WBI ENERGY TRANSMISSION, INC.

North Bakken Expansion Project

Resource Report 7
Soil Resources

Final

Docket No.
CP20-52-000

February 2020

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

Minimum Filing Requirements:	**Addressed in:**
1. Identify, describe, and group by milepost the soils affected by the proposed pipeline and aboveground facilities – Title 18 of the Code of Federal Regulations (CFR) Part (§) 380.12(I)(1)	Appendices 7A and 7B
2. For aboveground facilities that would occupy sites over 5 acres, determine the acreage of prime farmland soils that would be affected by construction and operation – 18 CFR § 380.12(I)(2)	Section 7.3.2
3. Describe by milepost potential impacts on soils – 18 CFR § 380.12(I)(3,4)	Section 7.3.1 and appendix 7A
4. Identify proposed mitigation to minimize impact on soils and compare with the staff's Upland Erosion Control, Revegetation, and Maintenance Plan – 18 CFR § 380.12(I)(5)	Section 7.3

Additional Information:	**Addressed in:**
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
Identify invasive species and/or noxious weeds that occur in the area and measures to prevent the introduction and/or spread of these species (if not addressed in Resource Report 3).	Resource Report 3, section 3.5.4
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.	Resource Report 1, appendix 1G

Federal Energy Regulatory Commission's January 17, 2020 Environmental Information Request:	**Addressed in:**
1. Identify any soil amendments that may be used during project construction and restoration. The use of soil amendments such as hydrated lime (Calciment) to aid in the drying of saturated soils during restoration can result in increased pH levels in soils (affecting revegetation success) and within downgradient environmental receptors affecting surface water quality. Describe how these materials would be managed on site, and how their use would be managed to prevent impact on soils and revegetation success; and impact on water quality of environmental receptors such as surface waters and wetlands.	Section 7.3.1

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ACRONYMS AND ABBREVIATIONS

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

WBI ENERGY TRANSMISSION, INC.
NORTH BAKKEN EXPANSION PROJECT

7.0 RESOURCE REPORT 7 – SOIL RESOURCES

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

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

In accordance with Title 18 of the Code of Federal Regulations Part 380.12(i), Resource Report 7 describes soils and soil uses 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, 2020a). 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 standardly 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, 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, 2020b).

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 Central Dark Brown Glaciated Plains and the Rolling Soft Shale Plain (USDA, 2006).

7.2.1 Central Dark Brown Glaciated Plains (MLRA 53B)

Physiography in the Central Dark Brown Glaciated Plains MLRA is characterized by nearly level to rolling till plains that include kettle holes, kames, moraines, and small glacial lakes. Moderately steep and steep slopes are adjacent to the major stream valleys. Elevations range from 1,640 to 1,970 feet, increasing gradually from southeast to northwest. Almost all of the MLRA is covered by glacial till plains, though some glaciolacustrine deposits also occur (USDA, 2006).

The dominant soil order in the Central Dark Brown Glaciated Plains MLRA is Mollisols. These very deep, medium- to fine-textured soils have a frigid temperature regime, an ustic or aquic soil moisture regime, and mixed or smectitic mineralogy. Soil groups in this order include Endoaquolls, Argiaquolls, Argialbolls, Natrustolls, Calciustolls, Haplustolls, and Argiustolls. Endoaquolls (Southam series) and Argiaquolls (Parnell series) formed in alluvium in depressions on till plains, moraines, and lake plains. Argialbolls (Tonka series) formed in alluvium over till in depressions on till plains and lake plains. Natrustolls (Niobell and Noonan series) and Calciustolls (Zahl series) formed in till on till plains and moraines. Haplustolls formed in alluvium (Bowdle and Lehr series) and glaciofluvial deposits (Wabek series) on outwash plains and terraces, in till (Max series) on till plains, and in silty drift or loess (Bryant series) on uplands. Argiustolls formed in till (Vida and Williams series) and mixed till and alluvium (Bowbells series) on till plains, moraines, and hills (USDA, 2006).

Most of this area is farms and ranches, with over one-half of the land comprising dry-farmed cropland. Spring wheat is the chief crop, but flax, oats, barley, and alfalfa are grown in many farms. The major soil resource concerns are wind erosion, water erosion, maintenance of the content of organic matter and productivity of the soils, and management of soil moisture (USDA, 2006)

7.2.2 Rolling Soft Shale Plain (MLRA 54)

Physiography in the Rolling Soft Shale Plain MLRA is characterized by an old, moderately dissected, rolling plain with some local badlands, buttes, and isolated hills. Terraces are adjacent to broad flood plains along most of the major drainages. Elevation is 1,650 feet in the east with a gradual slope to approximately 3,600 feet in the west. Maximum local relief is approximately 330 feet, but relief is considerably lower in most of the area. This area is underlain by soft, calcareous shales, siltstones, and sandstones of the Tertiary Fort Union Formation and the Fox Hills and Hell Creek units (USDA, 2006).

The dominant soil orders in this MLRA are Mollisols and Entisols. The soils in the area dominantly have a frigid soil temperature regime, an ustic soil moisture regime, and mixed or smectitic mineralogy. They are shallow to very deep, generally somewhat excessively drained to moderately well drained, and loamy or clayey. Haplustolls formed in residuum on uplands (Amor and Vebar series) and in alluvium on stream terraces and in upland drainageways (Parshall series). Natrustolls (Belfield, Daglum, and Rhoades series) formed in residuum and/or alluvium on uplands and stream terraces and in upland drainageways. Calciustolls (Chama series), Ustorthents (Cabba series), and Ustipsamments (Flasher series) formed in residuum and/or colluvium on uplands. Argiustolls formed in residuum on uplands (Morton, Reeder, and Regent series) and in till on till plains and moraines (Williams series) (USDA, 2006).

Farms and ranches make up nearly all of this area. They produce a combination of cash-grain crops and livestock. More than one-half of the area supports native grasses and shrubs that are grazed. Approximately one-third of the area is used for dry-farmed small grains, such as wheat, barley, oats, rye, and flax. Corn for grain and silage, sunflowers, and alfalfa also are important crops. Some small tracts on the bottom land along the Missouri River are irrigated. The major soil resource concerns are wind erosion, water erosion, maintenance of the content of organic matter and productivity of the soils, management of soil moisture, and control of saline seeps (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 and/or irrigation systems.

In addition, the presence of certain soil conditions along the pipeline routes (e.g., droughty soils) could result in poor revegetation of the rights-of-way, including a potential increase in invasive plant species.

TABLE 7.3-1

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

Facility	Total Acres	Prime Farmland [b]	Compaction Prone [c]	Highly Erodible		Revegetation Concerns [f]	Rocky [g]	Shallow Bedrock [h]
				Water [d]	Wind [e]			
Pipeline Facilities [i]								
Tioga-Elkhorn Creek	793.3	386.2	3.4	258.9	52.8	206.9	32.9	137.6
Elkhorn Creek-Northern Border	3.5	0.0	0.0	0.5	0.0	0.3	0.4	0.1
Line Section 25 Loop	214.9	91.3	15.4	60.6	0.0	24.3	24.1	0.4
Line Section 30 Loop	96.0	62.4	2.2	21.4	0.0	17.8	4.9	0.0
Tioga Compressor Lateral	4.4	3.1	0.0	0.6	0.0	0.0	0.0	0.0
Uprate Line Section 25	15.4	2.8	2.8	7.6	0.0	6.6	1.6	0.0
Subtotal	**1,127.5**	**545.8**	**23.8**	**349.6**	**52.8**	**255.9**	**63.9**	**138.1**
Aboveground Facilities [j]								
Elkhorn Creek Compressor Station	12.0	0.0	0.0	4.9	0.0	3.8	3.4	1.4
Tioga Compressor Station	8.5	8.5	0.0	0.0	0.0	0.0	0.0	0.0
Lignite Plant Receipt Station and Lignite Town Border Station	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0
Norse Plant Receipt Station	0.6	0.2	0.0	0.0	0.0	0.0	0.4	0.0
Norse Transfer Station	1.3	0.9	0.0	0.0	0.0	0.0	0.4	0.0
Northern Border Interconnect	2.1	0.0	0.0	0.4	0.0	0.4	0.0	0.1
Robinson Lake Plant Receipt Station	1.4	1.3	0.0	0.0	0.0	0.0	0.0	0.0
Springbrook Plant Receipt Station	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
Tioga Plant Receipt Station	1.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0
Block valves [k]	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0
Pig launchers/receivers [l]	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	**29.6**	**14.7**	**0.0**	**5.3**	**0.0**	**4.3**	**4.3**	**1.6**
Access Roads								
Temporary Access Roads	54.9	17.9	1.1	2.0	24.1	4.5	18.9	4.4
Permanent Access Roads	3.7	0.9	0.2	0.0	1.4	0.0	0.6	0.2
Subtotal	**58.6**	**18.8**	**2.0**	**25.4**	**4.5**	**19.5**	**6.1**	**4.6**

TABLE 7.3-1 (cont'd)

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

Facility	Total Acres	Prime Farmland [b]	Compaction Prone [c]	Highly Erodible		Revegetation Concerns [f]	Rocky [g]	Shallow Bedrock [h]
Staging Areas								
68th Street Yard	20.4	0.0	0.6	5.0	0.0	5.0	13.5	0.0
Boehm Staging Yard	6.2	4.9	0.0	0.0	0.0	0.0	1.3	0.0
CRS Yard	22.8	0.5	0.0	3.2	0.0	10.5	22.3	0.0
Delta Contractors Yard	23.6	22.3	0.0	1.4	0.0	1.4	0.0	0.0
Enget Yard	39.8	0.0	0.3	33.6	0.0	39.2	39.2	0.0
Flatlands Yard 1	4.9	4.4	0.0	0.4	0.0	0.3	0.0	0.0
Flatlands Yard 2	6.1	0.0	0.0	1.9	0.0	1.9	5.5	0.0
Lobell Yard	39.5	36.6	0.1	1.8	0.0	0.0	0.0	0.0
Schmidt Yard	8.4	1.4	0.0	4.5	0.0	0.0	0.0	0.0
Weflen Staging Yard	17.7	15.6	0.0	1.4	0.0	0.0	0.0	0.0
Subtotal	**189.4**	**85.6**	**1.0**	**53.2**	**0.0**	**58.3**	**81.7**	**0.0**
Total	**1,405.1**	**664.9**	**26.8**	**433.5**	**57.3**	**338.0**	**156.0**	**144.3**

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 do 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.

[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] Includes the appurtenant facilities within the pipeline rights-of-way (e.g., block valves, cathodic protection facilities).

[j] Includes the appurtenant facilities within the aboveground facility sites (e.g., pig launcher/receiver).

[k] Four of the six proposed block valves (Valve No. 13.6, the 56th Avenue N.W. Block Valve, the Highway 10 Block Valve, and the South Lake Block Valve) will be constructed entirely within the permanent pipeline rights-of-way, and no additional land will be required for their construction or operation. However, the Cherry Creek Block Valve and Valve No. 6.8 will require an additional 0.9 and less than 0.1 acre of land, respectively, outside the existing permanent pipeline right-of-way for construction and operation.

[l] One pig launcher/receiver site will be constructed at MP 6.1 of the Tioga-Elkhorn Creek pipeline. The remaining pig launcher/receiver sites will be constructed and operated within the compressor/meter station sites; no additional land will be required for construction and operation of these facilities.

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).

Prime Farmland

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 designations are direct attributes in the SSURGO database. Percentages and acreages of prime farmland were determined by a simple query of the database. Approximately 545.8 acres (48 percent) of the soils that will be affected by pipeline construction are considered prime farmland. 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 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. To date, no agricultural drain tile systems have been identified within the Project area. Prior to construction, WBI Energy will consult with landowners and/or tenants to locate existing drain tiles. If 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 distinctly marked. If water is flowing through a damaged drain tile line, WBI Energy will immediately implement temporary repairs 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 covered with filter material to prevent the entry of soil or other foreign material.

Permanent drain tile line repairs will be made within 20 days following the completion of construction on the affected landowners' property, weather and soil conditions permitting. Local tile contractors will be employed, where available, to make permanent repairs of affected tile lines. Prior to completion of the permanent repairs, tile lines will be examined by suitable means on both sides of the trench for the entire length within the work area to check for tile damaged by construction equipment. Tile line repairs will be made with materials of the same or better quality as those damaged.

Irrigation Systems

As discussed in section 2.2.1 of Resource Report 2, irrigation is one of the congressionally authorized purposes of the U.S. Army Corps of Engineers Garrison Project. The Garrison Diversion Unit was authorized in 1965 with the purpose of diverting Missouri River water to central and eastern North Dakota for irrigation, water supply (industrial and municipal), fish and wildlife conservation, flood control, and recreation. Construction of the Garrison Diversion Unit was started in 1967. Various projects have been completed (including the Snake Creek Pumping Plant, New Rockford Canal, and McClusky Canal) as part of the Garrison Diversion Unit. Additionally, over 30 agricultural irrigation water systems have intakes for withdrawing water from Lake Sakakawea (U.S. Army Corps of Engineers, 2007).

Project construction and operation would not divert or appropriate water from the Missouri River; therefore, the Project would not affect the lake water volumes. To date, no drainage or irrigation facilities have been identified along the proposed pipeline routes as a result of landowner consultations or field surveys. Prior to construction, WBI Energy will continue to consult with landowners and/or tenants to identify and locate existing irrigation systems and wells. Water flow to irrigation systems will be maintained throughout construction, unless landowner permission is obtained to temporarily interrupt water flow. Should irrigation systems be affected during construction, WBI Energy will restore/repair the damaged irrigation systems and compensate affected parties for crop losses resulting from irrigation system interruptions.

Compaction Potential

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 23.8 acres (2 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 to minimize compaction and

rutting. In addition, environmental inspectors (EI) 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.

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 to waterbodies and wetlands. 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 349.6 acres (31 percent) of the soils that will be affected by pipeline construction are considered susceptible to erosion by water. WBI Energy will utilize erosion and sedimentation control devices in accordance with the FERC Plan. Temporary erosion controls (silt fences, straw bales, or straw logs) will be installed, where appropriate, during clearing to prevent the movement of disturbed soils off the right-of-way or other work areas. As necessary, trench breakers (stacked sand bags or foam) will be installed in the trench around the pipe to prevent movement of subsurface water along the pipeline. Additionally, temporary slope breakers consisting of mounded and compacted soil will be installed across the right-of-way in areas required by the FERC Plan and Procedures. Temporary slope breakers will be installed during clearing and grading activities, and permanent slope breakers will be installed during cleanup or as soon as weather conditions permit in accordance with the FERC Plan and Procedures. WBI Energy's EIs will inspect sedimentation and erosion control devices on a regular basis as specified in the FERC Plan and Procedures.

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 52.8 acres (5 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.

Temporary Sediment Barriers

Sediment barriers (e.g., silt fences or straw bales and straw logs) 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. WBI Energy will install and maintain these devices 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 construct slope breakers 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 these breakers will be determined by WBI Energy and its EIs based on the FERC Plan and field conditions.

Permanent Trench Breakers

Trench breakers consisting of stacked sand bags or foam will be installed 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

WBI Energy will attempt to complete final cleanup 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 make every effort to ensure the rapid, successful establishment of vegetation on areas requiring revegetation as described in the FERC Plan. 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. In saturated upland soils on steep slopes, additional mitigation may be required to accelerate the stabilization of soils prone to slips or erosion. WBI Energy's preferred method is to mechanically mix saturated topsoil or spoil piles to allow evaporation to achieve target moisture levels. 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. 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 federal 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's EIs will monitor the effectiveness of temporary erosion control devices. During long-term operation and maintenance of the pipeline system, WBI Energy operations 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. Following successful revegetation of construction areas, temporary erosion control devices will be removed.

Revegetation Concerns

Droughty soils that have a coarse surface texture and are somewhat excessively and excessively drained may prove to be difficult to revegetate. The drier soils have less water to aid in the germination and eventual establishment of new vegetation. The 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 along some parts of the pipeline routes 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 255.9 acres (23 percent) of the soils that will be affected by pipeline construction are considered to have revegetation concerns. Successful restoration and revegetation is important for maintaining agricultural productivity and to protect the underlying soil from potential damage, such as erosion. In accordance with the FERC Plan, 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 October 2019, WBI Energy contacted four regional NRCS offices to request comments on proposed seed mixes for the Project (see appendix 1G of Resource Report 1). These seed mixes were designed for reseeding private land based on observations during field surveys and in accordance with the NRCS Field Office Technical Guide and the North Dakota Department of Transportation *2014 Standards and Specifications for Road and Bridge Construction*. Federally managed land affected by the Project will be restored in accordance with recommendations provided by the U.S. Forest Service. As of January 2020, WBI Energy has received comments from one of the four NRCS offices. WBI Energy will continue to consult with the NRCS and provide any additional responses and incorporated recommendations as they are available.

WBI Energy has initiated consultations with the Farm Service Agency to determine if any lands crossed by the Project are enrolled in the Conservation Reserve Program. WBI Energy will continue to consult with the Farm Service Agency and work with landowners on any specific seeding requirements.

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 identified 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 is lithic (consolidated crystalline rock) and would require blasting to excavate, or is paralithic (unconsolidated weathered rock) and could likely be ripped and dug without blasting (see Resource Report 6 for more information regarding bedrock and blasting). Approximately 138.1 acres (12 percent) contain bedrock within 60 inches of the surface. All of the bedrock identified is paralithic and will likely be rippable using standard construction equipment.

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. Approximately 63.9 acres (6 percent) of the soils that will be affected by pipeline construction are considered rocky soils.

The introduction of subsoil rocks into agricultural topsoil will be minimized by segregating topsoil from trench spoil and replacing topsoil during cleanup and restoration. 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 areas not disturbed by construction. 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 not higher than the original bedrock profile. Where 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 one greenfield compressor station (Elkhorn Creek Compressor Station), modifications to the Tioga Compressor Station, and construction of or modifications to delivery, receipt, and transfer 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 the greenfield Elkhorn Creek Compressor Station will affect approximately 12.0 acres, of which approximately 10.9 acres will be permanently converted to commercial/industrial use. None of the soils affected are considered to be prime farmland or farmland of statewide importance.

[1] Construction and operation of the block valves will occur within the permanent pipeline easement, and the associated impacts are included in the pipeline facilities section.

Modifications to the Tioga Compressor Station will affect approximately 8.5 acres during construction and result in an expansion of the fence line to permanently convert an additional 2.2 acres to commercial/industrial use (resulting in a total of approximately 4.4 acres of land retained for operation). All of the soils affected by construction and operation of the Tioga Compressor Station are considered to be farmland of statewide importance; however, none are currently being used for agricultural purposes.

Construction of the greenfield Norse Transfer Station, Northern Border Interconnect, block valves, and pig launchers/receivers will affect approximately 4.5 acres during construction and permanently convert approximately 2.3 acres of land to commercial/industrial use. Approximately 1.4 acres of the permanently converted land is considered either prime farmland (0.2 acre) or farmland of statewide importance (1.2 acres). Portions of the Northern Border Interconnect are currently being used for agricultural purposes.

Modifications to the existing Lignite Town Border and Lignite Plant Receipt Station, Norse Plant Receipt Station, Robinson Lake Plant Receipt Station, Springbrook Plant Receipt Station, and Tioga Plant Receipt Station will affect approximately 4.7 acres and permanently convert approximately 3.3 acres of land to commercial/industrial use. Approximately 2.9 acres of permanently converted land is considered to be farmland of statewide importance. Portions of the Springbrook Plant Receipt Station and Robinson Lake Plant Receipt Station are currently being used for agricultural purposes.

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. Standard-maintenance public roads will be used for access without modification or improvement. However, some minimum-maintenance public roads and private roads will require improvement (such as grading; placement of gravel, crushed rock, or scoria for stability and surface improvement; replacing or installing culverts; and clearing of overhead vegetation, if present) to safely accommodate Project equipment and vehicles. The use of existing dirt access roads could cause minimal disturbance to soils; however, these areas are already disturbed and therefore a discussion of potential impacts is not included in this report.

Use of temporary access roads will affect approximately 54.9 acres. Ten permanent access roads (affecting approximately 3.7 acres) will be graveled or paved and retained during operation to provide access to Project facilities. Use of the permanent access roads will not affect any soils considered to be prime farmland. Approximately 0.9 acre are considered farmland of statewide importance, approximately 0.7 of which is currently being used for agricultural purposes.

7.3.4 Staging Areas

WBI Energy anticipates the need for approximately 189.4 acres of land for use as ten temporary staging areas. Preparation of the staging areas will consist of topsoil segregation and minor grading and leveling. Topsoil stockpiles will be stabilized with a cover species such as wheat, oats, or ryegrass to establish a temporary cover, or by spraying with water or an approved chemical dust suppressant to create a semi-hard protective layer to minimize wind erosion. Once construction is complete, the land within the staging areas 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 68th Street Yard is approximately 2.7 miles west of the Tioga Compressor Station on 68th Street. Use of the yard will temporarily affect approximately 20.4 acres of land. Soils at the 68th Street Yard include Zahl-Max-Bowbells loams, Parnell silty clay loam, and Lehr loam. None of these soils are considered prime farmland or farmland of statewide importance.

The Boehm Staging Yard is approximately 24.5 miles south-southwest of the Tioga Compressor Station on North Dakota Highway 1806. Use of the yard will temporarily affect approximately 6.2 acres of land. Soils at the Boehm Staging Yard consist of Velva fine sandy loam, Lehr-Bowdle loams, and Tally fine sandy loam. Approximately 4.9 acres are considered farmland of statewide importance.

The CRS Yard is approximately 2.0 miles northwest of the Tioga Compressor Station on North Dakota Highway 40. Use of the yard will temporarily affect approximately 22.8 acres of land. Soils at the CRS Yard consist of Velva fine sandy loam, Lehr-Bowdle loams, William-Bowbell loams, and Dooley-Zahl complex. Approximately 0.5 acre is considered farmland of statewide importance.

The Delta Contractors Yard is approximately 49.0 miles south-southwest of the Tioga Compressor Station on U.S. Route 85. Use of the yard will temporarily affect approximately 23.6 acres of land. Soils at the Delta Contractors Yard consist of Belfield-Grail clay loams, Tally-Parshall fine sandy loams, Williams-Bowbells loams, and Dooley-Zahl complexes. Approximately 22.3 acres of these soils are considered farmland of statewide importance.

The Enget Yard is located approximately 2.4 miles northeast of the Tioga Compressor Station on 101st Avenue. Use of the yard will temporarily affect approximately 39.8 acres of land. Soils at the Enget Yard consist of Zahl-Max loams, Zahl-Williams-Bowbells loams, Southam silty clay loam, Appam sandy loam, and Wabek-Lehr-Appam complex. None of these soils are considered prime farmland or farmland of statewide importance.

The Flatlands Yard 1 is approximately 25.0 miles southwest of the Tioga Compressor Station on North Dakota Highway 1806. Use of the yard will temporarily affect approximately 4.9 acres of land. Soils at the Flatlands Yard 1 consist of Williams-Zahl loams, Zahl-Williams loams, Zahl-Max loams, and Dooley-Zahl complex. Approximately 4.4 acres are considered to be farmland of statewide importance.

The Flatlands Yard 2 is approximately 26.0 miles south-southwest of the Tioga Compressor Station on 115th Avenue. Use of the yard will temporarily affect approximately 6.1 acres of land. Soils at the Flatlands Yard 2 consist of Tally-Parshall fine sandy loams, Manning-Schaller-Wabek complex, and Manning fine sandy loam. Less than 0.1 acres of these soils are considered farmland of statewide importance.

The Lobell Yard is located approximately 7.0 miles southwest of the Tioga Compressor Station on U.S. Route 2. Use of the yard will temporarily affect approximately 39.5 acres of land. Soils at the Lobell Yard consist of Sahl-Williams-Zahill complex, Williams-Bowbells loams, Divide loam, Orthents-Aquents-Urban land, Nutley silty clay, and Lehr-Wabek loams. Approximately 36.6 acres of these soils are considered to be farmland of statewide importance.

The Schmidt Yard is located approximately 7.0 miles southwest of the Tioga Compressor Station on U.S. Route 2, approximately 0.25 mile west of the Lobell Yard. Use of this yard will temporarily affect approximately 8.4 acres of land. Soils at the Schmidt Yard consists of Zahl-Williams-Zahill complex and Williams-Zahl loams. Approximately 1.4 acres of these soils are considered to be farmland of statewide importance.

The Weflen Staging Yard is approximately 2.7 miles north-northwest of the Tioga Compressor Station on North Dakota Highway 40. Use of the yard will temporarily affect approximately 17.7 acres of land. Soils at the Weflen Staging Yard consist of Zahl-Williams-Zahill complex and Williams-Bowbells loams. Approximately 15.6 acres are considered farmland of statewide importance.

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 when combined with the past, present, and reasonably foreseeable future actions (RFFA) identified in appendix 1J and figure 1.10-1 of Resource Report 1. The location, proposed schedule, and a description of each RFFA are provided in appendix 1J.

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, or disruption of water drainage. Additionally, construction of aboveground facilities and permanent access roads will permanently convert approximately 24.8 acres of land (including approximately 0.2 acre of prime farmland and approximately 9.4 acres of farmland of statewide importance) to commercial/industrial use.

Four RFFAs fall within the Project's geographic and temporal scope for soil resources, including the Aurora Wind Electric Transmission Line, Gunslinger Federal and Gladstone Oil and Gas Well Pads, Cenex Pipeline's 10-inch-diameter refined fuels pipeline, and the Western Area Water Supply Project. More information regarding these projects is included in appendix 1J of Resource Report 1. A minimal amount of overlap occurs between these RFFAs and the proposed Project, estimated to be less than 5 acre. A description of potential impacts on soils associated with these projects is provided below.

- Construction activities associated with the Aurora Wind Electric Transmission Line may cause the soil surface to become more prone to wind and water erosion and may result in soil compaction. Erosion and sediment control measures will include segregation of topsoil and the use of appropriately sized construction equipment. Additionally, Aurora Wind will verify that access road grades fit closely with the natural terrain, soil cuttings are properly disposed of, and proper drainage is maintained. Project construction will temporarily affect approximately 225 acres of prime farmland or farmland of statewide importance; however, less than 0.2 acre of prime farmland or farmland of statewide importance will be retained for project operation.

- Construction and operation of the Gunslinger Federal and Gladstone oil and gas well pads would have both temporary and permanent impacts on soils. Erosion and sediment control structures would be installed during ground-disturbing activities to stabilize soils and minimize runoff. The proposed alternative would include approximately 50.4 acres of impact, including 23.9 acres associated with the well pads and access roads which would be permanent.

- During construction of Cenex Pipeline's 10-inch-diameter refined fuels pipeline, Cenex Pipeline will use construction equipment that reduces potential soil compaction and impacts on vegetation. The risk of soil contamination from a potential release of crude oil by way of a pipeline integrity emergency in the proposed pipeline will be minimal. Potential agricultural losses from the temporary disturbance of 670.8 acres of prime farmland are anticipated to be minor or non-existent. Aboveground facilities associated with the project would result in conversion of approximately 0.3 acre of prime farmland to non-agricultural uses.

- Little information is publically available regarding the potential impacts of the Western Area Water Supply Project; however, it is likely that soil impacts would be similar to the proposed pipeline projects described above. Impacts could include water or wind erosion, mixing of topsoil with subsoil, soil compaction, and disruption of surface and subsurface drainage systems.

With implementation of the mitigation measures described in section 7.3, the Project will result in limited and temporary impacts on soils. While both the Project and the RFFAs could contribute to soils impacts within the overlapping construction areas (less than 5 acres) during pipeline construction and restoration, these impacts will be temporary and highly localized. 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.

7.5 REFERENCES

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NORTH BAKKEN EXPANSION PROJECT

Resource Report 7

APPENDIX 7A
Characteristics of the Soil Map Units at the Proposed Project Facilities

APPENDIX 7A

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
Tioga-Elkhorn Creek													
0.00	0.23	C210B	44%	Bowbells	0.10	State	N	N	N	N	N	N	N
			56%	Williams	0.13	State	N	N	N	N	N	N	N
0.23	0.30	C155F	21%	Arnegard	0.01	N	N	N	Y	N	Y	N	N
			34%	Max	0.02	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.03	N	N	N	Y	N	Y	N	N
0.30	0.33	C210A	26%	Bowbells	0.01	State	N	N	N	N	N	N	N
			74%	Williams	0.02	State	N	N	N	N	N	N	N
0.33	0.39	C155F	21%	Arnegard	0.01	N	N	N	Y	N	Y	N	N
			34%	Max	0.02	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.03	N	N	N	Y	N	Y	N	N
0.39	0.42	C210A	26%	Bowbells	0.01	State	N	N	N	N	N	N	N
			74%	Williams	0.02	State	N	N	N	N	N	N	N
0.42	0.45	C155F	21%	Arnegard	0.01	N	N	N	Y	N	Y	N	N
			34%	Max	0.01	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.02	N	N	N	Y	N	Y	N	N
0.45	0.49	C210A	26%	Bowbells	0.01	State	N	N	N	N	N	N	N
			74%	Williams	0.03	State	N	N	N	N	N	N	N
0.49	0.58	C155F	21%	Arnegard	0.02	N	N	N	Y	N	Y	N	N
			34%	Max	0.03	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.04	N	N	N	Y	N	Y	N	N
0.58	0.63	C210A	26%	Bowbells	0.01	State	N	N	N	N	N	N	N
			74%	Williams	0.04	State	N	N	N	N	N	N	N
0.63	0.67	C155F	21%	Arnegard	0.01	N	N	N	Y	N	Y	N	N
			34%	Max	0.01	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.02	N	N	N	Y	N	Y	N	N
0.67	0.84	C135D	42%	Williams	0.07	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.10	N	N	N	Y	N	Y	N	N
0.84	0.87	C155F	21%	Arnegard	0.01	N	N	N	Y	N	Y	N	N
			34%	Max	0.01	N	N	N	Y	N	Y	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
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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]			
			45%	Zahl	0.01	N	N	N	Y	N	Y	N	N
0.87	1.80	C210B	44%	Bowbells	0.41	State	N	N	N	N	N	N	N
			56%	Williams	0.52	State	N	N	N	N	N	N	N
1.80	1.97	C210A	26%	Bowbells	0.04	State	N	N	N	N	N	N	N
			74%	Williams	0.12	State	N	N	N	N	N	N	N
1.97	2.01	C210B	44%	Bowbells	0.02	State	N	N	N	N	N	N	N
			56%	Williams	0.03	State	N	N	N	N	N	N	N
2.01	2.16	C210A	26%	Bowbells	0.04	State	N	N	N	N	N	N	N
			74%	Williams	0.11	State	N	N	N	N	N	N	N
2.16	2.25	C155F	21%	Arnegard	0.02	N	N	N	Y	N	Y	N	N
			34%	Max	0.03	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.04	N	N	N	Y	N	Y	N	N
2.25	2.33	C451A	100%	Arnegard	0.08	Prime	N	N	N	N	N	N	N
2.33	2.37	C155F	21%	Arnegard	0.01	N	N	N	Y	N	Y	N	N
			34%	Max	0.01	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.02	N	N	N	Y	N	Y	N	N
2.37	2.48	C800B	100%	Appam	0.11	N	N	N	N	N	Y	Y	N
2.48	2.83	C210B	44%	Bowbells	0.15	State	N	N	N	N	N	N	N
			56%	Williams	0.19	State	N	N	N	N	N	N	N
2.83	3.00	C210A	26%	Bowbells	0.05	State	N	N	N	N	N	N	N
			74%	Williams	0.13	State	N	N	N	N	N	N	N
3.00	3.19	C210B	44%	Bowbells	0.08	State	N	N	N	N	N	N	N
			56%	Williams	0.10	State	N	N	N	N	N	N	N
3.19	3.40	C210A	26%	Bowbells	0.06	State	N	N	N	N	N	N	N
			74%	Williams	0.16	State	N	N	N	N	N	N	N
3.40	3.54	C210B	44%	Bowbells	0.06	State	N	N	N	N	N	N	N
			56%	Williams	0.08	State	N	N	N	N	N	N	N
3.54	3.83	C210A	26%	Bowbells	0.08	State	N	N	N	N	N	N	N
			74%	Williams	0.22	State	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
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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]			
3.83	3.90	C132B	27%	Zahl	0.02	State	N	N	N	N	N	N	N
			73%	Williams	0.05	State	N	N	N	N	N	N	N
3.90	3.94	C132C	18%	Zahill	0.01	N	N	N	Y	N	N	N	N
			24%	Zahl	0.01	N	N	N	Y	N	N	N	N
			59%	Williams	0.02	N	N	N	N	N	N	N	N
3.94	3.97	C155F	21%	Arnegard	0.01	N	N	N	Y	N	Y	N	N
			34%	Max	0.01	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.02	N	N	N	Y	N	Y	N	N
3.97	4.01	C132C	18%	Zahill	0.01	N	N	N	Y	N	N	N	N
			24%	Zahl	0.01	N	N	N	Y	N	N	N	N
			59%	Williams	0.02	N	N	N	N	N	N	N	N
4.01	4.15	C132B	27%	Zahl	0.04	State	N	N	N	N	N	N	N
			73%	Williams	0.10	State	N	N	N	N	N	N	N
4.15	4.66	C210B	44%	Bowbells	0.23	State	N	N	N	N	N	N	N
			56%	Williams	0.29	State	N	N	N	N	N	N	N
4.66	4.78	C132C	18%	Zahill	0.02	N	N	N	Y	N	N	N	N
			24%	Zahl	0.03	N	N	N	Y	N	N	N	N
			59%	Williams	0.07	N	N	N	N	N	N	N	N
4.78	4.98	C210B	44%	Bowbells	0.09	State	N	N	N	N	N	N	N
			56%	Williams	0.11	State	N	N	N	N	N	N	N
4.98	5.05	C210A	26%	Bowbells	0.02	State	N	N	N	N	N	N	N
			74%	Williams	0.05	State	N	N	N	N	N	N	N
5.05	5.22	C210B	44%	Bowbells	0.08	State	N	N	N	N	N	N	N
			56%	Williams	0.10	State	N	N	N	N	N	N	N
5.22	5.27	C999F	19%	Orthents	0.01	N	N	N	Y	N	N	N	N
				Urban land	0.01	N	N	N	N	N	N	N	N
			20%	Aquents	0.01	N	N	Y	N	N	N	N	N
			43%	Orthents	0.02	N	N	N	Y	N	Y	N	N
5.27	5.84	C210B	44%	Bowbells	0.25	State	N	N	N	N	N	N	N
			56%	Williams	0.32	State	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
5.84	6.12	C451A	100%	Arnegard	0.27	Prime	N	N	N	N	N	N	N
6.12	6.26	C210B	44%	Bowbells	0.06	State	N	N	N	N	N	N	N
			56%	Williams	0.08	State	N	N	N	N	N	N	N
6.26	6.62	C210A	26%	Bowbells	0.09	State	N	N	N	N	N	N	N
			74%	Williams	0.26	State	N	N	N	N	N	N	N
6.62	6.93	C210B	44%	Bowbells	0.14	State	N	N	N	N	N	N	N
			56%	Williams	0.18	State	N	N	N	N	N	N	N
6.93	7.22	C210A	26%	Bowbells	0.08	State	N	N	N	N	N	N	N
			74%	Williams	0.21	State	N	N	N	N	N	N	N
7.22	7.43	C210B	44%	Bowbells	0.09	State	N	N	N	N	N	N	N
			56%	Williams	0.11	State	N	N	N	N	N	N	N
7.43	7.46	C132C	18%	Zahill	0.01	N	N	N	Y	N	N	N	N
			24%	Zahl	0.01	N	N	N	Y	N	N	N	N
			59%	Williams	0.02	N	N	N	N	N	N	N	N
7.46	7.50	C210B	44%	Bowbells	0.01	State	N	N	N	N	N	N	N
			56%	Williams	0.02	State	N	N	N	N	N	N	N
7.50	7.52	C132C	18%	Zahill	0.01	N	N	N	Y	N	N	N	N
			24%	Zahl	0.01	N	N	N	Y	N	N	N	N
			59%	Williams	0.02	N	N	N	N	N	N	N	N
7.52	7.57	C210B	44%	Bowbells	0.02	State	N	N	N	N	N	N	N
			56%	Williams	0.02	State	N	N	N	N	N	N	N
7.57	7.74	C132C	18%	Zahill	0.03	N	N	N	Y	N	N	N	N
			24%	Zahl	0.04	N	N	N	Y	N	N	N	N
			59%	Williams	0.10	N	N	N	N	N	N	N	N
7.74	8.52	C210B	44%	Bowbells	0.34	State	N	N	N	N	N	N	N
			56%	Williams	0.44	State	N	N	N	N	N	N	N
8.52	8.85	C415A	100%	Tansem	0.33	State	N	N	N	N	N	N	N
8.85	9.29	C419A	100%	Wildrose	0.44	Prime	N	N	N	N	N	N	N
9.29	9.45	C415A	100%	Tansem	0.16	State	N	N	N	N	N	N	N
9.45	9.51	C419A	100%	Wildrose	0.06	Prime	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
9.51	9.58	C415A	100%	Tansem	0.07	State	N	N	N	N	N	N	N
9.58	9.60	C135C	17%	Zahill	0.00	N	N	N	Y	N	N	N	N
			35%	Williams	0.01	N	N	N	N	N	N	N	N
			48%	Zahl	0.01	N	N	N	Y	N	N	N	N
9.60	9.63	C451A	100%	Arnegard	0.03	Prime	N	N	N	N	N	N	N
9.63	9.66	C135C	17%	Zahill	0.00	N	N	N	Y	N	N	N	N
			35%	Williams	0.01	N	N	N	N	N	N	N	N
			48%	Zahl	0.01	N	N	N	Y	N	N	N	N
9.66	9.81	C210A	26%	Bowbells	0.04	State	N	N	N	N	N	N	N
			74%	Williams	0.11	State	N	N	N	N	N	N	N
9.81	9.84	C210B	44%	Bowbells	0.02	State	N	N	N	N	N	N	N
			56%	Williams	0.02	State	N	N	N	N	N	N	N
9.84	10.07	C135C	17%	Zahill	0.04	N	N	N	Y	N	N	N	N
			35%	Williams	0.08	N	N	N	N	N	N	N	N
			48%	Zahl	0.11	N	N	N	Y	N	N	N	N
10.07	10.37	C210A	26%	Bowbells	0.08	State	N	N	N	N	N	N	N
			74%	Williams	0.22	State	N	N	N	N	N	N	N
10.37	10.44	C135C	17%	Zahill	0.01	N	N	N	Y	N	N	N	N
			35%	Williams	0.02	N	N	N	N	N	N	N	N
			48%	Zahl	0.03	N	N	N	Y	N	N	N	N
10.44	10.71	C210B	44%	Bowbells	0.12	State	N	N	N	N	N	N	N
			56%	Williams	0.15	State	N	N	N	N	N	N	N
10.71	10.74	C451A	100%	Arnegard	0.04	Prime	N	N	N	N	N	N	N
10.74	10.80	C210B	44%	Bowbells	0.03	State	N	N	N	N	N	N	N
			56%	Williams	0.03	State	N	N	N	N	N	N	N
10.80	11.05	C451A	100%	Arnegard	0.25	Prime	N	N	N	N	N	N	N
11.05	11.14	C135C	17%	Zahill	0.02	N	N	N	Y	N	N	N	N
			35%	Williams	0.03	N	N	N	N	N	N	N	N
			48%	Zahl	0.04	N	N	N	Y	N	N	N	N
11.14	11.66	C210B	44%	Bowbells	0.23	State	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			56%	Williams	0.29	State	N	N	N	N	N	N	N
11.66	11.75	C135C	17%	Zahill	0.02	N	N	N	Y	N	N	N	N
			35%	Williams	0.03	N	N	N	N	N	N	N	N
			48%	Zahl	0.04	N	N	N	Y	N	N	N	N
11.75	11.86	C155F	21%	Arnegard	0.02	N	N	N	Y	N	Y	N	N
			34%	Max	0.04	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.05	N	N	N	Y	N	Y	N	N
11.86	11.90	C210B	44%	Bowbells	0.02	State	N	N	N	N	N	N	N
			56%	Williams	0.02	State	N	N	N	N	N	N	N
11.90	12.00	C135C	17%	Zahill	0.02	N	N	N	Y	N	N	N	N
			35%	Williams	0.04	N	N	N	N	N	N	N	N
			48%	Zahl	0.05	N	N	N	Y	N	N	N	N
12.00	12.13	C155F	21%	Arnegard	0.03	N	N	N	Y	N	Y	N	N
			34%	Max	0.05	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.06	N	N	N	Y	N	Y	N	N
12.13	12.15	C908F	18%	Zahl	0.00	N	N	N	Y	N	Y	N	N
			33%	Amor	0.01	N	N	N	Y	N	Y	N	Paralithic
			49%	Werner	0.01	N	N	N	Y	N	Y	N	Paralithic
12.15	12.22	C155F	21%	Arnegard	0.01	N	N	N	Y	N	Y	N	N
			34%	Max	0.02	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.03	N	N	N	Y	N	Y	N	N
12.22	12.43	C818B	49%	Williams	0.11	N	N	N	N	N	N	N	N
			51%	Lehr	0.11	N	N	N	N	N	N	Y	N
12.43	12.60	C135C	17%	Zahill	0.03	N	N	N	Y	N	N	N	N
			35%	Williams	0.06	N	N	N	N	N	N	N	N
			48%	Zahl	0.08	N	N	N	Y	N	N	N	N
12.60	12.67	C132B	27%	Zahl	0.02	State	N	N	N	N	N	N	N
			73%	Williams	0.05	State	N	N	N	N	N	N	N
12.67	12.70	C135C	17%	Zahill	0.00	N	N	N	Y	N	N	N	N
			35%	Williams	0.01	N	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			48%	Zahl	0.01	N	N	N	Y	N	N	N	N
12.70	12.75	C155F	21%	Arnegard	0.01	N	N	N	Y	N	Y	N	N
			34%	Max	0.02	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.02	N	N	N	Y	N	Y	N	N
12.75	13.09	C132B	27%	Zahl	0.09	State	N	N	N	N	N	N	N
			73%	Williams	0.25	State	N	N	N	N	N	N	N
13.09	13.12	C419A	100%	Wildrose	0.03	Prime	N	N	N	N	N	N	N
13.12	13.19	C155F	21%	Arnegard	0.01	N	N	N	Y	N	Y	N	N
			34%	Max	0.02	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.03	N	N	N	Y	N	Y	N	N
13.19	13.29	C419A	100%	Wildrose	0.10	Prime	N	N	N	N	N	N	N
13.29	13.47	C451A	100%	Arnegard	0.19	Prime	N	N	N	N	N	N	N
13.47	13.60	C155F	21%	Arnegard	0.03	N	N	N	Y	N	Y	N	N
			34%	Max	0.04	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.06	N	N	N	Y	N	Y	N	N
13.60	13.90	C132B	27%	Zahl	0.08	State	N	N	N	N	N	N	N
			73%	Williams	0.22	State	N	N	N	N	N	N	N
13.90	14.07	C132C	18%	Zahill	0.03	N	N	N	Y	N	N	N	N
			24%	Zahl	0.04	N	N	N	Y	N	N	N	N
			59%	Williams	0.10	N	N	N	N	N	N	N	N
14.07	14.27	C132B	27%	Zahl	0.06	State	N	N	N	N	N	N	N
			73%	Williams	0.15	State	N	N	N	N	N	N	N
14.27	14.41	C210A	26%	Bowbells	0.04	State	N	N	N	N	N	N	N
			74%	Williams	0.10	State	N	N	N	N	N	N	N
14.41	14.69	C132B	27%	Zahl	0.07	State	N	N	N	N	N	N	N
			73%	Williams	0.20	State	N	N	N	N	N	N	N
14.69	14.72	C210A	26%	Bowbells	0.01	State	N	N	N	N	N	N	N
			74%	Williams	0.03	State	N	N	N	N	N	N	N
14.72	14.79	C132B	27%	Zahl	0.02	State	N	N	N	N	N	N	N
			73%	Williams	0.05	State	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
14.79	14.82	C210A	26%	Bowbells	0.01	State	N	N	N	N	N	N	N
			74%	Williams	0.02	State	N	N	N	N	N	N	N
14.82	14.94	C132B	27%	Zahl	0.03	State	N	N	N	N	N	N	N
			73%	Williams	0.09	State	N	N	N	N	N	N	N
14.94	15.05	C135C	17%	Zahill	0.02	N	N	N	Y	N	N	N	N
			35%	Williams	0.04	N	N	N	N	N	N	N	N
			48%	Zahl	0.06	N	N	N	Y	N	N	N	N
15.05	15.16	C132B	27%	Zahl	0.03	State	N	N	N	N	N	N	N
			73%	Williams	0.08	State	N	N	N	N	N	N	N
15.16	15.22	C451A	100%	Arnegard	0.06	Prime	N	N	N	N	N	N	N
15.22	15.41	C210B	44%	Bowbells	0.08	State	N	N	N	N	N	N	N
			56%	Williams	0.11	State	N	N	N	N	N	N	N
15.41	15.52	C135C	17%	Zahill	0.02	N	N	N	Y	N	N	N	N
			35%	Williams	0.04	N	N	N	N	N	N	N	N
			48%	Zahl	0.05	N	N	N	Y	N	N	N	N
15.52	15.64	C210B	44%	Bowbells	0.05	State	N	N	N	N	N	N	N
			56%	Williams	0.07	State	N	N	N	N	N	N	N
15.64	15.68	C132C	18%	Zahill	0.01	N	N	N	Y	N	N	N	N
			24%	Zahl	0.01	N	N	N	Y	N	N	N	N
			59%	Williams	0.02	N	N	N	N	N	N	N	N
15.68	15.74	C210B	44%	Bowbells	0.03	State	N	N	N	N	N	N	N
			56%	Williams	0.04	State	N	N	N	N	N	N	N
15.74	15.77	C132C	18%	Zahill	0.01	N	N	N	Y	N	N	N	N
			24%	Zahl	0.01	N	N	N	Y	N	N	N	N
			59%	Williams	0.02	N	N	N	N	N	N	N	N
15.77	16.02	C210B	44%	Bowbells	0.11	State	N	N	N	N	N	N	N
			56%	Williams	0.14	State	N	N	N	N	N	N	N
16.02	16.06	C451A	100%	Arnegard	0.05	Prime	N	N	N	N	N	N	N
16.06	16.09	C816B	100%	Lehr	0.03	N	N	N	N	N	N	Y	N
16.09	16.29	C210B	44%	Bowbells	0.09	State	N	N	N	N	N	N	N

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North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			56%	Williams	0.11	State	N	N	N	N	N	N	N
16.29	16.32	C816B	100%	Lehr	0.02	N	N	N	N	N	N	Y	N
16.32	16.45	C210B	44%	Bowbells	0.06	State	N	N	N	N	N	N	N
			56%	Williams	0.07	State	N	N	N	N	N	N	N
16.45	16.47	C816B	100%	Lehr	0.03	N	N	N	N	N	N	Y	N
16.47	16.55	C451A	100%	Arnegard	0.07	Prime	N	N	N	N	N	N	N
16.55	16.62	C210B	44%	Bowbells	0.03	State	N	N	N	N	N	N	N
			56%	Williams	0.04	State	N	N	N	N	N	N	N
16.62	16.67	C135D	42%	Williams	0.02	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.03	N	N	N	Y	N	Y	N	N
16.67	16.82	C155F	21%	Arnegard	0.03	N	N	N	Y	N	Y	N	N
			34%	Max	0.05	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.07	N	N	N	Y	N	Y	N	N
16.82	16.86	C135D	42%	Williams	0.02	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.03	N	N	N	Y	N	Y	N	N
16.86	16.92	C155F	21%	Arnegard	0.01	N	N	N	Y	N	Y	N	N
			34%	Max	0.02	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.03	N	N	N	Y	N	Y	N	N
16.92	17.00	C210B	44%	Bowbells	0.03	State	N	N	N	N	N	N	N
			56%	Williams	0.04	State	N	N	N	N	N	N	N
17.00	17.02	C132C	18%	Zahill	0.00	N	N	N	Y	N	N	N	N
			24%	Zahl	0.01	N	N	N	Y	N	N	N	N
			59%	Williams	0.01	N	N	N	N	N	N	N	N
17.02	17.11	C210B	44%	Bowbells	0.04	State	N	N	N	N	N	N	N
			56%	Williams	0.05	State	N	N	N	N	N	N	N
17.11	17.22	C132C	18%	Zahill	0.02	N	N	N	Y	N	N	N	N
			24%	Zahl	0.03	N	N	N	Y	N	N	N	N
			59%	Williams	0.07	N	N	N	N	N	N	N	N
17.22	17.35	C210B	44%	Bowbells	0.06	State	N	N	N	N	N	N	N
			56%	Williams	0.08	State	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
17.35	17.44	C135D	42%	Williams	0.04	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.05	N	N	N	Y	N	Y	N	N
17.44	17.64	C132C	18%	Zahill	0.04	N	N	N	Y	N	N	N	N
			24%	Zahl	0.05	N	N	N	Y	N	N	N	N
			59%	Williams	0.12	N	N	N	N	N	N	N	N
17.64	17.69	C800B	100%	Appam	0.06	N	N	N	N	N	Y	Y	N
17.69	17.79	C155F	21%	Arnegard	0.02	N	N	N	Y	N	Y	N	N
			34%	Max	0.03	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.04	N	N	N	Y	N	Y	N	N
17.79	17.90	C580A	32%	Stirum	0.04	N	Y	N	N	N	N	N	N
			33%	Regan	0.04	N	Y	Y	N	N	N	N	N
			35%	Harriet	0.04	N	Y	Y	N	N	N	N	N
17.90	17.98	C816B	100%	Lehr	0.08	N	N	N	N	N	N	Y	N
17.98	18.14	E4051A	100%	Trembles	0.16	State	N	N	N	N	N	N	N
18.14	18.17	C870E	20%	Appam	0.01	N	N	N	Y	N	Y	Y	N
			22%	Lehr	0.01	N	N	N	Y	N	Y	Y	N
			58%	Wabek	0.02	N	N	N	Y	N	Y	Y	N
18.17	18.33	E0821A	100%	Lawther	0.15	State	N	N	N	N	N	N	N
18.33	18.41	E2203B	100%	Farland	0.09	State	N	N	N	N	N	N	N
18.41	18.52	E2145A	100%	Shambo	0.10	State	N	N	N	N	N	N	N
18.52	18.78	E3203B	100%	Cherry	0.27	State	N	N	N	N	N	N	N
18.78	18.86	E3603E	26%	Cabba	0.02	N	N	N	Y	N	Y	N	Paralithic
			29%	Zahl	0.02	N	N	N	Y	N	Y	N	N
			45%	Amor	0.03	N	N	N	Y	N	Y	N	Paralithic
18.86	18.94	E3203B	100%	Cherry	0.08	State	N	N	N	N	N	N	N
18.94	19.00	E3203C	100%	Cherry	0.05	State	N	N	N	N	N	N	N
19.00	19.14	E3609F	13%	Maschetah	0.02	N	N	N	N	N	N	N	N
			16%	Maschetah	0.02	N	N	N	Y	N	Y	N	N
			32%	Cabba	0.04	N	N	N	Y	N	Y	N	Paralithic
			39%	Zahl	0.05	N	N	N	Y	N	Y	N	N

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North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
19.14	19.18	E3107F	44%	Badland	0.02	N	N	N	Y	N	Y	N	Paralithic
			56%	Cabba	0.02	N	N	N	Y	N	Y	N	Paralithic
19.18	19.28	E3603E	26%	Cabba	0.03	N	N	N	Y	N	Y	N	Paralithic
			29%	Zahl	0.03	N	N	N	Y	N	Y	N	N
			45%	Amor	0.05	N	N	N	Y	N	Y	N	Paralithic
19.28	19.38	E3203C	100%	Cherry	0.09	State	N	N	N	N	N	N	N
19.38	19.88	E3203B	100%	Cherry	0.50	State	N	N	N	N	N	N	N
19.88	19.93	E4137A	100%	Korchea	0.05	State	N	N	N	N	N	N	N
19.93	20.08	E0821A	100%	Lawther	0.15	State	N	N	N	N	N	N	N
20.08	20.33	E2203B	100%	Farland	0.26	State	N	N	N	N	N	N	N
20.33	20.40	E0821A	100%	Lawther	0.06	State	N	N	N	N	N	N	N
20.40	20.46	E0835A	23%	Grail	0.01	State	N	N	N	N	N	N	N
			78%	Savage	0.05	State	N	N	N	N	N	N	N
20.46	20.85	E2203B	100%	Farland	0.39	State	N	N	N	N	N	N	N
20.85	20.94	E4137A	100%	Korchea	0.09	State	N	N	N	N	N	N	N
20.94	21.01	E0821A	100%	Lawther	0.07	State	N	N	N	N	N	N	N
21.01	21.11	E4137A	100%	Korchea	0.10	State	N	N	N	N	N	N	N
21.11	21.16	E4051A	100%	Trembles	0.05	State	N	N	N	N	N	N	N
21.16	21.24	E4137A	100%	Korchea	0.08	State	N	N	N	N	N	N	N
21.24	21.38	E4051A	100%	Trembles	0.13	State	N	N	N	N	N	N	N
21.38	21.47	E4137A	100%	Korchea	0.09	State	N	N	N	N	N	N	N
21.47	21.61	E2107A	100%	Arnegard	0.14	Prime	N	N	N	N	N	N	N
21.61	21.64	E4137A	100%	Korchea	0.03	State	N	N	N	N	N	N	N
21.64	21.70	E2107A	100%	Arnegard	0.05	Prime	N	N	N	N	N	N	N
21.70	21.78	E4137A	100%	Korchea	0.09	State	N	N	N	N	N	N	N
21.78	21.80	E1805B	25%	Parshall	0.01	N	N	N	N	N	N	N	N
			75%	Lihen	0.02	N	N	N	Y	Y	Y	N	N
21.80	21.86	E4227D	16%	Banks	0.01	N	N	N	Y	Y	Y	N	N
			84%	Seroco	0.05	N	N	N	Y	Y	Y	N	N
21.86	22.11	E1805B	25%	Parshall	0.06	N	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			75%	Lihen	0.19	N	N	N	Y	Y	Y	N	N
22.11	22.20	E4227D	16%	Banks	0.01	N	N	N	Y	Y	Y	N	N
			84%	Seroco	0.07	N	N	N	Y	Y	Y	N	N
22.20	22.32	E1805B	25%	Parshall	0.03	N	N	N	N	N	N	N	N
			75%	Lihen	0.09	N	N	N	Y	Y	Y	N	N
22.32	22.42	E4582A	100%	Appam	0.10	N	N	N	N	N	Y	N	N
22.42	22.85	E1805B	25%	Parshall	0.11	N	N	N	N	N	N	N	N
			75%	Lihen	0.32	N	N	N	Y	Y	Y	N	N
22.85	22.94	E4583E	24%	Appam	0.02	N	N	N	Y	N	Y	N	N
			76%	Wabek	0.07	N	N	N	Y	N	Y	Y	N
22.94	23.08	E4582B	100%	Appam	0.13	N	N	N	N	N	Y	N	N
23.08	23.12	E4583E	24%	Appam	0.01	N	N	N	Y	N	Y	N	N
			76%	Wabek	0.03	N	N	N	Y	N	Y	Y	N
23.12	25.17	EW	100%	Water	2.04	N	N	N	N	N	N	N	N
25.17	25.17	EW	100%	Water	0.00	N	N	N	N	N	N	N	N
25.17	25.46	E4999	100%	Water	0.29	N	N	N	N	N	N	N	N
25.46	25.53	E3559E	39%	Max	0.03	N	N	N	Y	N	Y	N	N
			61%	Zahl	0.05	N	N	N	Y	N	Y	N	N
25.53	25.61	E3607F	28%	Arikara	0.02	N	N	N	Y	N	Y	N	N
			30%	Cabba	0.02	N	N	N	Y	N	Y	N	Paralithic
			42%	Zahl	0.03	N	N	N	Y	N	Y	N	N
25.61	25.78	E3559E	39%	Max	0.07	N	N	N	Y	N	Y	N	N
			61%	Zahl	0.10	N	N	N	Y	N	Y	N	N
25.78	25.92	E3703D	32%	Zahl	0.05	N	N	N	Y	N	Y	N	N
			68%	Dooley	0.10	N	N	N	Y	N	Y	N	N
25.92	25.95	E3541B	35%	Zahl	0.01	N	N	N	N	N	N	N	N
			65%	Williams	0.02	N	N	N	N	N	N	N	N
25.95	26.01	E3703D	32%	Zahl	0.02	N	N	N	Y	N	Y	N	N
			68%	Dooley	0.04	N	N	N	Y	N	Y	N	N
26.01	26.09	E3559E	39%	Max	0.03	N	N	N	Y	N	Y	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			61%	Zahl	0.05	N	N	N	Y	N	Y	N	N
26.09	26.11	E3541B	35%	Zahl	0.01	N	N	N	N	N	N	N	N
			65%	Williams	0.02	N	N	N	N	N	N	N	N
26.11	26.14	E3703C	26%	Zahl	0.01	N	N	N	Y	N	N	N	N
			74%	Dooley	0.02	N	N	N	Y	N	N	N	N
26.14	26.48	E3513B	46%	Williams	0.16	State	N	N	N	N	N	N	N
			54%	Niobell	0.18	State	N	N	N	N	N	N	N
26.48	26.52	E3703C	26%	Zahl	0.01	N	N	N	Y	N	N	N	N
			74%	Dooley	0.03	N	N	N	Y	N	N	N	N
26.52	26.58	E2120B	100%	Farnuf	0.05	State	N	N	N	N	N	N	N
26.58	26.72	E4585B	100%	Manning	0.14	N	N	N	N	N	N	Y	N
26.72	26.90	E4561F	27%	Wabek	0.05	N	N	N	Y	N	Y	Y	N
			33%	Schaller	0.06	N	N	N	Y	N	Y	N	N
			40%	Manning	0.08	N	N	N	Y	N	Y	Y	N
26.90	26.98	E0605A	33%	Grail	0.03	State	N	N	N	N	N	N	N
			67%	Belfield	0.05	State	N	N	N	N	N	N	N
26.98	27.07	E3607F	28%	Arikara	0.03	N	N	N	Y	N	Y	N	N
			30%	Cabba	0.03	N	N	N	Y	N	Y	N	Paralithic
			42%	Zahl	0.04	N	N	N	Y	N	Y	N	N
27.07	27.13	E4585B	100%	Manning	0.06	N	N	N	N	N	N	Y	N
27.13	27.25	E3703B	14%	Zahl	0.02	State	N	N	N	N	N	N	N
			86%	Dooley	0.10	State	N	N	N	N	N	N	N
27.25	27.39	E3609F	13%	Maschetah	0.02	N	N	N	N	N	N	N	N
			16%	Maschetah	0.02	N	N	N	Y	N	Y	N	N
			32%	Cabba	0.04	N	N	N	Y	N	Y	N	Paralithic
			39%	Zahl	0.05	N	N	N	Y	N	Y	N	N
27.39	27.42	E4561F	27%	Wabek	0.01	N	N	N	Y	N	Y	Y	N
			33%	Schaller	0.01	N	N	N	Y	N	Y	N	N
			40%	Manning	0.01	N	N	N	Y	N	Y	Y	N
27.42	27.47	E3609F	13%	Maschetah	0.01	N	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			16%	Maschetah	0.01	N	N	N	Y	N	Y	N	N
			32%	Cabba	0.02	N	N	N	Y	N	Y	N	Paralithic
			39%	Zahl	0.02	N	N	N	Y	N	Y	N	N
27.47	27.78	E3541B	35%	Zahl	0.11	N	N	N	N	N	N	N	N
			65%	Williams	0.20	N	N	N	N	N	N	N	N
27.78	27.88	E3541C	48%	Zahl	0.05	N	N	N	Y	N	N	N	N
			52%	Williams	0.05	N	N	N	N	N	N	N	N
27.88	28.00	E3609F	13%	Maschetah	0.02	N	N	N	N	N	N	N	N
			16%	Maschetah	0.02	N	N	N	Y	N	Y	N	N
			32%	Cabba	0.04	N	N	N	Y	N	Y	N	Paralithic
			39%	Zahl	0.05	N	N	N	Y	N	Y	N	N
28.00	28.13	E3541B	35%	Zahl	0.05	N	N	N	N	N	N	N	N
			65%	Williams	0.08	N	N	N	N	N	N	N	N
28.13	28.25	E3567F	35%	Max	0.04	N	N	N	Y	N	Y	N	N
			65%	Zahl	0.08	N	N	N	Y	N	Y	N	N
28.25	28.63	E3703B	14%	Zahl	0.05	State	N	N	N	N	N	N	N
			86%	Dooley	0.33	State	N	N	N	N	N	N	N
28.63	28.69	E3703D	32%	Zahl	0.02	N	N	N	Y	N	Y	N	N
			68%	Dooley	0.04	N	N	N	Y	N	Y	N	N
28.69	28.73	E3703B	14%	Zahl	0.00	State	N	N	N	N	N	N	N
			86%	Dooley	0.03	State	N	N	N	N	N	N	N
28.73	28.77	E3703D	32%	Zahl	0.02	N	N	N	Y	N	Y	N	N
			68%	Dooley	0.03	N	N	N	Y	N	Y	N	N
28.77	28.88	E3609F	13%	Maschetah	0.01	N	N	N	N	N	N	N	N
			16%	Maschetah	0.02	N	N	N	Y	N	Y	N	N
			32%	Cabba	0.03	N	N	N	Y	N	Y	N	Paralithic
			39%	Zahl	0.04	N	N	N	Y	N	Y	N	N
28.88	28.92	E3555D	33%	Williams	0.01	N	N	N	Y	N	Y	N	N
			67%	Zahl	0.03	N	N	N	Y	N	Y	N	N
28.92	28.95	E3541C	48%	Zahl	0.01	N	N	N	Y	N	N	N	N

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North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			52%	Williams	0.02	N	N	N	N	N	N	N	N
28.95	28.96	E3555D	33%	Williams	0.00	N	N	N	Y	N	Y	N	N
			67%	Zahl	0.01	N	N	N	Y	N	Y	N	N
28.96	29.01	E3541C	48%	Zahl	0.02	N	N	N	Y	N	N	N	N
			52%	Williams	0.03	N	N	N	N	N	N	N	N
29.01	29.07	E2120B	100%	Farnuf	0.06	State	N	N	N	N	N	N	N
29.07	29.16	E3555D	33%	Williams	0.03	N	N	N	Y	N	Y	N	N
			67%	Zahl	0.06	N	N	N	Y	N	Y	N	N
29.16	29.33	E3701B	100%	Dooley	0.16	State	N	N	N	N	N	N	N
29.33	29.41	E3703C	26%	Zahl	0.02	N	N	N	Y	N	N	N	N
			74%	Dooley	0.06	N	N	N	Y	N	N	N	N
29.41	29.48	E3703D	32%	Zahl	0.03	N	N	N	Y	N	Y	N	N
			68%	Dooley	0.05	N	N	N	Y	N	Y	N	N
29.48	29.55	E2120B	100%	Farnuf	0.06	State	N	N	N	N	N	N	N
29.55	29.60	E4553B	100%	Tally	0.05	State	N	N	N	N	N	N	N
29.60	29.62	E2120B	100%	Farnuf	0.02	State	N	N	N	N	N	N	N
29.62	29.70	E1423F	21%	Parshall	0.02	N	N	N	Y	N	Y	N	N
			30%	Vebar	0.02	N	N	N	Y	N	Y	N	Paralithic
			49%	Flasher	0.04	N	N	N	Y	Y	Y	N	Paralithic
29.70	29.78	E4195A	100%	Velva	0.08	State	N	N	N	N	N	N	N
29.78	29.91	E2120A	100%	Farnuf	0.12	State	N	N	N	N	N	N	N
29.91	29.93	E4195A	100%	Velva	0.02	State	N	N	N	N	N	N	N
29.93	29.97	E2120A	100%	Farnuf	0.04	State	N	N	N	N	N	N	N
29.97	30.00	E4195A	100%	Velva	0.03	State	N	N	N	N	N	N	N
30.00	30.22	E4137A	100%	Korchea	0.22	State	N	N	N	N	N	N	N
30.22	30.28	E2120A	100%	Farnuf	0.07	State	N	N	N	N	N	N	N
30.28	30.48	E0447B	25%	Belfield	0.05	N	N	N	N	N	N	N	N
			75%	Daglum	0.15	N	N	N	N	N	N	N	N
30.48	30.51	E4195A	100%	Velva	0.03	State	N	N	N	N	N	N	N
30.51	30.68	E4137A	100%	Korchea	0.17	State	N	N	N	N	N	N	N

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North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
30.68	30.74	E4139A	43%	Fluvaquents	0.02	N	Y	N	N	N	N	N	N
			57%	Korchea	0.03	N	N	N	N	N	N	N	N
30.74	31.01	E4195A	100%	Velva	0.28	State	N	N	N	N	N	N	N
31.01	31.07	E3567F	35%	Max	0.02	N	N	N	Y	N	Y	N	N
			65%	Zahl	0.04	N	N	N	Y	N	Y	N	N
31.07	31.16	E1865C	25%	Parshall	0.02	N	N	N	Y	N	N	N	N
			75%	Tally	0.07	N	N	N	Y	N	N	N	N
31.16	31.33	E3703D	32%	Zahl	0.05	N	N	N	Y	N	Y	N	N
			68%	Dooley	0.11	N	N	N	Y	N	Y	N	N
31.33	31.50	E3567F	35%	Max	0.06	N	N	N	Y	N	Y	N	N
			65%	Zahl	0.11	N	N	N	Y	N	Y	N	N
31.50	31.54	E2120C	100%	Farnuf	0.04	State	N	N	N	N	N	N	N
31.54	31.66	E3541C	48%	Zahl	0.06	N	N	N	Y	N	N	N	N
			52%	Williams	0.06	N	N	N	N	N	N	N	N
31.66	31.71	E3555D	33%	Williams	0.02	N	N	N	Y	N	Y	N	N
			67%	Zahl	0.03	N	N	N	Y	N	Y	N	N
31.71	31.75	E2120B	100%	Farnuf	0.04	State	N	N	N	N	N	N	N
31.75	31.83	E2120A	100%	Farnuf	0.09	State	N	N	N	N	N	N	N
31.83	32.07	E3541C	48%	Zahl	0.11	N	N	N	Y	N	N	N	N
			52%	Williams	0.12	N	N	N	N	N	N	N	N
32.07	32.49	E2120B	100%	Farnuf	0.42	State	N	N	N	N	N	N	N
32.49	32.78	E2120C	100%	Farnuf	0.29	State	N	N	N	N	N	N	N
32.78	32.98	E2120B	100%	Farnuf	0.20	State	N	N	N	N	N	N	N
32.98	33.07	E0617B	24%	Daglum	0.02	State	N	N	N	N	N	N	N
			35%	Savage	0.03	State	N	N	N	N	N	N	N
			41%	Belfield	0.04	State	N	N	N	N	N	N	N
33.07	33.12	E2641C	24%	Werner	0.01	State	N	N	Y	N	N	N	Paralithic
			76%	Reeder	0.04	State	N	N	N	N	N	N	Paralithic
33.12	33.17	E3641D	26%	Williams	0.01	N	N	N	Y	N	Y	N	N
			33%	Cabba	0.02	N	N	N	Y	N	Y	N	Paralithic

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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%	Zahl	0.02	N	N	N	Y	N	Y	N	N
33.17	33.26	E2641C	24%	Werner	0.02	State	N	N	Y	N	N	N	Paralithic
			76%	Reeder	0.07	State	N	N	N	N	N	N	Paralithic
33.26	33.36	E3641D	26%	Williams	0.03	N	N	N	Y	N	Y	N	N
			33%	Cabba	0.03	N	N	N	Y	N	Y	N	Paralithic
			41%	Zahl	0.04	N	N	N	Y	N	Y	N	N
33.36	33.43	E3541B	35%	Zahl	0.02	N	N	N	N	N	N	N	N
			65%	Williams	0.04	N	N	N	N	N	N	N	N
33.43	33.64	E3609F	13%	Maschetah	0.03	N	N	N	N	N	N	N	N
			16%	Maschetah	0.03	N	N	N	Y	N	Y	N	N
			32%	Cabba	0.07	N	N	N	Y	N	Y	N	Paralithic
			39%	Zahl	0.08	N	N	N	Y	N	Y	N	N
33.64	33.70	E3639C	25%	Cabba	0.02	N	N	N	Y	N	N	N	Paralithic
			36%	Williams	0.02	N	N	N	N	N	N	N	N
			39%	Zahl	0.02	N	N	N	Y	N	N	N	N
33.70	33.75	E3555D	33%	Williams	0.02	N	N	N	Y	N	Y	N	N
			67%	Zahl	0.03	N	N	N	Y	N	Y	N	N
33.75	33.88	E3639C	25%	Cabba	0.03	N	N	N	Y	N	N	N	Paralithic
			36%	Williams	0.05	N	N	N	N	N	N	N	N
			39%	Zahl	0.05	N	N	N	Y	N	N	N	N
33.88	33.98	E3555D	33%	Williams	0.03	N	N	N	Y	N	Y	N	N
			67%	Zahl	0.06	N	N	N	Y	N	Y	N	N
33.98	34.07	E3541C	48%	Zahl	0.04	N	N	N	Y	N	N	N	N
			52%	Williams	0.05	N	N	N	N	N	N	N	N
34.07	34.12	E3641D	26%	Williams	0.01	N	N	N	Y	N	Y	N	N
			33%	Cabba	0.02	N	N	N	Y	N	Y	N	Paralithic
			41%	Zahl	0.02	N	N	N	Y	N	Y	N	N
34.12	34.18	E3541C	48%	Zahl	0.03	N	N	N	Y	N	N	N	N
			52%	Williams	0.03	N	N	N	N	N	N	N	N
34.18	34.30	E3641D	26%	Williams	0.03	N	N	N	Y	N	Y	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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%	Cabba	0.04	N	N	N	Y	N	Y	N	Paralithic
			41%	Zahl	0.05	N	N	N	Y	N	Y	N	N
34.30	34.54	E3639C	25%	Cabba	0.06	N	N	N	Y	N	N	N	Paralithic
			36%	Williams	0.08	N	N	N	N	N	N	N	N
			39%	Zahl	0.09	N	N	N	Y	N	N	N	N
34.54	34.62	E3641D	26%	Williams	0.02	N	N	N	Y	N	Y	N	N
			33%	Cabba	0.03	N	N	N	Y	N	Y	N	Paralithic
			41%	Zahl	0.03	N	N	N	Y	N	Y	N	N
34.62	34.66	E0559B	36%	Janesburg	0.01	N	N	N	N	N	N	N	Paralithic
			64%	Dogtooth	0.02	N	N	N	N	N	N	N	Paralithic
34.66	34.88	E3639C	25%	Cabba	0.06	N	N	N	Y	N	N	N	Paralithic
			36%	Williams	0.08	N	N	N	N	N	N	N	N
			39%	Zahl	0.09	N	N	N	Y	N	N	N	N
34.88	35.06	E0605A	33%	Grail	0.06	State	N	N	N	N	N	N	N
			67%	Belfield	0.12	State	N	N	N	N	N	N	N
35.06	35.14	E3701A	100%	Dooley	0.08	State	N	N	N	N	N	N	N
35.14	35.30	E0605A	33%	Grail	0.05	State	N	N	N	N	N	N	N
			67%	Belfield	0.10	State	N	N	N	N	N	N	N
35.30	35.44	E0821A	100%	Lawther	0.14	State	N	N	N	N	N	N	N
35.44	35.62	E4585B	100%	Manning	0.17	N	N	N	N	N	N	Y	N
35.62	35.65	E4561F	27%	Wabek	0.01	N	N	N	Y	N	Y	Y	N
			33%	Schaller	0.01	N	N	N	Y	N	Y	N	N
			40%	Manning	0.01	N	N	N	Y	N	Y	Y	N
35.65	35.66	E4729A	100%	Heil	0.01	N	Y	Y	N	N	N	N	N
35.66	35.77	E4561F	27%	Wabek	0.03	N	N	N	Y	N	Y	Y	N
			33%	Schaller	0.04	N	N	N	Y	N	Y	N	N
			40%	Manning	0.05	N	N	N	Y	N	Y	Y	N
35.77	36.17	E4585B	100%	Manning	0.40	N	N	N	N	N	N	Y	N
36.17	36.24	E4139A	43%	Fluvaquents	0.03	N	Y	N	N	N	N	N	N
			57%	Korchea	0.04	N	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
36.24	36.37	E4195A	100%	Velva	0.13	State	N	N	N	N	N	N	N
36.37	36.44	E0447B	25%	Belfield	0.02	N	N	N	N	N	N	N	N
			75%	Daglum	0.05	N	N	N	N	N	N	N	N
36.44	36.51	E4542B	34%	Bowdle	0.02	N	N	N	N	N	N	Y	N
			66%	Lehr	0.05	N	N	N	N	N	N	Y	N
36.51	36.65	E0447B	25%	Belfield	0.03	N	N	N	N	N	N	N	N
			75%	Daglum	0.10	N	N	N	N	N	N	N	N
36.65	36.74	E4561F	27%	Wabek	0.03	N	N	N	Y	N	Y	Y	N
			33%	Schaller	0.03	N	N	N	Y	N	Y	N	N
			40%	Manning	0.04	N	N	N	Y	N	Y	Y	N
36.74	37.03	E4585B	100%	Manning	0.28	N	N	N	N	N	N	Y	N
37.03	37.11	E3701B	100%	Dooley	0.08	State	N	N	N	N	N	N	N
37.11	37.20	E3541C	48%	Zahl	0.05	N	N	N	Y	N	N	N	N
			52%	Williams	0.05	N	N	N	N	N	N	N	N
37.20	37.23	E0447B	25%	Belfield	0.01	N	N	N	N	N	N	N	N
			75%	Daglum	0.02	N	N	N	N	N	N	N	N
37.23	37.39	E3541C	48%	Zahl	0.08	N	N	N	Y	N	N	N	N
			52%	Williams	0.08	N	N	N	N	N	N	N	N
37.39	37.51	E0447B	25%	Belfield	0.03	N	N	N	N	N	N	N	N
			75%	Daglum	0.09	N	N	N	N	N	N	N	N
37.51	37.52	E3701B	100%	Dooley	0.01	State	N	N	N	N	N	N	N
37.52	37.52	E3107F	44%	Badland	0.00	N	N	N	Y	N	Y	N	Paralithic
			56%	Cabba	0.00	N	N	N	Y	N	Y	N	Paralithic
37.52	37.65	E0447B	25%	Belfield	0.03	N	N	N	N	N	N	N	N
			75%	Daglum	0.10	N	N	N	N	N	N	N	N
37.65	37.70	E2120A	100%	Farnuf	0.05	State	N	N	N	N	N	N	N
37.70	37.95	E0447B	25%	Belfield	0.06	N	N	N	N	N	N	N	N
			75%	Daglum	0.19	N	N	N	N	N	N	N	N
37.95	37.95	E1333C	33%	Cohagen	0.00	N	N	N	Y	N	N	N	Paralithic
			67%	Vebar	0.00	N	N	N	Y	N	N	N	Paralithic

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
37.95	38.07	E3555D	33%	Williams	0.04	N	N	N	Y	N	Y	N	N
			67%	Zahl	0.08	N	N	N	Y	N	Y	N	N
38.07	38.19	E0559B	36%	Janesburg	0.05	N	N	N	N	N	N	N	Paralithic
			64%	Dogtooth	0.08	N	N	N	N	N	N	N	Paralithic
38.19	38.27	E4995F	100%	Pits	0.07	N	N	N	Y	N	Y	Y	N
38.27	38.46	E3609F	13%	Maschetah	0.02	N	N	N	N	N	N	N	N
			16%	Maschetah	0.03	N	N	N	Y	N	Y	N	N
			32%	Cabba	0.06	N	N	N	Y	N	Y	N	Paralithic
			39%	Zahl	0.07	N	N	N	Y	N	Y	N	N
38.46	38.73	E0617B	24%	Daglum	0.07	State	N	N	N	N	N	N	N
			35%	Savage	0.10	State	N	N	N	N	N	N	N
			41%	Belfield	0.11	State	N	N	N	N	N	N	N
38.73	38.79	E4561F	27%	Wabek	0.02	N	N	N	Y	N	Y	Y	N
			33%	Schaller	0.02	N	N	N	Y	N	Y	N	N
			40%	Manning	0.02	N	N	N	Y	N	Y	Y	N
38.79	38.92	E0447B	25%	Belfield	0.03	N	N	N	N	N	N	N	N
			75%	Daglum	0.09	N	N	N	N	N	N	N	N
38.92	38.94	E4561F	27%	Wabek	0.01	N	N	N	Y	N	Y	Y	N
			33%	Schaller	0.01	N	N	N	Y	N	Y	N	N
			40%	Manning	0.01	N	N	N	Y	N	Y	Y	N
38.94	38.99	E4143A	15%	Korchea	0.01	N	N	N	N	N	N	N	N
			41%	Fluvaquents	0.02	N	Y	N	N	N	N	N	N
			43%	Korchea	0.02	N	N	N	N	N	N	N	N
38.99	39.04	E2120A	100%	Farnuf	0.05	State	N	N	N	N	N	N	N
39.04	39.07	E0447B	25%	Belfield	0.01	N	N	N	N	N	N	N	N
			75%	Daglum	0.03	N	N	N	N	N	N	N	N
39.07	39.16	E2120A	100%	Farnuf	0.09	State	N	N	N	N	N	N	N
39.16	39.42	E0447B	25%	Belfield	0.06	N	N	N	N	N	N	N	N
			75%	Daglum	0.19	N	N	N	N	N	N	N	N
39.42	39.74	E0515B	38%	Daglum	0.12	N	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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%	Rhoades	0.21	N	N	N	N	N	N	N	N
39.74	39.82	E4005A	100%	Harriet	0.08	N	Y	Y	N	N	N	N	N
39.82	40.03	E0447B	25%	Belfield	0.05	N	N	N	N	N	N	N	N
			75%	Daglum	0.16	N	N	N	N	N	N	N	N
40.03	40.13	E0559B	36%	Janesburg	0.03	N	N	N	N	N	N	N	Paralithic
			64%	Dogtooth	0.06	N	N	N	N	N	N	N	Paralithic
40.13	40.25	E1355D	20%	Tally	0.02	N	N	N	Y	N	Y	N	Paralithic
			34%	Flasher	0.04	N	N	N	Y	Y	Y	N	Paralithic
			45%	Vebar	0.06	N	N	N	Y	N	Y	N	Paralithic
40.25	40.35	E3641D	26%	Williams	0.03	N	N	N	Y	N	Y	N	N
			33%	Cabba	0.03	N	N	N	Y	N	Y	N	Paralithic
			41%	Zahl	0.04	N	N	N	Y	N	Y	N	N
40.35	40.41	E0447B	25%	Belfield	0.02	N	N	N	N	N	N	N	N
			75%	Daglum	0.05	N	N	N	N	N	N	N	N
40.41	40.73	E0559B	36%	Janesburg	0.12	N	N	N	N	N	N	N	Paralithic
			64%	Dogtooth	0.21	N	N	N	N	N	N	N	Paralithic
40.73	40.92	E1865B	32%	Parshall	0.06	State	N	N	N	N	N	N	N
			68%	Tally	0.13	State	N	N	N	N	N	N	N
40.92	41.02	E3107F	44%	Badland	0.04	N	N	N	Y	N	Y	N	Paralithic
			56%	Cabba	0.06	N	N	N	Y	N	Y	N	Paralithic
41.02	41.11	E0559B	36%	Janesburg	0.03	N	N	N	N	N	N	N	Paralithic
			64%	Dogtooth	0.06	N	N	N	N	N	N	N	Paralithic
41.11	41.35	E0701F	27%	Cabba	0.07	N	N	N	Y	N	Y	N	Paralithic
			30%	Janesburg	0.07	N	N	N	Y	N	Y	N	Paralithic
			43%	Dogtooth	0.11	N	N	N	Y	N	Y	N	Paralithic
41.35	41.46	E1355D	20%	Tally	0.02	N	N	N	Y	N	Y	N	Paralithic
			34%	Flasher	0.03	N	N	N	Y	Y	Y	N	Paralithic
			45%	Vebar	0.05	N	N	N	Y	N	Y	N	Paralithic
41.46	41.53	E0701F	27%	Cabba	0.02	N	N	N	Y	N	Y	N	Paralithic
			30%	Janesburg	0.02	N	N	N	Y	N	Y	N	Paralithic

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			43%	Dogtooth	0.03	N	N	N	Y	N	Y	N	Paralithic
41.53	41.58	E0605A	33%	Grail	0.02	State	N	N	N	N	N	N	N
			67%	Belfield	0.03	State	N	N	N	N	N	N	N
41.58	41.80	E0701F	27%	Cabba	0.06	N	N	N	Y	N	Y	N	Paralithic
			30%	Janesburg	0.07	N	N	N	Y	N	Y	N	Paralithic
			43%	Dogtooth	0.10	N	N	N	Y	N	Y	N	Paralithic
41.80	41.86	E0447B	25%	Belfield	0.01	N	N	N	N	N	N	N	N
			75%	Daglum	0.04	N	N	N	N	N	N	N	N
41.86	41.93	E3641D	26%	Williams	0.02	N	N	N	Y	N	Y	N	N
			33%	Cabba	0.02	N	N	N	Y	N	Y	N	Paralithic
			41%	Zahl	0.03	N	N	N	Y	N	Y	N	N
41.93	42.39	E0447B	25%	Belfield	0.11	N	N	N	N	N	N	N	N
			75%	Daglum	0.34	N	N	N	N	N	N	N	N
42.39	42.58	E1333C	33%	Cohagen	0.06	N	N	N	Y	N	N	N	Paralithic
			67%	Vebar	0.13	N	N	N	Y	N	N	N	Paralithic
42.58	42.65	E2120B	100%	Farnuf	0.07	State	N	N	N	N	N	N	N
42.65	42.75	E0913C	24%	Wayden	0.02	N	N	N	N	N	N	N	Paralithic
			76%	Moreau	0.08	N	N	N	Y	N	N	N	Paralithic
42.75	43.08	E3703B	14%	Zahl	0.05	State	N	N	N	N	N	N	N
			86%	Dooley	0.28	State	N	N	N	N	N	N	N
43.08	43.09	E3701B	100%	Dooley	0.01	State	N	N	N	N	N	N	N
43.09	43.26	E3703B	14%	Zahl	0.02	State	N	N	N	N	N	N	N
			86%	Dooley	0.15	State	N	N	N	N	N	N	N
43.26	43.47	E3703C	26%	Zahl	0.06	N	N	N	Y	N	N	N	N
			74%	Dooley	0.16	N	N	N	Y	N	N	N	N
43.47	43.63	E3703B	14%	Zahl	0.02	State	N	N	N	N	N	N	N
			86%	Dooley	0.14	State	N	N	N	N	N	N	N
43.63	43.71	E4542B	34%	Bowdle	0.03	N	N	N	N	N	N	Y	N
			66%	Lehr	0.05	N	N	N	N	N	N	Y	N
43.71	43.78	E0605A	33%	Grail	0.02	State	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			67%	Belfield	0.05	State	N	N	N	N	N	N	N
43.78	43.83	E3703B	14%	Zahl	0.01	State	N	N	N	N	N	N	N
			86%	Dooley	0.04	State	N	N	N	N	N	N	N
43.83	43.89	E0605A	33%	Grail	0.02	State	N	N	N	N	N	N	N
			67%	Belfield	0.04	State	N	N	N	N	N	N	N
43.89	44.12	E3703C	26%	Zahl	0.06	N	N	N	Y	N	N	N	N
			74%	Dooley	0.18	N	N	N	Y	N	N	N	N
44.12	44.21	E1865C	25%	Parshall	0.02	N	N	N	Y	N	N	N	N
			75%	Tally	0.06	N	N	N	Y	N	N	N	N
44.21	44.23	E3703D	32%	Zahl	0.01	N	N	N	Y	N	Y	N	N
			68%	Dooley	0.02	N	N	N	Y	N	Y	N	N
44.23	44.27	E3559E	39%	Max	0.02	N	N	N	Y	N	Y	N	N
			61%	Zahl	0.03	N	N	N	Y	N	Y	N	N
44.27	44.43	E0559B	36%	Janesburg	0.06	N	N	N	N	N	N	N	Paralithic
			64%	Dogtooth	0.10	N	N	N	N	N	N	N	Paralithic
44.43	44.50	E0605A	33%	Grail	0.02	State	N	N	N	N	N	N	N
			67%	Belfield	0.05	State	N	N	N	N	N	N	N
44.50	44.68	E4137A	100%	Korchea	0.18	State	N	N	N	N	N	N	N
44.68	44.73	E3541C	48%	Zahl	0.03	N	N	N	Y	N	N	N	N
			52%	Williams	0.03	N	N	N	N	N	N	N	N
44.73	45.21	E0563B	42%	Dogtooth	0.20	N	N	N	N	N	N	N	Paralithic
			58%	Janesburg	0.28	N	N	N	N	N	N	N	Paralithic
45.21	45.34	E0605A	33%	Grail	0.04	State	N	N	N	N	N	N	N
			67%	Belfield	0.08	State	N	N	N	N	N	N	N
45.34	45.51	E0559B	36%	Janesburg	0.06	N	N	N	N	N	N	N	Paralithic
			64%	Dogtooth	0.11	N	N	N	N	N	N	N	Paralithic
45.51	45.66	E1333B	26%	Cohagen	0.04	N	N	N	Y	N	N	N	Paralithic
			74%	Vebar	0.11	N	N	N	N	N	N	N	Paralithic
45.66	45.68	E1333C	33%	Cohagen	0.01	N	N	N	Y	N	N	N	Paralithic
			67%	Vebar	0.01	N	N	N	Y	N	N	N	Paralithic

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
45.68	45.71	E0447B	25%	Belfield	0.01	N	N	N	N	N	N	N	N
			75%	Daglum	0.03	N	N	N	N	N	N	N	N
45.71	45.79	E3703D	32%	Zahl	0.03	N	N	N	Y	N	Y	N	N
			68%	Dooley	0.05	N	N	N	Y	N	Y	N	N
45.79	46.07	E3703C	26%	Zahl	0.07	N	N	N	Y	N	N	N	N
			74%	Dooley	0.20	N	N	N	Y	N	N	N	N
46.07	46.47	E3703B	14%	Zahl	0.06	State	N	N	N	N	N	N	N
			86%	Dooley	0.35	State	N	N	N	N	N	N	N
46.47	46.61	E0605A	33%	Grail	0.05	State	N	N	N	N	N	N	N
			67%	Belfield	0.09	State	N	N	N	N	N	N	N
46.61	46.68	E4195A	100%	Velva	0.06	State	N	N	N	N	N	N	N
46.68	46.75	E4139A	43%	Fluvaquents	0.03	N	Y	N	N	N	N	N	N
			57%	Korchea	0.04	N	N	N	N	N	N	N	N
46.75	46.79	E4195A	100%	Velva	0.04	State	N	N	N	N	N	N	N
46.79	46.87	E0605A	33%	Grail	0.03	State	N	N	N	N	N	N	N
			67%	Belfield	0.06	State	N	N	N	N	N	N	N
46.87	46.97	E2120A	100%	Farnuf	0.10	State	N	N	N	N	N	N	N
46.97	47.15	E0835A	23%	Grail	0.04	State	N	N	N	N	N	N	N
			78%	Savage	0.14	State	N	N	N	N	N	N	N
47.15	47.30	E2120A	100%	Farnuf	0.15	State	N	N	N	N	N	N	N
47.30	47.43	E0605A	33%	Grail	0.04	State	N	N	N	N	N	N	N
			67%	Belfield	0.09	State	N	N	N	N	N	N	N
47.43	47.47	E2120A	100%	Farnuf	0.04	State	N	N	N	N	N	N	N
47.47	47.71	E0515B	38%	Daglum	0.09	N	N	N	N	N	N	N	N
			63%	Rhoades	0.15	N	N	N	N	N	N	N	N
47.71	47.86	E0835A	23%	Grail	0.03	State	N	N	N	N	N	N	N
			78%	Savage	0.12	State	N	N	N	N	N	N	N
47.86	47.90	E0447B	25%	Belfield	0.01	N	N	N	N	N	N	N	N
			75%	Daglum	0.04	N	N	N	N	N	N	N	N
47.90	48.10	E2120A	100%	Farnuf	0.20	State	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
48.10	48.13	E3701A	100%	Dooley	0.03	State	N	N	N	N	N	N	N
48.13	48.17	E4190F	21%	Havrelon	0.01	N	N	N	N	N	N	N	N
			36%	Chama	0.01	N	N	N	Y	N	Y	N	Paralithic
			43%	Cabba	0.02	N	N	N	Y	N	Y	N	Paralithic
48.17	48.35	E0605A	33%	Grail	0.06	State	N	N	N	N	N	N	N
			67%	Belfield	0.12	State	N	N	N	N	N	N	N
48.35	48.39	E2120A	100%	Farnuf	0.04	State	N	N	N	N	N	N	N
48.39	48.63	E2120B	100%	Farnuf	0.24	State	N	N	N	N	N	N	N
48.63	48.74	E3609F	13%	Maschetah	0.01	N	N	N	N	N	N	N	N
			16%	Maschetah	0.02	N	N	N	Y	N	Y	N	N
			32%	Cabba	0.03	N	N	N	Y	N	Y	N	Paralithic
			39%	Zahl	0.04	N	N	N	Y	N	Y	N	N
48.74	48.84	E3639C	25%	Cabba	0.03	N	N	N	Y	N	N	N	Paralithic
			36%	Williams	0.04	N	N	N	N	N	N	N	N
			39%	Zahl	0.04	N	N	N	Y	N	N	N	N
48.84	48.94	E3555D	33%	Williams	0.03	N	N	N	Y	N	Y	N	N
			67%	Zahl	0.06	N	N	N	Y	N	Y	N	N
48.94	49.19	E2120B	100%	Farnuf	0.25	State	N	N	N	N	N	N	N
49.19	49.33	E1865B	32%	Parshall	0.04	State	N	N	N	N	N	N	N
			68%	Tally	0.09	State	N	N	N	N	N	N	N
49.33	49.39	E1603D	43%	Telfer	0.03	N	N	N	Y	Y	Y	N	N
			57%	Beisigl	0.04	N	N	N	Y	Y	Y	N	Paralithic
49.39	49.60	E1865C	25%	Parshall	0.05	N	N	N	Y	N	N	N	N
			75%	Tally	0.15	N	N	N	Y	N	N	N	N
49.60	49.62	E2120C	100%	Farnuf	0.02	State	N	N	N	N	N	N	N
49.62	49.78	E2601D	39%	Cabba	0.06	N	N	N	Y	N	Y	N	Paralithic
			61%	Amor	0.09	N	N	N	Y	N	Y	N	Paralithic
49.78	49.92	E1403D	19%	Telfer	0.03	N	N	N	Y	Y	Y	N	N
			32%	Flasher	0.05	N	N	N	Y	Y	Y	N	Paralithic
			49%	Beisigl	0.07	N	N	N	Y	Y	Y	N	Paralithic

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
49.92	50.12	E1423F	21%	Parshall	0.04	N	N	N	Y	N	Y	N	N
			30%	Vebar	0.06	N	N	N	Y	N	Y	N	Paralithic
			49%	Flasher	0.10	N	N	N	Y	Y	Y	N	Paralithic
50.12	50.51	E1403D	19%	Telfer	0.07	N	N	N	Y	Y	Y	N	N
			32%	Flasher	0.13	N	N	N	Y	Y	Y	N	Paralithic
			49%	Beisigl	0.19	N	N	N	Y	Y	Y	N	Paralithic
50.51	50.66	E3637D	22%	Tally	0.03	N	N	N	Y	N	Y	N	N
			33%	Beisigl	0.05	N	N	N	Y	Y	Y	N	Paralithic
			44%	Zahl	0.07	N	N	N	Y	N	Y	N	N
50.66	50.73	E2601C	40%	Cabba	0.03	N	N	N	Y	N	N	N	Paralithic
			60%	Amor	0.04	N	N	N	N	N	N	N	Paralithic
50.73	50.76	E2120B	100%	Farnuf	0.04	State	N	N	N	N	N	N	N
50.76	50.80	E4139A	43%	Fluvaquents	0.01	N	Y	N	N	N	N	N	N
			57%	Korchea	0.02	N	N	N	N	N	N	N	N
50.80	50.91	E3555D	33%	Williams	0.04	N	N	N	Y	N	Y	N	N
			67%	Zahl	0.08	N	N	N	Y	N	Y	N	N
50.91	50.96	E2120A	100%	Farnuf	0.05	State	N	N	N	N	N	N	N
50.96	51.03	E4561F	27%	Wabek	0.02	N	N	N	Y	N	Y	Y	N
			33%	Schaller	0.02	N	N	N	Y	N	Y	N	N
			40%	Manning	0.03	N	N	N	Y	N	Y	Y	N
51.03	51.05	E4137A	100%	Korchea	0.03	State	N	N	N	N	N	N	N
51.05	51.22	E1865B	32%	Parshall	0.05	State	N	N	N	N	N	N	N
			68%	Tally	0.12	State	N	N	N	N	N	N	N
51.22	51.33	E1423F	21%	Parshall	0.02	N	N	N	Y	N	Y	N	N
			30%	Vebar	0.03	N	N	N	Y	N	Y	N	Paralithic
			49%	Flasher	0.05	N	N	N	Y	Y	Y	N	Paralithic
51.33	51.42	E4137A	100%	Korchea	0.09	State	N	N	N	N	N	N	N
51.42	51.49	E1865B	32%	Parshall	0.02	State	N	N	N	N	N	N	N
			68%	Tally	0.05	State	N	N	N	N	N	N	N
51.49	51.56	E1355D	20%	Tally	0.01	N	N	N	Y	N	Y	N	Paralithic

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			34%	Flasher	0.02	N	N	N	Y	Y	Y	N	Paralithic
			45%	Vebar	0.03	N	N	N	Y	N	Y	N	Paralithic
51.56	51.86	E1423F	21%	Parshall	0.06	N	N	N	Y	N	Y	N	N
			30%	Vebar	0.09	N	N	N	Y	N	Y	N	Paralithic
			49%	Flasher	0.15	N	N	N	Y	Y	Y	N	Paralithic
51.86	52.05	E1865B	32%	Parshall	0.06	State	N	N	N	N	N	N	N
			68%	Tally	0.13	State	N	N	N	N	N	N	N
52.05	52.36	E4137A	100%	Korchea	0.31	State	N	N	N	N	N	N	N
52.36	52.52	E2120A	100%	Farnuf	0.16	State	N	N	N	N	N	N	N
52.52	52.57	E1865B	32%	Parshall	0.02	State	N	N	N	N	N	N	N
			68%	Tally	0.04	State	N	N	N	N	N	N	N
52.57	52.61	E3703D	32%	Zahl	0.01	N	N	N	Y	N	Y	N	N
			68%	Dooley	0.03	N	N	N	Y	N	Y	N	N
52.61	52.68	E1355D	20%	Tally	0.01	N	N	N	Y	N	Y	N	Paralithic
			34%	Flasher	0.02	N	N	N	Y	Y	Y	N	Paralithic
			45%	Vebar	0.03	N	N	N	Y	N	Y	N	Paralithic
52.68	52.87	E1423F	21%	Parshall	0.04	N	N	N	Y	N	Y	N	N
			30%	Vebar	0.06	N	N	N	Y	N	Y	N	Paralithic
			49%	Flasher	0.09	N	N	N	Y	Y	Y	N	Paralithic
52.87	52.92	E1403D	19%	Telfer	0.01	N	N	N	Y	Y	Y	N	N
			32%	Flasher	0.02	N	N	N	Y	Y	Y	N	Paralithic
			49%	Beisigl	0.03	N	N	N	Y	Y	Y	N	Paralithic
52.92	53.05	E1423F	21%	Parshall	0.03	N	N	N	Y	N	Y	N	N
			30%	Vebar	0.04	N	N	N	Y	N	Y	N	Paralithic
			49%	Flasher	0.06	N	N	N	Y	Y	Y	N	Paralithic
53.05	53.19	E1403D	19%	Telfer	0.03	N	N	N	Y	Y	Y	N	N
			32%	Flasher	0.04	N	N	N	Y	Y	Y	N	Paralithic
			49%	Beisigl	0.07	N	N	N	Y	Y	Y	N	Paralithic
53.19	53.32	E1865B	32%	Parshall	0.04	State	N	N	N	N	N	N	N
			68%	Tally	0.09	State	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
53.32	53.43	E3641D	26%	Williams	0.03	N	N	N	Y	N	Y	N	N
			33%	Cabba	0.04	N	N	N	Y	N	Y	N	Paralithic
			41%	Zahl	0.05	N	N	N	Y	N	Y	N	N
53.43	53.47	E3541B	35%	Zahl	0.01	N	N	N	N	N	N	N	N
			65%	Williams	0.03	N	N	N	N	N	N	N	N
53.47	53.52	E3641D	26%	Williams	0.01	N	N	N	Y	N	Y	N	N
			33%	Cabba	0.02	N	N	N	Y	N	Y	N	Paralithic
			41%	Zahl	0.02	N	N	N	Y	N	Y	N	N
53.52	53.56	E3555D	33%	Williams	0.01	N	N	N	Y	N	Y	N	N
			67%	Zahl	0.03	N	N	N	Y	N	Y	N	N
53.56	53.63	E3541B	35%	Zahl	0.02	N	N	N	N	N	N	N	N
			65%	Williams	0.04	N	N	N	N	N	N	N	N
53.63	53.66	E3555D	33%	Williams	0.01	N	N	N	Y	N	Y	N	N
			67%	Zahl	0.02	N	N	N	Y	N	Y	N	N
53.66	53.74	E3541C	48%	Zahl	0.04	N	N	N	Y	N	N	N	N
			52%	Williams	0.04	N	N	N	N	N	N	N	N
53.74	53.83	E3555D	33%	Williams	0.03	N	N	N	Y	N	Y	N	N
			67%	Zahl	0.06	N	N	N	Y	N	Y	N	N
53.83	53.99	E3527B	29%	Bowbells	0.05	State	N	N	N	N	N	N	N
			71%	Williams	0.11	State	N	N	N	N	N	N	N
53.99	54.06	E3541B	35%	Zahl	0.02	N	N	N	N	N	N	N	N
			65%	Williams	0.04	N	N	N	N	N	N	N	N
54.06	54.15	E3527B	29%	Bowbells	0.03	State	N	N	N	N	N	N	N
			71%	Williams	0.06	State	N	N	N	N	N	N	N
54.15	54.18	E1865B	32%	Parshall	0.01	State	N	N	N	N	N	N	N
			68%	Tally	0.02	State	N	N	N	N	N	N	N
54.18	54.29	E3541C	48%	Zahl	0.05	N	N	N	Y	N	N	N	N
			52%	Williams	0.06	N	N	N	N	N	N	N	N
54.29	54.36	E1423F	21%	Parshall	0.02	N	N	N	Y	N	Y	N	N
			30%	Vebar	0.02	N	N	N	Y	N	Y	N	Paralithic

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			49%	Flasher	0.04	N	N	N	Y	Y	Y	N	Paralithic
54.36	54.56	E1865B	32%	Parshall	0.06	State	N	N	N	N	N	N	N
			68%	Tally	0.13	State	N	N	N	N	N	N	N
54.56	54.65	E4005A	100%	Harriet	0.09	N	Y	Y	N	N	N	N	N
54.65	54.74	E1355D	20%	Tally	0.02	N	N	N	Y	N	Y	N	Paralithic
			34%	Flasher	0.03	N	N	N	Y	Y	Y	N	Paralithic
			45%	Vebar	0.04	N	N	N	Y	N	Y	N	Paralithic
54.74	54.78	E0447B	25%	Belfield	0.01	N	N	N	N	N	N	N	N
			75%	Daglum	0.03	N	N	N	N	N	N	N	N
54.78	54.83	E1355D	20%	Tally	0.01	N	N	N	Y	N	Y	N	Paralithic
			34%	Flasher	0.02	N	N	N	Y	Y	Y	N	Paralithic
			45%	Vebar	0.03	N	N	N	Y	N	Y	N	Paralithic
54.83	55.02	E1333C	33%	Cohagen	0.06	N	N	N	Y	N	N	N	Paralithic
			67%	Vebar	0.13	N	N	N	Y	N	N	N	Paralithic
55.02	55.22	E1423F	21%	Parshall	0.04	N	N	N	Y	N	Y	N	N
			30%	Vebar	0.06	N	N	N	Y	N	Y	N	Paralithic
			49%	Flasher	0.10	N	N	N	Y	Y	Y	N	Paralithic
55.22	55.38	E0701F	27%	Cabba	0.04	N	N	N	Y	N	Y	N	Paralithic
			30%	Janesburg	0.05	N	N	N	Y	N	Y	N	Paralithic
			43%	Dogtooth	0.07	N	N	N	Y	N	Y	N	Paralithic
55.38	55.90	E1423F	21%	Parshall	0.11	N	N	N	Y	N	Y	N	N
			30%	Vebar	0.16	N	N	N	Y	N	Y	N	Paralithic
			49%	Flasher	0.26	N	N	N	Y	Y	Y	N	Paralithic
55.90	55.94	E3161F	24%	Cherry	0.01	N	N	N	Y	N	Y	N	N
			35%	Cherry	0.01	N	N	N	Y	N	Y	N	N
			41%	Cabba	0.01	N	N	N	Y	N	Y	N	Paralithic
55.94	56.04	E3609F	13%	Maschetah	0.01	N	N	N	N	N	N	N	N
			16%	Maschetah	0.02	N	N	N	Y	N	Y	N	N
			32%	Cabba	0.03	N	N	N	Y	N	Y	N	Paralithic
			39%	Zahl	0.04	N	N	N	Y	N	Y	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
56.04	56.16	E1423F	21%	Parshall	0.02	N	N	N	Y	N	Y	N	N
			30%	Vebar	0.03	N	N	N	Y	N	Y	N	Paralithic
			49%	Flasher	0.06	N	N	N	Y	Y	Y	N	Paralithic
56.16	56.29	E1403D	19%	Telfer	0.02	N	N	N	Y	Y	Y	N	N
			32%	Flasher	0.04	N	N	N	Y	Y	Y	N	Paralithic
			49%	Beisigl	0.06	N	N	N	Y	Y	Y	N	Paralithic
56.29	56.41	E2617F	18%	Shambo	0.02	N	N	N	Y	N	Y	N	Paralithic
			33%	Chama	0.04	N	N	N	Y	N	Y	N	Paralithic
			49%	Cabba	0.06	N	N	N	Y	N	Y	N	Paralithic
56.41	56.45	E1423F	21%	Parshall	0.01	N	N	N	Y	N	Y	N	N
			30%	Vebar	0.01	N	N	N	Y	N	Y	N	Paralithic
			49%	Flasher	0.02	N	N	N	Y	Y	Y	N	Paralithic
56.45	56.49	E2617F	18%	Shambo	0.01	N	N	N	Y	N	Y	N	Paralithic
			33%	Chama	0.01	N	N	N	Y	N	Y	N	Paralithic
			49%	Cabba	0.02	N	N	N	Y	N	Y	N	Paralithic
56.49	56.59	E1423F	21%	Parshall	0.02	N	N	N	Y	N	Y	N	N
			30%	Vebar	0.03	N	N	N	Y	N	Y	N	Paralithic
			49%	Flasher	0.05	N	N	N	Y	Y	Y	N	Paralithic
56.59	56.85	E1403D	19%	Telfer	0.05	N	N	N	Y	Y	Y	N	N
			32%	Flasher	0.08	N	N	N	Y	Y	Y	N	Paralithic
			49%	Beisigl	0.13	N	N	N	Y	Y	Y	N	Paralithic
56.85	57.01	E1009B	23%	Barkof	0.04	State	N	N	N	N	N	N	Paralithic
			77%	Moreau	0.13	State	N	N	N	N	N	N	Paralithic
57.01	57.16	E2737C	20%	Sen	0.03	N	N	N	N	N	N	N	Paralithic
			31%	Cabba	0.05	N	N	N	Y	N	N	N	Paralithic
			48%	Chama	0.07	N	N	N	Y	N	N	N	Paralithic
57.16	57.22	E2120B	100%	Farnuf	0.06	State	N	N	N	N	N	N	N
57.22	57.27	E1423F	21%	Parshall	0.01	N	N	N	Y	N	Y	N	N
			30%	Vebar	0.02	N	N	N	Y	N	Y	N	Paralithic
			49%	Flasher	0.03	N	N	N	Y	Y	Y	N	Paralithic

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North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
57.27	57.32	E2737C	20%	Sen	0.01	N	N	N	N	N	N	N	Paralithic
			31%	Cabba	0.01	N	N	N	Y	N	N	N	Paralithic
			48%	Chama	0.02	N	N	N	Y	N	N	N	Paralithic
57.32	57.40	E1423F	21%	Parshall	0.02	N	N	N	Y	N	Y	N	N
			30%	Vebar	0.02	N	N	N	Y	N	Y	N	Paralithic
			49%	Flasher	0.04	N	N	N	Y	Y	Y	N	Paralithic
57.40	57.50	E1009B	23%	Barkof	0.02	State	N	N	N	N	N	N	Paralithic
			77%	Moreau	0.08	State	N	N	N	N	N	N	Paralithic
57.50	57.75	L1425F	48%	Fleak	0.12	N	N	N	Y	Y	Y	N	Paralithic
			52%	Rhame	0.13	N	N	N	Y	N	Y	N	Paralithic
57.75	57.83	L2807D	41%	Kremlin	0.03	N	N	N	Y	N	Y	N	Paralithic
			59%	Boxwell	0.05	N	N	N	Y	N	Y	N	Paralithic
57.83	57.98	L1425F	48%	Fleak	0.07	N	N	N	Y	Y	Y	N	Paralithic
			52%	Rhame	0.08	N	N	N	Y	N	Y	N	Paralithic
57.98	58.19	L3241B	100%	Patent	0.21	N	N	N	Y	N	N	N	N
58.19	58.30	L3013F	23%	Scairt	0.02	N	N	N	Y	N	Y	N	Paralithic
			77%	Kirby	0.08	N	N	N	Y	N	Y	Y	N
58.30	58.43	L2807D	41%	Kremlin	0.05	N	N	N	Y	N	Y	N	Paralithic
			59%	Boxwell	0.07	N	N	N	Y	N	Y	N	Paralithic
58.43	58.56	L0454B	44%	Gerda	0.06	N	N	N	N	N	N	N	N
			56%	Maltese	0.08	N	N	N	N	N	N	N	N
58.56	58.58	L3013F	23%	Scairt	0.00	N	N	N	Y	N	Y	N	Paralithic
			77%	Kirby	0.02	N	N	N	Y	N	Y	Y	N
58.58	58.71	L0454B	44%	Gerda	0.06	N	N	N	N	N	N	N	N
			56%	Maltese	0.07	N	N	N	N	N	N	N	N
58.71	58.81	L2633F	18%	Arikara	0.02	N	N	N	Y	N	Y	N	N
			39%	Cabbart	0.04	N	N	N	Y	N	Y	N	Paralithic
			43%	Boxwell	0.04	N	N	N	Y	N	Y	N	Paralithic
58.81	59.12	L2311E	23%	Boxwell	0.07	N	N	N	Y	N	Y	N	Paralithic
			31%	Maltese	0.10	N	N	N	Y	N	Y	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			46%	Scairt	0.14	N	N	N	Y	N	Y	N	Paralithic
59.12	59.20	L2807D	41%	Kremlin	0.03	N	N	N	Y	N	Y	N	Paralithic
			59%	Boxwell	0.05	N	N	N	Y	N	Y	N	Paralithic
59.20	59.35	L2633F	18%	Arikara	0.03	N	N	N	Y	N	Y	N	N
			39%	Cabbart	0.06	N	N	N	Y	N	Y	N	Paralithic
			43%	Boxwell	0.06	N	N	N	Y	N	Y	N	Paralithic
59.35	59.38	L2807C	41%	Kremlin	0.01	State	N	N	N	N	N	N	N
			59%	Boxwell	0.02	State	N	N	N	N	N	N	Paralithic
59.38	59.45	L3107F	33%	Badland	0.02	N	N	N	Y	N	Y	N	Paralithic
			67%	Cabbart	0.05	N	N	N	Y	N	Y	N	Paralithic
59.45	59.58	E0701F	27%	Cabba	0.04	N	N	N	Y	N	Y	N	Paralithic
			30%	Janesburg	0.04	N	N	N	Y	N	Y	N	Paralithic
			43%	Dogtooth	0.06	N	N	N	Y	N	Y	N	Paralithic
59.58	59.65	E2913B	18%	Cabba	0.01	State	N	N	N	N	N	N	Paralithic
			30%	Sen	0.02	State	N	N	N	N	N	N	Paralithic
			52%	Chama	0.03	State	N	N	N	N	N	N	Paralithic
59.65	59.68	E0617B	24%	Daglum	0.01	State	N	N	N	N	N	N	N
			35%	Savage	0.01	State	N	N	N	N	N	N	N
			41%	Belfield	0.02	State	N	N	N	N	N	N	N
59.68	59.76	E2617F	18%	Shambo	0.01	N	N	N	Y	N	Y	N	Paralithic
			33%	Chama	0.02	N	N	N	Y	N	Y	N	Paralithic
			49%	Cabba	0.04	N	N	N	Y	N	Y	N	Paralithic
59.76	59.82	E0447B	25%	Belfield	0.02	N	N	N	N	N	N	N	N
			75%	Daglum	0.05	N	N	N	N	N	N	N	N
59.82	59.88	E2601C	40%	Cabba	0.02	N	N	N	Y	N	N	N	Paralithic
			60%	Amor	0.04	N	N	N	N	N	N	N	Paralithic
59.88	60.10	E2741D	19%	Sen	0.04	N	N	N	Y	N	Y	N	Paralithic
			31%	Chama	0.07	N	N	N	Y	N	Y	N	Paralithic
			50%	Cabba	0.11	N	N	N	Y	N	Y	N	Paralithic
60.10	60.12	E0701F	27%	Cabba	0.01	N	N	N	Y	N	Y	N	Paralithic

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			30%	Janesburg	0.01	N	N	N	Y	N	Y	N	Paralithic
			43%	Dogtooth	0.01	N	N	N	Y	N	Y	N	Paralithic
60.12	60.15	E2741D	19%	Sen	0.01	N	N	N	Y	N	Y	N	Paralithic
			31%	Chama	0.01	N	N	N	Y	N	Y	N	Paralithic
			50%	Cabba	0.02	N	N	N	Y	N	Y	N	Paralithic
60.15	60.16	E0701F	27%	Cabba	0.00	N	N	N	Y	N	Y	N	Paralithic
			30%	Janesburg	0.00	N	N	N	Y	N	Y	N	Paralithic
			43%	Dogtooth	0.00	N	N	N	Y	N	Y	N	Paralithic
60.16	60.37	E2213C	100%	Golva	0.21	State	N	N	N	N	N	N	N
60.37	60.41	L2633F	18%	Arikara	0.01	N	N	N	Y	N	Y	N	N
			39%	Cabbart	0.02	N	N	N	Y	N	Y	N	Paralithic
			43%	Boxwell	0.02	N	N	N	Y	N	Y	N	Paralithic
60.41	60.69	E3609F	13%	Maschetah	0.04	N	N	N	N	N	N	N	N
			16%	Maschetah	0.04	N	N	N	Y	N	Y	N	N
			32%	Cabba	0.09	N	N	N	Y	N	Y	N	Paralithic
			39%	Zahl	0.11	N	N	N	Y	N	Y	N	N
60.69	60.85	E2601C	40%	Cabba	0.06	N	N	N	Y	N	N	N	Paralithic
			60%	Amor	0.10	N	N	N	N	N	N	N	Paralithic
60.85	61.24	E1403D	19%	Telfer	0.07	N	N	N	Y	Y	Y	N	N
			32%	Flasher	0.12	N	N	N	Y	Y	Y	N	Paralithic
			49%	Beisigl	0.19	N	N	N	Y	Y	Y	N	Paralithic
61.24	61.47	E2737C	20%	Sen	0.05	N	N	N	N	N	N	N	Paralithic
			31%	Cabba	0.07	N	N	N	Y	N	N	N	Paralithic
			48%	Chama	0.11	N	N	N	Y	N	N	N	Paralithic
61.47	61.53	E3609F	13%	Maschetah	0.01	N	N	N	N	N	N	N	N
			16%	Maschetah	0.01	N	N	N	Y	N	Y	N	N
			32%	Cabba	0.02	N	N	N	Y	N	Y	N	Paralithic
			39%	Zahl	0.02	N	N	N	Y	N	Y	N	N
61.53	61.60	E2741D	19%	Sen	0.01	N	N	N	Y	N	Y	N	Paralithic
			31%	Chama	0.02	N	N	N	Y	N	Y	N	Paralithic

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			50%	Cabba	0.03	N	N	N	Y	N	Y	N	Paralithic
61.60	61.63	E2120C	100%	Farnuf	0.03	State	N	N	N	N	N	N	N
61.63	61.67	E2741D	19%	Sen	0.01	N	N	N	Y	N	Y	N	Paralithic
			31%	Chama	0.01	N	N	N	Y	N	Y	N	Paralithic
			50%	Cabba	0.02	N	N	N	Y	N	Y	N	Paralithic
61.67	61.86	E3013F	21%	Dogtooth	0.04	N	N	N	Y	N	Y	N	Paralithic
			24%	Cabba	0.05	N	N	N	Y	N	Y	N	Paralithic
			54%	Brandenburg	0.10	N	N	N	Y	N	Y	Y	N
61.86	61.88	E3013D	19%	Dogtooth	0.00	N	N	N	Y	N	Y	N	Paralithic
			33%	Searing	0.01	N	N	N	Y	N	N	Y	N
			48%	Brandenburg	0.01	N	N	N	Y	N	Y	Y	N
Elkhorn Creek-Northern Border													
0.00	0.18	E3541B	35%	Zahl	0.06	N	N	N	N	N	N	N	N
			65%	Williams	0.12	N	N	N	N	N	N	N	N
0.18	0.20	E3639C	25%	Cabba	0.00	N	N	N	Y	N	N	N	Paralithic
			36%	Williams	0.01	N	N	N	N	N	N	N	N
			39%	Zahl	0.01	N	N	N	Y	N	N	N	N
0.20	0.25	E3541B	35%	Zahl	0.02	N	N	N	N	N	N	N	N
			65%	Williams	0.03	N	N	N	N	N	N	N	N
0.25	0.29	E3013D	19%	Dogtooth	0.01	N	N	N	Y	N	Y	N	Paralithic
			33%	Searing	0.02	N	N	N	Y	N	N	Y	N
			48%	Brandenburg	0.02	N	N	N	Y	N	Y	Y	N
0.29	0.30	E3541B	35%	Zahl	0.00	N	N	N	N	N	N	N	N
			65%	Williams	0.00	N	N	N	N	N	N	N	N
Line Section 25 Loop													
0.00	0.47	C210B	44%	Bowbells	0.21	State	N	N	N	N	N	N	N
			56%	Williams	0.26	State	N	N	N	N	N	N	N
0.47	0.51	C132C	18%	Zahill	0.01	N	N	N	Y	N	N	N	N
			24%	Zahl	0.01	N	N	N	Y	N	N	N	N
			59%	Williams	0.02	N	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
0.51	0.69	C210B	44%	Bowbells	0.08	State	N	N	N	N	N	N	N
			56%	Williams	0.10	State	N	N	N	N	N	N	N
0.69	0.93	C165F	27%	Parnell	0.06	N	Y	Y	N	N	N	N	N
			32%	Max	0.08	N	N	N	Y	N	Y	N	N
			41%	Zahl	0.10	N	N	N	Y	N	Y	N	N
0.93	1.10	C148C	26%	Parnell	0.05	N	Y	Y	N	N	N	N	N
			32%	Zahl	0.06	N	N	N	Y	N	N	N	N
			42%	Williams	0.07	N	N	N	N	N	N	N	N
1.10	1.14	C800B	100%	Appam	0.04	N	N	N	N	N	Y	Y	N
1.14	1.21	C877B	34%	Lehr	0.02	N	N	N	N	N	N	Y	N
			66%	Wabek	0.04	N	N	N	N	N	N	Y	N
1.21	1.23	C818B	49%	Williams	0.01	N	N	N	N	N	N	N	N
			51%	Lehr	0.01	N	N	N	N	N	N	Y	N
1.23	1.24	C800B	100%	Appam	0.01	N	N	N	N	N	Y	Y	N
1.24	1.28	C816B	100%	Lehr	0.04	N	N	N	N	N	N	Y	N
1.28	1.33	C800B	100%	Appam	0.05	N	N	N	N	N	Y	Y	N
1.33	1.54	C451A	100%	Arnegard	0.22	Prime	N	N	N	N	N	N	N
1.54	1.62	C135C	17%	Zahill	0.01	N	N	N	Y	N	N	N	N
			35%	Williams	0.03	N	N	N	N	N	N	N	N
			48%	Zahl	0.04	N	N	N	Y	N	N	N	N
1.62	1.67	C210B	44%	Bowbells	0.02	State	N	N	N	N	N	N	N
			56%	Williams	0.02	State	N	N	N	N	N	N	N
1.67	1.70	C135C	17%	Zahill	0.01	N	N	N	Y	N	N	N	N
			35%	Williams	0.01	N	N	N	N	N	N	N	N
			48%	Zahl	0.01	N	N	N	Y	N	N	N	N
1.70	1.76	C210B	44%	Bowbells	0.03	State	N	N	N	N	N	N	N
			56%	Williams	0.03	State	N	N	N	N	N	N	N
1.76	2.04	C135C	17%	Zahill	0.05	N	N	N	Y	N	N	N	N
			35%	Williams	0.10	N	N	N	N	N	N	N	N
			48%	Zahl	0.14	N	N	N	Y	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
2.04	2.09	C132B	27%	Zahl	0.01	State	N	N	N	N	N	N	N
			73%	Williams	0.04	State	N	N	N	N	N	N	N
2.09	2.15	C135C	17%	Zahill	0.01	N	N	N	Y	N	N	N	N
			35%	Williams	0.02	N	N	N	N	N	N	N	N
			48%	Zahl	0.03	N	N	N	Y	N	N	N	N
2.15	2.19	C210B	44%	Bowbells	0.02	State	N	N	N	N	N	N	N
			56%	Williams	0.03	State	N	N	N	N	N	N	N
2.19	2.25	C156F	19%	Bowbells	0.01	N	N	N	N	N	N	N	N
			23%	Max	0.01	N	N	N	Y	N	Y	N	N
			57%	Zahl	0.03	N	N	N	Y	N	Y	N	N
2.25	2.35	C210B	44%	Bowbells	0.04	State	N	N	N	N	N	N	N
			56%	Williams	0.05	State	N	N	N	N	N	N	N
2.35	2.38	C874B	26%	Appam	0.01	N	N	N	N	N	Y	Y	N
			74%	Wabek	0.03	N	N	N	N	N	Y	Y	N
2.38	2.45	C451A	100%	Arnegard	0.07	Prime	N	N	N	N	N	N	N
2.45	2.52	C906E	26%	Werner	0.02	N	N	N	Y	N	Y	N	Paralithic
			29%	Zahl	0.02	N	N	N	Y	N	Y	N	N
			45%	Amor	0.03	N	N	N	Y	N	Y	N	Paralithic
2.52	2.57	C135C	17%	Zahill	0.01	N	N	N	Y	N	N	N	N
			35%	Williams	0.02	N	N	N	N	N	N	N	N
			48%	Zahl	0.02	N	N	N	Y	N	N	N	N
2.57	2.76	C210B	44%	Bowbells	0.08	State	N	N	N	N	N	N	N
			56%	Williams	0.11	State	N	N	N	N	N	N	N
2.76	2.82	C135C	17%	Zahill	0.01	N	N	N	Y	N	N	N	N
			35%	Williams	0.02	N	N	N	N	N	N	N	N
			48%	Zahl	0.03	N	N	N	Y	N	N	N	N
2.82	2.89	C210B	44%	Bowbells	0.03	State	N	N	N	N	N	N	N
			56%	Williams	0.04	State	N	N	N	N	N	N	N
2.89	2.92	C132B	27%	Zahl	0.01	State	N	N	N	N	N	N	N
			73%	Williams	0.02	State	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
2.92	2.98	C135D	42%	Williams	0.02	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.03	N	N	N	Y	N	Y	N	N
2.98	3.09	C210B	44%	Bowbells	0.05	State	N	N	N	N	N	N	N
			56%	Williams	0.06	State	N	N	N	N	N	N	N
3.09	3.17	C135C	17%	Zahill	0.01	N	N	N	Y	N	N	N	N
			35%	Williams	0.03	N	N	N	N	N	N	N	N
			48%	Zahl	0.04	N	N	N	Y	N	N	N	N
3.17	3.73	C210B	44%	Bowbells	0.24	State	N	N	N	N	N	N	N
			56%	Williams	0.31	State	N	N	N	N	N	N	N
3.73	3.88	C148C	26%	Parnell	0.04	N	Y	Y	N	N	N	N	N
			32%	Zahl	0.05	N	N	N	Y	N	N	N	N
			42%	Williams	0.07	N	N	N	N	N	N	N	N
3.88	3.96	C272A	40%	Tonka	0.03	N	Y	Y	N	N	N	N	N
			60%	Hamerly	0.05	N	N	Y	N	N	N	N	N
3.96	4.03	C419A	100%	Wildrose	0.07	Prime	N	N	N	N	N	N	N
4.03	4.10	C210B	44%	Bowbells	0.03	State	N	N	N	N	N	N	N
			56%	Williams	0.04	State	N	N	N	N	N	N	N
4.10	4.28	C135C	17%	Zahill	0.03	N	N	N	Y	N	N	N	N
			35%	Williams	0.06	N	N	N	N	N	N	N	N
			48%	Zahl	0.09	N	N	N	Y	N	N	N	N
4.28	4.50	C132B	27%	Zahl	0.06	State	N	N	N	N	N	N	N
			73%	Williams	0.16	State	N	N	N	N	N	N	N
4.50	4.63	C135C	17%	Zahill	0.02	N	N	N	Y	N	N	N	N
			35%	Williams	0.05	N	N	N	N	N	N	N	N
			48%	Zahl	0.06	N	N	N	Y	N	N	N	N
4.63	4.75	C3A	100%	Parnell	0.12	N	Y	Y	N	N	N	N	N
4.75	4.83	C135D	42%	Williams	0.04	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.05	N	N	N	Y	N	Y	N	N
4.83	4.88	C3A	100%	Parnell	0.04	N	Y	Y	N	N	N	N	N
4.88	4.90	C135C	17%	Zahill	0.00	N	N	N	Y	N	N	N	N

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North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			35%	Williams	0.01	N	N	N	N	N	N	N	N
			48%	Zahl	0.01	N	N	N	Y	N	N	N	N
4.90	5.01	C135D	42%	Williams	0.05	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.06	N	N	N	Y	N	Y	N	N
5.01	5.13	C148C	26%	Parnell	0.03	N	Y	Y	N	N	N	N	N
			32%	Zahl	0.04	N	N	N	Y	N	N	N	N
			42%	Williams	0.05	N	N	N	N	N	N	N	N
5.13	5.19	C132B	27%	Zahl	0.02	State	N	N	N	N	N	N	N
			73%	Williams	0.04	State	N	N	N	N	N	N	N
5.19	5.26	C135D	42%	Williams	0.03	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.04	N	N	N	Y	N	Y	N	N
5.26	5.67	C148C	26%	Parnell	0.11	N	Y	Y	N	N	N	N	N
			32%	Zahl	0.13	N	N	N	Y	N	N	N	N
			42%	Williams	0.17	N	N	N	N	N	N	N	N
5.67	5.77	C135D	42%	Williams	0.04	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.06	N	N	N	Y	N	Y	N	N
5.77	5.94	C132B	27%	Zahl	0.05	State	N	N	N	N	N	N	N
			73%	Williams	0.13	State	N	N	N	N	N	N	N
5.94	6.01	C156F	19%	Bowbells	0.01	N	N	N	N	N	N	N	N
			23%	Max	0.02	N	N	N	Y	N	Y	N	N
			57%	Zahl	0.04	N	N	N	Y	N	Y	N	N
6.01	6.11	C148C	26%	Parnell	0.03	N	Y	Y	N	N	N	N	N
			32%	Zahl	0.03	N	N	N	Y	N	N	N	N
			42%	Williams	0.04	N	N	N	N	N	N	N	N
6.11	6.16	C825A	100%	Divide	0.05	N	N	Y	N	N	N	N	N
6.16	6.31	C148C	26%	Parnell	0.04	N	Y	Y	N	N	N	N	N
			32%	Zahl	0.05	N	N	N	Y	N	N	N	N
			42%	Williams	0.06	N	N	N	N	N	N	N	N
6.31	6.34	C816B	100%	Lehr	0.03	N	N	N	N	N	N	Y	N
6.34	6.38	C148C	26%	Parnell	0.01	N	Y	Y	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			32%	Zahl	0.01	N	N	N	Y	N	N	N	N
			42%	Williams	0.02	N	N	N	N	N	N	N	N
6.38	6.64	C210B	44%	Bowbells	0.11	State	N	N	N	N	N	N	N
			56%	Williams	0.14	State	N	N	N	N	N	N	N
6.64	6.72	C132C	18%	Zahill	0.01	N	N	N	Y	N	N	N	N
			24%	Zahl	0.02	N	N	N	Y	N	N	N	N
			59%	Williams	0.04	N	N	N	N	N	N	N	N
6.72	6.72	C132C	18%	Zahill	0.00	N	N	N	Y	N	N	N	N
			24%	Zahl	0.00	N	N	N	Y	N	N	N	N
			59%	Williams	0.00	N	N	N	N	N	N	N	N
6.72	6.73	C210B	44%	Bowbells	0.00	State	N	N	N	N	N	N	N
			56%	Williams	0.01	State	N	N	N	N	N	N	N
6.73	6.77	C210B	44%	Bowbells	0.02	State	N	N	N	N	N	N	N
			56%	Williams	0.02	State	N	N	N	N	N	N	N
6.77	6.81	C210A	26%	Bowbells	0.01	State	N	N	N	N	N	N	N
			74%	Williams	0.03	State	N	N	N	N	N	N	N
6.81	6.95	C132B	27%	Zahl	0.04	State	N	N	N	N	N	N	N
			73%	Williams	0.10	State	N	N	N	N	N	N	N
6.95	7.01	C210A	26%	Bowbells	0.02	State	N	N	N	N	N	N	N
			74%	Williams	0.05	State	N	N	N	N	N	N	N
7.01	7.47	C132B	27%	Zahl	0.12	State	N	N	N	N	N	N	N
			73%	Williams	0.34	State	N	N	N	N	N	N	N
7.47	7.57	C816B	100%	Lehr	0.10	N	N	N	N	N	N	Y	N
7.57	7.70	C874C	30%	Appam	0.04	N	N	N	Y	N	Y	Y	N
			70%	Wabek	0.09	N	N	N	N	N	Y	Y	N
7.70	7.75	C816B	100%	Lehr	0.05	N	N	N	N	N	N	Y	N
7.75	7.81	C415A	100%	Tansem	0.06	State	N	N	N	N	N	N	N
7.81	7.82	C825A	100%	Divide	0.01	N	N	Y	N	N	N	N	N
7.82	7.87	C415A	100%	Tansem	0.05	State	N	N	N	N	N	N	N
7.87	8.13	C825A	100%	Divide	0.27	N	N	Y	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
8.13	8.25	C132B	27%	Zahl	0.03	State	N	N	N	N	N	N	N
			73%	Williams	0.08	State	N	N	N	N	N	N	N
8.25	8.50	C154C	20%	Bowbells	0.05	N	N	N	N	N	N	N	N
			30%	Williams	0.08	N	N	N	N	N	N	N	N
			50%	Zahl	0.13	N	N	N	Y	N	N	N	N
8.50	8.80	C816B	100%	Lehr	0.30	N	N	N	N	N	N	Y	N
8.80	8.81	C3A	100%	Parnell	0.01	N	Y	Y	N	N	N	N	N
8.81	8.93	C825A	100%	Divide	0.12	N	N	Y	N	N	N	N	N
8.93	9.41	C135C	17%	Zahill	0.08	N	N	N	Y	N	N	N	N
			35%	Williams	0.17	N	N	N	N	N	N	N	N
			48%	Zahl	0.23	N	N	N	Y	N	N	N	N
9.41	9.52	C154C	20%	Bowbells	0.02	N	N	N	N	N	N	N	N
			30%	Williams	0.03	N	N	N	N	N	N	N	N
			50%	Zahl	0.05	N	N	N	Y	N	N	N	N
9.52	9.57	C132B	27%	Zahl	0.01	State	N	N	N	N	N	N	N
			73%	Williams	0.03	State	N	N	N	N	N	N	N
9.57	9.60	C154C	20%	Bowbells	0.01	N	N	N	N	N	N	N	N
			30%	Williams	0.01	N	N	N	N	N	N	N	N
			50%	Zahl	0.01	N	N	N	Y	N	N	N	N
9.60	9.65	C132B	27%	Zahl	0.01	State	N	N	N	N	N	N	N
			73%	Williams	0.04	State	N	N	N	N	N	N	N
9.65	9.74	C154C	20%	Bowbells	0.02	N	N	N	N	N	N	N	N
			30%	Williams	0.03	N	N	N	N	N	N	N	N
			50%	Zahl	0.04	N	N	N	Y	N	N	N	N
9.74	9.94	C135C	17%	Zahill	0.03	N	N	N	Y	N	N	N	N
			35%	Williams	0.07	N	N	N	N	N	N	N	N
			48%	Zahl	0.10	N	N	N	Y	N	N	N	N
9.94	10.16	C135D	42%	Williams	0.10	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.13	N	N	N	Y	N	Y	N	N
10.16	10.17	C132B	27%	Zahl	0.00	State	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			73%	Williams	0.01	State	N	N	N	N	N	N	N
10.17	10.38	C154C	20%	Bowbells	0.04	N	N	N	N	N	N	N	N
			30%	Williams	0.06	N	N	N	N	N	N	N	N
			50%	Zahl	0.10	N	N	N	Y	N	N	N	N
10.38	10.38	C154C	20%	Bowbells	0.00	N	N	N	N	N	N	N	N
			30%	Williams	0.00	N	N	N	N	N	N	N	N
			50%	Zahl	0.00	N	N	N	Y	N	N	N	N
10.38	10.39	C154C	20%	Bowbells	0.00	N	N	N	N	N	N	N	N
			30%	Williams	0.00	N	N	N	N	N	N	N	N
			50%	Zahl	0.01	N	N	N	Y	N	N	N	N
10.39	11.04	C135C	17%	Zahill	0.11	N	N	N	Y	N	N	N	N
			35%	Williams	0.23	N	N	N	N	N	N	N	N
			48%	Zahl	0.31	N	N	N	Y	N	N	N	N
11.04	11.11	C819A	30%	Wabek	0.02	N	N	N	N	N	N	Y	N
			70%	Lehr	0.05	N	N	N	N	N	N	Y	N
11.11	11.78	C135C	17%	Zahill	0.11	N	N	N	Y	N	N	N	N
			35%	Williams	0.24	N	N	N	N	N	N	N	N
			48%	Zahl	0.32	N	N	N	Y	N	N	N	N
11.78	11.81	C132B	27%	Zahl	0.01	State	N	N	N	N	N	N	N
			73%	Williams	0.02	State	N	N	N	N	N	N	N
11.81	11.83	C135D	42%	Williams	0.01	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.01	N	N	N	Y	N	Y	N	N
11.83	12.00	C132B	27%	Zahl	0.04	State	N	N	N	N	N	N	N
			73%	Williams	0.12	State	N	N	N	N	N	N	N
12.00	12.60	C135C	17%	Zahill	0.10	N	N	N	Y	N	N	N	N
			35%	Williams	0.21	N	N	N	N	N	N	N	N
			48%	Zahl	0.29	N	N	N	Y	N	N	N	N
12.60	12.74	C819A	30%	Wabek	0.04	N	N	N	N	N	N	Y	N
			70%	Lehr	0.10	N	N	N	N	N	N	Y	N
12.74	12.82	C135C	17%	Zahill	0.01	N	N	N	Y	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			35%	Williams	0.03	N	N	N	N	N	N	N	N
			48%	Zahl	0.04	N	N	N	Y	N	N	N	N
12.82	12.87	C819A	30%	Wabek	0.01	N	N	N	N	N	N	Y	N
			70%	Lehr	0.03	N	N	N	N	N	N	Y	N
12.87	13.04	C135C	17%	Zahill	0.03	N	N	N	Y	N	N	N	N
			35%	Williams	0.06	N	N	N	N	N	N	N	N
			48%	Zahl	0.08	N	N	N	Y	N	N	N	N
13.04	13.20	C153E	40%	Max	0.07	N	N	N	Y	N	Y	N	N
			60%	Zahl	0.10	N	N	N	Y	N	Y	N	N
13.20	13.24	C580A	32%	Stirum	0.01	N	Y	N	N	N	N	N	N
			33%	Regan	0.01	N	Y	Y	N	N	N	N	N
			35%	Harriet	0.01	N	Y	Y	N	N	N	N	N
13.24	13.33	C153E	40%	Max	0.04	N	N	N	Y	N	Y	N	N
			60%	Zahl	0.05	N	N	N	Y	N	Y	N	N
13.33	13.44	C870E	20%	Appam	0.02	N	N	N	Y	N	Y	Y	N
			22%	Lehr	0.02	N	N	N	Y	N	Y	Y	N
			58%	Wabek	0.06	N	N	N	Y	N	Y	Y	N
13.44	13.57	C580A	32%	Stirum	0.04	N	Y	N	N	N	N	N	N
			33%	Regan	0.04	N	Y	Y	N	N	N	N	N
			35%	Harriet	0.05	N	Y	Y	N	N	N	N	N
13.57	13.61	C870E	20%	Appam	0.01	N	N	N	Y	N	Y	Y	N
			22%	Lehr	0.01	N	N	N	Y	N	Y	Y	N
			58%	Wabek	0.02	N	N	N	Y	N	Y	Y	N
13.61	13.66	C819A	30%	Wabek	0.02	N	N	N	N	N	N	Y	N
			70%	Lehr	0.04	N	N	N	N	N	N	Y	N
13.66	13.70	C870E	20%	Appam	0.01	N	N	N	Y	N	Y	Y	N
			22%	Lehr	0.01	N	N	N	Y	N	Y	Y	N
			58%	Wabek	0.03	N	N	N	Y	N	Y	Y	N
13.70	13.97	C819A	30%	Wabek	0.08	N	N	N	N	N	N	Y	N
			70%	Lehr	0.18	N	N	N	N	N	N	Y	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
13.97	14.11	C874C	30%	Appam	0.04	N	N	N	Y	N	Y	Y	N
			70%	Wabek	0.10	N	N	N	N	N	Y	Y	N
14.11	14.16	C819A	30%	Wabek	0.01	N	N	N	N	N	N	Y	N
			70%	Lehr	0.03	N	N	N	N	N	N	Y	N
14.16	14.16	C874C	30%	Appam	0.00	N	N	N	Y	N	Y	Y	N
			70%	Wabek	0.01	N	N	N	N	N	Y	Y	N
14.16	14.32	C132B	27%	Zahl	0.04	State	N	N	N	N	N	N	N
			73%	Williams	0.12	State	N	N	N	N	N	N	N
14.32	14.57	C135C	17%	Zahill	0.04	N	N	N	Y	N	N	N	N
			35%	Williams	0.09	N	N	N	N	N	N	N	N
			48%	Zahl	0.12	N	N	N	Y	N	N	N	N
14.57	14.74	C132B	27%	Zahl	0.04	State	N	N	N	N	N	N	N
			73%	Williams	0.12	State	N	N	N	N	N	N	N
14.74	14.79	C135C	17%	Zahill	0.01	N	N	N	Y	N	N	N	N
			35%	Williams	0.02	N	N	N	N	N	N	N	N
			48%	Zahl	0.03	N	N	N	Y	N	N	N	N
14.79	14.92	C135D	42%	Williams	0.05	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.07	N	N	N	Y	N	Y	N	N
14.92	14.95	C135C	17%	Zahill	0.01	N	N	N	Y	N	N	N	N
			35%	Williams	0.01	N	N	N	N	N	N	N	N
			48%	Zahl	0.01	N	N	N	Y	N	N	N	N
14.95	15.21	C132B	27%	Zahl	0.07	State	N	N	N	N	N	N	N
			73%	Williams	0.19	State	N	N	N	N	N	N	N
15.21	15.32	C135C	17%	Zahill	0.02	N	N	N	Y	N	N	N	N
			35%	Williams	0.04	N	N	N	N	N	N	N	N
			48%	Zahl	0.05	N	N	N	Y	N	N	N	N
15.32	15.53	C132B	27%	Zahl	0.06	State	N	N	N	N	N	N	N
			73%	Williams	0.15	State	N	N	N	N	N	N	N
15.53	15.63	C135C	17%	Zahill	0.02	N	N	N	Y	N	N	N	N
			35%	Williams	0.04	N	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			48%	Zahl	0.05	N	N	N	Y	N	N	N	N
15.63	15.86	C132B	27%	Zahl	0.06	State	N	N	N	N	N	N	N
			73%	Williams	0.17	State	N	N	N	N	N	N	N
15.86	15.88	C135C	17%	Zahill	0.00	N	N	N	Y	N	N	N	N
			35%	Williams	0.01	N	N	N	N	N	N	N	N
			48%	Zahl	0.01	N	N	N	Y	N	N	N	N
15.88	15.91	C132B	27%	Zahl	0.01	State	N	N	N	N	N	N	N
			73%	Williams	0.03	State	N	N	N	N	N	N	N
15.91	16.00	C272A	40%	Tonka	0.04	N	Y	Y	N	N	N	N	N
			60%	Hamerly	0.05	N	N	Y	N	N	N	N	N
16.00	16.05	C132B	27%	Zahl	0.01	State	N	N	N	N	N	N	N
			73%	Williams	0.03	State	N	N	N	N	N	N	N
16.05	16.14	C3A	100%	Parnell	0.08	N	Y	Y	N	N	N	N	N
16.14	16.27	C132B	27%	Zahl	0.04	State	N	N	N	N	N	N	N
			73%	Williams	0.10	State	N	N	N	N	N	N	N
16.27	16.36	C825A	100%	Divide	0.09	N	N	Y	N	N	N	N	N
16.36	16.49	C132B	27%	Zahl	0.04	State	N	N	N	N	N	N	N
			73%	Williams	0.10	State	N	N	N	N	N	N	N
16.49	16.54	C135C	17%	Zahill	0.01	N	N	N	Y	N	N	N	N
			35%	Williams	0.02	N	N	N	N	N	N	N	N
			48%	Zahl	0.02	N	N	N	Y	N	N	N	N
16.54	16.63	C135D	42%	Williams	0.04	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.05	N	N	N	Y	N	Y	N	N
16.63	17.22	C132B	27%	Zahl	0.16	State	N	N	N	N	N	N	N
			73%	Williams	0.43	State	N	N	N	N	N	N	N
17.22	17.25	C418B	18%	Sakakawea	0.01	State	N	N	N	N	N	N	N
			82%	Tansem	0.03	State	N	N	N	N	N	N	N
17.25	17.26	C272A	40%	Tonka	0.00	N	Y	Y	N	N	N	N	N
			60%	Hamerly	0.00	N	N	Y	N	N	N	N	N
17.26	17.57	C415A	100%	Tansem	0.31	State	N	N	N	N	N	N	N

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North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
17.57	17.65	C418B	18%	Sakakawea	0.02	State	N	N	N	N	N	N	N
			82%	Tansem	0.07	State	N	N	N	N	N	N	N
17.65	17.66	C415A	100%	Tansem	0.01	State	N	N	N	N	N	N	N
17.66	17.72	C418B	18%	Sakakawea	0.01	State	N	N	N	N	N	N	N
			82%	Tansem	0.05	State	N	N	N	N	N	N	N
17.72	17.99	C415A	100%	Tansem	0.28	State	N	N	N	N	N	N	N
17.99	18.04	C410C	25%	Tansem	0.01	State	N	N	N	N	N	N	N
			75%	Sakakawea	0.04	State	N	N	Y	N	N	N	N
18.04	18.12	C819A	30%	Wabek	0.02	N	N	N	N	N	N	Y	N
			70%	Lehr	0.05	N	N	N	N	N	N	Y	N
18.12	18.42	C132B	27%	Zahl	0.08	State	N	N	N	N	N	N	N
			73%	Williams	0.22	State	N	N	N	N	N	N	N
18.42	18.48	C272A	40%	Tonka	0.02	N	Y	Y	N	N	N	N	N
			60%	Hamerly	0.04	N	N	Y	N	N	N	N	N
18.48	18.97	C424A	100%	Nutley	0.49	State	N	N	N	N	N	N	N
18.97	19.46	C415A	100%	Tansem	0.49	State	N	N	N	N	N	N	N
19.46	19.67	C410E	35%	Tansem	0.07	N	N	N	Y	N	Y	N	N
			65%	Sakakawea	0.14	N	N	N	Y	N	Y	N	N
19.67	19.82	C415A	100%	Tansem	0.15	State	N	N	N	N	N	N	N
19.82	19.88	C272A	40%	Tonka	0.02	N	Y	Y	N	N	N	N	N
			60%	Hamerly	0.03	N	N	Y	N	N	N	N	N
19.88	19.94	C874C	30%	Appam	0.02	N	N	N	Y	N	Y	Y	N
			70%	Wabek	0.04	N	N	N	N	N	Y	Y	N
19.94	20.19	C819A	30%	Wabek	0.07	N	N	N	N	N	N	Y	N
			70%	Lehr	0.17	N	N	N	N	N	N	Y	N
20.19	20.22	C424A	100%	Nutley	0.03	State	N	N	N	N	N	N	N
20.22	20.26	C819A	30%	Wabek	0.01	N	N	N	N	N	N	Y	N
			70%	Lehr	0.03	N	N	N	N	N	N	Y	N
20.26	20.35	C424A	100%	Nutley	0.09	State	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
Line Section 30 Loop													
0.00	0.24	C135C	17%	Zahill	0.04	N	N	N	Y	N	N	N	N
			35%	Williams	0.08	N	N	N	N	N	N	N	N
			48%	Zahl	0.12	N	N	N	Y	N	N	N	N
0.24	0.30	C2A	100%	Tonka	0.06	N	Y	Y	N	N	N	N	N
0.30	0.46	C135C	17%	Zahill	0.03	N	N	N	Y	N	N	N	N
			35%	Williams	0.06	N	N	N	N	N	N	N	N
			48%	Zahl	0.08	N	N	N	Y	N	N	N	N
0.46	0.52	C135D	42%	Williams	0.02	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.03	N	N	N	Y	N	Y	N	N
0.52	0.56	C135C	17%	Zahill	0.01	N	N	N	Y	N	N	N	N
			35%	Williams	0.02	N	N	N	N	N	N	N	N
			48%	Zahl	0.02	N	N	N	Y	N	N	N	N
0.56	0.59	C135D	42%	Williams	0.01	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.02	N	N	N	Y	N	Y	N	N
0.59	0.67	C210B	44%	Bowbells	0.03	State	N	N	N	N	N	N	N
			56%	Williams	0.04	State	N	N	N	N	N	N	N
0.67	0.70	C135C	17%	Zahill	0.01	N	N	N	Y	N	N	N	N
			35%	Williams	0.01	N	N	N	N	N	N	N	N
			48%	Zahl	0.02	N	N	N	Y	N	N	N	N
0.70	0.92	C419A	100%	Wildrose	0.21	Prime	N	N	N	N	N	N	N
0.92	1.06	C418B	18%	Sakakawea	0.03	State	N	N	N	N	N	N	N
			82%	Tansem	0.12	State	N	N	N	N	N	N	N
1.06	1.17	C135C	17%	Zahill	0.02	N	N	N	Y	N	N	N	N
			35%	Williams	0.04	N	N	N	N	N	N	N	N
			48%	Zahl	0.05	N	N	N	Y	N	N	N	N
1.17	1.30	C210B	44%	Bowbells	0.06	State	N	N	N	N	N	N	N
			56%	Williams	0.08	State	N	N	N	N	N	N	N
1.30	1.41	C135C	17%	Zahill	0.02	N	N	N	Y	N	N	N	N
			35%	Williams	0.04	N	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			48%	Zahl	0.05	N	N	N	Y	N	N	N	N
1.41	1.46	C148C	26%	Parnell	0.01	N	Y	Y	N	N	N	N	N
			32%	Zahl	0.02	N	N	N	Y	N	N	N	N
			42%	Williams	0.02	N	N	N	N	N	N	N	N
1.46	1.61	C132B	27%	Zahl	0.04	State	N	N	N	N	N	N	N
			73%	Williams	0.11	State	N	N	N	N	N	N	N
1.61	1.70	C418B	18%	Sakakawea	0.02	State	N	N	N	N	N	N	N
			82%	Tansem	0.07	State	N	N	N	N	N	N	N
1.70	1.75	C135D	42%	Williams	0.02	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.03	N	N	N	Y	N	Y	N	N
1.75	1.87	C132B	27%	Zahl	0.03	State	N	N	N	N	N	N	N
			73%	Williams	0.09	State	N	N	N	N	N	N	N
1.87	1.93	C135C	17%	Zahill	0.01	N	N	N	Y	N	N	N	N
			35%	Williams	0.02	N	N	N	N	N	N	N	N
			48%	Zahl	0.02	N	N	N	Y	N	N	N	N
1.93	2.05	C148C	26%	Parnell	0.03	N	Y	Y	N	N	N	N	N
			32%	Zahl	0.04	N	N	N	Y	N	N	N	N
			42%	Williams	0.05	N	N	N	N	N	N	N	N
2.05	2.10	C135C	17%	Zahill	0.01	N	N	N	Y	N	N	N	N
			35%	Williams	0.02	N	N	N	N	N	N	N	N
			48%	Zahl	0.03	N	N	N	Y	N	N	N	N
2.10	2.26	C135D	42%	Williams	0.07	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.09	N	N	N	Y	N	Y	N	N
2.26	2.29	C148C	26%	Parnell	0.01	N	Y	Y	N	N	N	N	N
			32%	Zahl	0.01	N	N	N	Y	N	N	N	N
			42%	Williams	0.01	N	N	N	N	N	N	N	N
2.29	2.32	C135D	42%	Williams	0.01	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.02	N	N	N	Y	N	Y	N	N
2.32	2.37	C148C	26%	Parnell	0.01	N	Y	Y	N	N	N	N	N
			32%	Zahl	0.02	N	N	N	Y	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			42%	Williams	0.02	N	N	N	N	N	N	N	N
2.37	2.47	C135C	17%	Zahill	0.02	N	N	N	Y	N	N	N	N
			35%	Williams	0.03	N	N	N	N	N	N	N	N
			48%	Zahl	0.04	N	N	N	Y	N	N	N	N
2.47	2.80	C210B	44%	Bowbells	0.15	State	N	N	N	N	N	N	N
			56%	Williams	0.19	State	N	N	N	N	N	N	N
2.80	2.84	C135C	17%	Zahill	0.01	N	N	N	Y	N	N	N	N
			35%	Williams	0.02	N	N	N	N	N	N	N	N
			48%	Zahl	0.02	N	N	N	Y	N	N	N	N
2.84	2.95	C210B	44%	Bowbells	0.05	State	N	N	N	N	N	N	N
			56%	Williams	0.06	State	N	N	N	N	N	N	N
2.95	2.99	C132C	18%	Zahill	0.01	N	N	N	Y	N	N	N	N
			24%	Zahl	0.01	N	N	N	Y	N	N	N	N
			59%	Williams	0.03	N	N	N	N	N	N	N	N
2.99	3.07	C818B	49%	Williams	0.04	N	N	N	N	N	N	N	N
			51%	Lehr	0.04	N	N	N	N	N	N	Y	N
3.07	3.17	C210B	44%	Bowbells	0.05	State	N	N	N	N	N	N	N
			56%	Williams	0.06	State	N	N	N	N	N	N	N
3.17	3.26	C210A	26%	Bowbells	0.02	State	N	N	N	N	N	N	N
			74%	Williams	0.07	State	N	N	N	N	N	N	N
3.26	3.39	C816B	100%	Lehr	0.14	N	N	N	N	N	N	Y	N
3.39	3.42	C2A	100%	Tonka	0.02	N	Y	Y	N	N	N	N	N
3.42	3.84	C210B	44%	Bowbells	0.19	State	N	N	N	N	N	N	N
			56%	Williams	0.24	State	N	N	N	N	N	N	N
3.84	3.93	C132B	27%	Zahl	0.02	State	N	N	N	N	N	N	N
			73%	Williams	0.07	State	N	N	N	N	N	N	N
3.93	4.01	C3A	100%	Parnell	0.08	N	Y	Y	N	N	N	N	N
4.01	4.18	C210B	44%	Bowbells	0.07	State	N	N	N	N	N	N	N
			56%	Williams	0.09	State	N	N	N	N	N	N	N
4.18	4.20	C132C	18%	Zahill	0.00	N	N	N	Y	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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%	Zahl	0.01	N	N	N	Y	N	N	N	N
			59%	Williams	0.01	N	N	N	N	N	N	N	N
4.20	4.25	C210B	44%	Bowbells	0.02	State	N	N	N	N	N	N	N
			56%	Williams	0.03	State	N	N	N	N	N	N	N
4.25	4.27	C132C	18%	Zahill	0.01	N	N	N	Y	N	N	N	N
			24%	Zahl	0.01	N	N	N	Y	N	N	N	N
			59%	Williams	0.02	N	N	N	N	N	N	N	N
4.27	4.56	C210B	44%	Bowbells	0.13	State	N	N	N	N	N	N	N
			56%	Williams	0.16	State	N	N	N	N	N	N	N
4.56	5.22	C210A	26%	Bowbells	0.17	State	N	N	N	N	N	N	N
			74%	Williams	0.49	State	N	N	N	N	N	N	N
5.22	5.42	C210B	44%	Bowbells	0.08	State	N	N	N	N	N	N	N
			56%	Williams	0.11	State	N	N	N	N	N	N	N
5.42	5.58	C800B	100%	Appam	0.17	N	N	N	N	N	Y	Y	N
5.58	5.67	C155F	21%	Arnegard	0.02	N	N	N	Y	N	Y	N	N
			34%	Max	0.03	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.04	N	N	N	Y	N	Y	N	N
5.67	5.76	C800B	100%	Appam	0.08	N	N	N	N	N	Y	Y	N
5.76	5.94	C155F	21%	Arnegard	0.04	N	N	N	Y	N	Y	N	N
			34%	Max	0.06	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.08	N	N	N	Y	N	Y	N	N
5.94	6.30	C210B	44%	Bowbells	0.16	State	N	N	N	N	N	N	N
			56%	Williams	0.20	State	N	N	N	N	N	N	N
6.30	6.37	C155F	21%	Arnegard	0.02	N	N	N	Y	N	Y	N	N
			34%	Max	0.03	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.03	N	N	N	Y	N	Y	N	N
6.37	6.45	C210B	44%	Bowbells	0.03	State	N	N	N	N	N	N	N
			56%	Williams	0.04	State	N	N	N	N	N	N	N
6.45	6.53	C155F	21%	Arnegard	0.02	N	N	N	Y	N	Y	N	N
			34%	Max	0.03	N	N	N	Y	N	Y	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			45%	Zahl	0.04	N	N	N	Y	N	Y	N	N
6.53	6.96	C210B	44%	Bowbells	0.19	State	N	N	N	N	N	N	N
			56%	Williams	0.24	State	N	N	N	N	N	N	N
6.96	7.08	C800B	100%	Appam	0.11	N	N	N	N	N	Y	Y	N
7.08	7.12	C155F	21%	Arnegard	0.01	N	N	N	Y	N	Y	N	N
			34%	Max	0.01	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.02	N	N	N	Y	N	Y	N	N
7.12	7.20	C451A	100%	Arnegard	0.08	Prime	N	N	N	N	N	N	N
7.20	7.28	C155F	21%	Arnegard	0.02	N	N	N	Y	N	Y	N	N
			34%	Max	0.03	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.04	N	N	N	Y	N	Y	N	N
7.28	7.29	C210B	44%	Bowbells	0.00	State	N	N	N	N	N	N	N
			56%	Williams	0.00	State	N	N	N	N	N	N	N
7.29	7.42	C210A	26%	Bowbells	0.03	State	N	N	N	N	N	N	N
			74%	Williams	0.10	State	N	N	N	N	N	N	N
7.42	7.49	C210B	44%	Bowbells	0.03	State	N	N	N	N	N	N	N
			56%	Williams	0.04	State	N	N	N	N	N	N	N
7.49	7.63	C210A	26%	Bowbells	0.04	State	N	N	N	N	N	N	N
			74%	Williams	0.10	State	N	N	N	N	N	N	N
7.63	8.57	C210B	44%	Bowbells	0.41	State	N	N	N	N	N	N	N
			56%	Williams	0.53	State	N	N	N	N	N	N	N
8.57	8.60	C155F	21%	Arnegard	0.01	N	N	N	Y	N	Y	N	N
			34%	Max	0.01	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.01	N	N	N	Y	N	Y	N	N
8.60	8.77	C135D	42%	Williams	0.07	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.10	N	N	N	Y	N	Y	N	N
8.77	8.81	C155F	21%	Arnegard	0.01	N	N	N	Y	N	Y	N	N
			34%	Max	0.01	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.02	N	N	N	Y	N	Y	N	N
8.81	8.87	C210A	26%	Bowbells	0.02	State	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			74%	Williams	0.04	State	N	N	N	N	N	N	N
8.87	8.94	C155F	21%	Arnegard	0.01	N	N	N	Y	N	Y	N	N
			34%	Max	0.02	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.03	N	N	N	Y	N	Y	N	N
8.94	9.07	C210A	26%	Bowbells	0.04	State	N	N	N	N	N	N	N
			74%	Williams	0.10	State	N	N	N	N	N	N	N
9.07	9.10	C155F	21%	Arnegard	0.00	N	N	N	Y	N	Y	N	N
			34%	Max	0.01	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.01	N	N	N	Y	N	Y	N	N
9.10	9.15	C210A	26%	Bowbells	0.01	State	N	N	N	N	N	N	N
			74%	Williams	0.04	State	N	N	N	N	N	N	N
9.15	9.20	C155F	21%	Arnegard	0.01	N	N	N	Y	N	Y	N	N
			34%	Max	0.02	N	N	N	Y	N	Y	N	N
			45%	Zahl	0.02	N	N	N	Y	N	Y	N	N
9.20	9.45	C210B	44%	Bowbells	0.11	State	N	N	N	N	N	N	N
			56%	Williams	0.14	State	N	N	N	N	N	N	N
Tioga Compressor Lateral													
0.00	0.28	C210B	44%	Bowbells	0.12	State	N	N	N	N	N	N	N
			56%	Williams	0.16	State	N	N	N	N	N	N	N
0.28	0.41	C132C	18%	Zahill	0.02	N	N	N	Y	N	N	N	N
			24%	Zahl	0.03	N	N	N	Y	N	N	N	N
			59%	Williams	0.08	N	N	N	N	N	N	N	N
0.41	0.47	C210B	44%	Bowbells	0.03	State	N	N	N	N	N	N	N
			56%	Williams	0.03	State	N	N	N	N	N	N	N
86th Street NW Bore													
0.00	0.06	C424A	100%	Nutley	0.06	State	N	N	N	N	N	N	N
0.06	0.06	C819A	30%	Wabek	0.00	N	N	N	N	N	N	Y	N
			70%	Lehr	0.00	N	N	N	N	N	N	Y	N
0.06	0.19	C75A	100%	Vallers	0.13	N	Y	Y	N	N	N	N	N
0.19	0.22	C210A	26%	Bowbells	0.01	State	N	N	N	N	N	N	N

APPENDIX 7A (cont'd)

North Bakken Expansion Project
Characteristics of the Soil Map Units at the Proposed Project Facilities

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]			
			74%	Williams	0.03	State	N	N	N	N	N	N	N
92nd Avene Bore													
0.00	0.08	C135D	42%	Williams	0.03	N	N	N	Y	N	Y	N	N
			58%	Zahl	0.05	N	N	N	Y	N	Y	N	N
93rd Street NW/89th Avenue NW Bore													
0.00	0.06	C165F	27%	Parnell	0.02	N	Y	Y	N	N	N	N	N
			32%	Max	0.02	N	N	N	Y	N	Y	N	N
			41%	Zahl	0.02	N	N	N	Y	N	Y	N	N
Highway 40 Bore													
0.00	0.10	C165F	27%	Parnell	0.03	N	Y	Y	N	N	N	N	N
			32%	Max	0.03	N	N	N	Y	N	Y	N	N
			41%	Zahl	0.04	N	N	N	Y	N	Y	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 statewiode 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

NORTH BAKKEN EXPANSION PROJECT

Resource Report 7

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

APPENDIX 7B

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope Low	Percent Slope High	Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
Tioga-Elkhorn Creek											
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Williams	73	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
		Zahl	27	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Williams	59	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
		Zahill	18	6	9	CL	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustepts	fine-loamy till	ground moraines, till plains
		Zahl	24	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains
C135C	Zahl-Williams-Zahill complex, 6 to 9 percent slopes	Williams	35	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
		Zahill	17	6	9	CL	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustepts	fine-loamy till	ground moraines, till plains
		Zahl	48	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Williams	42	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	hills, ridges, till plains
		Zahl	58	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	hills, ridges, till plains
C155F	Zahl-Max-Arnegard loams, 15 to 60 percent slopes	Arnegard	21	15	25	L	W	M	Fine-loamy, mixed, superactive, frigid Pachic Haplustolls	fine-loamy till	swales, till plains
		Max	34	25	60	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	fine-loamy till	hills, ridges, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope Low	Percent Slope High	Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
		Zahl	45	25	60	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ridges, till plains
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Bowbells	26	0	3	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	flats, till plains
		Williams	74	0	3	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Bowbells	44	3	6	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	rises, till plains
		Williams	56	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
C2A	Tonka silt loam, 0 to 1 percent slopes	Tonka	100	0	1	SIL	P	M	Fine, smectitic, frigid Argiaquic Argialbolls	local alluvium over till	depressions, till plains
C415A	Tansem loam, 0 to 2 percent slopes	Tansem	100	0	2	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	loamy glaciolacustrine deposits	flats, glacial lakes (relict), till plains
C419A	Wildrose silty clay, 0 to 2 percent slopes	Wildrose	100	0	2	SIC	W	VS	Fine, smectitic, frigid Typic Haplusterts	clayey glaciolacustrine deposits	flats, glacial lakes (relict), till plains
C451A	Arnegard loam, 0 to 2 percent slopes	Arnegard	100	0	2	L	W	M	Fine-loamy, mixed, superactive, frigid Pachic Haplustolls	fine-loamy till	swales, till plains
C580A	Harriet-Regan-Stirum complex, 0 to 2 percent slopes, occasionally flooded	Harriet	35	0	2	L	P	MS	Fine, smectitic, frigid Typic Natraquolls	local alluvium	drainageways, till plains
		Regan	33	0	2	SICL	VP	M	Fine-silty, mixed, superactive, frigid Typic Calciaquolls	local alluvium	drainageways, till plains
		Stirum	32	0	2	FSL	P	MR	Coarse-loamy, mixed, superactive, frigid Typic Natraquolls	eolian deposits	outwash plains, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
C800B	Appam sandy loam, 2 to 6 percent slopes	Appam	100	2	6	SL	SE	MR	Sandy, mixed, frigid Typic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, rises
C816B	Lehr loam, 2 to 6 percent slopes	Lehr	100	2	6	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	loamy alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, rises
C818B	Lehr-Williams loams, 0 to 6 percent slopes	Lehr	51	2	6	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, till plains
		Williams	49	0	3	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Appam	20	9	15	SL	SE	MR	Sandy, mixed, frigid Typic Haplustolls	sandy and gravelly glaciofluvial deposits	hills, outwash plains
		Lehr	22	9	25	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	loamy alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, ridges
		Wabek	58	9	25	L	E	M	Sandy-skeletal, mixed, frigid Entic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, ridges
C908F	Werner-Amor-Zahl loams, 25 to 60 percent slopes	Amor	33	25	50	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	loamy residuum weathered from mudstone	hills, ridges, uplands
		Werner	49	25	50	L	W	M	Loamy, mixed, superactive, frigid, shallow Entic Haplustolls	fine-loamy residuum weathered from sandstone	ridges, uplands

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Zahl	18	25	60	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ridges, till plains
C999F	Orthents-Aquents-Urban land, highway complex, 0 to 35 percent slopes	Aquents	20	0	3	L	SP	M	Fine-loamy, mixed (calcareous), frigid Aeric Endoaquents	fine-loamy till	swales, till plains
		Orthents	19	0	6	L	W	M	Orthents	fine-loamy till	cuts (road, railroad, etc.), scalped areas, till plains
			43	6	35	L	W	M	Orthents	fine-loamy till	cuts (road, railroad, etc.), scalped areas, till plains
		Urban land	19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	road beds
E0447B	Daglum-Belfield complex, 0 to 6 percent slopes	Belfield	25	0	6	SIL	MW	M	Fine, smectitic, frigid Glossic Natrustolls	clayey alluvium derived from sedimentary rock	flats, uplands
		Daglum	75	0	6	CL	MW	M	Fine, smectitic, frigid Vertic Natrustolls	clayey alluvium	alluvial fans, uplands
E0515B	Rhoades-Daglum complex, 0 to 6 percent slopes	Daglum	38	0	6	SIL	MW	M	Fine, smectitic, frigid Vertic Natrustolls	alluvium derived from shale and siltstone	hillslopes, plains
		Rhoades	63	0	6	L	MW	M	Fine, smectitic, frigid Leptic Vertic Natrustolls	alluvium derived from shale and siltstone	hillslopes, plains
E0559B	Dogtooth-Janesburg silt loams, 0 to 6 percent slopes	Dogtooth	64	0	6	SIL	W	M	Fine, smectitic, frigid Leptic Natrustolls	clayey residuum weathered from shale	pediments, uplands
		Janesburg	36	0	6	SIL	W	MS	Fine, smectitic, frigid Typic Natrustolls	clayey residuum weathered from shale	pediments, uplands
E0563B	Janesburg-Dogtooth silt loams, 0 to 6 percent slopes	Dogtooth	42	0	6	SIL	W	M	Fine, smectitic, frigid Leptic Natrustolls	clayey residuum weathered from shale	pediments, uplands

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Janesburg	58	0	6	SIL	W	MS	Fine, smectitic, frigid Typic Natrustolls	clayey residuum weathered from shale	pediments, uplands
E0605A	Belfield-Grail clay loams, 0 to 2 percent slopes	Belfield	67	0	2	CL	MW	MS	Fine, smectitic, frigid Glossic Natrustolls	slope alluvium derived from shale and siltstone	drainageways, plains
		Grail	33	0	2	CL	MW	MS	Fine, smectitic, frigid Pachic Vertic Argiustolls	slope alluvium derived from shale and siltstone	drainageways, plains
E0617B	Belfield-Savage-Daglum complex, 2 to 6 percent slopes	Belfield	41	2	6	SIL	MW	M	Fine, smectitic, frigid Glossic Natrustolls	slope alluvium derived from shale and siltstone	hillslopes, plains
		Daglum	24	2	6	CL	MW	MS	Fine, smectitic, frigid Vertic Natrustolls	slope alluvium derived from shale and siltstone	hillslopes, plains
		Savage	35	2	6	CL	W	MS	Fine, smectitic, frigid Vertic Argiustolls	slope alluvium derived from shale and siltstone	hillslopes, plains
E0701F	Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes	Cabba	27	9	35	L	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	residuum weathered from mudstone	hillslopes, plains
		Dogtooth	43	6	25	L	W	M	Fine, smectitic, frigid Leptic Natrustolls	residuum weathered from shale and siltstone	hillslopes, plains
		Janesburg	30	6	25	SICL	W	MS	Fine, smectitic, frigid Typic Natrustolls	residuum weathered from shale and siltstone	hillslopes, plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
E0821A	Lawther silty clay, 0 to 2 percent slopes	Lawther	100	0	2	SIC	W	S	Fine, smectitic, frigid Typic Haplusterts	clayey alluvium derived from sedimentary rock	alluvial flats, uplands
E0835A	Savage-Grail silty clay loams, 0 to 2 percent slopes	Grail	23	0	2	SICL	MW	MS	Fine, smectitic, frigid Pachic Vertic Argiustolls	clayey alluvium derived from sedimentary rock	swales, uplands
		Savage	78	0	2	SICL	W	MS	Fine, smectitic, frigid Vertic Argiustolls	clayey alluvium derived from sedimentary rock	alluvial flats, uplands
E0913C	Moreau-Wayden silty clays, 6 to 9 percent slopes	Moreau	76	6	9	SIC	W	S	Fine, smectitic, frigid Vertic Haplustolls	clayey residuum weathered from calcareous shale	ridges, uplands
		Wayden	24	6	9	SIC	W	S	Clayey, smectitic, calcareous, frigid, shallow Typic Ustorthents	clayey residuum weathered from shale	pediments, rises, uplands
E1009B	Moreau-Barkof silty clays, 3 to 6 percent slopes	Barkof	23	3	6	SIC	W	VS	Fine, smectitic, frigid Leptic Haplusterts	clayey residuum weathered from shale	pediments, uplands
		Moreau	77	3	6	SIC	W	S	Fine, smectitic, frigid Vertic Haplustolls	clayey residuum weathered from calcareous shale	pediments, uplands
E1333B	Vebar-Cohagen fine sandy loams, 3 to 6 percent slopes	Cohagen	26	3	6	FSL	W	MR	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	coarse-loamy residuum weathered from sandstone	rises, uplands
		Vebar	74	3	6	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Typic Haplustolls	coarse-loamy residuum weathered from calcareous sandstone	pediments, uplands
E1333C	Vebar-Cohagen fine sandy loams, 6 to 9 percent slopes	Cohagen	33	6	9	FSL	W	MR	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	residuum weathered from sandstone	hillslopes, plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Vebar	67	6	9	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Typic Haplustolls	residuum weathered from sandstone	hillslopes, plains
E1355D	Vebar-Flasher-Tally complex, 9 to 15 percent slopes	Flasher	34	9	15	LFS	SE	R	Mixed, frigid, shallow Typic Ustipsamments	residuum weathered from sandstone	hillslopes, plains
		Tally	20	9	15	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Typic Haplustolls	slope alluvium derived from sandstone	hillslopes, plains
		Vebar	45	9	15	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Typic Haplustolls	residuum weathered from sandstone	hillslopes, plains
E1403D	Beisigl-Flasher-Telfer loamy fine sands, 6 to 15 percent slopes	Beisigl	49	6	15	LFS	SE	R	Mixed, frigid Typic Ustipsamments	sandy residuum weathered from sandstone	hills, uplands
		Flasher	32	6	15	LFS	SE	R	Mixed, frigid, shallow Typic Ustipsamments	sandy residuum weathered from sandstone	hills, uplands
		Telfer	19	6	9	LFS	SE	R	Sandy, mixed, frigid Entic Haplustolls	sandy alluvium derived from sedimentary rock	hills, uplands
E1423F	Flasher-Vebar-Parshall complex, 9 to 35 percent slopes	Flasher	49	9	35	LFS	SE	R	Mixed, frigid, shallow Typic Ustipsamments	residuum weathered from sandstone	hillslopes, plains
		Parshall	21	9	15	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Pachic Haplustolls	slope alluvium derived from sandstone	hillslopes, plains
		Vebar	30	9	25	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Typic Haplustolls	residuum weathered from sandstone	hillslopes, plains
E1603D	Beisigl-Telfer loamy fine sands, 6 to 15 percent slopes	Beisigl	57	6	15	LFS	SE	R	Mixed, frigid Typic Ustipsamments	sandy residuum weathered from sandstone	hills, uplands
		Telfer	43	6	15	LFS	SE	R	Sandy, mixed, frigid Entic Haplustolls	sandy alluvium derived from sedimentary rock	hills, uplands

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
E1805B	Lihen-Parshall complex, 0 to 6 percent slopes	Lihen	75	0	6	LFS	SE	R	Sandy, mixed, frigid Entic Haplustolls	sandy alluvium derived from sedimentary rock	alluvial fans, uplands
		Parshall	25	0	6	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Pachic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	swales, uplands
E1865B	Tally-Parshall fine sandy loams, 2 to 6 percent slopes	Parshall	32	2	6	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Pachic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	alluvial fans, uplands
		Tally	68	2	6	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Typic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	alluvial fans, uplands
E1865C	Tally-Parshall fine sandy loams, 6 to 9 percent slopes	Parshall	25	6	9	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Pachic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	hills, uplands
		Tally	75	6	9	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Typic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	hills, uplands
E2107A	Arnegard loam, 0 to 2 percent slopes	Arnegard	100	0	2	L	W	M	Fine-loamy, mixed, superactive, frigid Pachic Haplustolls	alluvium derived from mudstone	plains, swales
E2120A	Farnuf loam, 0 to 2 percent slopes	Farnuf	100	0	2	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy alluvium derived from sedimentary rock	alluvial flats, uplands
E2120B	Farnuf loam, 2 to 6 percent slopes	Farnuf	100	2	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy alluvium derived from sedimentary rock	alluvial fans, uplands
E2120C	Farnuf loam, 6 to 9 percent slopes	Farnuf	100	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy alluvium derived from sedimentary rock	alluvial fans, uplands

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
E2145A	Shambo loam, 0 to 2 percent slopes	Shambo	100	0	2	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	alluvium derived from mudstone	hillslopes, plains
E2203B	Farland silt loam, 2 to 6 percent slopes	Farland	100	2	6	SIL	W	M	Fine-silty, mixed, superactive, frigid Typic Argiustolls	fine-silty alluvium	alluvial fans, uplands
E2213C	Golva silt loam, 6 to 9 percent slopes	Golva	100	6	9	SIL	W	M	Fine-silty, mixed, superactive, frigid Typic Haplustolls	fine-silty alluvium derived from siltstone	hills, uplands
E2601C	Amor-Cabba loams, 6 to 9 percent slopes	Amor	60	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	residuum weathered from sedimentary rock	hillslopes, plains
		Cabba	40	6	9	L	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	residuum weathered from sedimentary rock	hillslopes, plains
E2601D	Amor-Cabba loams, 9 to 15 percent slopes	Amor	61	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	residuum weathered from sedimentary rock	hillslopes, plains
		Cabba	39	9	15	L	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	residuum weathered from sedimentary rock	hillslopes, plains
E2617F	Cabba-Chama-Shambo loams, 9 to 50 percent slopes	Cabba	49	15	50	L	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	residuum weathered from sedimentary rock	hillslopes, plains
		Chama	33	9	35	L	W	M	Fine-silty, mixed, superactive, frigid Typic Calciustolls	residuum weathered from sedimentary rock	hillslopes, plains
		Shambo	18	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	alluvium derived from sedimentary rock	hillslopes, plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
E2641C	Reeder-Werner loams, 6 to 9 percent slopes	Reeder	76	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy residuum weathered from mudstone	ridges, uplands
		Werner	24	6	9	L	W	M	Loamy, mixed, superactive, frigid, shallow Entic Haplustolls	fine-loamy residuum weathered from sandstone	knolls, uplands
E2737C	Chama-Cabba-Sen silt loams, 6 to 9 percent slopes	Cabba	31	6	9	SIL	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	fine-silty residuum weathered from sedimentary rock	ridges, uplands
		Chama	48	6	9	SIL	W	M	Fine-silty, mixed, superactive, frigid Typic Calciustolls	fine-silty residuum weathered from siltstone	hills, uplands
		Sen	20	6	9	SIL	W	M	Fine-silty, mixed, superactive, frigid Typic Haplustolls	fine-silty residuum weathered from siltstone	ridges, uplands
E2741D	Cabba-Chama-Sen silt loams, 9 to 15 percent slopes	Cabba	50	9	15	SIL	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	fine-silty residuum weathered from sedimentary rock	ridges, uplands
		Chama	31	9	15	SIL	W	M	Fine-silty, mixed, superactive, frigid Typic Calciustolls	fine-silty residuum weathered from siltstone	hills, uplands
		Sen	19	9	15	SIL	W	M	Fine-silty, mixed, superactive, frigid Typic Haplustolls	fine-silty residuum weathered from siltstone	hills, uplands
E2913B	Chama-Sen-Cabba silt loams, 3 to 6 percent slopes	Cabba	18	3	6	SIL	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	fine-silty residuum weathered from sedimentary rock	rises, uplands

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Chama	52	3	6	SIL	W	M	Fine-silty, mixed, superactive, frigid Typic Calciustolls	fine-silty residuum weathered from siltstone	pediments, uplands
		Sen	30	3	6	SIL	W	M	Fine-silty, mixed, superactive, frigid Typic Haplustolls	fine-silty residuum weathered from siltstone	pediments, uplands
E3013D	Brandenburg-Searing-Dogtooth complex, 6 to 15 percent slopes	Brandenburg	48	6	15	CN-L	E	M	Fragmental, mixed, frigid Typic Ustorthents	loamy residuum weathered from porcellanite	knobs, uplands
		Dogtooth	19	6	15	SIL	W	M	Fine, smectitic, frigid Leptic Natrustolls	clayey residuum weathered from shale	hills, uplands
		Searing	33	6	9	L	W	M	Fine-loamy over fragmental, mixed, superactive, frigid Typic Haplustolls	fine-loamy residuum weathered from porcellanite	hills, uplands
E3013F	Brandenburg-Cabba-Dogtooth complex, 15 to 70 percent slopes	Brandenburg	54	15	70	CN-L	E	M	Fragmental, mixed, frigid Typic Ustorthents	loamy residuum weathered from porcellanite	ridges, uplands
		Cabba	24	15	70	L	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	fine-loamy residuum weathered from sedimentary rock	ridges, uplands
		Dogtooth	21	15	25	SIL	W	M	Fine, smectitic, frigid Leptic Natrustolls	clayey residuum weathered from shale	ridges, uplands
E3107F	Cabba-Badland complex, 6 to 70 percent slopes	Badland	44	9	150	SIL	N/A	M	N/A	sedimentary rock	ridges, uplands
		Cabba	56	6	70	L	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	fine-loamy residuum weathered from sedimentary rock	ridges, uplands

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
E3161F	Cherry-Cabba silt loams, 9 to 45 percent slopes	Cabba	41	9	45	SIL	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	fine-silty residuum weathered from sedimentary rock	ridges, uplands
		Cherry	24	9	15	SIL	W	M	Fine-silty, mixed, superactive, frigid Typic Haplustepts	fine-silty alluvium	alluvial fans, uplands
			35	15	25	SIL	W	M	Fine-silty, mixed, superactive, frigid Typic Haplustepts	fine-silty alluvium	alluvial fans, uplands
E3197F	Badland, 9 to 150 percent slopes	Badland	100	9	150	SIL	N/A	M	N/A	sedimentary rock	ridges, uplands
E3203B	Cherry silt loam, 0 to 6 percent slopes	Cherry	100	0	6	SIL	W	M	Fine-silty, mixed, superactive, frigid Typic Haplustepts	fine-silty alluvium	alluvial fans, uplands
E3203C	Cherry silt loam, 6 to 9 percent slopes	Cherry	100	6	9	SIL	W	M	Fine-silty, mixed, superactive, frigid Typic Haplustepts	fine-silty alluvium	alluvial fans, uplands
E3513A	Niobell-Williams loams, 0 to 3 percent slopes	Niobell	63	0	3	L	MW	M	Fine, smectitic, frigid Glossic Natrustolls	fine-loamy till	flats, till plains
		Williams	37	0	3	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
E3513B	Niobell-Williams loams, 3 to 6 percent slopes	Niobell	54	3	6	L	MW	M	Fine, smectitic, frigid Glossic Natrustolls	fine-loamy till	rises, till plains
		Williams	46	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
E3527B	Williams-Bowbells loams, 3 to 6 percent slopes	Bowbells	29	3	6	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	swales, till plains
		Williams	71	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
E3541B	Williams-Zahl loams, 3 to 6 percent slopes	Williams	65	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
		Zahl	35	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	rises, till plains
E3541C	Williams-Zahl loams, 6 to 9 percent slopes	Williams	52	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	knolls, till plains
		Zahl	48	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	knolls, till plains
E3555D	Zahl-Williams loams, 9 to 15 percent slopes	Williams	33	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	hills, till plains
		Zahl	67	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	hills, till plains
E3559E	Zahl-Max loams, 15 to 25 percent slopes	Max	39	15	25	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	fine-loamy till	ridges, till plains
		Zahl	61	15	25	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ridges, till plains
E3567F	Zahl-Max loams, dissected, 15 to 45 percent slopes	Max	35	15	25	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	fine-loamy till	ridges, till plains
		Zahl	65	15	45	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ridges, till plains
E3603E	Amor-Zahl-Cabba loams, 9 to 25 percent slopes	Amor	45	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	loamy residuum weathered from mudstone	hills, uplands
		Cabba	26	9	25	L	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	fine-loamy residuum weathered from sedimentary rock	ridges, uplands

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope Low	Percent Slope High	Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
		Zahl	29	9	25	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ridges, till plains
E3607F	Zahl-Cabba-Arikara complex, 9 to 70 percent slopes	Arikara	28	15	70	SPM	W	VR	Fine-loamy, mixed, superactive, frigid Typic Haplustepts	loamy colluvium derived from mudstone	ridges, uplands
		Cabba	30	9	70	SIL	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	fine-silty residuum weathered from sedimentary rock	ridges, uplands
		Zahl	42	9	60	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ridges, till plains
E3609F	Zahl-Cabba-Maschetah complex, 6 to 70 percent slopes	Cabba	32	6	70	SIL	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	fine-silty residuum weathered from sedimentary rock	ridges, uplands
		Maschetah	13	2	6	SIL	W	M	Fine-silty, mixed, superactive, frigid Typic Calciustolls	fine-silty alluvium derived from sedimentary rock	alluvial fans, uplands
			16	6	15	SIL	W	M	Fine-silty, mixed, superactive, frigid Typic Calciustolls	fine-silty alluvium derived from sedimentary rock	ridges, uplands
		Zahl	39	9	60	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ridges, till plains
E3637D	Zahl-Beisigl-Tally complex, 9 to 15 percent slopes	Beisigl	33	9	15	LFS	SE	R	Mixed, frigid Typic Ustipsamments	sandy residuum weathered from sandstone	hills, uplands
		Tally	22	9	15	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Typic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	hills, uplands
		Zahl	44	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	hills, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
E3639C	Zahl-Williams-Cabba complex, 6 to 9 percent slopes	Cabba	25	6	9	SIL	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	fine-silty residuum weathered from sedimentary rock	ridges, uplands
		Williams	36	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	knolls, till plains
		Zahl	39	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	knolls, till plains
E3641D	Zahl-Cabba-Williams complex, 9 to 15 percent slopes	Cabba	33	9	15	SIL	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	fine-silty residuum weathered from sedimentary rock	ridges, uplands
		Williams	26	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	hills, till plains
		Zahl	41	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	hills, till plains
E3701A	Dooley fine sandy loam, 0 to 3 percent slopes	Dooley	100	0	3	FSL	W	MR	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	coarse-loamy eolian deposits over fine-loamy till	rises, till plains
E3701B	Dooley fine sandy loam, 3 to 6 percent slopes	Dooley	100	3	6	FSL	W	MR	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	coarse-loamy eolian deposits over fine-loamy till	rises, till plains
E3703B	Dooley-Zahl complex, 3 to 6 percent slopes	Dooley	86	3	6	FSL	W	MR	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	coarse-loamy eolian deposits over fine-loamy till	rises, till plains
		Zahl	14	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	rises, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
E3703C	Dooley-Zahl complex, 6 to 9 percent slopes	Dooley	74	6	9	FSL	W	MR	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy alluvium	knolls, till plains
		Zahl	26	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	knolls, till plains
E3703D	Dooley-Zahl complex, 9 to 15 percent slopes	Dooley	68	9	15	FSL	W	MR	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy alluvium	knolls, till plains
		Zahl	32	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	hills, till plains
E4005A	Harriet loam, 0 to 2 percent slopes, occasionally flooded	Harriet	100	0	2	L	P	M	Fine, smectitic, frigid Typic Natraquolls	clayey alluvium derived from sedimentary rock	drainageways, uplands
E4051A	Trembles fine sandy loam, slightly wet, 0 to 2 percent slopes, occasionally flooded	Trembles	100	0	2	FSL	MW	MR	Coarse-loamy, mixed, superactive, calcareous, frigid Typic Ustifluvents	coarse-loamy alluvium derived from sedimentary rock	flood plains, leveled land, river valleys
E4137A	Korchea loam, 0 to 2 percent slopes, occasionally flooded	Korchea	100	0	2	L	W	M	Fine-loamy, mixed, superactive, calcareous, frigid Mollic Ustifluvents	stratified fine-loamy alluvium derived from sedimentary rock	flood plains, river valleys, uplands
E4139A	Korchea-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded	Fluvaquents	43	0	2	FSL	VP	MR	Fluvaquents	alluvium	channels, flood plains, uplands
		Korchea	57	0	2	L	W	M	Fine-loamy, mixed, superactive, calcareous, frigid Mollic Ustifluvents	stratified fine-loamy alluvium derived from sedimentary rock	flood plains, river valleys, uplands
E4143A	Korchea, wooded-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded	Fluvaquents	41	0	2	FSL	VP	MR	Fluvaquents	alluvium	channels, flood plains, uplands

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Korchea	15	0	2	L	W	M	Fine-loamy, mixed, superactive, calcareous, frigid Mollic Ustifluvents	stratified fine-loamy alluvium derived from sedimentary rock	flood plains, river valleys, uplands
			43	0	2	L	W	M	Fine-loamy, mixed, superactive, calcareous, frigid Mollic Ustifluvents	stratified fine-loamy alluvium derived from sedimentary rock	flood plains, river valleys, uplands
E4190F	Cabba-Chama-Havrelon, occasionally flooded complex, 2 to 70 percent slopes	Cabba	43	6	70	SIL	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	fine-silty residuum weathered from sedimentary rock	ridges, uplands
		Chama	36	6	25	SIL	W	M	Fine-silty, mixed, superactive, frigid Typic Calciustolls	fine-silty residuum weathered from siltstone	hills, uplands
		Havrelon	21	2	6	L	W	M	Fine-loamy, mixed, superactive, calcareous, frigid Typic Ustifluvents	fine-loamy alluvium derived from sedimentary rock	flood plains, river valleys, uplands
E4195A	Velva fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Velva	100	0	2	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Fluventic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	flood plains, river valleys
E4227D	Seroco, hummocky-Banks, occasionally flooded loamy fine sands, 0 to 15 percent slopes	Banks	16	0	2	LFS	E	MR	Sandy, mixed, frigid Typic Ustifluvents	sandy alluvium	flood plains, river valleys, uplands
		Seroco	84	2	15	LFS	E	R	Mixed, frigid Typic Ustipsamments	sandy alluvium derived from sedimentary rock and/or eolian sands	ridges, uplands

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
E4542B	Lehr-Bowdle loams, 2 to 6 percent slopes	Bowdle	34	2	6	L	W	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Pachic Haplustolls	loamy alluvium	terraces, uplands
		Lehr	66	2	6	L	SE	MR	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	fine-loamy alluvium	terraces, uplands
E4553B	Tally fine sandy loam, gravelly substratum, 2 to 6 percent slopes	Tally	100	2	6	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Typic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	stream terraces, uplands
E4561F	Manning-Schaller-Wabek complex, 6 to 35 percent slopes	Manning	40	6	15	FSL	SE	MR	Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	escarpments, stream terraces, uplands
		Schaller	33	6	25	SL	E	MR	Sandy, mixed, frigid Entic Haplustolls	sandy alluvium derived from sedimentary rock	escarpments, stream terraces, uplands
		Wabek	27	9	35	L	E	M	Sandy-skeletal, mixed, frigid Entic Haplustolls	sandy and gravelly alluvium	escarpments, terraces, uplands
E4582A	Appam sandy loam, 0 to 2 percent slopes	Appam	100	0	2	SL	SE	MR	Sandy, mixed, frigid Typic Haplustolls	sandy and gravelly glaciofluvial deposits	glacial drainage channels, till plains
E4582B	Appam sandy loam, 2 to 6 percent slopes	Appam	100	2	6	SL	SE	MR	Sandy, mixed, frigid Typic Haplustolls	sandy and gravelly glaciofluvial deposits	glacial drainage channels, till plains
E4583E	Wabek-Appam sandy loams, 6 to 25 percent slopes	Appam	24	6	15	SL	SE	MR	Sandy, mixed, frigid Typic Haplustolls	sandy and gravelly glaciofluvial deposits	glacial drainage channels, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Wabek	76	15	25	SL	E	MR	Sandy-skeletal, mixed, frigid Entic Haplustolls	sandy and gravelly alluvium	escarpments, terraces, uplands
E4585B	Manning fine sandy loam, 2 to 6 percent slopes	Manning	100	2	6	FSL	SE	MR	Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	river valleys, stream terraces, uplands
E4729A	Heil silty clay loam, 0 to 1 percent slopes	Heil	100	0	1	SICL	P	MS	Fine, smectitic, frigid Typic Natraquerts	clayey alluvium derived from sedimentary rock	depressions, uplands
E4995F	Pits, gravel and sand	Pits	100	0	60	GRX-S	E	R	N/A	alluvium	stream terraces, uplands
E4999	Water	Water	100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
EW	Water	Water	100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
L0454B	Maltese-Gerda complex, 0 to 6 percent slopes	Gerda	44	0	6	L	MW	M	Fine, smectitic, frigid Leptic Torrertic Natrustolls	slope alluvium derived from shale and siltstone	badlands, hillslopes
		Maltese	56	0	6	SIL	MW	M	Fine, smectitic, frigid Torrertic Natrustolls	slope alluvium derived from shale and siltstone	badlands, hillslopes
L1425F	Rhame-Fleak complex, 9 to 50 percent slopes	Fleak	48	9	50	LFS	E	R	Mixed, frigid, shallow Aridic Ustipsamments	residuum weathered from calcareous sandstone	badlands, hillslopes
		Rhame	52	9	35	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Aridic Haplustolls	residuum weathered from sandstone	badlands, hillslopes
L2311E	Scairt-Maltese-BoxW complex, 2 to 25 percent slopes	BoxW	23	6	15	L	W	M	Fine-loamy, mixed, superactive, frigid Aridic Haplustolls	fine-loamy residuum weathered from mudstone	badlands, ridges
		Maltese	31	2	25	SIL	W	M	Fine, smectitic, frigid Torrertic Natrustolls	silty and clayey alluvium	badlands, ridges

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Scairt	46	6	15	SIL	W	M	Fine, smectitic, frigid Aridic Leptic Natrustolls	silty and clayey residuum weathered from shale and siltstone	badlands, hills
L2633F	BoxW-Cabbart-Arikara complex, 9 to 70 percent slopes	Arikara	18	15	70	SPM	W	VR	Fine-loamy, mixed, superactive, frigid Typic Haplustepts	loamy colluvium derived from mudstone	badlands, ridges
		BoxW	43	9	50	L	W	M	Fine-loamy, mixed, superactive, frigid Aridic Haplustolls	fine-loamy residuum weathered from mudstone	badlands, ridges
		Cabbart	39	9	50	L	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Aridic Ustorthents	loamy residuum weathered from siltstone and mudstone	badlands, ridges
L2807C	BoxW-Kremlin loams, 6 to 9 percent slopes	BoxW	59	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Aridic Haplustolls	residuum weathered from mudstone	badlands, hillslopes
		Kremlin	41	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Aridic Haplustolls	slope alluvium derived from mudstone	badlands, hillslopes
L2807D	BoxW-Kremlin loams, 9 to 15 percent slopes	BoxW	59	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Aridic Haplustolls	residuum weathered from mudstone	badlands, hillslopes
		Kremlin	41	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Aridic Haplustolls	slope alluvium derived from mudstone	badlands, hillslopes
L3013F	Kirby-Scairt complex, 9 to 70 percent slopes	Kirby	77	9	70	CN-L	E	MR	Loamy-skeletal over fragmental, mixed, superactive, calcareous, frigid Aridic Ustorthents	channery residuum weathered from porcellanite	badlands, ridges

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope Low	Percent Slope High	Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
		Scairt	23	9	25	SIL	W	M	Fine, smectitic, frigid Aridic Leptic Natrustolls	silty and clayey residuum weathered from shale and siltstone	badlands, ridges
L3107F	Cabbart-Badland complex, 6 to 70 percent slopes	Badland	33	9	150	SIL	N/A	M	N/A	shale and siltstone	badlands, hillslopes
		Cabbart	67	6	70	L	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Aridic Ustorthents	residuum weathered from calcareous siltstone	badlands, hillslopes
L3241B	Patent loam, 0 to 6 percent slopes, occasionally flooded	Patent	100	0	6	L	W	M	Fine-loamy, mixed, superactive, calcareous, frigid Aridic Ustorthents	fine-loamy alluvium	alluvial fans, badlands
Elkhorn Creek-Northern Border											
E3013D	Brandenburg-Searing-Dogtooth complex, 6 to 15 percent slopes	Brandenburg	48	6	15	CN-L	E	M	Fragmental, mixed, frigid Typic Ustorthents	loamy residuum weathered from porcellanite	knobs, uplands
		Dogtooth	19	6	15	SIL	W	M	Fine, smectitic, frigid Leptic Natrustolls	clayey residuum weathered from shale	hills, uplands
		Searing	33	6	9	L	W	M	Fine-loamy over fragmental, mixed, superactive, frigid Typic Haplustolls	fine-loamy residuum weathered from porcellanite	hills, uplands
E3541B	Williams-Zahl loams, 3 to 6 percent slopes	Williams	65	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
		Zahl	35	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	rises, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope Low	Percent Slope High	Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
E3639C	Zahl-Williams-Cabba complex, 6 to 9 percent slopes	Cabba	25	6	9	SIL	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	fine-silty residuum weathered from sedimentary rock	ridges, uplands
		Williams	36	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	knolls, till plains
		Zahl	39	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	knolls, till plains
Line Section 25 Loop											
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Williams	73	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
		Zahl	27	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Williams	59	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
		Zahill	18	6	9	CL	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustepts	fine-loamy till	ground moraines, till plains
		Zahl	24	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains
C135C	Zahl-Williams-Zahill complex, 6 to 9 percent slopes	Williams	35	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
		Zahill	17	6	9	CL	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustepts	fine-loamy till	ground moraines, till plains
		Zahl	48	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Williams	42	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	hills, ridges, till plains
		Zahl	58	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	hills, ridges, till plains
C148C	Williams-Zahl-Parnell complex, 0 to 9 percent slopes	Parnell	26	0	1	SICL	VP	MS	Fine, smectitic, frigid Vertic Argiaquolls	local alluvium	depressions, till plains
		Williams	42	0	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
		Zahl	32	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	rises, till plains
C153E	Zahl-Max loams, 15 to 25 percent slopes	Max	40	15	25	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	fine-loamy till	disintegration moraines, till plains
		Zahl	60	15	25	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	disintegration moraines, till plains
C154C	Zahl-Williams-Bowbells loams, 3 to 9 percent slopes	Bowbells	20	3	6	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	rises, till plains
		Williams	30	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
		Zahl	50	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	rises, till plains
C156F	Zahl-Max-Bowbells loams, 6 to 35 percent slopes	Bowbells	19	6	9	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	rises, till plains
		Max	23	15	25	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	fine-loamy till	hills, ridges, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Zahl	57	15	35	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ridges, till plains
C165F	Zahl-Max-Parnell complex, 0 to 35 percent slopes	Max	32	15	25	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	fine-loamy till	hills, ridges, till plains
		Parnell	27	0	1	SICL	VP	MS	Fine, smectitic, frigid Vertic Argiaquolls	local alluvium	depressions, till plains
		Zahl	41	15	35	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ridges, till plains
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Bowbells	26	0	3	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	flats, till plains
		Williams	74	0	3	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Bowbells	44	3	6	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	rises, till plains
		Williams	56	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes	Hamerly	60	0	3	L	SP	M	Fine-loamy, mixed, superactive, frigid Aeric Calciaquolls	fine-loamy till	flats, till plains
		Tonka	40	0	1	SIL	P	M	Fine, smectitic, frigid Argiaquic Argialbolls	local alluvium over till	depressions, till plains
C2A	Tonka silt loam, 0 to 1 percent slopes	Tonka	100	0	1	SIL	P	M	Fine, smectitic, frigid Argiaquic Argialbolls	local alluvium over till	depressions, till plains
C328C	Lihen-Sakakawea complex, 2 to 9 percent slopes	Lihen	55	2	9	FSL	W	MR	Sandy, mixed, frigid Entic Haplustolls	sandy glaciofluvial deposits	outwash plains, rises
		Sakakawea	45	2	9	SICL	W	M	Coarse-silty, mixed, superactive, frigid Typic Calciustolls	calcareous coarse-silty glaciolacustrine deposits	glacial lakes (relict), rises, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
C3A	Parnell silty clay loam, 0 to 1 percent slopes	Parnell	100	0	1	SICL	VP	MS	Fine, smectitic, frigid Vertic Argiaquolls	local alluvium	depressions, till plains
C410C	Sakakawea-Tansem loams, 6 to 9 percent slopes	Sakakawea	75	6	9	L	W	M	Coarse-silty, mixed, superactive, frigid Typic Calciustolls	calcareous coarse-silty glaciolacustrine deposits	glacial lakes (relict), rises, till plains
		Tansem	25	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	loamy glaciolacustrine deposits	glacial lakes (relict), rises, till plains
C410E	Sakakawea-Tansem loams, 9 to 25 percent slopes	Sakakawea	65	9	25	L	W	M	Coarse-silty, mixed, superactive, frigid Typic Calciustolls	calcareous coarse-silty glaciolacustrine deposits	glacial lakes (relict), ridges, till plains
		Tansem	35	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	loamy glaciolacustrine deposits	glacial lakes (relict), hills, till plains
C415A	Tansem loam, 0 to 2 percent slopes	Tansem	100	0	2	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	loamy glaciolacustrine deposits	flats, glacial lakes (relict), till plains
C418B	Tansem-Sakakawea loams, 2 to 6 percent slopes	Sakakawea	18	2	6	SICL	W	M	Coarse-silty, mixed, superactive, frigid Typic Calciustolls	calcareous coarse-silty glaciolacustrine deposits	glacial lakes (relict), rises, till plains
		Tansem	82	2	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	loamy glaciolacustrine deposits	glacial lakes (relict), rises, till plains
C419A	Wildrose silty clay, 0 to 2 percent slopes	Wildrose	100	0	2	SIC	W	VS	Fine, smectitic, frigid Typic Haplusterts	clayey glaciolacustrine deposits	flats, glacial lakes (relict), till plains
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Nutley	100	0	2	SIC	W	S	Fine, smectitic, frigid Chromic Haplusterts	clayey glaciolacustrine deposits	flats, glacial lakes (relict), till plains
C451A	Arnegard loam, 0 to 2 percent slopes	Arnegard	100	0	2	L	W	M	Fine-loamy, mixed, superactive, frigid Pachic Haplustolls	fine-loamy till	swales, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
C580A	Harriet-Regan-Stirum complex, 0 to 2 percent slopes, occasionally flooded	Harriet	35	0	2	L	P	MS	Fine, smectitic, frigid Typic Natraquolls	local alluvium	drainageways, till plains
		Regan	33	0	2	SICL	VP	M	Fine-silty, mixed, superactive, frigid Typic Calciaquolls	local alluvium	drainageways, till plains
		Stirum	32	0	2	FSL	P	MR	Coarse-loamy, mixed, superactive, frigid Typic Natraquolls	eolian deposits	outwash plains, till plains
C75A	Vallers loam, Mly saline, 0 to 1 percent slopes	Vallers	100	0	1	L	P	M	Fine-loamy, mixed, superactive, frigid Typic Calciaquolls	fine-loamy till	flats, till plains
C800B	Appam sandy loam, 2 to 6 percent slopes	Appam	100	2	6	SL	SE	MR	Sandy, mixed, frigid Typic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, rises
C816B	Lehr loam, 2 to 6 percent slopes	Lehr	100	2	6	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	loamy alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, rises
C818B	Lehr-Williams loams, 0 to 6 percent slopes	Lehr	51	2	6	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, till plains
		Williams	49	0	3	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
C819A	Lehr-Wabek loams, 0 to 2 percent slopes	Lehr	70	0	2	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	loamy alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, rises

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Wabek	30	0	2	L	E	M	Sandy-skeletal, mixed, frigid Entic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, rises
C825A	Divide loam, 0 to 2 percent slopes	Divide	100	0	2	L	SP	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Aeric Calciaquolls	local alluvium	flats, outwash plains
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Appam	20	9	15	SL	SE	MR	Sandy, mixed, frigid Typic Haplustolls	sandy and gravelly glaciofluvial deposits	hills, outwash plains
		Lehr	22	9	25	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	loamy alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, ridges
		Wabek	58	9	25	L	E	M	Sandy-skeletal, mixed, frigid Entic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, ridges
C874B	Wabek-Appam complex, 2 to 6 percent slopes	Appam	26	2	6	SL	SE	MR	Sandy, mixed, frigid Typic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, rises
		Wabek	74	2	6	GR-SL	E	MR	Sandy-skeletal, mixed, frigid Entic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, rises
C874C	Wabek-Appam complex, 6 to 9 percent slopes	Appam	30	6	9	SL	SE	MR	Sandy, mixed, frigid Typic Haplustolls	sandy and gravelly glaciofluvial deposits	knolls, outwash plains
		Wabek	70	6	9	GR-SL	E	MR	Sandy-skeletal, mixed, frigid Entic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, rises

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope Low	Percent Slope High	Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
C877B	Wabek-Lehr complex, 2 to 6 percent slopes	Lehr	34	2	6	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	loamy alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, rises
		Wabek	66	2	6	GR-L	E	M	Sandy-skeletal, mixed, frigid Entic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, rises
C906E	Amor-Zahl-Werner loams, 9 to 25 percent slopes	Amor	45	15	25	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	loamy residuum weathered from mudstone	hills, ridges, uplands
		Werner	26	9	25	L	W	M	Loamy, mixed, superactive, frigid, shallow Entic Haplustolls	fine-loamy residuum weathered from sandstone	hills, ridges, uplands
		Zahl	29	9	25	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ridges, till plains
C990F	Pits, gravel and sand, 0 to 60 percent slopes	Pits	100	0	60	GRX-S	E	R	N/A	alluvium	stream terraces, uplands
Line Section 30 Loop											
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Williams	73	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
		Zahl	27	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Williams	59	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
		Zahill	18	6	9	CL	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustepts	fine-loamy till	ground moraines, till plains
		Zahl	24	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
C135C	Zahl-Williams-Zahill complex, 6 to 9 percent slopes	Williams	35	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
		Zahill	17	6	9	CL	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustepts	fine-loamy till	ground moraines, till plains
		Zahl	48	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Williams	42	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	hills, ridges, till plains
		Zahl	58	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	hills, ridges, till plains
C148C	Williams-Zahl-Parnell complex, 0 to 9 percent slopes	Parnell	26	0	1	SICL	VP	MS	Fine, smectitic, frigid Vertic Argiaquolls	local alluvium	depressions, till plains
		Williams	42	0	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
		Zahl	32	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	rises, till plains
C155F	Zahl-Max-Arnegard loams, 15 to 60 percent slopes	Arnegard	21	15	25	L	W	M	Fine-loamy, mixed, superactive, frigid Pachic Haplustolls	fine-loamy till	swales, till plains
		Max	34	25	60	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	fine-loamy till	hills, ridges, till plains
		Zahl	45	25	60	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ridges, till plains
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Bowbells	26	0	3	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	flats, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Williams	74	0	3	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Bowbells	44	3	6	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	rises, till plains
		Williams	56	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
C2A	Tonka silt loam, 0 to 1 percent slopes	Tonka	100	0	1	SIL	P	M	Fine, smectitic, frigid Argiaquic Argialbolls	local alluvium over till	depressions, till plains
C3A	Parnell silty clay loam, 0 to 1 percent slopes	Parnell	100	0	1	SICL	VP	MS	Fine, smectitic, frigid Vertic Argiaquolls	local alluvium	depressions, till plains
C418B	Tansem-Sakakawea loams, 2 to 6 percent slopes	Sakakawea	18	2	6	SICL	W	M	Coarse-silty, mixed, superactive, frigid Typic Calciustolls	calcareous coarse-silty glaciolacustrine deposits	glacial lakes (relict), rises, till plains
		Tansem	82	2	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	loamy glaciolacustrine deposits	glacial lakes (relict), rises, till plains
C419A	Wildrose silty clay, 0 to 2 percent slopes	Wildrose	100	0	2	SIC	W	VS	Fine, smectitic, frigid Typic Haplusterts	clayey glaciolacustrine deposits	flats, glacial lakes (relict), till plains
C451A	Arnegard loam, 0 to 2 percent slopes	Arnegard	100	0	2	L	W	M	Fine-loamy, mixed, superactive, frigid Pachic Haplustolls	fine-loamy till	swales, till plains
C800B	Appam sandy loam, 2 to 6 percent slopes	Appam	100	2	6	SL	SE	MR	Sandy, mixed, frigid Typic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, rises
C816B	Lehr loam, 2 to 6 percent slopes	Lehr	100	2	6	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	loamy alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, rises

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
C818B	Lehr-Williams loams, 0 to 6 percent slopes	Lehr	51	2	6	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, till plains
		Williams	49	0	3	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
C818C	Lehr-Williams loams, 6 to 9 percent slopes	Lehr	57	6	9	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, till plains
		Williams	43	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
Tioga Compressor Lateral											
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	Williams	59	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
		Zahill	18	6	9	CL	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustepts	fine-loamy till	ground moraines, till plains
		Zahl	24	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Bowbells	44	3	6	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	rises, till plains
		Williams	56	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
Uprating Existing Line											

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Williams	73	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
		Zahl	27	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains
C135C	Zahl-Williams-Zahill complex, 6 to 9 percent slopes	Williams	35	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
		Zahill	17	6	9	CL	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustepts	fine-loamy till	ground moraines, till plains
		Zahl	48	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains
C135D	Zahl-Williams loams, 9 to 15 percent slopes	Williams	42	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	hills, ridges, till plains
		Zahl	58	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	hills, ridges, till plains
C165F	Zahl-Max-Parnell complex, 0 to 35 percent slopes	Max	32	15	25	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	fine-loamy till	hills, ridges, till plains
		Parnell	27	0	1	SICL	VP	MS	Fine, smectitic, frigid Vertic Argiaquolls	local alluvium	depressions, till plains
		Zahl	41	15	35	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ridges, till plains
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Bowbells	26	0	3	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	flats, till plains
		Williams	74	0	3	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Nutley	100	0	2	SIC	W	S	Fine, smectitic, frigid Chromic Haplusterts	clayey glaciolacustrine deposits	flats, glacial lakes (relict), till plains
C75A	Vallers loam, Mly saline, 0 to 1 percent slopes	Vallers	100	0	1	L	P	M	Fine-loamy, mixed, superactive, frigid Typic Calciaquolls	fine-loamy till	flats, till plains
C819A	Lehr-Wabek loams, 0 to 2 percent slopes	Lehr	70	0	2	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	loamy alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, rises
		Wabek	30	0	2	L	E	M	Sandy-skeletal, mixed, frigid Entic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, rises
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Appam	20	9	15	SL	SE	MR	Sandy, mixed, frigid Typic Haplustolls	sandy and gravelly glaciofluvial deposits	hills, outwash plains
		Lehr	22	9	25	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	loamy alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, ridges
		Wabek	58	9	25	L	E	M	Sandy-skeletal, mixed, frigid Entic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, ridges
Elkhorn Creek Compressor Station											
E3013D	Brandenburg-Searing-Dogtooth complex, 6 to 15 percent slopes	Brandenburg	48	6	15	CN-L	E	M	Fragmental, mixed, frigid Typic Ustorthents	loamy residuum weathered from porcellanite	knobs, uplands
		Dogtooth	19	6	15	SIL	W	M	Fine, smectitic, frigid Leptic Natrustolls	clayey residuum weathered from shale	hills, uplands

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Searing	33	6	9	L	W	M	Fine-loamy over fragmental, mixed, superactive, frigid Typic Haplustolls	fine-loamy residuum weathered from porcellanite	hills, uplands
E3013F	Brandenburg-Cabba-Dogtooth complex, 15 to 70 percent slopes	Brandenburg	54	15	70	CN-L	E	M	Fragmental, mixed, frigid Typic Ustorthents	loamy residuum weathered from porcellanite	ridges, uplands
		Cabba	24	15	70	L	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	fine-loamy residuum weathered from sedimentary rock	ridges, uplands
		Dogtooth	21	15	25	SIL	W	M	Fine, smectitic, frigid Leptic Natrustolls	clayey residuum weathered from shale	ridges, uplands
E3541B	Williams-Zahl loams, 3 to 6 percent slopes	Williams	65	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
		Zahl	35	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	rises, till plains
E3639C	Zahl-Williams-Cabba complex, 6 to 9 percent slopes	Cabba	25	6	9	SIL	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	fine-silty residuum weathered from sedimentary rock	ridges, uplands
		Williams	36	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	knolls, till plains
		Zahl	39	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	knolls, till plains
Tioga Compressor Station											
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Bowbells	44	3	6	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	rises, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope Low	Percent Slope High	Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
		Williams	56	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
Lignite Plant Receipt Sation and Lignite Town Border Station											
2031	Williams-Zahl loams, 3 to 6 percent slopes	Williams	65	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
		Zahl	35	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	rises, till plains
Norse Plant Receipt Station											
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Nutley	100	0	2	SIC	W	S	Fine, smectitic, frigid Chromic Haplusterts	clayey glaciolacustrine deposits	flats, glacial lakes (relict), till plains
C819A	Lehr-Wabek loams, 0 to 2 percent slopes	Lehr	70	0	2	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	loamy alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, rises
		Wabek	30	0	2	L	E	M	Sandy-skeletal, mixed, frigid Entic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, rises
Norse Transfer Station											
C424A	Nutley silty clay, low precipitation, 0 to 2 percent slopes	Nutley	100	0	2	SIC	W	S	Fine, smectitic, frigid Chromic Haplusterts	clayey glaciolacustrine deposits	flats, glacial lakes (relict), till plains
C819A	Lehr-Wabek loams, 0 to 2 percent slopes	Lehr	70	0	2	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	loamy alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, rises
		Wabek	30	0	2	L	E	M	Sandy-skeletal, mixed, frigid Entic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, rises

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope Low	Percent Slope High	Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
Northern Border Interconnect											
E3013D	Brandenburg-Searing-Dogtooth complex, 6 to 15 percent slopes	Brandenburg	48	6	15	CN-L	E	M	Fragmental, mixed, frigid Typic Ustorthents	loamy residuum weathered from porcellanite	knobs, uplands
		Dogtooth	19	6	15	SIL	W	M	Fine, smectitic, frigid Leptic Natrustolls	clayey residuum weathered from shale	hills, uplands
		Searing	33	6	9	L	W	M	Fine-loamy over fragmental, mixed, superactive, frigid Typic Haplustolls	fine-loamy residuum weathered from porcellanite	hills, uplands
E3541B	Williams-Zahl loams, 3 to 6 percent slopes	Williams	65	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
		Zahl	35	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	rises, till plains
E3641D	Zahl-Cabba-Williams complex, 9 to 15 percent slopes	Cabba	33	9	15	SIL	W	M	Loamy, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents	fine-silty residuum weathered from sedimentary rock	ridges, uplands
		Williams	26	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	hills, till plains
		Zahl	41	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	hills, till plains
Robinson Lake Plant Receipt Station											
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Williams	73	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
		Zahl	27	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
C154C	Zahl-Williams-Bowbells loams, 3 to 9 percent slopes	Bowbells	20	3	6	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	rises, till plains
		Williams	30	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
		Zahl	50	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	rises, till plains
Springbrook Plant Receipt Station											
2014	Williams-Bowbells loams, 0 to 3 percent slopes	Bowbells	26	0	3	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	flats, till plains
		Williams	74	0	3	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
2015	Williams-Bowbells loams, 3 to 6 percent slopes	Bowbells	35	3	6	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	rises, till plains
		Williams	65	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
Tioga Plant Receipt Station											
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Bowbells	44	3	6	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	rises, till plains
		Williams	56	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
Block Valves											
E1865B	Tally-Parshall fine sandy loams, 2 to 6 percent slopes	Parshall	32	2	6	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Pachic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	alluvial fans, uplands

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Tally	68	2	6	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Typic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	alluvial fans, uplands
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Williams	73	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
		Zahl	27	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains
Pig Launchers/\Receivers											
C451A	Arnegard loam, 0 to 2 percent slopes	Arnegard	100	0	2	L	W	M	Fine-loamy, mixed, superactive, frigid Pachic Haplustolls	fine-loamy till	swales, till plains
68th Street Yard											
C156F	Zahl-Max-Bowbells loams, 6 to 35 percent slopes	Bowbells	19	6	9	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	rises, till plains
		Max	23	15	25	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	fine-loamy till	hills, ridges, till plains
		Zahl	57	15	35	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ridges, till plains
C3A	Parnell silty clay loam, 0 to 1 percent slopes	Parnell	100	0	1	SICL	VP	MS	Fine, smectitic, frigid Vertic Argiaquolls	local alluvium	depressions, till plains
C816B	Lehr loam, 2 to 6 percent slopes	Lehr	100	2	6	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	loamy alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, rises
Boehm Staging Yard											
E4195A	Velva fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Velva	100	0	2	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Fluventic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	flood plains, river valleys

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
E4542B	Lehr-Bowdle loams, 2 to 6 percent slopes	Bowdle	34	2	6	L	W	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Pachic Haplustolls	loamy alluvium	terraces, uplands
		Lehr	66	2	6	L	SE	MR	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	fine-loamy alluvium	terraces, uplands
E4553B	Tally fine sandy loam, gravelly substratum, 2 to 6 percent slopes	Tally	100	2	6	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Typic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	stream terraces, uplands
CRS Yard											
C210A	Williams-Bowbells loams, 0 to 3 percent slopes	Bowbells	26	0	3	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	flats, till plains
		Williams	74	0	3	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
C2A	Tonka silt loam, 0 to 1 percent slopes	Tonka	100	0	1	SIL	P	M	Fine, smectitic, frigid Argiaquic Argialbolls	local alluvium over till	depressions, till plains
C810A	Bowdle loam, 0 to 2 percent slopes	Bowdle	100	0	2	L	W	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Pachic Haplustolls	loamy alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, swales
C825A	Divide loam, 0 to 2 percent slopes	Divide	100	0	2	L	SP	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Aeric Calciaquolls	local alluvium	flats, outwash plains
C874C	Wabek-Appam complex, 6 to 9 percent slopes	Appam	30	6	9	SL	SE	MR	Sandy, mixed, frigid Typic Haplustolls	sandy and gravelly glaciofluvial deposits	knolls, outwash plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope Low	Percent Slope High	Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
		Wabek	70	6	9	GR-SL	E	MR	Sandy-skeletal, mixed, frigid Entic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, rises
C877B	Wabek-Lehr complex, 2 to 6 percent slopes	Lehr	34	2	6	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	loamy alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, rises
		Wabek	66	2	6	GR-L	E	M	Sandy-skeletal, mixed, frigid Entic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, rises
Delta Contractors Yard											
E0605A	Belfield-Grail clay loams, 0 to 2 percent slopes	Belfield	67	0	2	CL	MW	MS	Fine, smectitic, frigid Glossic Natrustolls	slope alluvium derived from shale and siltstone	drainageways, plains
		Grail	33	0	2	CL	MW	MS	Fine, smectitic, frigid Pachic Vertic Argiustolls	slope alluvium derived from shale and siltstone	drainageways, plains
E1865B	Tally-Parshall fine sandy loams, 2 to 6 percent slopes	Parshall	32	2	6	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Pachic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	alluvial fans, uplands
		Tally	68	2	6	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Typic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	alluvial fans, uplands
E3527B	Williams-Bowbells loams, 3 to 6 percent slopes	Bowbells	29	3	6	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	swales, till plains
		Williams	71	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
E3703B	Dooley-Zahl complex, 3 to 6 percent slopes	Dooley	86	3	6	FSL	W	MR	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	coarse-loamy eolian deposits over fine-loamy till	rises, till plains
		Zahl	14	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	rises, till plains
E3703D	Dooley-Zahl complex, 9 to 15 percent slopes	Dooley	68	9	15	FSL	W	MR	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy alluvium	knolls, till plains
		Zahl	32	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	hills, till plains
Enget Yard											
C153E	Zahl-Max loams, 15 to 25 percent slopes	Max	40	15	25	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	fine-loamy till	disintegration moraines, till plains
		Zahl	60	15	25	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	disintegration moraines, till plains
C154C	Zahl-Williams-Bowbells loams, 3 to 9 percent slopes	Bowbells	20	3	6	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	rises, till plains
		Williams	30	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
		Zahl	50	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	rises, till plains
C5A	Southam silty clay loam, 0 to 1 percent slopes	Southam	100	0	1	SICL	VP	MS	Fine, smectitic, calcareous, frigid Cumulic Vertic Endoaquolls	local alluvium	marshes, till plains
C800B	Appam sandy loam, 2 to 6 percent slopes	Appam	100	2	6	SL	SE	MR	Sandy, mixed, frigid Typic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, rises

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes	Appam	20	9	15	SL	SE	MR	Sandy, mixed, frigid Typic Haplustolls	sandy and gravelly glaciofluvial deposits	hills, outwash plains
		Lehr	22	9	25	L	SE	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	loamy alluvium over sandy and gravelly glaciofluvial deposits	outwash plains, ridges
		Wabek	58	9	25	L	E	M	Sandy-skeletal, mixed, frigid Entic Haplustolls	sandy and gravelly glaciofluvial deposits	outwash plains, ridges
Flatlands Yard 1											
E3541C	Williams-Zahl loams, 6 to 9 percent slopes	Williams	52	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	knolls, till plains
		Zahl	48	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	knolls, till plains
E3555D	Zahl-Williams loams, 9 to 15 percent slopes	Williams	33	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	hills, till plains
		Zahl	67	9	15	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	hills, till plains
E3567F	Zahl-Max loams, dissected, 15 to 45 percent slopes	Max	35	15	25	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Haplustolls	fine-loamy till	ridges, till plains
		Zahl	65	15	45	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ridges, till plains
E3703B	Dooley-Zahl complex, 3 to 6 percent slopes	Dooley	86	3	6	FSL	W	MR	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	coarse-loamy eolian deposits over fine-loamy till	rises, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
		Zahl	14	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	rises, till plains
Flatlands Yard 2											
E1865B	Tally-Parshall fine sandy loams, 2 to 6 percent slopes	Parshall	32	2	6	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Pachic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	alluvial fans, uplands
		Tally	68	2	6	FSL	W	MR	Coarse-loamy, mixed, superactive, frigid Typic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	alluvial fans, uplands
E4561F	Manning-Schaller-Wabek complex, 6 to 35 percent slopes	Manning	40	6	15	FSL	SE	MR	Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	escarpments, stream terraces, uplands
		Schaller	33	6	25	SL	E	MR	Sandy, mixed, frigid Entic Haplustolls	sandy alluvium derived from sedimentary rock	escarpments, stream terraces, uplands
		Wabek	27	9	35	L	E	M	Sandy-skeletal, mixed, frigid Entic Haplustolls	sandy and gravelly alluvium	escarpments, terraces, uplands
E4585B	Manning fine sandy loam, 2 to 6 percent slopes	Manning	100	2	6	FSL	SE	MR	Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Haplustolls	coarse-loamy alluvium derived from sedimentary rock	river valleys, stream terraces, uplands
Lobell Yard											
C135C	Zahl-Williams-Zahill complex, 6 to 9 percent slopes	Williams	35	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
		Zahill	17	6	9	CL	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustepts	fine-loamy till	ground moraines, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope Low	Percent Slope High	Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
		Zahl	48	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Bowbells	44	3	6	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	rises, till plains
		Williams	56	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
C825A	Divide loam, 0 to 2 percent slopes	Divide	100	0	2	L	SP	M	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Aeric Calciaquolls	local alluvium	flats, outwash plains
C999F	Orthents-Aquents-Urban land, highway complex, 0 to 35 percent slopes	Aquents	20	0	3	L	SP	M	Fine-loamy, mixed (calcareous), frigid Aeric Endoaquents	fine-loamy till	swales, till plains
		Orthents	19	0	6	L	W	M	Orthents	fine-loamy till	cuts (road, railroad, etc.), scalped areas, till plains
			43	6	35	L	W	M	Orthents	fine-loamy till	cuts (road, railroad, etc.), scalped areas, till plains
		Urban land	19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	road beds
Schmidt Yard											
C132B	Williams-Zahl loams, 3 to 6 percent slopes	Williams	73	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
		Zahl	27	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains
C135C	Zahl-Williams-Zahill complex, 6 to 9 percent slopes	Williams	35	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains

APPENDIX 7B (cont'd)

North Bakken Expansion Project
Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area [a]

Map Unit Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope Low	Percent Slope High	Surface Texture [b]	Drainage Class [c]	Permeability [d]	Taxonomic Classification	Parent Material	Landforms
		Zahill	17	6	9	CL	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustepts	fine-loamy till	ground moraines, till plains
		Zahl	48	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Bowbells	44	3	6	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	rises, till plains
		Williams	56	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains
Weflen Staging Yard											
C135C	Zahl-Williams-Zahill complex, 6 to 9 percent slopes	Williams	35	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	ground moraines, till plains
		Zahill	17	6	9	CL	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustepts	fine-loamy till	ground moraines, till plains
		Zahl	48	6	9	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Calciustolls	fine-loamy till	ground moraines, till plains
C210B	Williams-Bowbells loams, 3 to 6 percent slopes	Bowbells	44	3	6	L	MW	M	Fine-loamy, mixed, superactive, frigid Pachic Argiustolls	fine-loamy till	rises, till plains
		Williams	56	3	6	L	W	M	Fine-loamy, mixed, superactive, frigid Typic Argiustolls	fine-loamy till	rises, till plains

[a] Map units crossed by pipeline facilities include access roads.
[b] Surface textures include: loam (L), gravely loam (GR-L), gravely sandy loam (GR-SL), loamy fine sand (LFS), sandy loam (SL), fine sandy loam (FSL), silt loam (SIL), silty clay loam (SICL), clay loam (CL), and silty clay (SIC).
[c] Drainage classes include: Very Poor (VP), Poor (P), Somewhat Poor (SP), Moderately Well (MW), Well (W), Somewhat Excessively (SE), and Exessively (E) drained .
[d] Permeability rates include: Very Rapid (VR), Rapid (R), Moderately Rapid (MR), Moderate (M), Moderately Slow (MS), Slow (S) and Very Slow (VS) permeablility.