Bearden	0.27	N	N	Y	N	N	N	N	N
20.89	21.06	I371A	47%	Kindred	0.08	Prime	N	Y	N	N	N	N	N
			53%	Bearden	0.09	Prime	N	Y	N	N	N	N	N
21.06	21.10	I233A	100%	Fargo	0.04	Prime	Y	Y	N	N	N	N	N
21.10	21.19	I601A	100%	Bearden	0.10	N	N	Y	N	N	N	N	N
21.19	21.27	I473A	38%	Fargo	0.03	Prime	Y	Y	N	N	N	N	N

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Milepost In	Milepost Out	Map Unit Symbol	Component Percent	Component Name	Total Length (miles)	Prime Farmland [a]	Hydric Soils [a]	Compaction Prone [b]	Highly Erodible		Revegetation Concerns [e]	Rocky [f]	Shallow Bedrock [g]
									Water [c]	Wind [d]			
			63%	Hegne	0.05	Prime	Y	Y	N	N	N	N	N
21.27	21.32	I601A	100%	Bearden	0.05	N	N	Y	N	N	N	N	N
21.32	21.37	I473A	38%	Fargo	0.02	Prime	Y	Y	N	N	N	N	N
			63%	Hegne	0.03	Prime	Y	Y	N	N	N	N	N
21.37	21.59	I229A	100%	Fargo	0.22	Prime	Y	Y	N	N	N	N	N
21.59	21.63	I235A	100%	Fargo	0.04	Prime	Y	Y	N	N	N	N	N
21.63	22.11	I373A	38%	Bearden	0.18	Prime	N	Y	N	N	N	N	N
			63%	Kindred	0.30	Prime	N	Y	N	N	N	N	N
22.11	22.50	I482A	40%	Bearden	0.16	Prime	N	Y	N	N	N	N	N
			60%	Overly	0.23	Prime	N	N	N	N	N	N	N
22.50	22.82	I373A	38%	Bearden	0.12	Prime	N	Y	N	N	N	N	N
			63%	Kindred	0.20	Prime	N	Y	N	N	N	N	N
22.82	22.90	I482A	40%	Bearden	0.03	Prime	N	Y	N	N	N	N	N
			60%	Overly	0.05	Prime	N	N	N	N	N	N	N
22.90	23.33	I241A	35%	Ryan	0.15	N	Y	Y	N	N	N	N	N
			65%	Fargo	0.28	N	Y	Y	N	N	N	N	N
23.33	23.36	I229A	100%	Fargo	0.02	Prime	Y	Y	N	N	N	N	N
23.36	23.80	I241A	35%	Ryan	0.16	N	Y	Y	N	N	N	N	N
			65%	Fargo	0.29	N	Y	Y	N	N	N	N	N
23.80	23.89	I229A	100%	Fargo	0.08	Prime	Y	Y	N	N	N	N	N
23.89	23.96	I233A	100%	Fargo	0.07	Prime	Y	Y	N	N	N	N	N
23.96	24.07	I381A	100%	LaDelle	0.11	Prime	N	N	N	N	N	N	N
24.07	24.11	I329A	100%	Fairdale	0.04	Prime	N	N	N	N	N	N	N
24.11	24.14	I447B	44%	Fluvaquents	0.01	N	Y	N	N	N	N	N	N
			56%	Fairdale	0.02	N	N	N	N	N	N	N	N
24.14	24.15	IWa	100%	Water	0.01	N	N	N	N	N	N	N	N
24.15	24.17	I447B	44%	Fluvaquents	0.01	N	Y	N	N	N	N	N	N
			56%	Fairdale	0.01	N	N	N	N	N	N	N	N
24.17	24.20	I329A	100%	Fairdale	0.03	Prime	N	N	N	N	N	N	N
24.20	24.40	I381A	100%	LaDelle	0.19	Prime	N	N	N	N	N	N	N

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Characteristics of the Soil Map Units at the Proposed Pipeline

Milepost In	Milepost Out	Map Unit Symbol	Component Percent	Component Name	Total Length (miles)	Prime Farmland [a]	Hydric Soils [a]	Compaction Prone [b]	Highly Erodible		Revegetation Concerns [e]	Rocky [f]	Shallow Bedrock [g]
									Water [c]	Wind [d]			
24.40	24.48	I480A	100%	Fairdale	0.08	Prime	N	N	N	N	N	N	N
24.48	24.63	I233A	100%	Fargo	0.16	Prime	Y	Y	N	N	N	N	N
24.63	24.72	I229A	100%	Fargo	0.08	Prime	Y	Y	N	N	N	N	N
Richland County													
24.72	24.81	I229A	100%	Fargo	0.10	Prime	Y	Y	N	N	N	N	N
24.81	24.91	I233A	100%	Fargo	0.10	Prime	Y	Y	N	N	N	N	N
24.91	25.66	I229A	100%	Fargo	0.75	Prime	Y	Y	N	N	N	N	N
25.66	25.69	I383A	100%	Overly	0.04	Prime	N	N	N	N	N	N	N
25.69	27.04	I229A	100%	Fargo	1.34	Prime	Y	Y	N	N	N	N	N
27.04	27.24	I235A	100%	Fargo	0.20	Prime	Y	Y	N	N	N	N	N
27.24	30.95	I229A	100%	Fargo	3.72	Prime	Y	Y	N	N	N	N	N
30.95	31.08	I233A	100%	Fargo	0.13	Prime	Y	Y	N	N	N	N	N
31.08	31.49	I229A	100%	Fargo	0.41	Prime	Y	Y	N	N	N	N	N
31.49	31.51	I235A	100%	Fargo	0.02	Prime	Y	Y	N	N	N	N	N
31.51	31.79	I378A	100%	Bearden	0.28	N	N	Y	N	N	N	N	N
31.79	32.11	I383A	100%	Overly	0.32	Prime	N	N	N	N	N	N	N
32.11	32.26	I252A	27%	Ryan	0.04	N	Y	Y	Y	N	N	N	N
			73%	Aberdeen	0.11	N	N	Y	N	N	N	N	N
32.26	32.55	I378A	100%	Bearden	0.29	N	N	Y	N	N	N	N	N
32.55	32.60	I252A	27%	Ryan	0.01	N	Y	Y	Y	N	N	N	N
			73%	Aberdeen	0.03	N	N	Y	N	N	N	N	N
32.60	32.61	I383A	100%	Overly	0.01	Prime	N	N	N	N	N	N	N
32.61	32.73	I252A	27%	Ryan	0.03	N	Y	Y	Y	N	N	N	N
			73%	Aberdeen	0.09	N	N	Y	N	N	N	N	N
32.73	32.74	I383A	100%	Overly	0.01	Prime	N	N	N	N	N	N	N
32.74	32.92	I283A	38%	Espelie	0.07	N	Y	N	N	Y	N	N	N
			63%	Hilaire	0.11	N	N	N	N	Y	Y	N	N
32.92	32.97	I246A	38%	Wheatville	0.02	Prime	N	Y	N	N	N	N	N
			63%	Galchutt	0.03	Prime	N	Y	N	N	N	N	N
32.97	33.02	I375A	100%	Perella	0.05	Prime	Y	Y	N	N	N	N	N

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Milepost In	Milepost Out	Map Unit Symbol	Component Percent	Component Name	Total Length (miles)	Prime Farmland [a]	Hydric Soils [a]	Compaction Prone [b]	Highly Erodible		Revegetation Concerns [e]	Rocky [f]	Shallow Bedrock [g]
									Water [c]	Wind [d]			
33.02	33.24	I246A	38%	Wheatville	0.08	Prime	N	Y	N	N	N	N	N
			63%	Galchutt	0.14	Prime	N	Y	N	N	N	N	N
33.24	33.64	I235A	100%	Fargo	0.40	Prime	Y	Y	N	N	N	N	N
33.64	33.96	I249A	100%	Aberdeen	0.32	State	N	N	N	N	N	N	N
33.96	34.14	I229A	100%	Fargo	0.18	Prime	Y	Y	N	N	N	N	N
34.14	34.23	I291C	24%	Serden	0.02	N	N	N	Y	Y	Y	N	N
			29%	Thiefriver	0.02	N	Y	N	N	N	N	N	N
			47%	Aylmer	0.04	N	N	N	Y	Y	Y	N	N
34.23	34.32	I272A	100%	Thiefriver	0.09	N	Y	N	N	N	N	N	N
34.32	34.43	I249A	100%	Aberdeen	0.11	State	N	N	N	N	N	N	N
34.43	34.45	I219A	100%	Tiffany	0.02	Prime	Y	Y	N	N	N	N	N
34.45	34.75	I283A	38%	Espelie	0.11	N	Y	N	N	Y	N	N	N
			63%	Hilaire	0.19	N	N	N	N	Y	Y	N	N
34.75	35.06	I291B	38%	Bantry	0.12	N	N	N	Y	Y	N	N	N
			63%	Aylmer	0.19	N	N	N	Y	Y	Y	N	N
35.06	35.08	I284A	17%	Thiefriver	0.00	N	Y	N	N	N	N	N	N
			33%	Espelie	0.01	N	Y	N	N	Y	N	N	N
			50%	Hilaire	0.01	N	N	N	N	Y	Y	N	N
35.08	35.28	I272A	100%	Thiefriver	0.19	N	Y	N	N	N	N	N	N
35.28	35.41	I285B	25%	Espelie	0.03	N	Y	N	N	Y	N	N	N
			38%	Hilaire	0.05	N	N	N	N	Y	Y	N	N
			38%	Maddock	0.05	N	N	N	Y	Y	Y	N	N
35.41	35.48	I272A	100%	Thiefriver	0.08	N	Y	N	N	N	N	N	N
35.48	35.58	I285B	25%	Espelie	0.03	N	Y	N	N	Y	N	N	N
			38%	Hilaire	0.04	N	N	N	N	Y	Y	N	N
			38%	Maddock	0.04	N	N	N	Y	Y	Y	N	N
35.58	35.74	I272A	100%	Thiefriver	0.16	N	Y	N	N	N	N	N	N
35.74	36.03	I285B	25%	Espelie	0.07	N	Y	N	N	Y	N	N	N
			38%	Hilaire	0.11	N	N	N	N	Y	Y	N	N
			38%	Maddock	0.11	N	N	N	Y	Y	Y	N	N

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Characteristics of the Soil Map Units at the Proposed Pipeline

Milepost In	Milepost Out	Map Unit Symbol	Component Percent	Component Name	Total Length (miles)	Prime Farmland [a]	Hydric Soils [a]	Compaction Prone [b]	Highly Erodible		Revegetation Concerns [e]	Rocky [f]	Shallow Bedrock [g]
									Water [c]	Wind [d]			
36.03	36.19	I374A	100%	Perella	0.16	Prime	Y	Y	N	N	N	N	N
36.19	36.64	I279A	28%	Elmville	0.13	N	N	N	N	N	N	N	N
			36%	Delamere	0.16	N	N	N	N	N	N	N	N
			37%	Mantador	0.17	N	N	N	N	N	N	N	N
36.64	36.70	I374A	100%	Perella	0.06	Prime	Y	Y	N	N	N	N	N
36.70	36.71	I280A	100%	Wheatville	0.01	N	N	Y	N	N	N	N	N
36.71	36.78	I374A	100%	Perella	0.08	Prime	Y	Y	N	N	N	N	N
36.78	36.83	I285B	25%	Espelie	0.01	N	Y	N	N	Y	N	N	N
			38%	Hilaire	0.02	N	N	N	N	Y	Y	N	N
			38%	Maddock	0.02	N	N	N	Y	Y	Y	N	N
36.83	36.89	I374A	100%	Perella	0.06	Prime	Y	Y	N	N	N	N	N
36.89	37.10	I280A	100%	Wheatville	0.21	N	N	Y	N	N	N	N	N
37.10	37.18	I279A	28%	Elmville	0.02	N	N	N	N	N	N	N	N
			36%	Delamere	0.03	N	N	N	N	N	N	N	N
			37%	Mantador	0.03	N	N	N	N	N	N	N	N
37.18	37.57	I244A	100%	Galchutt	0.39	Prime	N	Y	N	N	N	N	N
37.57	37.61	I281A	25%	Delamere	0.01	N	N	Y	N	N	N	N	N
			31%	Mantador	0.01	N	N	Y	N	N	N	N	N
			44%	Wheatville	0.02	N	N	Y	N	N	N	N	N
37.61	37.70	I246A	38%	Wheatville	0.03	Prime	N	Y	N	N	N	N	N
			63%	Galchutt	0.05	Prime	N	Y	N	N	N	N	N
37.70	38.05	I251A	18%	Fargo	0.07	State	Y	Y	N	N	N	N	N
			27%	Galchutt	0.10	State	N	Y	N	N	N	N	N
			55%	Aberdeen	0.20	State	N	Y	N	N	N	N	N
38.05	39.00	I378A	100%	Bearden	0.94	N	N	Y	N	N	N	N	N
39.00	39.12	I251A	18%	Fargo	0.02	State	Y	Y	N	N	N	N	N
			27%	Galchutt	0.03	State	N	Y	N	N	N	N	N
			55%	Aberdeen	0.07	State	N	Y	N	N	N	N	N
39.12	39.26	I237A	35%	Enloe	0.05	Prime	Y	Y	N	N	N	N	N
			65%	Fargo	0.09	Prime	Y	Y	N	N	N	N	N

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Characteristics of the Soil Map Units at the Proposed Pipeline

Milepost In	Milepost Out	Map Unit Symbol	Component Percent	Component Name	Total Length (miles)	Prime Farmland [a]	Hydric Soils [a]	Compaction Prone [b]	Highly Erodible		Revegetation Concerns [e]	Rocky [f]	Shallow Bedrock [g]
									Water [c]	Wind [d]			
39.26	39.34	I251A	18%	Fargo	0.02	State	Y	Y	N	N	N	N	N
			27%	Galchutt	0.02	State	N	Y	N	N	N	N	N
			55%	Aberdeen	0.05	State	N	Y	N	N	N	N	N
39.34	39.40	I281A	25%	Delamere	0.02	N	N	Y	N	N	N	N	N
			31%	Mantador	0.02	N	N	Y	N	N	N	N	N
			44%	Wheatville	0.03	N	N	Y	N	N	N	N	N
39.40	39.60	I289A	28%	Elmville	0.06	N	N	Y	N	N	N	N	N
			33%	Delamere	0.07	N	N	Y	N	N	N	N	N
			39%	Mantador	0.08	N	N	Y	N	N	N	N	N
39.60	39.73	I281A	25%	Delamere	0.03	N	N	Y	N	N	N	N	N
			31%	Mantador	0.04	N	N	Y	N	N	N	N	N
			44%	Wheatville	0.06	N	N	Y	N	N	N	N	N
39.73	39.74	I251A	18%	Fargo	0.00	State	Y	Y	N	N	N	N	N
			27%	Galchutt	0.00	State	N	Y	N	N	N	N	N
			55%	Aberdeen	0.00	State	N	Y	N	N	N	N	N
39.74	40.02	I378A	100%	Bearden	0.28	N	N	Y	N	N	N	N	N
40.02	40.09	I237A	35%	Enloe	0.03	Prime	Y	Y	N	N	N	N	N
			65%	Fargo	0.05	Prime	Y	Y	N	N	N	N	N
40.09	40.39	I242A	28%	Fargo	0.08	N	Y	Y	N	N	N	N	N
			72%	Ryan	0.21	N	Y	Y	Y	N	N	N	N
40.28	40.29	I321A	100%	Bearden	0.00	Prime	N	Y	N	N	N	N	N
40.39	40.40	I321A	100%	Bearden	0.00	Prime	N	Y	N	N	N	N	N
40.40	40.91	I281A	25%	Delamere	0.13	N	N	Y	N	N	N	N	N
			31%	Mantador	0.16	N	N	Y	N	N	N	N	N
			44%	Wheatville	0.22	N	N	Y	N	N	N	N	N
40.91	40.92	I280A	100%	Wheatville	0.02	N	N	Y	N	N	N	N	N
40.92	41.00	I906F	20%	Urban land	0.01	N	N	N	N	N	N	N	N
			25%	Aquents	0.02	N	Y	Y	N	N	N	N	N
				Orthents	0.02	N	N	N	Y	N	Y	N	N
			30%	Orthents	0.02	N	N	N	Y	N	Y	N	N

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Characteristics of the Soil Map Units at the Proposed Pipeline

Milepost In	Milepost Out	Map Unit Symbol	Component Percent	Component Name	Total Length (miles)	Prime Farmland [a]	Hydric Soils [a]	Compaction Prone [b]	Highly Erodible		Revegetation Concerns [e]	Rocky [f]	Shallow Bedrock [g]
									Water [c]	Wind [d]			
41.00	41.37	I280A	100%	Wheatville	0.37	N	N	Y	N	N	N	N	N
41.37	41.44	I281A	25%	Delamere	0.02	N	N	Y	N	N	N	N	N
			31%	Mantador	0.02	N	N	Y	N	N	N	N	N
			44%	Wheatville	0.03	N	N	Y	N	N	N	N	N
41.44	41.58	I280A	100%	Wheatville	0.14	N	N	Y	N	N	N	N	N
41.58	41.80	I377A	100%	Wheatville	0.22	Prime	N	Y	N	N	N	N	N
41.80	41.98	I378A	100%	Bearden	0.18	N	N	Y	N	N	N	N	N
41.98	42.12	I251A	18%	Fargo	0.03	State	Y	Y	N	N	N	N	N
			27%	Galchutt	0.04	State	N	Y	N	N	N	N	N
			55%	Aberdeen	0.08	State	N	Y	N	N	N	N	N
42.12	42.23	I378A	100%	Bearden	0.12	N	N	Y	N	N	N	N	N
42.23	42.38	I377A	100%	Wheatville	0.14	Prime	N	Y	N	N	N	N	N
42.38	42.81	I378A	100%	Bearden	0.43	N	N	Y	N	N	N	N	N
42.81	43.26	I251A	18%	Fargo	0.08	State	Y	Y	N	N	N	N	N
			27%	Galchutt	0.12	State	N	Y	N	N	N	N	N
			55%	Aberdeen	0.25	State	N	Y	N	N	N	N	N
43.26	43.32	I237A	35%	Enloe	0.02	Prime	Y	Y	N	N	N	N	N
			65%	Fargo	0.04	Prime	Y	Y	N	N	N	N	N
43.32	43.52	I242A	28%	Fargo	0.05	N	Y	Y	N	N	N	N	N
			72%	Ryan	0.14	N	Y	Y	Y	N	N	N	N
43.52	43.67	I251A	18%	Fargo	0.03	State	Y	Y	N	N	N	N	N
			27%	Galchutt	0.04	State	N	Y	N	N	N	N	N
			55%	Aberdeen	0.08	State	N	Y	N	N	N	N	N
43.67	44.11	I237A	35%	Enloe	0.15	Prime	Y	Y	N	N	N	N	N
			65%	Fargo	0.28	Prime	Y	Y	N	N	N	N	N
44.11	44.12	I242A	28%	Fargo	0.00	N	Y	Y	N	N	N	N	N
			72%	Ryan	0.01	N	Y	Y	Y	N	N	N	N
44.12	44.20	I237A	35%	Enloe	0.03	Prime	Y	Y	N	N	N	N	N
			65%	Fargo	0.05	Prime	Y	Y	N	N	N	N	N
44.20	44.30	I251A	18%	Fargo	0.02	State	Y	Y	N	N	N	N	N

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Characteristics of the Soil Map Units at the Proposed Pipeline

Milepost In	Milepost Out	Map Unit Symbol	Component Percent	Component Name	Total Length (miles)	Prime Farmland [a]	Hydric Soils [a]	Compaction Prone [b]	Highly Erodible		Revegetation Concerns [e]	Rocky [f]	Shallow Bedrock [g]
									Water [c]	Wind [d]			
			27%	Galchutt	0.03	State	N	Y	N	N	N	N	N
			55%	Aberdeen	0.05	State	N	Y	N	N	N	N	N
44.30	44.52	I237A	35%	Enloe	0.08	Prime	Y	Y	N	N	N	N	N
			65%	Fargo	0.14	Prime	Y	Y	N	N	N	N	N
44.52	44.80	I251A	18%	Fargo	0.05	State	Y	Y	N	N	N	N	N
			27%	Galchutt	0.07	State	N	Y	N	N	N	N	N
			55%	Aberdeen	0.15	State	N	Y	N	N	N	N	N
44.80	44.92	I252A	27%	Ryan	0.03	N	Y	Y	Y	N	N	N	N
			73%	Aberdeen	0.09	N	N	Y	N	N	N	N	N
44.92	44.98	I384B	44%	Nutley	0.02	Prime	N	N	N	N	N	N	N
			56%	Overly	0.03	Prime	N	N	N	N	N	N	N
44.98	45.05	I383A	100%	Overly	0.07	Prime	N	N	N	N	N	N	N
45.05	45.14	I378A	100%	Bearden	0.09	N	N	Y	N	N	N	N	N
45.14	45.29	I251A	18%	Fargo	0.03	State	Y	Y	N	N	N	N	N
			27%	Galchutt	0.04	State	N	Y	N	N	N	N	N
			55%	Aberdeen	0.08	State	N	Y	N	N	N	N	N
45.29	45.47	I378A	100%	Bearden	0.18	N	N	Y	N	N	N	N	N
45.47	46.29	I378A	100%	Bearden	0.82	N	N	Y	N	N	N	N	N
46.29	46.46	I321A	100%	Bearden	0.17	Prime	N	Y	N	N	N	N	N
46.46	46.53	I226A	100%	Gardena	0.07	Prime	N	N	N	N	N	N	N
46.53	46.54	I321A	100%	Bearden	0.01	Prime	N	Y	N	N	N	N	N
46.54	47.79	I340A	29%	Elmville	0.37	Prime	N	Y	N	N	N	N	N
			35%	Delamere	0.44	Prime	N	Y	N	N	N	N	N
			36%	Mantador	0.44	Prime	N	Y	N	N	N	N	N
47.79	47.97	I246A	38%	Wheatville	0.07	Prime	N	Y	N	N	N	N	N
			63%	Galchutt	0.11	Prime	N	Y	N	N	N	N	N
47.97	48.12	I340A	29%	Elmville	0.04	Prime	N	Y	N	N	N	N	N
			35%	Delamere	0.05	Prime	N	Y	N	N	N	N	N
			36%	Mantador	0.05	Prime	N	Y	N	N	N	N	N
48.12	49.04	I251A	18%	Fargo	0.17	State	Y	Y	N	N	N	N	N

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Characteristics of the Soil Map Units at the Proposed Pipeline

Milepost In	Milepost Out	Map Unit Symbol	Component Percent	Component Name	Total Length (miles)	Prime Farmland [a]	Hydric Soils [a]	Compaction Prone [b]	Highly Erodible		Revegetation Concerns [e]	Rocky [f]	Shallow Bedrock [g]
									Water [c]	Wind [d]			
			27%	Galchutt	0.25	State	N	Y	N	N	N	N	N
			55%	Aberdeen	0.50	State	N	Y	N	N	N	N	N
49.04	49.09	I321A	100%	Bearden	0.05	Prime	N	Y	N	N	N	N	N
49.09	49.10	I251A	18%	Fargo	0.00	State	Y	Y	N	N	N	N	N
			27%	Galchutt	0.00	State	N	Y	N	N	N	N	N
			55%	Aberdeen	0.01	State	N	Y	N	N	N	N	N
49.10	49.47	I237A	35%	Enloe	0.13	Prime	Y	Y	N	N	N	N	N
			65%	Fargo	0.24	Prime	Y	Y	N	N	N	N	N
49.47	49.95	I251A	18%	Fargo	0.09	State	Y	Y	N	N	N	N	N
			27%	Galchutt	0.13	State	N	Y	N	N	N	N	N
			55%	Aberdeen	0.26	State	N	Y	N	N	N	N	N
49.95	50.03	I237A	35%	Enloe	0.03	Prime	Y	Y	N	N	N	N	N
			65%	Fargo	0.05	Prime	Y	Y	N	N	N	N	N
50.03	50.27	I251A	18%	Fargo	0.04	State	Y	Y	N	N	N	N	N
			27%	Galchutt	0.06	State	N	Y	N	N	N	N	N
			55%	Aberdeen	0.13	State	N	Y	N	N	N	N	N
50.27	50.72	I241A	35%	Ryan	0.16	N	Y	Y	N	N	N	N	N
			65%	Fargo	0.30	N	Y	Y	N	N	N	N	N
50.72	50.79	I229A	100%	Fargo	0.06	Prime	Y	Y	N	N	N	N	N
50.79	50.82	I234B	44%	Fargo	0.01	Prime	N	Y	N	N	N	N	N
			56%	Nutley	0.02	Prime	N	N	N	N	N	N	N
50.82	50.87	I381A	100%	LaDelle	0.05	Prime	N	N	N	N	N	N	N
50.87	50.88	I149F	44%	Fluvaquents	0.00	N	Y	N	N	N	N	N	N
			56%	Cashel	0.00	N	N	Y	Y	N	Y	N	N
50.88	50.88	IWa	100%	Water	0.01	N	N	N	N	N	N	N	N
50.88	50.90	I149F	44%	Fluvaquents	0.01	N	Y	N	N	N	N	N	N
			56%	Cashel	0.01	N	N	Y	Y	N	Y	N	N
50.90	50.91	I241A	35%	Ryan	0.01	N	Y	Y	N	N	N	N	N
			65%	Fargo	0.01	N	Y	Y	N	N	N	N	N
50.91	51.04	I229A	100%	Fargo	0.12	Prime	Y	Y	N	N	N	N	N

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Characteristics of the Soil Map Units at the Proposed Pipeline

Milepost In	Milepost Out	Map Unit Symbol	Component Percent	Component Name	Total Length (miles)	Prime Farmland [a]	Hydric Soils [a]	Compaction Prone [b]	Highly Erodible		Revegetation Concerns [e]	Rocky [f]	Shallow Bedrock [g]
									Water [c]	Wind [d]			
51.04	51.06	I149F	44%	Fluvaquents	0.01	N	Y	N	N	N	N	N	N
			56%	Cashel	0.01	N	N	Y	Y	N	Y	N	N
51.06	51.07	IWa	100%	Water	0.01	N	N	N	N	N	N	N	N
51.07	51.09	I149F	44%	Fluvaquents	0.01	N	Y	N	N	N	N	N	N
			56%	Cashel	0.01	N	N	Y	Y	N	Y	N	N
51.09	51.17	I453A	100%	Wahpeton	0.08	Prime	N	N	N	N	N	N	N
51.17	51.38	I229A	100%	Fargo	0.21	Prime	Y	Y	N	N	N	N	N
51.38	51.55	I241A	35%	Ryan	0.06	N	Y	Y	N	N	N	N	N
			65%	Fargo	0.11	N	Y	Y	N	N	N	N	N
51.55	51.60	I241A	35%	Ryan	0.02	N	Y	Y	N	N	N	N	N
			65%	Fargo	0.03	N	Y	Y	N	N	N	N	N
51.60	52.34	I242A	28%	Fargo	0.20	N	Y	Y	N	N	N	N	N
			72%	Ryan	0.53	N	Y	Y	Y	N	N	N	N
52.34	52.40	I231A	100%	Dovray	0.06	Prime	Y	Y	N	N	N	N	N
52.40	52.49	I242A	28%	Fargo	0.02	N	Y	Y	N	N	N	N	N
			72%	Ryan	0.06	N	Y	Y	Y	N	N	N	N
52.49	52.66	I229A	100%	Fargo	0.18	Prime	Y	Y	N	N	N	N	N
52.66	52.70	I231A	100%	Dovray	0.04	Prime	Y	Y	N	N	N	N	N
52.70	52.84	I242A	28%	Fargo	0.04	N	Y	Y	N	N	N	N	N
			72%	Ryan	0.10	N	Y	Y	Y	N	N	N	N
52.84	53.03	I241A	35%	Ryan	0.07	N	Y	Y	N	N	N	N	N
			65%	Fargo	0.12	N	Y	Y	N	N	N	N	N
53.03	53.09	I237A	35%	Enloe	0.02	Prime	Y	Y	N	N	N	N	N
			65%	Fargo	0.04	Prime	Y	Y	N	N	N	N	N
53.09	53.28	I229A	100%	Fargo	0.19	Prime	Y	Y	N	N	N	N	N
53.15	53.15	I237A	35%	Enloe	0.00	Prime	Y	Y	N	N	N	N	N
			65%	Fargo	0.00	Prime	Y	Y	N	N	N	N	N
53.28	53.50	I242A	28%	Fargo	0.06	N	Y	Y	N	N	N	N	N
			72%	Ryan	0.16	N	Y	Y	Y	N	N	N	N
53.50	53.53	I231A	100%	Dovray	0.03	Prime	Y	Y	N	N	N	N	N

APPENDIX 7A

Wahpeton Expansion Project
Characteristics of the Soil Map Units at the Proposed Pipeline

Milepost In	Milepost Out	Map Unit Symbol	Component Percent	Component Name	Total Length (miles)	Prime Farmland [a]	Hydric Soils [a]	Compaction Prone [b]	Highly Erodible		Revegetation Concerns [e]	Rocky [f]	Shallow Bedrock [g]
									Water [c]	Wind [d]			
53.53	53.63	I242A	28%	Fargo	0.03	N	Y	Y	N	N	N	N	N
			72%	Ryan	0.07	N	Y	Y	Y	N	N	N	N
53.63	53.98	I229A	100%	Fargo	0.35	Prime	Y	Y	N	N	N	N	N
53.98	54.22	I242A	28%	Fargo	0.07	N	Y	Y	N	N	N	N	N
			72%	Ryan	0.17	N	Y	Y	Y	N	N	N	N
54.22	54.33	I237A	35%	Enloe	0.04	Prime	Y	Y	N	N	N	N	N
			65%	Fargo	0.07	Prime	Y	Y	N	N	N	N	N
54.33	54.67	I229A	100%	Fargo	0.33	Prime	Y	Y	N	N	N	N	N
54.67	54.73	I237A	35%	Enloe	0.02	Prime	Y	Y	N	N	N	N	N
			65%	Fargo	0.04	Prime	Y	Y	N	N	N	N	N
54.73	55.01	I229A	100%	Fargo	0.28	Prime	Y	Y	N	N	N	N	N
55.01	55.42	I241A	35%	Ryan	0.15	N	Y	Y	N	N	N	N	N
			65%	Fargo	0.27	N	Y	Y	N	N	N	N	N
55.42	55.47	I242A	28%	Fargo	0.01	N	Y	Y	N	N	N	N	N
			72%	Ryan	0.03	N	Y	Y	Y	N	N	N	N
55.47	55.79	I241A	35%	Ryan	0.11	N	Y	Y	N	N	N	N	N
			65%	Fargo	0.21	N	Y	Y	N	N	N	N	N
55.79	56.28	I242A	28%	Fargo	0.14	N	Y	Y	N	N	N	N	N
			72%	Ryan	0.35	N	Y	Y	Y	N	N	N	N
56.28	56.39	I241A	35%	Ryan	0.04	N	Y	Y	N	N	N	N	N
			65%	Fargo	0.08	N	Y	Y	N	N	N	N	N
56.39	56.67	I242A	28%	Fargo	0.08	N	Y	Y	N	N	N	N	N
			72%	Ryan	0.20	N	Y	Y	Y	N	N	N	N
56.67	56.88	I241A	35%	Ryan	0.07	N	Y	Y	N	N	N	N	N
			65%	Fargo	0.14	N	Y	Y	N	N	N	N	N
56.88	56.97	I234B	44%	Fargo	0.04	Prime	N	Y	N	N	N	N	N
			56%	Nutley	0.05	Prime	N	N	N	N	N	N	N
56.97	56.99	I149F	44%	Fluvaquents	0.01	N	Y	N	N	N	N	N	N
			56%	Cashel	0.01	N	N	Y	Y	N	Y	N	N
56.99	57.01	IWa	100%	Water	0.02	N	N	N	N	N	N	N	N

APPENDIX 7A

Wahpeton Expansion Project
Characteristics of the Soil Map Units at the Proposed Pipeline

Milepost In	Milepost Out	Map Unit Symbol	Component Percent	Component Name	Total Length (miles)	Prime Farmland [a]	Hydric Soils [a]	Compaction Prone [b]	Highly Erodible		Revegetation Concerns [e]	Rocky [f]	Shallow Bedrock [g]
									Water [c]	Wind [d]			
57.01	57.02	I149F	44%	Fluvaquents	0.00	N	Y	N	N	N	N	N	N
			56%	Cashel	0.01	N	N	Y	Y	N	Y	N	N
57.02	57.06	I453A	100%	Wahpeton	0.04	Prime	N	N	N	N	N	N	N
57.06	57.18	I234B	44%	Fargo	0.05	Prime	N	Y	N	N	N	N	N
			56%	Nutley	0.07	Prime	N	N	N	N	N	N	N
57.18	57.38	I241A	35%	Ryan	0.07	N	Y	Y	N	N	N	N	N
			65%	Fargo	0.13	N	Y	Y	N	N	N	N	N
57.38	57.53	I234B	44%	Fargo	0.06	Prime	N	Y	N	N	N	N	N
			56%	Nutley	0.08	Prime	N	N	N	N	N	N	N
57.53	57.56	I248A	100%	Wahpeton	0.03	Prime	N	N	N	N	N	N	N
57.56	57.57	I149F	44%	Fluvaquents	0.01	N	Y	N	N	N	N	N	N
			56%	Cashel	0.01	N	N	Y	Y	N	Y	N	N
57.57	57.59	IWa	100%	Water	0.02	N	N	N	N	N	N	N	N
57.59	57.60	I149F	44%	Fluvaquents	0.01	N	Y	N	N	N	N	N	N
			56%	Cashel	0.01	N	N	Y	Y	N	Y	N	N
57.60	57.73	I229A	100%	Fargo	0.13	Prime	Y	Y	N	N	N	N	N
57.73	57.78	I234A	44%	Nutley	0.02	Prime	N	N	N	N	N	N	N
			56%	Fargo	0.03	Prime	Y	Y	N	N	N	N	N
57.78	58.16	I229A	100%	Fargo	0.38	Prime	Y	Y	N	N	N	N	N
58.16	58.52	I241A	35%	Ryan	0.13	N	Y	Y	N	N	N	N	N
			65%	Fargo	0.23	N	Y	Y	N	N	N	N	N
58.52	58.74	I229A	100%	Fargo	0.22	Prime	Y	Y	N	N	N	N	N
58.74	59.01	I237A	35%	Enloe	0.10	Prime	Y	Y	N	N	N	N	N
			65%	Fargo	0.17	Prime	Y	Y	N	N	N	N	N
59.01	59.11	I229A	100%	Fargo	0.10	Prime	Y	Y	N	N	N	N	N
59.11	59.40	I237A	35%	Enloe	0.10	Prime	Y	Y	N	N	N	N	N
			65%	Fargo	0.19	Prime	Y	Y	N	N	N	N	N
59.40	59.57	I229A	100%	Fargo	0.17	Prime	Y	Y	N	N	N	N	N
59.57	59.70	I397A	32%	Mustinka	0.04	Prime	Y	Y	N	N	N	N	N
			68%	Antler	0.09	Prime	N	Y	N	N	N	N	N

APPENDIX 7A

Wahpeton Expansion Project
Characteristics of the Soil Map Units at the Proposed Pipeline

Milepost In	Milepost Out	Map Unit Symbol	Component Percent	Component Name	Total Length (miles)	Prime Farmland [a]	Hydric Soils [a]	Compaction Prone [b]	Highly Erodible		Revegetation Concerns [e]	Rocky [f]	Shallow Bedrock [g]
									Water [c]	Wind [d]			
59.70	59.90	I237A	35%	Enloe	0.07	Prime	Y	Y	N	N	N	N	N
			65%	Fargo	0.12	Prime	Y	Y	N	N	N	N	N
59.90	60.01	I229A	100%	Fargo	0.11	Prime	Y	Y	N	N	N	N	N
60.01	60.03	I237A	35%	Enloe	0.01	Prime	Y	Y	N	N	N	N	N
			65%	Fargo	0.01	Prime	Y	Y	N	N	N	N	N
60.03	60.48	I236A	32%	Reis	0.14	Prime	Y	Y	N	N	N	N	N
			68%	Clearwater	0.31	Prime	Y	Y	N	N	N	N	N
60.48	60.57	I243A	100%	Doran	0.09	Prime	N	Y	N	N	N	N	N

[a] As designated by the Natural Resources Conservation Service. Prime refers to prime farmland and prime farmland if mitigated. State refers to farmland of statewide importance.

[b] Includes soils that have clay loam or finer textures in somewhat poor, poor, and very poor drainage classes.

[c] Includes land in capability subclasses IVE through VIIIE and soils with an average slope greater than or equal to 9 percent.

[d] Includes soils with Wind Erodibility Group classification of 1 or 2.

[e] Includes coarse-textured soils (sandy loams and coarser) that are moderately well to excessively drained and soils with an average slope greater than or equal to 9 percent.

[f] Includes soils that have either: (1) a very gravelly, extremely gravelly, cobbley, stony, bouldery, flaggy, or channery modifier to the textural class, or (2) have greater than 5 percent (weight basis) of rock fragments larger than 3 inches in any layer within the profile.

[g] Includes soils that have bedrock within 60 inches of the soil surface. Paralithic refers to "soft" bedrock that will not likely require blasting during construction. Lithic refers to "hard" bedrock that may require blasting or other special construction techniques during installation of the proposed pipeline segments.

Note: Y = Yes; N = No

APPENDIX 7B Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

APPENDIX 7B

Wahpeton Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
Pipeline Right-of-Way											
I119A	Bearden silty clay loam, 0 to 2 percent slopes	Bearden	100%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
I149F	Cashel-Fluvaquents, channeled complex, wooded, 0 to 35 percent slopes, frequently flooded	Cashel	56%	15	35	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, calcareous, frigid Aquertic Udifluvents	Clayey alluvium	Flood plains, river valleys
		Fluvaquents	44%	0	6	Fine sand loam	Very poorly drained	Moderately Rapid	Fluvaquents	Alluvium	Flood plains, swales
I219A	Tiffany loam, clayey substratum, 0 to 1 percent slopes	Tiffany	100%	0	1	Loam	Poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Typic Endoaquolls	Coarse-loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Depressions
I226A	Gardena silt loam, clayey substratum, 0 to 2 percent slopes	Gardena	100%	0	2	Silt loam	Moderately well drained	Moderate	Coarse-silty over clayey, mixed over smectitic, superactive, frigid Pachic Hapludolls	Coarse-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I229A	Fargo silty clay, 0 to 1 percent slopes	Fargo	100%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I231A	Dovray silty clay, 0 to 1 percent slopes	Dovray	100%	0	1	Silty clay	Very poorly drained	Slow	Fine, smectitic, frigid Cumulic Vertic Epiaquolls	Clayey glaciolacustrine deposits	Drainageways, lake plains
I233A	Fargo silty clay loam, 0 to 1 percent slopes	Fargo	100%	0	1	Silt clay loam	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains

APPENDIX 7B

Wahpeton Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I234A	Fargo-Nutley silty clays, 0 to 2 percent slopes	Fargo	56%	0	2	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Nutley	44%	1	2	Silty clay	Well drained	Slow	Fine, smectitic, frigid Chromic Hapluderts	Clayey glaciolacustrine deposits	Flats, lake plains
I234B	Nutley-Fargo, dry, silty clays, 2 to 6 percent slopes	Fargo	44%	2	6	Silty clay	Somewhat poorly drained	Slow	Fine, smectitic, frigid Aquic Hapluderts	Clayey glaciolacustrine deposits	Drainageways, lake plains
		Nutley	56%	3	6	Silty clay	Well drained	Slow	Fine, smectitic, frigid Chromic Hapluderts	Clayey glaciolacustrine deposits	Drainageways, lake plains
I235A	Fargo silty clay, depressional, 0 to 1 percent slopes	Fargo	100%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Depressions, lake plains
I236A	Clearwater-Reis silty clays, loamy substratum, 0 to 1 percent slopes	Clearwater	68%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Calcareous clayey till	Flats
		Reis	32%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Calciaquerts	Calcareous clayey till	Flats
I237A	Fargo-Enloe complex, 0 to 1 percent slopes	Enloe	35%	0	1	Silt clay loam	Poorly drained	Moderately Slow	Fine, smectitic, frigid Argiaquic Argialbolls	Clayey glaciolacustrine deposits	Depressions, lake plains
		Fargo	65%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I238A	Fargo-Hegne silty clays, 0 to 1 percent slopes	Fargo	59%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Hegne	41%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Calciaquerts	Clayey glaciolacustrine deposits	Flats, lake plains

APPENDIX 7B

Wahpeton Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I241A	Fargo-Ryan, thick solum silty clays, 0 to 1 percents slopes	Fargo	65%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Ryan	35%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Natraquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I242A	Ryan-Fargo silty clays, 0 to 1 percent slopes	Fargo	28%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Ryan	72%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Natraquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I243A	Doran clay loam, 0 to 2 percent slopes	Doran	100%	0	2	Clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Aquertic Argiudolls	Loamy glaciolacustrine deposits over loamy till	Lake plains, till-floored lake plains
I244A	Galchutt silt loam, 0 to 2 percent slopes	Galchutt	100%	0	2	Silt loam	Somewhat poorly drained	Moderate	Fine, smectitic, frigid Vertic Argialbolls	Silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I246A	Galchutt-Wheatville, slightly saline silt loams, 0 to 2 percent slopes	Galchutt	63%	0	2	Silt loam	Somewhat poorly drained	Moderate	Fine, smectitic, frigid Vertic Argialbolls	Silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Wheatville	38%	0	2	Silt loam	Somewhat poorly drained	Moderate	Coarse-silty over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Coarse-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains

APPENDIX 7B

Wahpeton Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I248A	Wahpeton silty clay, 0 to 2 percent slopes, occasionally flooded	Wahpeton	100%	0	2	Silty clay	Moderately well drained	Slow	Fine, smectitic, frigid Typic Hapluderts	Clayey alluvium	Natural levees
I249A	Aberdeen fine sandy loam, 0 to 2 percent slopes	Aberdeen	100%	0	2	Fine sand loam	Somewhat poorly drained	Moderately Rapid	Fine, smectitic, frigid Glossic Natrudolls	Loamy glaciolacustrine deposits	Flats, lake plains
I251A	Aberdeen-Galchutt-Fargo complex, 0 to 2 percent slopes	Aberdeen	55%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Glossic Natrudolls	Loamy glaciolacustrine deposits	Flats, lake plains
		Fargo	18%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Galchutt	27%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Vertic Argialbolls	Silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I252A	Aberdeen-Ryan silty clay loams, 0 to 2 percent slopes	Aberdeen	73%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Glossic Natrudolls	Loamy glaciolacustrine deposits	Flats, lake plains
		Ryan	27%	0	1	Silt clay loam	Poorly drained	Slow	Fine, smectitic, frigid Typic Natraquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I272A	Thiefriver fine sandy loam, moderately saline, 0 to 1 percent slopes	Thiefriver	100%	0	1	Fine sand loam	Poorly drained	Moderately Rapid	Sandy over clayey, mixed over smectitic, frigid Typic Calciaquolls	Sandy glaciolacustrine deposits over clayey glaciolacustrine deposits	Depressions, lake plains

APPENDIX 7B

Wahpeton Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I279A	Mantador-Delamere-Elmville fine sandy loams, moderately saline, clayey substratum, 0 to 2 percent slopes	Delamere	36%	0	2	Fine sand loam	Somewhat poorly drained	Moderately Rapid	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Typic Endoaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Elmville	28%	0	2	Fine sand loam	Somewhat poorly drained	Moderately Rapid	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Mantador	37%	0	2	Fine sand loam	Somewhat poorly drained	Moderately Rapid	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aquic Pachic Hapludolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I280A	Wheatville silt loam, moderately saline, 0 to 2 percent slopes	Wheatville	100%	0	2	Silt loam	Somewhat poorly drained	Moderate	Coarse-silty over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Coarse-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I281A	Wheatville-Mantador-Delamere silt loams, moderately saline, clayey substratum, 0 to 2 percent slopes	Delamere	25%	0	2	Silt loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Typic Endoaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Mantador	31%	0	2	Silt loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aquic Pachic Hapludolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains

APPENDIX 7B

Wahpeton Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Wheatville	44%	0	2	Silt loam	Somewhat poorly drained	Moderate	Coarse-silty over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Coarse-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I283A	Hilaire-Espelie loamy fine sands, 0 to 2 percent slopes	Espelie	38%	0	1	Loamy fine sand	Poorly drained	Moderately Rapid	Sandy over clayey, mixed over smectitic, frigid Typic Epiaquolls	Sandy glaciofluvial deposits over clayey glaciolacustrine deposits	Depressions, lake plains
		Hilaire	63%	0	2	Loamy fine sand	Moderately well drained	Rapid	Sandy over clayey, mixed over smectitic, frigid Oxyaquic Hapludolls	Sandy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I284A	Hilaire-Espelie-Thiefriver, moderately saline complex, 0 to 2 percent slopes	Espelie	33%	0	1	Loamy fine sand	Poorly drained	Moderately Rapid	Sandy over clayey, mixed over smectitic, frigid Typic Epiaquolls	Sandy glaciofluvial deposits over clayey glaciolacustrine deposits	Depressions, lake plains
		Hilaire	50%	0	2	Loamy fine sand	Moderately well drained	Rapid	Sandy over clayey, mixed over smectitic, frigid Oxyaquic Hapludolls	Sandy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Thiefriver	17%	0	1	Fine sand loam	Poorly drained	Moderately Rapid	Sandy over clayey, mixed over smectitic, frigid Typic Calciaquolls	Sandy glaciolacustrine deposits over clayey glaciolacustrine deposits	Depressions, lake plains

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Wahpeton Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I285B	Maddock-Hilaire-Espelie loamy fine sands, 0 to 6 percent slopes	Espelie	25%	0	1	Loamy fine sand	Poorly drained	Moderately Rapid	Sandy over clayey, mixed over smectitic, frigid Typic Epiaquolls	Sandy glaciofluvial deposits over clayey glaciolacustrine deposits	Depressions, lake plains
		Hilaire	38%	0	2	Loamy fine sand	Moderately well drained	Rapid	Sandy over clayey, mixed over smectitic, frigid Oxyaquic Hapludolls	Sandy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Maddock	38%	2	6	Loamy fine sand	Well drained	Rapid	Sandy, mixed, frigid Entic Hapludolls	Sandy glaciofluvial deposits	Flats, lake plains
I289A	Mantador-Delamere-Elmville loams, moderately saline, clayey substratum, 0 to 2 percent slopes	Delamere	33%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Typic Endoaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Elmville	28%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Mantador	39%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aquic Pachic Hapludolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains

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Wahpeton Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I291B	Aylmer-Bantry fine sands, clayey substratum, 0 to 6 percent slopes	Aylmer	63%	2	6	Fine sand	Moderately well drained	Rapid	Mixed, frigid Aquic Udipsamments	Eolian deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Bantry	38%	0	2	Fine sand	Somewhat poorly drained	Rapid	Mixed, frigid Typic Psammaquents	Eolian deposits over clayey glaciolacustrine deposits	Flats, lake plains
I291C	Aylmer-Thiefriver, moderately saline-Serden complex, 0 to 9 percent slopes	Aylmer	47%	2	6	Fine sand	Moderately well drained	Rapid	Mixed, frigid Aquic Udipsamments	Eolian deposits	Flats, lake plains
		Serden	24%	3	9	Fine sand	Excessively drained	Rapid	Mixed, frigid Typic Udipsamments	Eolian deposits	Dunes, sandhills
		Thiefriver	29%	0	1	Fine sand loam	Poorly drained	Moderately Rapid	Sandy over clayey, mixed over smectitic, frigid Typic Calciaquolls	Sandy glaciolacustrine deposits over clayey glaciolacustrine deposits	Depressions, lake plains
I321A	Bearden silt loam, slightly saline, clayey substratum, 0 to 2 percent slopes	Bearden	100%	0	2	Silt loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I329A	Fairdale silt loam, 0 to 2 percent slopes, occasionally flooded	Fairdale	100%	0	3	Silt loam	Moderately well drained	Moderate	Fine-loamy, mixed, superactive, calcareous, frigid Mollic Udifluvents	Fine-loamy alluvium	Flood plains

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Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I340A	Mantador-Delamere-Elmville loams, slightly saline, clayey substratum, 0 to 2 percent slopes	Delamere	35%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Typic Endoaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Elmville	29%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Mantador	35%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aquic Pachic Hapludolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I371A	Bearden-Kindred silty clay loams, 0 to 2 percent slopes	Bearden	53%	0	2	Silt clay loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
		Kindred	47%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine-silty, mixed, superactive, frigid Typic Endoaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
I373A	Kindred-Bearden silty clay loams, 0 to 2 percent slopes	Bearden	38%	0	2	Silt clay loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
		Kindred	63%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine-silty, mixed, superactive, frigid Typic Endoaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains

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Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I374A	Perella loam, clayey substratum, 0 to 1 percent slopes	Perella	100%	0	1	Loam	Poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Typic Endoaquolls	Fine-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Depressions, lake plains
I375A	Perella silty clay loam, clayey substratum, 0 to 1 percent slopes	Perella	100%	0	1	Silt clay loam	Poorly drained	Moderately Slow	Fine-silty, mixed, superactive, frigid Typic Endoaquolls	Fine-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Depressions, lake plains
I377A	Wheatville silt loam, 0 to 2 percent slopes	Wheatville	100%	0	2	Silt loam	Somewhat poorly drained	Moderate	Coarse-silty over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Coarse-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I378A	Bearden silt loam, moderately saline, clayey substratum, 0 to 2 percent slopes	Bearden	100%	0	2	Silt loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I381A	LaDelle silty clay loam, 0 to 2 percent slopes, occasionally flooded	LaDelle	100%	0	2	Silt clay loam	Moderately well drained	Moderate	Fine-silty, mixed, superactive, frigid Cumulic Hapludolls	Fine-silty alluvium	Terraces
I383A	Overly silty clay loam, 0 to 2 percent slopes	Overly	100%	0	2	Silt clay loam	Moderately well drained	Moderately Slow	Fine-silty, mixed, superactive, frigid Pachic Hapludolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
I384B	Overly-Nutley silty clay loams, 2 to 6 percent slopes	Nutley	44%	2	6	Silt clay loam	Well drained	Slow	Fine, smectitic, frigid Chromic Hapluderts	Clayey glaciolacustrine deposits	Flats, lake plains

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Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Overly	56%	2	6	Silt clay loam	Moderately well drained	Moderately Slow	Fine-silty, mixed, superactive, frigid Pachic Hapludolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
I397A	Antler-Mustinka complex, 0 to 2 percent slopes	Antler	68%	0	2	Clay loam	Somewhat poorly drained	Moderate	Fine-loamy, mixed, superactive, frigid Aeric Calciaquolls	Silty glaciolacustrine deposits over loamy till	Lake plains, till-floored lake plains
		Mustinka	32%	0	1	Silt clay loam	Poorly drained	Moderately Slow	Fine, smectitic, frigid Typic Argiaquolls	Silty and clayey glaciolacustrine deposits over loamy till	Lake plains, till-floored lake plains
I447B	Fairdale-Fluvaquents, channeled complex, wooded, 0 to 6 percent slopes, frequently flooded	Fairdale	56%	0	6	Loam	Moderately well drained	Moderate	Fine-loamy, mixed, superactive, calcareous, frigid Mollic Udifluvents	Fine-loamy alluvium	Terraces
		Fluvaquents	44%	0	6	Fine sand loam	Very poorly drained	Moderately Rapid	Fluvaquents	Alluvium	Flood plains, swales
I453A	Wahpeton silty clay, wooded, 0 to 2 percent slopes, occasionally flooded	Wahpeton	100%	0	2	Silty clay	Moderately well drained	Slow	Fine, smectitic, frigid Typic Hapluderts	Clayey alluvium	Natural levees
I473A	Hegne-Fargo silty clay loams, 0 to 1 percent slopes	Fargo	38%	0	1	Silt clay loam	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Hegne	63%	0	1	Silt clay loam	Poorly drained	Slow	Fine, smectitic, frigid Typic Calciaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I480A	Fairdale silt loam, clayey substratum, 0 to 3 percent slopes, rarely flooded	Fairdale	100%	0	2	Silt loam	Moderately well drained	Moderate	Fine-loamy over clayey, mixed over smectitic, superactive, calcareous, frigid Mollic Udifluvents	Fine-loamy alluvium over clayey glaciolacustrine deposits	Flood plains

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Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I482A	Overly-Bearden silt loams, 0 to 2 percent slopes	Bearden	40%	0	2	Silt loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
		Overly	60%	0	2	Silt loam	Moderately well drained	Moderate	Fine-silty, mixed, superactive, frigid Pachic Hapludolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
I492A	Bearden-Lindaas silty clay loams, 0 to 2 percent slopes	Bearden	53%	0	2	Silt clay loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
		Lindaas	47%	0	1	Silt clay loam	Poorly drained	Moderately Slow	Fine, smectitic, frigid Typic Argiaquolls	Loamy glaciolacustrine deposits	Depressions, lake plains
I601A	Bearden silty clay loam, moderately saline, 0 to 2 percent slopes	Bearden	100%	0	2	Silt clay loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
I906F	Orthents-Aquents-Urban Land, highway complex, 0 to 35 percent slopes	Aquents	25%	0	1	Silt clay loam	Poorly drained	Moderately Slow	Aquents	Fine-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Ditches
		Orthents	25%	15	35	Silt clay loam	Well drained	Moderately Slow	Orthents	Glaciofluvial deposits and/or glaciolacustrine deposits	Road beds
			30%	3	15	Silt clay loam	Well drained	Moderately Slow	Orthents	Glaciofluvial deposits and/or glaciolacustrine deposits	Road beds
Additional Temporary Workspace											
I119A	Bearden silty clay loam, 0 to 2 percent slopes	Bearden	100%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains

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Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I226A	Gardena silt loam, clayey substratum, 0 to 2 percent slopes	Gardena	100%	0	2	Silt loam	Moderately well drained	Moderate	Coarse-silty over clayey, mixed over smectitic, superactive, frigid Pachic Hapludolls	Coarse-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I229A	Fargo silty clay, 0 to 1 percent slopes	Fargo	100%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I231A	Dovray silty clay, 0 to 1 percent slopes	Dovray	100%	0	1	Silty clay	Very poorly drained	Slow	Fine, smectitic, frigid Cumulic Vertic Epiaquolls	Clayey glaciolacustrine deposits	Drainageways, lake plains
I233A	Fargo silty clay loam, 0 to 1 percent slopes	Fargo	100%	0	1	Silt clay loam	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I234A	Fargo-Nutley silty clays, 0 to 2 percent slopes	Fargo	56%	0	2	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Nutley	44%	1	2	Silty clay	Well drained	Slow	Fine, smectitic, frigid Chromic Hapluderts	Clayey glaciolacustrine deposits	Flats, lake plains
I234B	Nutley-Fargo, dry, silty clays, 2 to 6 percent slopes	Fargo	44%	2	6	Silty clay	Somewhat poorly drained	Slow	Fine, smectitic, frigid Aquic Hapluderts	Clayey glaciolacustrine deposits	Drainageways, lake plains
		Nutley	56%	3	6	Silty clay	Well drained	Slow	Fine, smectitic, frigid Chromic Hapluderts	Clayey glaciolacustrine deposits	Drainageways, lake plains
I235A	Fargo silty clay, depressional, 0 to 1 percent slopes	Fargo	100%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Depressions, lake plains
I236A	Clearwater-Reis silty clays, loamy substratum, 0 to 1 percent slopes	Clearwater	68%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Calcareous clayey till	Flats

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Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Reis	32%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Calciaquerts	Calcareous clayey till	Flats
I237A	Fargo-Enloe complex, 0 to 1 percent slopes	Enloe	35%	0	1	Silt clay loam	Poorly drained	Moderately Slow	Fine, smectitic, frigid Argiaquic Argialbolls	Clayey glaciolacustrine deposits	Depressions, lake plains
		Fargo	65%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I238A	Fargo-Hegne silty clays, 0 to 1 percent slopes	Fargo	59%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Hegne	41%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Calciaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I241A	Fargo-Ryan, thick solum silty clays, 0 to 1 percents slopes	Fargo	65%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Ryan	35%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Natraquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I242A	Ryan-Fargo silty clays, 0 to 1 percent slopes	Fargo	28%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Ryan	72%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Natraquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I243A	Doran clay loam, 0 to 2 percent slopes	Doran	100%	0	2	Clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Aquertic Argiudolls	Loamy glaciolacustrine deposits over loamy till	Lake plains, till-floored lake plains

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Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I244A	Galchutt silt loam, 0 to 2 percent slopes	Galchutt	100%	0	2	Silt loam	Somewhat poorly drained	Moderate	Fine, smectitic, frigid Vertic Argialbolls	Silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I246A	Galchutt-Wheatville, slightly saline silt loams, 0 to 2 percent slopes	Galchutt	63%	0	2	Silt loam	Somewhat poorly drained	Moderate	Fine, smectitic, frigid Vertic Argialbolls	Silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Wheatville	38%	0	2	Silt loam	Somewhat poorly drained	Moderate	Coarse-silty over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Coarse-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I248A	Wahpeton silty clay, 0 to 2 percent slopes, occasionally flooded	Wahpeton	100%	0	2	Silty clay	Moderately well drained	Slow	Fine, smectitic, frigid Typic Hapluderts	Clayey alluvium	Natural levees
I251A	Aberdeen-Galchutt-Fargo complex, 0 to 2 percent slopes	Aberdeen	55%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Glossic Natrudolls	Loamy glaciolacustrine deposits	Flats, lake plains
		Fargo	18%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Galchutt	27%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Vertic Argialbolls	Silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains

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Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I252A	Aberdeen-Ryan silty clay loams, 0 to 2 percent slopes	Aberdeen	73%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Glossic Natrudolls	Loamy glaciolacustrine deposits	Flats, lake plains
		Ryan	27%	0	1	Silt clay loam	Poorly drained	Slow	Fine, smectitic, frigid Typic Natraquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I272A	Thiefriver fine sandy loam, moderately saline, 0 to 1 percent slopes	Thiefriver	100%	0	1	Fine sand loam	Poorly drained	Moderately Rapid	Sandy over clayey, mixed over smectitic, frigid Typic Calciaquolls	Sandy glaciolacustrine deposits over clayey glaciolacustrine deposits	Depressions, lake plains
I279A	Mantador-Delamere-Elmville fine sandy loams, moderately saline, clayey substratum, 0 to 2 percent slopes	Delamere	36%	0	2	Fine sand loam	Somewhat poorly drained	Moderately Rapid	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Typic Endoaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Elmville	28%	0	2	Fine sand loam	Somewhat poorly drained	Moderately Rapid	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Mantador	37%	0	2	Fine sand loam	Somewhat poorly drained	Moderately Rapid	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aquic Pachic Hapludolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I280A	Wheatville silt loam, moderately saline, 0 to 2 percent slopes	Wheatville	100%	0	2	Silt loam	Somewhat poorly drained	Moderate	Coarse-silty over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Coarse-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains

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Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I281A	Wheatville-Mantador-Delamere silt loams, moderately saline, clayey substratum, 0 to 2 percent slopes	Delamere	25%	0	2	Silt loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Typic Endoaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Mantador	31%	0	2	Silt loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aquic Pachic Hapludolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Wheatville	44%	0	2	Silt loam	Somewhat poorly drained	Moderate	Coarse-silty over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Coarse-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I285B	Maddock-Hilaire-Espelie loamy fine sands, 0 to 6 percent slopes	Espelie	25%	0	1	Loamy fine sand	Poorly drained	Moderately Rapid	Sandy over clayey, mixed over smectitic, frigid Typic Epiaquolls	Sandy glaciofluvial deposits over clayey glaciolacustrine deposits	Depressions, lake plains
		Hilaire	38%	0	2	Loamy fine sand	Moderately well drained	Rapid	Sandy over clayey, mixed over smectitic, frigid Oxyaquic Hapludolls	Sandy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Maddock	38%	2	6	Loamy fine sand	Well drained	Rapid	Sandy, mixed, frigid Entic Hapludolls	Sandy glaciofluvial deposits	Flats, lake plains

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Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I321A	Bearden silt loam, slightly saline, clayey substratum, 0 to 2 percent slopes	Bearden	100%	0	2	Silt loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I329A	Fairdale silt loam, 0 to 2 percent slopes, occasionally flooded	Fairdale	100%	0	3	Silt loam	Moderately well drained	Moderate	Fine-loamy, mixed, superactive, calcareous, frigid Mollic Udifluvents	Fine-loamy alluvium	Flood plains
I340A	Mantador-Delamere-Elmville loams, slightly saline, clayey substratum, 0 to 2 percent slopes	Delamere	35%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Typic Endoaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Elmville	29%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Mantador	35%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aquic Pachic Hapludolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I371A	Bearden-Kindred silty clay loams, 0 to 2 percent slopes	Bearden	53%	0	2	Silt clay loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
		Kindred	47%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine-silty, mixed, superactive, frigid Typic Endoaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains

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Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I373A	Kindred-Bearden silty clay loams, 0 to 2 percent slopes	Bearden	38%	0	2	Silt clay loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
		Kindred	63%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine-silty, mixed, superactive, frigid Typic Endoaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
I374A	Perella loam, clayey substratum, 0 to 1 percent slopes	Perella	100%	0	1	Loam	Poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Typic Endoaquolls	Fine-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Depressions, lake plains
I375A	Perella silty clay loam, clayey substratum, 0 to 1 percent slopes	Perella	100%	0	1	Silt clay loam	Poorly drained	Moderately Slow	Fine-silty, mixed, superactive, frigid Typic Endoaquolls	Fine-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Depressions, lake plains
I377A	Wheatville silt loam, 0 to 2 percent slopes	Wheatville	100%	0	2	Silt loam	Somewhat poorly drained	Moderate	Coarse-silty over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Coarse-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I378A	Bearden silt loam, moderately saline, clayey substratum, 0 to 2 percent slopes	Bearden	100%	0	2	Silt loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I381A	LaDelle silty clay loam, 0 to 2 percent slopes, occasionally flooded	LaDelle	100%	0	2	Silt clay loam	Moderately well drained	Moderate	Fine-silty, mixed, superactive, frigid Cumulic Hapludolls	Fine-silty alluvium	Terraces

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Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I383A	Overly silty clay loam, 0 to 2 percent slopes	Overly	100%	0	2	Silt clay loam	Moderately well drained	Moderately Slow	Fine-silty, mixed, superactive, frigid Pachic Hapludolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
I384B	Overly-Nutley silty clay loams, 2 to 6 percent slopes	Nutley	44%	2	6	Silt clay loam	Well drained	Slow	Fine, smectitic, frigid Chromic Hapluderts	Clayey glaciolacustrine deposits	Flats, lake plains
		Overly	56%	2	6	Silt clay loam	Moderately well drained	Moderately Slow	Fine-silty, mixed, superactive, frigid Pachic Hapludolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
I397A	Antler-Mustinka complex, 0 to 2 percent slopes	Antler	68%	0	2	Clay loam	Somewhat poorly drained	Moderate	Fine-loamy, mixed, superactive, frigid Aeric Calciaquolls	Silty glaciolacustrine deposits over loamy till	Lake plains, till-floored lake plains
		Mustinka	32%	0	1	Silt clay loam	Poorly drained	Moderately Slow	Fine, smectitic, frigid Typic Argiaquolls	Silty and clayey glaciolacustrine deposits over loamy till	Lake plains, till-floored lake plains
I453A	Wahpeton silty clay, wooded, 0 to 2 percent slopes, occasionally flooded	Wahpeton	100%	0	2	Silty clay	Moderately well drained	Slow	Fine, smectitic, frigid Typic Hapluderts	Clayey alluvium	Natural levees
I482A	Overly-Bearden silt loams, 0 to 2 percent slopes	Bearden	40%	0	2	Silt loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
		Overly	60%	0	2	Silt loam	Moderately well drained	Moderate	Fine-silty, mixed, superactive, frigid Pachic Hapludolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
I492A	Bearden-Lindaas silty clay loams, 0 to 2 percent slopes	Bearden	53%	0	2	Silt clay loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
		Lindaas	47%	0	1	Silt clay loam	Poorly drained	Moderately Slow	Fine, smectitic, frigid Typic Argiaquolls	Loamy glaciolacustrine deposits	Depressions, lake plains

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Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I601A	Bearden silty clay loam, moderately saline, 0 to 2 percent slopes	Bearden	100%	0	2	Silt clay loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
I906F	Orthents-Aquents-Urban Land, highway complex, 0 to 35 percent slopes	Aquents	25%	0	1	Silt clay loam	Poorly drained	Moderately Slow	Aquents	Fine-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Ditches
		Orthents	25%	15	35	Silt clay loam	Well drained	Moderately Slow	Orthents	Glaciofluvial deposits and/or glaciolacustrine deposits	Road beds
			30%	3	15	Silt clay loam	Well drained	Moderately Slow	Orthents	Glaciofluvial deposits and/or glaciolacustrine deposits	Road beds
Contractor Yards											
Kost Yard											
I235A	Fargo silty clay, depressional, 0 to 1 percent slopes	Fargo	100%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Depressions, lake plains
I238A	Fargo-Hegne silty clays, 0 to 1 percent slopes	Fargo	59%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Hegne	41%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Calciaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
Kindred Yard											
I229A	Fargo silty clay, 0 to 1 percent slopes	Fargo	100%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains

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Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I241A	Fargo-Ryan, thick solum silty clays, 0 to 1 percents slopes	Fargo	65%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Ryan	35%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Natraquerts	Clayey glaciolacustrine deposits	Flats, lake plains
Comstock Yard											
I236A	Clearwater-Reis silty clays, loamy substratum, 0 to 1 percent slopes	Clearwater	68%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Calcareous clayey till	Flats
		Reis	32%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Calciaquerts	Calcareous clayey till	Flats
I241A	Fargo-Ryan, thick solum silty clays, 0 to 1 percents slopes	Fargo	65%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Ryan	35%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Natraquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I455A	Epiaquolls, clayey, borrow areas, 0 to 2 percent slopes	Epiaquolls	100%	0	2	Silty clay	Poorly drained	Slow	Epiaquolls	Silty and clayey glaciolacustrine deposits	Reclaimed lands
Wahpeton City Yard											
I243A	Doran clay loam, 0 to 2 percent slopes	Doran	100%	0	2	Clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Aquertic Argiudolls	Loamy glaciolacustrine deposits over loamy till	Lake plains, till-floored lake plains
Wahpeton Yard											
I229A	Fargo silty clay, 0 to 1 percent slopes	Fargo	100%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains

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Wahpeton Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I901A	Urban Land-Aquerts complex, 0 to 2 percent slopes	Aquerts	35%	0	2	Silty clay	Poorly drained	Slow	Aquerts	Clayey glaciolacustrine deposits	Flats
Access Roads											
Permanent Access Roads											
I229A	Fargo silty clay, 0 to 1 percent slopes	Fargo	100%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I241A	Fargo-Ryan, thick solum silty clays, 0 to 1 percents slopes	Fargo	65%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Ryan	35%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Natraquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I243A	Doran clay loam, 0 to 2 percent slopes	Doran	100%	0	2	Clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Aquertic Argiudolls	Loamy glaciolacustrine deposits over loamy till	Lake plains, till-floored lake plains
I251A	Aberdeen-Galchutt-Fargo complex, 0 to 2 percent slopes	Aberdeen	55%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Glossic Natrudolls	Loamy glaciolacustrine deposits	Flats, lake plains
		Fargo	18%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Galchutt	27%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Vertic Argialbolls	Silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains

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Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I289A	Mantador-Delamere-Elmville loams, moderately saline, clayey substratum, 0 to 2 percent slopes	Delamere	33%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Typic Endoaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Elmville	28%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Mantador	39%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aquic Pachic Hapludolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I381A	LaDelle silty clay loam, 0 to 2 percent slopes, occasionally flooded	LaDelle	100%	0	2	Silt clay loam	Moderately well drained	Moderate	Fine-silty, mixed, superactive, frigid Cumulic Hapludolls	Fine-silty alluvium	Terraces
I397A	Antler-Mustinka complex, 0 to 2 percent slopes	Antler	68%	0	2	Clay loam	Somewhat poorly drained	Moderate	Fine-loamy, mixed, superactive, frigid Aeric Calciaquolls	Silty glaciolacustrine deposits over loamy till	Lake plains, till-floored lake plains
		Mustinka	32%	0	1	Silt clay loam	Poorly drained	Moderately Slow	Fine, smectitic, frigid Typic Argiaquolls	Silty and clayey glaciolacustrine deposits over loamy till	Lake plains, till-floored lake plains
Temporary Access Road											
I119A	Bearden silty clay loam, 0 to 2 percent slopes	Bearden	100%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains

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Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I219A	Tiffany loam, clayey substratum, 0 to 1 percent slopes	Tiffany	100%	0	1	Loam	Poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Typic Endoaquolls	Coarse-loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Depressions
I229A	Fargo silty clay, 0 to 1 percent slopes	Fargo	100%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I231A	Dovray silty clay, 0 to 1 percent slopes	Dovray	100%	0	1	Silty clay	Very poorly drained	Slow	Fine, smectitic, frigid Cumulic Vertic Epiaquolls	Clayey glaciolacustrine deposits	Drainageways, lake plains
I233A	Fargo silty clay loam, 0 to 1 percent slopes	Fargo	100%	0	1	Silt clay loam	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I234B	Nutley-Fargo, dry, silty clays, 2 to 6 percent slopes	Fargo	44%	2	6	Silty clay	Somewhat poorly drained	Slow	Fine, smectitic, frigid Aquic Hapluderts	Clayey glaciolacustrine deposits	Drainageways, lake plains
		Nutley	56%	3	6	Silty clay	Well drained	Slow	Fine, smectitic, frigid Chromic Hapluderts	Clayey glaciolacustrine deposits	Drainageways, lake plains
I235A	Fargo silty clay, depressional, 0 to 1 percent slopes	Fargo	100%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Depressions, lake plains
I238A	Fargo-Hegne silty clays, 0 to 1 percent slopes	Fargo	59%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Hegne	41%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Calciaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I241A	Fargo-Ryan, thick solum silty clays, 0 to 1 percents slopes	Fargo	65%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains

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Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Ryan	35%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Natraquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I242A	Ryan-Fargo silty clays, 0 to 1 percent slopes	Fargo	28%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Ryan	72%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Natraquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I246A	Galchutt-Wheatville, slightly saline silt loams, 0 to 2 percent slopes	Galchutt	63%	0	2	Silt loam	Somewhat poorly drained	Moderate	Fine, smectitic, frigid Vertic Argialbolls	Silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Wheatville	38%	0	2	Silt loam	Somewhat poorly drained	Moderate	Coarse-silty over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Coarse-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I249A	Aberdeen fine sandy loam, 0 to 2 percent slopes	Aberdeen	100%	0	2	Fine sand loam	Somewhat poorly drained	Moderately Rapid	Fine, smectitic, frigid Glossic Natrudolls	Loamy glaciolacustrine deposits	Flats, lake plains
I251A	Aberdeen-Galchutt-Fargo complex, 0 to 2 percent slopes	Aberdeen	55%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Glossic Natrudolls	Loamy glaciolacustrine deposits	Flats, lake plains
		Fargo	18%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains

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Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Galchutt	27%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Vertic Argialbolls	Silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I252A	Aberdeen-Ryan silty clay loams, 0 to 2 percent slopes	Aberdeen	73%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Glossic Natrudolls	Loamy glaciolacustrine deposits	Flats, lake plains
		Ryan	27%	0	1	Silt clay loam	Poorly drained	Slow	Fine, smectitic, frigid Typic Natraquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I279A	Mantador-Delamere-Elmville fine sandy loams, moderately saline, clayey substratum, 0 to 2 percent slopes	Delamere	36%	0	2	Fine sand loam	Somewhat poorly drained	Moderately Rapid	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Typic Endoaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Elmville	28%	0	2	Fine sand loam	Somewhat poorly drained	Moderately Rapid	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Mantador	37%	0	2	Fine sand loam	Somewhat poorly drained	Moderately Rapid	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aquic Pachic Hapludolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I280A	Wheatville silt loam, moderately saline, 0 to 2 percent slopes	Wheatville	100%	0	2	Silt loam	Somewhat poorly drained	Moderate	Coarse-silty over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Coarse-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains

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Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I283A	Hilaire-Espelie loamy fine sands, 0 to 2 percent slopes	Espelie	38%	0	1	Loamy fine sand	Poorly drained	Moderately Rapid	Sandy over clayey, mixed over smectitic, frigid Typic Epiaquolls	Sandy glaciofluvial deposits over clayey glaciolacustrine deposits	Depressions, lake plains
		Hilaire	63%	0	2	Loamy fine sand	Moderately well drained	Rapid	Sandy over clayey, mixed over smectitic, frigid Oxyaquic Hapludolls	Sandy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I285B	Maddock-Hilaire-Espelie loamy fine sands, 0 to 6 percent slopes	Espelie	25%	0	1	Loamy fine sand	Poorly drained	Moderately Rapid	Sandy over clayey, mixed over smectitic, frigid Typic Epiaquolls	Sandy glaciofluvial deposits over clayey glaciolacustrine deposits	Depressions, lake plains
		Hilaire	38%	0	2	Loamy fine sand	Moderately well drained	Rapid	Sandy over clayey, mixed over smectitic, frigid Oxyaquic Hapludolls	Sandy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Maddock	38%	2	6	Loamy fine sand	Well drained	Rapid	Sandy, mixed, frigid Entic Hapludolls	Sandy glaciofluvial deposits	Flats, lake plains
I329A	Fairdale silt loam, 0 to 2 percent slopes, occasionally flooded	Fairdale	100%	0	3	Silt loam	Moderately well drained	Moderate	Fine-loamy, mixed, superactive, calcareous, frigid Mollic Udifluvents	Fine-loamy alluvium	Flood plains

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Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I340A	Mantador-Delamere-Elmville loams, slightly saline, clayey substratum, 0 to 2 percent slopes	Delamere	35%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Typic Endoaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Elmville	29%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Mantador	35%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aquic Pachic Hapludolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I371A	Bearden-Kindred silty clay loams, 0 to 2 percent slopes	Bearden	53%	0	2	Silt clay loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
		Kindred	47%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine-silty, mixed, superactive, frigid Typic Endoaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
I374A	Perella loam, clayey substratum, 0 to 1 percent slopes	Perella	100%	0	1	Loam	Poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Typic Endoaquolls	Fine-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Depressions, lake plains
I378A	Bearden silt loam, moderately saline, clayey substratum, 0 to 2 percent slopes	Bearden	100%	0	2	Silt loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains

APPENDIX 7B

Wahpeton Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I381A	LaDelle silty clay loam, 0 to 2 percent slopes, occasionally flooded	LaDelle	100%	0	2	Silt clay loam	Moderately well drained	Moderate	Fine-silty, mixed, superactive, frigid Cumulic Hapludolls	Fine-silty alluvium	Terraces
I383A	Overly silty clay loam, 0 to 2 percent slopes	Overly	100%	0	2	Silt clay loam	Moderately well drained	Moderately Slow	Fine-silty, mixed, superactive, frigid Pachic Hapludolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
I447B	Fairdale-Fluvaquents, channeled complex, wooded, 0 to 6 percent slopes, frequently flooded	Fairdale	56%	0	6	Loam	Moderately well drained	Moderate	Fine-loamy, mixed, superactive, calcareous, frigid Mollic Udifluvents	Fine-loamy alluvium	Terraces
		Fluvaquents	44%	0	6	Fine sand loam	Very poorly drained	Moderately Rapid	Fluvaquents	Alluvium	Flood plains, swales
I473A	Hegne-Fargo silty clay loams, 0 to 1 percent slopes	Fargo	38%	0	1	Silt clay loam	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Hegne	63%	0	1	Silt clay loam	Poorly drained	Slow	Fine, smectitic, frigid Typic Calciaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I482A	Overly-Bearden silt loams, 0 to 2 percent slopes	Bearden	40%	0	2	Silt loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
		Overly	60%	0	2	Silt loam	Moderately well drained	Moderate	Fine-silty, mixed, superactive, frigid Pachic Hapludolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
I492A	Bearden-Lindaas silty clay loams, 0 to 2 percent slopes	Bearden	53%	0	2	Silt clay loam	Somewhat poorly drained	Moderate	Fine-silty, mixed, superactive, frigid Aeric Calciaquolls	Fine-silty glaciolacustrine deposits	Flats, lake plains
		Lindaas	47%	0	1	Silt clay loam	Poorly drained	Moderately Slow	Fine, smectitic, frigid Typic Argiaquolls	Loamy glaciolacustrine deposits	Depressions, lake plains

APPENDIX 7B

Wahpeton Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope Low	Percent Slope High	Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
Aboveground Facilities											
Mapleton Compressor Station											
I233A	Fargo silty clay loam, 0 to 1 percent slopes	Fargo	100%	0	1	Silt clay loam	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I248A	Wahpeton silty clay, 0 to 2 percent slopes, occasionally flooded	Wahpeton	100%	0	2	Silty clay	Moderately well drained	Slow	Fine, smectitic, frigid Typic Hapluderts	Clayey alluvium	Natural levees
MDU Border Stations											
I229A	Fargo silty clay, 0 to 1 percent slopes	Fargo	100%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I241A	Fargo-Ryan, thick solum silty clays, 0 to 1 percents slopes	Fargo	65%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Ryan	35%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Natraquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I243A	Doran clay loam, 0 to 2 percent slopes	Doran	100%	0	2	Clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Aquertic Argiudolls	Loamy glaciolacustrine deposits over loamy till	Lake plains, till-floored lake plains
I397A	Antler-Mustinka complex, 0 to 2 percent slopes	Antler	68%	0	2	Clay loam	Somewhat poorly drained	Moderate	Fine-loamy, mixed, superactive, frigid Aeric Calciaquolls	Silty glaciolacustrine deposits over loamy till	Lake plains, till-floored lake plains
		Mustinka	32%	0	1	Silt clay loam	Poorly drained	Moderately Slow	Fine, smectitic, frigid Typic Argiaquolls	Silty and clayey glaciolacustrine deposits over loamy till	Lake plains, till-floored lake plains
Block Valves and Pig Launcher/Receivers											

APPENDIX 7B

Wahpeton Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture	Drainage Class	Permeability	Taxonomic Classification	Parent Material	Landforms
				Low	High						
I229A	Fargo silty clay, 0 to 1 percent slopes	Fargo	100%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
I251A	Aberdeen-Galchutt-Fargo complex, 0 to 2 percent slopes	Aberdeen	55%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Glossic Natrudolls	Loamy glaciolacustrine deposits	Flats, lake plains
		Fargo	18%	0	1	Silty clay	Poorly drained	Slow	Fine, smectitic, frigid Typic Epiaquerts	Clayey glaciolacustrine deposits	Flats, lake plains
		Galchutt	27%	0	2	Silt clay loam	Somewhat poorly drained	Moderately Slow	Fine, smectitic, frigid Vertic Argialbolls	Silty glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
I289A	Mantador-Delamere-Elmville loams, moderately saline, clayey substratum, 0 to 2 percent slopes	Delamere	33%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Typic Endoaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Elmville	28%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aeric Calciaquolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains
		Mantador	39%	0	2	Loam	Somewhat poorly drained	Moderate	Coarse-loamy over clayey, mixed over smectitic, superactive, frigid Aquic Pachic Hapludolls	Loamy glaciolacustrine deposits over clayey glaciolacustrine deposits	Flats, lake plains

Soil Survey Staff, 2022

APPENDIX 7C Agency Correspondence

Destiny Kerr

From: Monson, Joshua - FPAC-NRCS, Fargo, ND <joshua.monson@usda.gov>
Sent: Tuesday, February 1, 2022 8:11 AM
To: Destiny Kerr
Cc: Gustafson, Brent - NRCS, Valley City, ND
Subject: RE: [External Email]WBI Energy NRCS Review - Cass County

Destiny,

The state office completed a review of the shapefile and I was told that the route does not intersect any easements and the closest one is 1,600' from the line. I hope this allows for continued planning of your project.

Thank you,

Joshua Monson
District Conservationist, Fargo Field Office
1665 43rd St. S. Suite 103
Fargo, ND 58103
Natural Resources Conservation Service
United States Department of Agriculture
http://www.nd.nrcs.usda.gov
Tel: 701-219-7142

Stay Connected with USDA:

From: Destiny Kerr <Destiny.Kerr@erm.com>
Sent: Thursday, January 27, 2022 10:07 AM
To: Monson, Joshua - FPAC-NRCS, Fargo, ND <joshua.monson@usda.gov>
Subject: RE: [External Email]WBI Energy NRCS Review - Cass County

Hi Joshua,

The shapefile for the Project is attached. Thank you for your assistance!

Best,

Destiny D. Kerr
(she/her)
Consultant II, Scientist

ERM
T +1 (857) 302-6637 | **M** 918-314-1833
E destiny.kerr@erm.com | **W** www.erm.com

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From: Monson, Joshua - FPAC-NRCS, Fargo, ND <joshua.monson@usda.gov>
Sent: Thursday, January 27, 2022 9:39 AM
To: Destiny Kerr <Destiny.Kerr@erm.com>
Subject: RE: [External Email]WBI Energy NRCS Review - Cass County

WARNING: The sender of this email could not be validated and may not match the person in the "From" field.

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Destiny,

Do you have a GIS shapefile of the proposed pipeline? If so can you please send it then I will get it to the State Office and they said they should be able to assist you moving forward.

Thanks,

Joshua Monson
District Conservationist, Fargo Field Office
1665 43rd St. S. Suite 103
Fargo, ND 58103
Natural Resources Conservation Service
United States Department of Agriculture
http://www.nd.nrcs.usda.gov
Tel: 701-219-7142

Stay Connected with USDA:

From: Destiny Kerr <Destiny.Kerr@erm.com>
Sent: Wednesday, January 26, 2022 1:48 PM
To: Monson, Joshua - FPAC-NRCS, Fargo, ND <joshua.monson@usda.gov>
Cc: Larry Brown <Larry.Brown@erm.com>; jill.linn@WBIEnergy.com; Robbyn.Reukauf@WBIEnergy.com; Maggie Suter <Maggie.Suter@erm.com>; Gustafson, Brent - NRCS, Valley City, ND <brent.gustafson@usda.gov>; Lisa DiNicolantonio <Lisa.DiNicolantonio@erm.com>
Subject: RE: [External Email]WBI Energy NRCS Review - Cass County

Hi Joshua,

To clarify, would you be able to help identify Agricultural Conservation Easement Program lands crossed by the Wahpeton Expansion Project?

Best,
Destiny D. Kerr
(she/her)
Consultant II, Scientist

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E destiny.kerr@erm.com | **W** www.erm.com

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From: Monson, Joshua - FPAC-NRCS, Fargo, ND <joshua.monson@usda.gov>
Sent: Tuesday, January 18, 2022 10:59 AM
To: Destiny Kerr <Destiny.Kerr@erm.com>
Cc: Larry Brown <Larry.Brown@erm.com>; jill.linn@WBIEnergy.com; Robbyn.Reukauf@WBIEnergy.com; Maggie Suter <Maggie.Suter@erm.com>; Gustafson, Brent - NRCS, Valley City, ND <brent.gustafson@usda.gov>; Lisa DiNicolantonio <Lisa.DiNicolantonio@erm.com>
Subject: RE: [External Email]WBI Energy NRCS Review - Cass County

Destiny,

If you know the owners of the ACEP and locations I could look at the mixes that were planted there and they could be replicated or just reseed with the DOT mix as it would likely provide adequate cover to meet the easement requirements.

Thank you,

Joshua Monson
District Conservationist, Fargo Field Office
1665 43rd St. S. Suite 103
Fargo, ND 58103
Natural Resources Conservation Service
United States Department of Agriculture
http://www.nd.nrcs.usda.gov
Tel: 701-219-7142

Stay Connected with USDA:

From: Destiny Kerr <Destiny.Kerr@erm.com>
Sent: Friday, January 14, 2022 3:37 PM
To: Monson, Joshua - FPAC-NRCS, Fargo, ND <joshua.monson@usda.gov>

Cc: Larry Brown <Larry.Brown@erm.com>; jill.linn@WBIEnergy.com; Robbyn.Reukauf@WBIEnergy.com; Maggie Suter <Maggie.Suter@erm.com>; Gustafson, Brent - NRCS, Valley City, ND <brent.gustafson@usda.gov>; Lisa DiNicolantonio <Lisa.DiNicolantonio@erm.com>
Subject: RE: [External Email]WBI Energy NRCS Review - Cass County

Good afternoon Joshua,

Thank you for your comments on the seed mixes for the Wahpeton Expansion Project. Would you also be able to provide comment on the Agricultural Conservation Easement Program lands crossed by the construction work area?

Your time and assistance is greatly appreciated.

Best,
Destiny D. Kerr
(she/her)
Consultant II, Scientist

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E destiny.kerr@erm.com | **W** www.erm.com

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From: Monson, Joshua - NRCS, Fargo, ND <joshua.monson@usda.gov>
Sent: Thursday, December 16, 2021 3:23 PM
To: Destiny Kerr <Destiny.Kerr@erm.com>
Cc: Larry Brown <Larry.Brown@erm.com>; jill.linn@WBIEnergy.com; Robbyn.Reukauf@WBIEnergy.com; Maggie Suter <Maggie.Suter@erm.com>; Gustafson, Brent - NRCS, Valley City, ND <brent.gustafson@usda.gov>
Subject: RE: [External Email]WBI Energy NRCS Review - Cass County

Destiny,

After looking at the mixes, our guidelines, and discussion with Brent Gustafson the CDU supervisor we agreed that using the NDDOT mix for the whole length of the project would likely yield the best results. Reasoning below:

- All native species unlike the grassland and pasture mixes so if there are any locations that are considered unbroken/ native we are planting back natives
- The Canada wildrye and slender wheatgrass both establish quickly and will help with restoration
- Those species have had good success in the restoration area and have a wide range of suitability based on soils

I would also suggest adding 10lbs of oats per acre as a companion/ nurse crop to reduce erosion and weed competition. Please let me know if we can be of any further assistance.

Thank you,

Joshua Monson
District Conservationist, Fargo Field Office
1665 43rd St. S. Suite 103
Fargo, ND 58103
Natural Resources Conservation Service
United States Department of Agriculture
http://www.nd.nrcs.usda.gov
Tel: 701-219-7142

Stay Connected with USDA:

From: Destiny Kerr <Destiny.Kerr@erm.com>
Sent: Thursday, December 16, 2021 1:30 PM
To: Monson, Joshua - NRCS, Fargo, ND <joshua.monson@usda.gov>
Cc: Larry Brown <Larry.Brown@erm.com>; jill.linn@WBIEnergy.com; Robbyn.Reukauf@WBIEnergy.com; Maggie Suter <Maggie.Suter@erm.com>
Subject: [External Email]WBI Energy NRCS Review - Cass County

Good afternoon Joshua Monson,

ERM is preparing environmental review documents on behalf of WBI Energy Transmission, Inc. for a development project affecting land in Cass County, ND. We respectfully request your review and comments on the proposed seed-mixes for use during restoration and Agricultural Conservation Easement Program lands crossed by the construction work area. Please see the attached document for the proposed seed-mixes and additional background information.

Your time and assistance is greatly appreciated. Please feel free to reach out if you have any questions.

Best,
Destiny D. Kerr
(she/her)
Consultant II, Scientist

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E destiny.kerr@erm.com | **W** www.erm.com

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WBI ENERGY TRANSMISSION, INC.
1250 West Century Ave.
P.O. Box 5601
Bismarck, ND 58506-5601
(701) 530-1600
www.wbienergy.com

December 14, 2021

Joshua J. Monson
District Conservationist
Fargo Field Office
Natural Resources Conservation Service
1665 43rd Street
Suite 103
Fargo, ND 58103

Subject: WBI Energy Transmission, Inc.
Wahpeton Expansion Project
Request for Comments on Seed Mixes and Agriculture Conservation Easement Land

Dear Joshua Monson,

WBI Energy Transmission, Inc. (WBI Energy) operates an interstate natural gas transmission pipeline system in the Northern Plains and is proposing to expand its system in southeastern North Dakota. The proposed Wahpeton Expansion Project (Project) will involve constructing approximately 60 miles of 12-inch diameter natural gas pipeline from WBI Energy's existing Mapleton Compressor Station near Mapleton, North Dakota, to a new delivery station near Wahpeton, North Dakota. The Project will also include minor modifications at the Mapleton Compressor Station and two new delivery stations, one near Kindred, North Dakota and (as previously mentioned) one near Wahpeton. The enclosed map shows the preliminary proposed pipeline route and locations of project facilities.

The Federal Energy Regulatory Commission (FERC) is the lead federal agency responsible for the review of the Project. ERM-West, Inc. (ERM) is assisting WBI Energy with assessing the potential environmental impacts of the Project for the FERC application. We are requesting the following assistance/information from your office to assist us in the development of our application to the FERC:

- Your review and any associated comments on the seed-mixes in Table 1 that WBI Energy tentatively proposes to use during revegetation and restoration of non cropland areas of the right-of-way and other workspaces disturbed by construction of the Project.

- Identification of and specific location information about any Agricultural Conservation Easement Program lands that are crossed or near the proposed Project right-of way.

Final cleanup will begin after backfilling the pipeline trench is complete, and as soon as weather and site conditions permit. Every reasonable effort will be made to complete final cleanup (including final grading and installation of permanent erosion control devices) within timeframes required by permits, in accordance with landowner requests. During clean-up, construction debris will be collected and taken to a disposal facility. Contours will be restored to pre-existing conditions as closely as possible, and topsoil that was segregated prior to installation of the pipeline will be

respread over the surface of the right-of-way. Permanent erosion controls will be installed as needed and where required by permits.

The seed-mixes in Table 1 have been designed for reseeding uplands in accordance with the North Dakota Natural Resources Conservation Service's (NRCS) Field Office Technical Guide (FOTG) *Herbaceous Vegetation Establishment Guide* (2021), and the North Dakota Department of Transportation (NDDOT) *2020 Standards and Specifications for Road and Bridge Construction*. The majority of the Project workspace is located in agricultural land and along road or other rights-of-ways. Small portions of the Project cross un cropped grass lands and forested lands. Workspace in agricultural cropland will be seeded or stabilized in accordance with land owner preferences and practices. Non-cultivated managed land will be seeded with the Pasture Mix in Table 1. Non-agricultural grassland areas will be seeded with the Grassland Mix. Road right-of-ways and all other areas will be seeded with the NDDOT Mix. These seed mixes are presented below in Table 1. In accordance with the FERC Wetland and Waterbody Construction and Mitigation Procedures, vegetation in wetlands will be cut just above ground level, leaving existing root systems in place to allow re-establishment of pre-construction wetland species.

TABLE 1

Wahpeton Expansion Project
Proposed Upland Seed Mixes for Lands Crossed by the Project

Species	PLS Lbs/Acre	Percent of Mix
Grassland Mix		
Little Bluestem	3.0	15
Big Bluestem	4.4	22
Sideoats grama	4.6	23
Crested Wheatgrass	4.1	21
Fowl Bluegrass	0.6	3
Purple Praireclover	2.2	11
Praire (yellow) coneflower	0.4	2
Maximilian sunflower	0.6	3
Total	**20.0**	**100**
Pasture Mix		
Fowl Bluegrass	1.5	10
Smooth Bromegrass	5.6	38
Crested Wheatgrass	4.9	33
Praire (yellow) coneflower	0.3	2
Purple Praireclover	2.7	18
Total	**15.0**	**100**

TABLE 1

Wahpeton Expansion Project
Proposed Upland Seed Mixes for Lands Crossed by the Project

Species	PLS Lbs/Acre	Percent of Mix
NDDOT Mix		
Western Wheatgrass	9.6	20
Switchgrass	1.6	20
Green Needlegrass	3.6	20
Canada Wild-rye	5.2	20
Slender Wheatgrass	5.0	20
Total	**25.0**	**100**

Note: PLS=Pure live seed

Restoration and revegetation will follow seedbed preparation, equipment, drill calibration, seed requirements, and seeding depth as outlined in the *Herbaceous Vegetation Establishment Guide* found in the FOTG. Any areas that cannot be restored before conditions prevent adequate seedbed preparation and seeding will be planted the following spring. Temporary erosion controls will be installed and maintained as appropriate over the winter in areas that cannot be seeded.

Thank you for your assistance with this matter. Receiving your responses within 30 days or by December 31, 2021 will allow WBI Energy to maintain the project schedule. If you need more detailed information about the Project route or have any questions about the Project or this request, please contact me by telephone at (406)-359-7332 or email at jill.linn@wbienergy.com. If I am unavailable, you can also contact Maggie Suter from ERM by telephone at (410) 972-4125 or email at maggie.suter@erm.com.

Sincerely,

Jill Linn

Environmental Manager

WBI Energy Transmission, Inc.

enclosures: Overview Map

Destiny Kerr

From: Destiny Kerr
Sent: Friday, January 14, 2022 4:46 PM
To: 'jessica.paler@usda.gov'
Cc: Larry Brown; 'jill.linn@WBIEnergy.com'; 'Robbyn.Reukauf@WBIEnergy.com'; Maggie Suter; Lisa DiNicolantonio
Subject: RE: WBI Energy NRCS Review - Richland County

Good afternoon Jessica,

I am following up with this request for your review and comments on the proposed seed-mixes for use during restoration and Agricultural Conservation Easement Program lands crossed by the Wahpeton Expansion Project construction work area.

Your time and assistance is greatly appreciated. Please feel free to reach out if you have any questions.

Best,
Destiny D. Kerr
(she/her)
Consultant II, Scientist

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E destiny.kerr@erm.com | **W** www.erm.com

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From: Destiny Kerr
Sent: Thursday, December 16, 2021 2:30 PM
To: jessica.paler@usda.gov
Cc: Larry Brown <Larry.Brown@erm.com>; jill.linn@WBIEnergy.com; Robbyn.Reukauf@WBIEnergy.com; Maggie Suter <Maggie.Suter@erm.com>
Subject: WBI Energy NRCS Review - Richland County

Good afternoon Jessica Paler,

ERM is preparing environmental review documents on behalf of WBI Energy Transmission, Inc. for a development project affecting land in Richland County, ND. We respectfully request your review and comments on the proposed seed-mixes for use during restoration and Agricultural Conservation Easement Program lands crossed by the construction work area. Please see the attached document for the proposed seed-mixes and additional background information.

Your time and assistance is greatly appreciated. Please feel free to reach out if you have any questions.

Best,

Destiny D. Kerr
(she/her)
Consultant II, Scientist

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WBI ENERGY TRANSMISSION, INC.
1250 West Century Ave.
P.O. Box 5601
Bismarck, ND 58506-5601
(701) 530-1600
www.wbienergy.com

December 14, 2021

Jessica Paler
District Conservationist
Wahpeton Field Office
Natural Resources Conservation Service
1687 Bypass Road
Wahpeton, ND 58075

Subject: WBI Energy Transmission, Inc.
Wahpeton Expansion Project
Request for Comments on Seed Mixes and Agriculture Conservation Easement Land

Dear Jessica Paler

WBI Energy Transmission, Inc. (WBI Energy) operates an interstate natural gas transmission pipeline system in the Northern Plains and is proposing to expand its system in southeastern North Dakota. The proposed Wahpeton Expansion Project (Project) will involve constructing approximately 60 miles of 12-inch diameter natural gas pipeline from WBI Energy's existing Mapleton Compressor Station near Mapleton, North Dakota, to a new delivery station near Wahpeton, North Dakota. The Project will also include minor modifications at the Mapleton Compressor Station and two new delivery stations, one near Kindred, North Dakota and (as previously mentioned) one near Wahpeton. The enclosed map shows the preliminary proposed pipeline route and locations of project facilities.

The Federal Energy Regulatory Commission (FERC) is the lead federal agency responsible for the review of the Project. ERM-West, Inc. (ERM) is assisting WBI Energy with assessing the potential environmental impacts of the Project for the FERC application. We are requesting the following assistance/information from your office to assist us in the development of our application to the FERC:

- Your review and any associated comments on the seed-mixes in Table 1 that WBI Energy tentatively proposes to use during revegetation and restoration of non cropland areas of the right-of-way and other workspaces disturbed by construction of the Project.

- Identification of and specific location information about any Agricultural Conservation Easement Program lands that are crossed or near the proposed Project right-of way.

Final cleanup will begin after backfilling the pipeline trench is complete, and as soon as weather and site conditions permit. Every reasonable effort will be made to complete final cleanup (including final grading and installation of permanent erosion control devices) within timeframes required by permits, in accordance with landowner requests. During clean-up, construction debris will be collected and taken to a disposal facility. Contours will be restored to pre-existing conditions as closely as possible, and topsoil that was segregated prior to installation of the pipeline will be respread over the surface of the right-of-way. Permanent erosion controls will be installed as needed and where required by permits.

The seed-mixes in Table 1 have been designed for reseeding uplands in accordance with the North Dakota Natural Resources Conservation Service's (NRCS) Field Office Technical Guide (FOTG) *Herbaceous Vegetation Establishment Guide* (2021), and the North Dakota Department of Transportation (NDDOT) *2020 Standards and Specifications for Road and Bridge Construction*. The majority of the Project workspace is located in agricultural land and along road or other rights-of-ways. Small portions of the Project cross un cropped grass lands and forested lands. Workspace in agricultural cropland will be seeded or stabilized in accordance with land owner preferences and practices. Non-cultivated managed land will be seeded with the Pasture Mix in Table 1. Non-agricultural grassland areas will be seeded with the Grassland Mix. Road right-of-ways and all other areas will be seeded with the NDDOT Mix. These seed mixes are presented below in Table 1. In accordance with the FERC Wetland and Waterbody Construction and Mitigation Procedures, vegetation in wetlands will be cut just above ground level, leaving existing root systems in place to allow re-establishment of pre-construction wetland species.

TABLE 1

Wahpeton Expansion Project
Proposed Upland Seed Mixes for Lands Crossed by the Project

Species	PLS Lbs/Acre	Percent of Mix
Grassland Mix		
Little Bluestem	3.0	15
Big Bluestem	4.4	22
Sideoats grama	4.6	23
Crested Wheatgrass	4.1	21
Fowl Bluegrass	0.6	3
Purple Praireclover	2.2	11
Praire (yellow) coneflower	0.4	2
Maximilian sunflower	0.6	3
Total	**20.0**	**100**
Pasture Mix		
Fowl Bluegrass	1.5	10
Smooth Bromegrass	5.6	38
Crested Wheatgrass	4.9	33
Praire (yellow) coneflower	0.3	2
Purple Praireclover	2.7	18
Total	**15.0**	**100**
NDDOT Mix		
Western Wheatgrass	9.6	20

TABLE 1

Wahpeton Expansion Project
Proposed Upland Seed Mixes for Lands Crossed by the Project

Species	PLS Lbs/Acre	Percent of Mix
Switchgrass	1.6	20
Green Needlegrass	3.6	20
Canada Wild-rye	5.2	20
Slender Wheatgrass	5.0	20
Total	**25.0**	**100**

Note: PLS=Pure live seed

Restoration and revegetation will follow seedbed preparation, equipment, drill calibration, seed requirements, and seeding depth as outlined in the *Herbaceous Vegetation Establishment Guide* found in the FOTG. Any areas that cannot be restored before conditions prevent adequate seedbed preparation and seeding will be planted the following spring. Temporary erosion controls will be installed and maintained as appropriate over the winter in areas that cannot be seeded.

Thank you for your assistance with this matter. Receiving your responses within 30 days or by December 31, 2021 will allow WBI Energy to maintain the project schedule. If you need more detailed information about the Project route or have any questions about the Project or this request, please contact me by telephone at (406)-359-7332 or email at jill.linn@wbienergy.com. If I am unavailable, you can also contact Maggie Suter from ERM by telephone at (410) 972-4125 or email at maggie.suter@erm.com.

Sincerely,

Jill Linn

Environmental Manager

WBI Energy Transmission, Inc.

enclosures: Overview Map