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December 30, 2011

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NDSHPO REF.: 10-0173a USDA-RUS/PSC Center to Grand Forks 345 kV Transmission
Line Project: Class III CRI Report

Dear Mr. Plank:

We have received and reviewed correspondence and documentation for: 10-0173a USDA-RUS/PSC Center to Grand Forks 345 kV Transmission Line Project: Class II CRI: "Class III Intensive Archaeological Resources Inventory Center to Grand Forks 345 kV Line," by Michael Justin and Ericka Eigenberger (HDR, August 2011). In accordance with the executed Programmatic Agreement (PA), a phased approach to identification, evaluation, and mitigation is acceptable. If as indicated, unevaluated and eligible sites are avoided as stated in the December 13th correspondence letter, we concur with "No Historic Properties Affected" and "No Significant Sites Affected" determinations. Likewise, we concur with the recommendations provided in Table 6 (pp. 131-133), Table 7 (134-136), and Table 8 (pp. 137-138) regarding Areas Remaining for (Inventory) Survey, Avoidance Areas, and National Register Status, respectively. Thank you for the opportunity to review the project, and we look forward to further consultation and to the review of (outstanding) project documentation on it. If you have questions please contact either Susan Quinnell at (701) 328-3576 or squinnell@nd.gov or Paul Picha at ppicha@nd.gov or (701) 328-3574.

Sincerely,

Merlan E. Paaverud, Jr.
State Historic Preservation Officer (North Dakota)

and
Director, State Historical Society of North Dakota

c: Dennis Rankin, RUS, Washington, DC

c: Barry G. Williams, USFWS, Bismarck

c: Patrick Fahn, ND PSC, Bismarck

Redacted

Class III Intensive Archaeological
Resources Inventory

Center to Grand Forks 345 kV Line

Minnkota Power Cooperative, Inc.

Prepared for
USDA
Rural Utilities Service

Prepared by
HDR Engineering, Inc.

Co-Principal Investigators:
Michael Justin, M.S. & Erika Eigenberger, M.A.

August 2011



Table of Contents

| | |
|--|----|
| Executive Summary..... | 1 |
| Acknowledgements..... | 3 |
| Introduction | 4 |
| The Area of Potential Effects (APE)..... | 4 |
| Project Description | 5 |
| Physiography and Environmental Overview..... | 5 |
| Missouri Plateau | 5 |
| River Breaks | 5 |
| Coteau Slope | 6 |
| Missouri Coteau | 6 |
| Glaciated Plains..... | 6 |
| Glacial Lake Agassiz Sand Deltas and Beach Ridges..... | 6 |
| Red River Valley | 7 |
| Culture History | 7 |
| Precontact Period | 7 |
| Paleo-Indian | 7 |
| Plains-Archaic..... | 8 |
| Plains Woodland | 8 |
| Plains Village | 8 |
| Equestrian-Nomadic | 9 |
| Fur Trade/Contact..... | 9 |
| Historic Period..... | 10 |
| Military Confrontation | 10 |
| American Settlement/Statehood..... | 10 |
| Modern Period | 10 |
| The Great Depression | 10 |
| Modern Industrial Development | 10 |
| North Dakota Archaeological Study Units | 11 |
| Southern Missouri River..... | 11 |
| Landscape | 12 |
| Floral and Faunal Resources | 12 |
| Lithic Resources | 12 |
| Site Types | 12 |

Center to Grand Forks Transmission Line
Class III Intensive Archaeological Resources Inventory

| | |
|--|----|
| James River | 13 |
| Landscape | 14 |
| Floral and Faunal Resources | 14 |
| Lithic Resources | 14 |
| Site Types | 15 |
| Sheyenne River | 16 |
| Landscape | 16 |
| Floral and Faunal Resources | 16 |
| Lithic Resources | 17 |
| Site Types | 17 |
| Northern Red River | 18 |
| Landscape | 18 |
| Floral and Faunal Resources | 18 |
| Lithic and Other Resources | 19 |
| Site Types | 19 |
| Records Search and Literature Review | 20 |
| Previous Surveys | 20 |
| Previously Recorded Archaeological Sites | 23 |
| Research Design | 24 |
| Objectives..... | 24 |
| Methods..... | 24 |
| Predictive Model..... | 24 |
| Field Survey..... | 27 |
| Human Remains/Burials | 27 |
| Site Forms | 28 |
| Collection Policy..... | 28 |
| Results of Investigations | 28 |
| Summary | 28 |
| Survey Segment Coverage | 29 |
| Oliver County | 29 |
| Burleigh County..... | 38 |
| McLean County | 43 |
| Burleigh County..... | 48 |
| McLean County | 50 |
| Sheridan County..... | 50 |

Center to Grand Forks Transmission Line
Class III Intensive Archaeological Resources Inventory

| | |
|--------------------------------------|-----|
| Wells County | 54 |
| Eddy County | 57 |
| Eddy County | 58 |
| Foster County..... | 60 |
| Griggs County..... | 60 |
| Steele County | 68 |
| Nelson County..... | 68 |
| Grand Forks County | 68 |
| Laydown Areas..... | 75 |
| Oliver County | 75 |
| McLean County | 75 |
| Wells County | 76 |
| Foster County..... | 77 |
| Griggs County..... | 78 |
| Grand Forks County | 79 |
| Traill County | 80 |
| Identified Sites | 80 |
| Precontact Sites | 85 |
| Historic Period Sites | 111 |
| Multi-Components Sites | 123 |
| Site Updates | 125 |
| Areas Remaining for Survey..... | 130 |
| Areas of Avoidance | 133 |
| Conclusions and Recommendations..... | 136 |
| References | 139 |

List of Tables

| | |
|---|-----|
| Table 1: Previous Cultural Resources Investigations within the APE..... | 20 |
| Table 2: Previous Cultural Resources within the APE | 23 |
| Table 3: Target Range of Acres for Survey by Probability Zone Based on 1st Model..... | 26 |
| Table 4: Project Survey Area Based on Final Model | 26 |
| Table 5: Identified Sites..... | 81 |
| Table 6: Areas Remaining for Survey | 131 |
| Table 7: Areas of Avoidance..... | 134 |
| Table 8: National Register Status of Sites within ROW..... | 137 |

List of Photos

| | |
|--|-----|
| Photo 1: General Landscape in the Southern Missouri River Archaeological Study Unit..... | 11 |
| Photo 2: General Landscape in the James River Archaeological Study Unit | 14 |
| Photo 3: General Landscape in the Sheyenne River Archaeological Study Unit | 16 |
| Photo 4: General Landscape in the Northern Red River Archaeological Study Unit | 18 |
| Photo 5: Feature 001, Segment B, view to NE | 86 |
| Photo 6: Overview of Artifact Scatter, Segment C, view to E | 88 |
| Photo 7: Feature 001, Segment C, view to W | 88 |
| Photo 8: Partial Projectile Point, Segment C..... | 89 |
| Photo 9: Biface Fragment, Segment C | 89 |
| Photo 10: Overview of Feature 008, Segment D, view to S..... | 90 |
| Photo 11: Overview of Feature 009, Segment D, view to SW | 91 |
| Photo 12: Overview of Feature 001, Segment F, view to SE | 92 |
| Photo 13: Surface Find 001, Segment F | 93 |
| Photo 14: Overview of Surface Find 001, Segment F, view to W | 93 |
| Photo 15: Feature 001, Segment G, view to S | 94 |
| Photo 16: Feature 002, Segment G, view to E | 94 |
| Photo 17: Feature 003, Segment G, view to SW..... | 95 |
| Photo 18: Overview of Feature 003 area, Segment G, view to NW | 96 |
| Photo 19: Surface Find 001, Segment K..... | 97 |
| Photo 20: Overview of Surface Find 001 area, Segment K, view to W | 97 |
| Photo 21: Feature 001, Segment L, view to NW | 98 |
| Photo 22: Feature 002, Segment L, view to NW | 98 |
| Photo 23: Feature 003, Segment N, view to NW | 100 |
| Photo 24: Feature 004, Segment N, view to NE | 100 |
| Photo 25: Feature 005, Segment N, view to SW..... | 101 |
| Photo 26: Feature 001, Segment N, view to S | 102 |
| Photo 27: Overview of Feature 002, Segment N, view to E..... | 102 |
| Photo 28: Feature 006, Segment N, view to W | 103 |
| Photo 29: Overview of Segment DD, view to E..... | 104 |
| Photo 30: Overview of Shovel Test area, Segment DD8, view to NW | 105 |
| Photo 31: Surface Find 001, Segment EE | 106 |
| Photo 32: Overview of Surface Find 001 area, Segment EE, view to S..... | 106 |
| Photo 33: Surface Find 002, Segment EE | 107 |
| Photo 34: Overview of Surface Find 002 area, Segment EE, view to S..... | 107 |

| | |
|--|-----|
| Photo 35: Surface Find 003, Segment EE | 108 |
| Photo 36: Overview of Surface Find 003 area, Segment EE, view to N | 109 |
| Photo 37: Feature 001, Segment HH, view to S..... | 110 |
| Photo 38: Feature 002, Segment HH, view to W | 110 |
| Photo 39: Overview of Feature 001 and 002, Segment HH, view to WSW | 111 |
| Photo 40: Feature 001, Trash Pile, view to N..... | 112 |
| Photo 41: Feature 002, Depression, view to N | 113 |
| Photo 42: Feature 003, Depression, view to SE..... | 113 |
| Photo 43: Feature 004, Depression, view to S..... | 114 |
| Photo 44: Feature 002, Segment D, view to S | 115 |
| Photo 45: Feature 002, Segment D, view to NE..... | 115 |
| Photo 46: Overview of 32SH269, Segment L, view to S..... | 116 |
| Photo 47: Overview of Farmstead and 32GG180, Segment R2, view to SW..... | 117 |
| Photo 48: Surface Find 001, Segment S2, view to E | 118 |
| Photo 49: Overview of Surface Find 001 area, Segment S2, view to W | 119 |
| Photo 50: Feature 005, House Foundation Pit, Segment EEE, view to S | 120 |
| Photo 51: Feature 006, Depression, Segment EEE, view to W | 120 |
| Photo 52: Feature 003, Concrete Foundation, and Feature 004, Windmill, Segment EEE, view to E..... | 121 |
| Photo 53: Surface Find 001, Segment Y, view to E | 122 |
| Photo 54: Surface Find 002, Segment Y, view to W..... | 122 |
| Photo 55: Feature 001, Dump, Segment R1, view to W | 124 |
| Photo 56: Feature 002, Dump, Segment R1, view to S..... | 124 |
| Photo 57: Feature 003, Stone Pile, Segment R1, view to S..... | 125 |
| Photo 58: Large rock on Site Lead 32GGx117, Segment S1, view to E | 128 |
| Photo 59: Overview of Site Lead 32GGx117, Segment S1, view to NW | 128 |

List of Appendices

- Appendix A – Figures (**Sensitive Location Information Removed**)
- Appendix B – Shovel Test Soil Profiles
- Appendix C – Geomorphological Model
- Appendix D – Initial Predictive Model
- Appendix E – Final Predictive Model

Executive Summary

Minnkota Power Cooperative, Inc., (Minnkota) proposes to build an approximately 248-mile-long, 345 kilovolt (kV) Transmission Line (Project) from the Center 345 kV Substation, near Center, North Dakota, to the Prairie Substation, located just west of Grand Forks, North Dakota (Appendix A, Figure 1). The U.S. Department of Agriculture Rural Utilities Service (RUS) is considering a request for funding for the project. RUS has determined that the Project constitutes an undertaking which requires consultation under Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations (36 Code of Federal Regulations (CFR) Part 800). Section 106 requires federal agencies to consider the potential effects of undertakings within their jurisdictions on properties listed, or eligible for listing, on the National Register of Historic Places (NRHP). The project also requires consideration of cultural resources under Section 101(b) of the National Environmental Policy Act (NEPA). RUS must complete an environmental analysis and prepare an Environmental Assessment with scoping (EA) in accordance with its Environmental Policy and Procedures for Implementing the National Environmental Policy Act (7 CFR Part 1794) before the proposed Project can be considered for financing assistance. The draft EA was published in November 2010, prior to the completion of historic property identification studies; however, a Programmatic Agreement was created to address the identification and treatment of historic properties to comply with Section 106 regulations.

In order to identify historic properties that might be affected, in October 2009, Minnkota and its consultant, HDR Engineering Inc (HDR), prepared a Macro-Corridor Study (MCS) for RUS that defined the project study area; a large macro-corridor that varies from 3 to 6 miles in width and traverses North Dakota from the Missouri River in the west to the Red River Valley in the east. The macro-corridor was identified based on environmental, engineering, economic, and permitting constraints, along with an analysis of available land use/land cover data and existing infrastructure. The corridor was developed with the intention that multiple route options could be considered within it, that would minimize environmental impacts by passing near a limited number of residences, crossing rivers near existing linear infrastructure, and avoiding conflicting land uses.

From December 2009 to February 2010, HDR completed a Class I cultural resources inventory (literature search) for the proposed Project. This literature search was based on the macro-corridor, and was performed under contract with Minnkota. The purpose of the literature search was to determine the location of previously recorded historic properties and surveys (archaeological surveys, archaeological sites, and architectural structures) within the study area, and to assess the potential for the presence of as-yet-unrecorded archaeological resources within the macro-corridor. The literature review was completed by HDR employee Dylan Eigenberger, M.A.

In addition, several predictive models were developed to help identify areas within the corridor alternatives that might have a higher potential for containing archaeological resources. Separate models were developed, one for assessing the potential for deeply buried archaeological sites, and another for predicting the occurrence of pre-European contact surface or near-surface archaeological sites (Appendix C, Appendix D, and Appendix E). Development of the models was overseen by HDR employee Marcus Grant, M.A.

After considering the limiting factors presented by the various studies, Minnkota defined a preferred corridor that currently includes portions of Oliver, McLean, Burleigh, Sheridan, Wells, Eddy, Foster, Griggs, Nelson, Steele, and Grand Forks Counties. The preferred corridor is discussed along with the other alternatives in the EA prepared for RUS in November 2010.

In a Programmatic Agreement for this project, RUS defined the Area of Potential Effects (APE) for archaeological resources as the 1,000-ft corridor chosen by Minnkota as the preferred route. Beginning in October 2010, and continuing into June 2011, HDR performed field inventory studies to identify historic properties within the 150-ft preferred right-of-way (ROW) corridor that falls within the APE. As survey of the entire length of the corridor was not considered warranted by RUS, Minnkota and HDR used the combined predictive models to inform the identification effort. Field surveys concentrated on high probability areas, although some moderate- to low-probability areas were also subjected to survey. In other words, the survey strategy did not rely solely on the predictive model, but rather, additional areas were intuitively selected for study by archaeologists while in the field if they appeared to have a high potential for containing archaeological resources, regardless of the model designations. Principal investigators for the survey were HDR employees Michael Justin, M.S., and Strom Engineering employee Erika Eigenberger, M.A.

Files provided by the State Historical Society of North Dakota (SHSND) indicate there are 15 previously identified archaeological sites within the 1,000-ft APE. These sites include six precontact sites, seven historic sites, and two sites with unknown cultural affiliation. None of the previously recorded sites has been evaluated for National Register of Historic Places (NRHP) eligibility. Eight of the 13 sites are within the 150-ft ROW.

This document reports on the results of 80 linear miles (1,700 acres) of intensively surveyed corridor. Methods included pedestrian surface reconnaissance, and shovel testing. The Class III inventory resulted in the identification of 25 previously unrecorded cultural resources including 17 precontact sites; CGF-B-1 (32OL641), CGF-C-1 (32OL642), CGF-D-1 (32OL643), CGF-DD-1 (32BLX287), CGF-DD8-1 (32BLX287), CGF-EE-1 (32MLX767), CGF-EE-2 (32MLX768), CGF-EE-2 (32ML1237), CGF-F-1 (32BL719), CGF-F-2 (32BL720), CGF-G-1 (32ML1238), CGF-G-2 (32ML1239), CGF-HH-1 (32ML1240), CGF-K-1 (32BLX288), CGF-L-1 (32SH268), CGF-N-1 (32SH270), CGF-N-2 (32SH271), seven historic sites; CGF-D-2 (32OL644), CGF-D-3 (32OL645), CGF-L-2 (32SH269), CGF-R1-1 (32GG179), CGF-R2-1 (32GG180), CGF-S2-1 (32GG181), CGF-Y-1 (32GF3552), and one multi-component site; CGF-EEE-1 (32GF3551). Of the 25 previously unrecorded sites, four are isolated finds and are considered not eligible for listing on the NRHP (32BL720, 32BLX288, 32BLX287, and 32MLX767). The remaining 21 sites have not been evaluated for the NRHP and further work would be needed to determine their eligibility.

HDR recommends all newly recorded sites be avoided during construction activities. If avoidance is not possible, HDR recommends that the sites be formally evaluated for their eligibility. Those that are eligible should be analyzed for adverse effects. If adverse effects are determined, appropriate strategies should be followed to mitigate those effects. Such strategies may include avoidance, data recovery, or other mitigation to be determined through consultation.

Acknowledgements

To accomplish the goal of completing a Class III survey and report requires the collaborative work of many individuals. This report is authored by multiple individuals from HDR Engineering, Inc., Strom Engineering, and Strata Morph Geoexplorations, Inc., too numerous to account for fully here. The principal investigators for the Class III Survey are Michael Justin and Erika Eigenberger. Invaluable assistance in report writing, background research and data collection and analysis was provided by Dylan Eigenberger, Stephan Sabatke, Michelle Porwoll, Karen Weber, Mark Glauner, Judy Davis, Megan Mueller, Melissa Lundberg, Aaron Diehl, Michael Swenson, and Jen Theis. GIS and statistical services were provided by Ann Fossum, Jason Smiley, and Marcus Grant. Technical writing and editorial assistance was provided by Meg Desmond, and quality control was provided by Michael Madson.

Introduction

Minnkota Power Cooperative, Inc., (Minnkota) proposes to build an approximately 248-mile-long 345-kilovolt (kV) Transmission Line (Project) from the Center 345 kV Substation, near Center, North Dakota, to the Prairie Substation, located just west of Grand Forks, North Dakota (Appendix A, Figure 1). The U.S. Department of Agriculture Rural Utilities Service (RUS) is considering a request for funding for the project. RUS has determined that the Project constitutes an undertaking which requires consultation under Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations (36 Code of Federal Regulations (CFR) Part 800). Section 106 requires federal agencies to consider the potential effects of undertakings within their jurisdictions on properties listed, or eligible for listing, on the National Register of Historic Places (NRHP). The project also requires consideration of cultural resources under Section 101(b) of the National Environmental Policy Act (NEPA). RUS must complete an environmental analysis and prepare an Environmental Assessment with scoping (EA) in accordance with its Environmental Policy and Procedures for Implementing the National Environmental Policy Act (7 CFR Part 1794) before the proposed Project can be considered for financing assistance. The draft EA was published in November 2010, prior to the completion of historic property identification studies; however, a Programmatic Agreement was created to address identification and treatment of historic properties to comply with Section 106 regulations.

The project will cross several major rivers and streams that fall under the jurisdiction of the U.S. Army Corps of Engineers. It will also cross easement lands under the jurisdiction of the U.S. Fish and Wildlife Service. These federal agencies have responsibilities under Section 106 of the National Historic Preservation Act, as amended, as well as other federal regulations. However, RUS has assumed the role of lead federal agency for the project, as it is considering funding the project. Numerous telephone conference calls and on-site meetings were held with federal agencies, regional American Indian tribes, and the State Historical Society of North Dakota (SHSND). These meetings and conversations resulted in a Programmatic Agreement among the consulting parties that details the specific project concerns relating to historic property identification, possible adverse effects, and treatment.

The Area of Potential Effects (APE)

In a Programmatic Agreement for this project, RUS defines the Area of Potential Effects (APE) for archaeological resources as the 1,000-ft corridor chosen by Minnkota as the preferred route. This is the area within which a 150-ft right of way (ROW) will be obtained for line construction, and where ground-disturbing activities may occur. The 150 ft ROW will be negotiated with landowners and is subject to the approval of the North Dakota Public Services Commission. Pedestrian survey and subsurface testing was limited to the 150-ft ROW, with the understanding that it could shift within the 1,000 ft APE. Any shifts would be subject to review.

Also included in the APE are 18 staging or laydown areas and areas of substation expansion, access roads, and other areas where ancillary construction activities may alter the ground surface and therefore, may affect possible archaeological sites. This APE does not take into consideration effects to buildings, standing structures, or traditional cultural properties.

This report will not duplicate the physiography and environmental overviews provided in the Class I survey report, but will summarize them as necessary. It will, however, present cultural contexts and the archaeological study units relevant to the preferred alignment, will discuss the results of field research, and will make recommendations for additional research and eligibility recommendations for the NRHP

for any archaeological resources identified through this effort. While references may be made to other types of cultural resources, this report is an inventory of only archaeological resources.

Project Description

The Project consists of approximately 248 miles of new, high voltage AC transmission line from the existing Center 345 kV Substation at the Milton R. Young Generation Station located about 4.5 miles southeast of the town of Center, North Dakota in Oliver County, to the existing Prairie Substation located on the western boundary of the city of Grand Forks, North Dakota in Grand Forks County. While final engineering and design have not been completed, the majority of the line will be constructed with self-supported mono-pole tubular steel structures. Typical structures will be approximately 140-foot-high and placed approximately 1,000-feet apart. While the typical ROW is approximately 150-foot-wide, in some limited instances, where specialty structures are required for long spans, additional ROW may be needed for the transmission line. Eight staging areas will be established for the proposed Project, 18 potential locations will be surveyed to determine the appropriate locations. Six staging areas would be located along the proposed route, one staging area would be located at the Center 345-kV Substation, and one staging area would be located at the Prairie Substation. Four fiber optic regeneration stations with permanent access roads would be required along the transmission line route. Also possible is the burial of distribution lines within the existing ROW.

Physiography and Environmental Overview

From west to east, the corridor crosses the Great Plains and Central Lowlands physiographic provinces of North Dakota (Bluemle and Biek 2007). Within these provinces, the corridor traverses seven physiographic regions: the Missouri Plateau, the River Breaks, the Coteau Slope, the Missouri Coteau, the Glaciated Plains, the Glacial Lake Agassiz Sand Deltas and Beach Ridges, and the Red River Valley (Bluemle and Biek 2007, USGS 2006) (Appendix A, Figure 2).

Missouri Plateau

The Missouri Plateau region is an unglaciated landscape characterized by rolling plains, isolated sandstone buttes, and a complex stream drainage pattern (USGS 2006). Historically this region was a shortgrass prairie with natural vegetation including blue grama, wheatgrass/needlegrass association, little bluestem, and prairie sandreed. Patches of native prairie can still be found on unbroken rangeland throughout this region. The current land use consists of a mix of dryland agriculture (spring wheat, barley, oats, and sunflowers) and cattle grazing. The mean annual precipitation is 15 to 17 inches. The average January high temperature is 21°F, while the average July high is 83°F. The average frost free season lasts from 95 to 130 days (USGS 2006).

River Breaks

The River Breaks region encompasses the floodplains, terraces, and steeply dissected upland margins of the Missouri River and its major tributaries (USGS 2006). Due to the steep and broken nature of the topography, this region retains more natural vegetation than surrounding areas. Native grasses, including blue grama, western wheatgrass, buffalograss, and some bluestem, can still be found throughout this region. Juniper and deciduous trees can be found in draws and on north-facing slopes. Cottonwood gallery forests line the floodplains, although they have been largely eliminated along the Missouri River due to impoundments. Due to the steep terrain, current land use is largely restricted to cattle grazing. The mean annual precipitation in this region is 16 to 18 inches. The average January high

temperature is 21°F, while the average July high is 87°F. The average frost free season lasts from 80 to 125 days (USGS 2006).

Coteau Slope

The Coteau Slope is characterized by a gently rolling topography with fewer pothole wetlands and more streams as it slopes down from the Missouri Coteau to the Missouri River Trench (USGS 2006). Historically, this region was a mixed-grass prairie with natural vegetation including western wheatgrass, needleandthread, prairie junegrass, and green needlegrass. The current land use consists mostly of agriculture (spring wheat, barley, alfalfa, silage corn) with some cattle grazing on the steeper slopes along drainages. The mean annual precipitation is 15 to 18 inches. The average January high temperature is 20°F, while the average July high is 86°F. The average frost free season lasts from 110 to 130 days (USGS 2006).

Missouri Coteau

The Missouri Coteau is characterized by rolling, hummocky topography containing numerous pothole wetlands. This region's distinctive pothole topography was formed when the Wisconsinan glacier stalled on the Missouri escarpment during its retreat and gradually melted beneath a mantle of sediment. Historically, this region was a mixed-grass prairie with natural vegetation including western wheatgrass, bluestem, needleandthread, and green needlegrass, along with prairie cordgrass and northern reedgrass near wetlands. Patches of native prairie can be found on unbroken rangeland throughout this region. The current land use consists of a mix of cattle grazing on steeper terrain and agriculture (winter wheat, hay) in areas of less topographical relief (USGS 2006). This region's climate is semiarid continental, with long, cold winters and hot summers (Gregg et al. 2008). The mean annual precipitation in this region is 15 to 19 inches. The average January high temperature is 16°F, while the average July high is 84°F. The average frost free season lasts from 110 to 130 days (USGS 2006).

Glaciated Plains

The Glaciated Plains region is characterized by a rolling landscape with numerous temporary and seasonal wetlands formed by glacial till deposited by the Wisconsinan glacier as it slowly retreated. Historically, this region was a mix of tall and shortgrass prairie with natural vegetation consisting of western wheatgrass, big and little bluestem, switchgrass, and indiagrass. The current land use consists almost completely of agriculture (spring wheat and other small grains, sunflowers, and alfalfa). The mean annual precipitation is 17 to 19 inches. The average January high temperature is 16°F, while the average July high is 83°F. The average frost free season lasts from 95 to 125 days (USGS 2006).

Glacial Lake Agassiz Sand Deltas and Beach Ridges

The Glacial Lake Agassiz Sand Deltas and Beach Ridges region is characterized by topographical relief at the western edge of the flat Red River Valley. The beach ridges are parallel lines of sand and gravel up to several miles wide that were deposited by wave action on the varying shorelines during fluctuations in the level of Glacial Lake Agassiz. The sand deltas are made up of sand lenses and were formed where major rivers entered Glacial Lake Agassiz and deposited sediment. Some of these deposits were windblown and formed dunes. Historically, this region was covered by tallgrass prairie, with oak savannah in the sand delta areas. The current land use consists of agriculture on the beach ridges (sunflowers, potatoes, and small grains) and cattle grazing on the sand deltas. The mean annual precipitation is 18 to 21 inches. The average January high temperature is 12°F, while the average July high is 82°F. The average frost free season lasts from 95 to 125 days (USGS 2006).

Red River Valley

The Red River Valley is the basin of Glacial Lake Agassiz, composed of thick, lacustrine sediments underlain by glacial till. This region is extremely flat, with the majority of land under cultivation. Meandering streams and tributaries drain into the Red River from the uplands to the east and west. This region has fewer lakes and pothole wetlands than surrounding regions, with most wetlands being drained and ditched for agriculture. Historically, this region was mostly tallgrass prairie, with woodland found along rivers and streams. Natural vegetation included big and little bluestem, switchgrass, and indiagrass, along with cottonwood, willow, green ash, burr oak, and American elm trees. The current land use consists almost exclusively of intensive agriculture (sugar beets, potatoes, edible beans, and wheat) with wooded areas along streams and rivers and within shelterbelts. Urban and residential development is increasing. The mean annual precipitation in this region is 18 to 21 inches. The average January high temperature is 12°F, while the average July high is 82°F. The average frost free season lasts from 95 to 125 days (USGS 2006).

Culture History

This section provides a summary of the five precontact/protohistoric cultural traditions identified in the SHSND's State Historic Preservation Office (NDSHPO) planning document *The North Dakota Comprehensive Plan for Historic Preservation: Archaeological Component*: Paleo-Indian; Plains Archaic; Plains Woodland; Plains Village; and Equestrian Nomadic (Gregg et al. 2008). These cultural traditions are differentiated based on technical innovations (e.g. changes in projectile point form or pottery decoration) and changes in resource exploitation and mobility patterns that can be observed in the archaeological record. This section also presents an overview of the state's Contact, Historical, and Modern period contexts. Within these contexts we examine historical events and trends important to the development of North Dakota as a state. The following discussion of precontact cultural traditions has been adapted from *The North Dakota Comprehensive Plan for Historic Preservation: Archaeological Component* (Gregg et al. 2008), and *The Handbook of North American Indians* (DeMallie 2001). The following overview of the Contact, Historical, and Modern period contexts in North Dakota has been adapted from *Early History of North Dakota: Essential Outlines of American History* (Lounsbury 1919), *Out Where the West Begins: Early and Romantic History of North Dakota* (Trinka 1920), and the chapter "North Dakota History: Overview and Summary" from *North Dakota Blue Book* (Remele 1998).

Precontact Period

Paleo-Indian

The Paleo-Indian Tradition (9500-5500 BC) begins with what is thought to be the initial peopling of the state following the recession of the Wisconsin glacier, and lasts until the transition of Paleo-Indian lifeways into Plains Archaic lifeways. Boreal climatic conditions dominated the early part of this tradition. Grasslands and spruce-aspen parklands surrounding major rivers and large lakes were common throughout the state and were popular locations for Paleo-Indian settlement. This tradition is characterized by a highly mobile, nomadic settlement pattern and a subsistence strategy based largely on hunting Pleistocene megafauna such as mammoths, camels, and giant bison, and later, smaller species of bison closer in size to modern forms. Wild plant foods were gathered as well, but archaeological evidence regarding this activity is sparse. Large lanceolate and fluted projectile points diagnostic of this tradition are used to mark the various Paleo-Indian cultural complexes represented in North Dakota. These include Clovis, Goshen, Folsom, Hell Gap-Agate Basin, Cody, Parallel Oblique Flaked, Pryor Stemmed, and Caribou Lake. Site types include camps, Knife River flint (KRF) quarry sites, other lithic procurement areas, lithic workshops, and isolate artifact finds.

Plains-Archaic

The Plains-Archaic Tradition (5500-400 BC) is characterized by hunting and gathering adaptations to a plains ecosystem with a greater variety of resources available for exploitation. Climatic shifts during this period brought about more arid and droughty conditions, broken up by short periods of more mesic conditions. These climatic conditions may have led to declining populations and a reduction in the extent of interaction between population groups. Settlement patterns for this tradition are not as well known as other traditions because comparatively few Archaic period sites have been identified in the state. Projectile point styles became more regionalized, indicating the beginnings of regional cultural variation. Diversified technologies associated with hunting, trapping, fishing, foraging, wood working, and plant processing are represented in the material culture from Plains-Archaic sites. Of particular note, the atlatl weapon is developed during this tradition, and ground stone tools appear in the archaeological record. Side-notched projectile points and chipped stone scrapers, knives, punches, and drills also appear in the Plains-Archaic toolkit. Plains Archaic complexes recognized in North Dakota include Logan Creek-Mummy Cave, Oxbow, McKean Lanceolate, Duncan, Hanna, Yonke, and Pelican Lake. Site types include animal kill sites, camps, KRF quarry sites, lithic workshops, and burial sites.

Plains Woodland

The Plains Woodland Tradition (400 BC-AD 1200) is characterized by the emergence of ceramic technology, mound burials, and limited horticulture in addition to the continued subsistence strategies and settlement patterns exhibited in the Plains Archaic Tradition. The climate began to stabilize and resembled the climate that exists today. The development of horticulture and construction of burial mounds indicate a transition to a more sedentary lifestyle in this tradition. Interaction between population groups broadened and trade networks with other parts of the country expanded. The bow and arrow was developed during this tradition. Smaller side- and corner-notched projectile points, along with a variety of chipped stone cutting tools, ground stone tools, and ceramic pottery, are common in the Plains Woodland toolkit. The Plains Woodland complexes recognized in North Dakota are based largely on ceramic wares and include Sonota/Besant, Laurel, Avonlea, Brainerd, Blackduck, Mortlach, Old Women's, and Sandy Lake. Site types include burial mounds and other burial sites, occupations, camps, quarries and lithic procurement areas, and bison kill sites.

Plains Village

The Plains Village Tradition (AD 1200-ca. 1780) is characterized by an intensification of agriculture and the emergence of larger, more complex societies. Subsistence strategies included an equal mixture of cultivating river floodplains for garden crops and hunting game, primarily bison, in the upland grasslands. Corn was the primary crop cultivated during this tradition. Dried corn was stored in subterranean storage pits, creating a dependable surplus of food. This surplus supported semi-permanent earthlodge villages, situated on the higher terraces and uplands overlooking river channels and floodplains. The Plains Village cultures in North Dakota were concentrated primarily along the Missouri River Trench and within the James and Sheyenne River basins, although hybrid Woodland/Plains Village cultures existed in other parts of the state. Material culture from this tradition includes distinctly decorated ceramic pottery, triangular chipped-stone side-notched and unnotched projectile points, chipped stone end scrapers, drills and bifaces, bison or elk scapulae hoes and digging tools, an array of bone tools and decorations, mollusk shell beads and ornaments, a variety of ground stone tools, and various smoking pipes. Luxury items include native copper from the Great Lakes, shells from the Gulf or Atlantic coasts, snails from the southeastern United States, steatite from northern Wyoming, obsidian from near Yellowstone Park in Wyoming, dentallium from the Pacific Coast, and catlinite from southwestern Minnesota. In North Dakota, the Plains Village tradition is subdivided into

the Middle Missouri and Coalescent Traditions, and the Northeastern Plains Village Complex. Site types include occupations (fortified and unfortified earthlodge villages), winter villages, camps (hunting), flint quarries, eagle trapping sites, conical timber lodges, burials, lithic workshops, bison kill sites, and rock art sites.

Equestrian-Nomadic

The Equestrian Nomadic period (AD 1780-1880) encompasses both the late Protohistoric and Historic times, following the arrival of European trade goods and the introduction of the horse. The horse replaced the dog as a beast of burden and allowed a more nomadic settlement pattern. Subsistence economies changed as groups were able to travel further from residential bases to hunt bison and other large game. The new Equestrian Nomadic lifeway spread throughout the region and was adopted by different cultural groups, eventually leading to greater interactions among them. Less complex bands came together and formed larger tribes as migration increased and competition for resources grew. An increasing number of European trade goods appear in the material culture of this period. Site types include camps, battle sites, and animal kill sites.

Fur Trade/Contact

One of the first known Euro-American expeditions into North Dakota was by Pierre Gaultier de la Verendrye, a French explorer and fur trader, who in 1738 visited Mandan villages near present day Bismarck. By the 1790s the Canadian North West Company and Hudson's Bay Company erected trading posts along the Red River of the North and in the northeastern corner of the state. Euro-American interest in this part of the country increased with the United States' purchase of the Louisiana Territory in 1803. The Lewis and Clark expedition was organized to explore and report on this new territory, and in 1804 they passed through North Dakota. During their time in North Dakota, Lewis and Clark visited Mandan, Hidatsa, and Arahami villages along the Missouri River, and wintered in Fort Mandan, which they built 6 miles below the mouth of the Knife River. The following year, the expedition made its way through the rest of North Dakota on its way into present day Montana.

Increasing numbers of explorers and fur traders would reach the area in the following years. This time period is recognized by the establishment, operation, and adaptation of gathering the hides of fur bearing mammals in exchange for other goods and materials. This exchange linked the Northern Plains to a world-wide economic and political system. Increased demand for furs by European societies led to the establishment of settlements or forts in strategic locations throughout the Northern Plains. These areas of centered interaction allowed the furs to be procured in an orderly fashion and transported to markets in Europe as quickly as possible. One of the earliest settlements in North Dakota was a colony set up by white settlers from Winnipeg in 1812 at the confluence of the Pembina River and the Red River of the North near present day Pembina. The Red River Valley was also occupied by the Metis, people of mixed European and Native American ancestry. The Metis were active in the fur trade in the region, and they carried furs and merchandise between Winnipeg and St. Paul, Minnesota, by oxcart. By 1859 steamboats were being used to transport goods between the two cities. Known site types include fur trading posts and forts; trails; loading and shipping facilities; trapping, trading and hunting grounds; camps and camp sites; steamboat docks; stores, dwellings, and warehouses; and residences of prominent fur trade participants.

Historic Period

Military Confrontation

This time period, defined as between 1862 and 1870, is characterized by an increasing U.S. federal presence in the form of a chain of military outposts. An unfulfilled treaty between the federal government and the Dakota led to a violent uprising in Minnesota in 1862. This in turn led to major military expeditions by the U.S. government in 1863, 1864, and 1865. Battles at Whitestone Hill and Killdeer Mountain in 1863, and battles in the Badlands in 1864, diminished Dakota resistance. However, strained relations between federal entities and Dakota populations existed well into the 1890s, and to some extent still exist today. Known site types include forts, posts, armories, battlefields, trails, roads, bridges, fords, mail stations, cemeteries, villages, camps, camp sites, dumps, defensive work corrals, barns, storage areas, and dwellings and residences.

American Settlement/Statehood

The American Settlement time period ran from 1861 through North Dakota's statehood in 1889. The settlement of North Dakota was a direct tie to creation of railroads and railroad lines across the state. In 1862, gold was discovered in present day Montana and Idaho, leading to waves of settlers traveling west across North Dakota. In 1864, the Northern Pacific Railroad Company was granted rights to build a railroad through the territory, and in 1871, an expedition with a military escort was sent out to scout and survey potential routes. In 1872, the Northern Pacific was built as far as Bismarck, and by the end of the 1870s, railroad links from the east brought homesteaders, including many Norwegian and German immigrants, to the state. Throughout the 1870s and 1880s towns and settlements developed to serve homesteaders, frontier citizens, and railroad crews working in the territory. Around 1879, a population boom occurred that had direct ties to the development of organized, highly mechanized, and large bonanza farms. These bonanza farms had a dramatic effect on the landscape. For the first time, large sections of land were able to be cultivated.

On November 2, 1889, President Benjamin Harrison approved the admission of North Dakota to the United States. The new state was a Republican stronghold, with the state government dealing with issues concerning large amounts of resources and wealth being extracted from the state with no reinvestment. This eventually led to the Democratic Party winning elections and in turn reinvesting wealth and resource back into the state. Known site types may include towns, colonies, settlements, reservations, businesses, residences, farms, courthouses, city halls, township halls, government office buildings, office jails, police and sheriff's offices, fire stations, maintenance shops, storage yards, buildings and facilities, dumps, warehouses, roads, highways, streets, alleys, bridges, water and sewer treatment facilities, and homes of prominent local political leaders.

Modern Period

The Great Depression

During the Great Depression (1929-1940), a slowing national economy, heavy from debt, low prices for agricultural goods, crop failures, dust storms, and extreme weather resulted in series of farm foreclosures, bank failures, and abandonment of residential dwellings and businesses. Known site types may include abandoned farms, banks, business buildings, city parks, civic improvements, relief facilities, Works Progress Administration projects, and Civilian Conservation Corps camps and project sites.

Modern Industrial Development

Remele defines this time period as the 1940s, 50s, and 60s. During this time period, a postwar economy was driving the development of large industrial facilities in order to change raw materials into products

for local and national consumption. Large construction projects, such as dam building and reservoirs, allowed farms, corporations, and citizens of the state to control their access to water resources throughout the year in a more predictable manner. Discovery of natural resources, such as oil and coal, allowed development of these industries in the state. Additionally, the beginnings of Cold War stress between the U.S. and foreign governments generated a perceived need for strategic placement of military bases. In 1960, two large Air Force bases were built in North Dakota at Grand Forks and Minot. Known site types include Air Force installations, armories, storage areas, dwellings and residences, brick plants, concrete plants, bottling plants, meat packing plants, food processing plants, assembly plants, factories, foundries, saw mills, gristmills, gravel potash and uranium mines, tipples, mines, mine entrances, loading and transportation facilities, storage yards, railroad spurs, office buildings, camps, oil wells, gas wells, petroleum product refineries, tank batteries, pipelines, and pumping stations.

North Dakota Archaeological Study Units

The SHSND has divided the state into thirteen archaeological study units, based on major drainage basins. These study units were developed to enable a better analysis of prehistory or history in terms of regional adaptations to geography and environmental conditions (Gregg et al. 2008). The Project corridor encompasses portions of four archaeological study units: The Southern Missouri River, the James River, the Sheyenne River, and the Northern Red River (Gregg et al. 2008) (Appendix A, Figure 3).

Southern Missouri River

The Southern Missouri River archaeological study unit (SMSU) is centered on the north-to-south portion of the Missouri River Trench located in south-central North Dakota (Photo 1). This study unit falls within the Great Plains physiographic province and traverses the Missouri Coteau, the Coteau Slope, and the River Breaks physiographic regions, as well as a small portion of the Missouri Plateau region west of the Missouri River (Bluemle and Biek 2007, USGS 2006). The following discussion of the SMSU is adapted from *The North Dakota Comprehensive Plan for Historic Preservation: Archaeological Component: Southern Missouri Study Unit* (Gregg et al. 2008).



Photo 1: General Landscape in the Southern Missouri River Archaeological Study Unit

Landscape

Before modern dam impoundments, the Missouri River flowed through a broad, deeply entrenched valley. The Missouri River Valley and some of its larger tributaries are made up of several landforms that have been utilized by human populations since the end of the Pleistocene: floodplains, terraces, and breaks terrain. The floodplains of the Missouri River and its tributaries are made up of alluvial sediments that have built up to variable thicknesses since the final retreat of the last Pleistocene glacier. These floodplain deposits may vary from several to many meters thick. The terraces of the Missouri River and its tributaries are made up of lateral, uneroded margins of prior stream beds or remains of former floodplains that are currently located above the existing floodplain. Three terraces have been identified within the Missouri River Valley. The uppermost Holocene sediments in these terraces are eolian in origin and classified in the Oahe Formation. These terraces were flood-free and well drained and were heavily occupied as warm weather residential settlements. The Missouri River “breaks” are the eroded and steeply dissected margins of the River Trench, and often appear as woody draws. The breaks were important resource procurement areas exploited for both faunal and floral resources. Outside of the Missouri River Valley, the upland plains landscape, characterized by the rolling uplands and pothole lakes of the Missouri Coteau, has been utilized since at least the Late Plains Archaic. Stone circles and other rock features such as cairns are common site types found in these rolling uplands.

Floral and Faunal Resources

Floral resources historically available in the SMSU include the cottonwood, willow, box elder, and green ash trees that comprise the forested areas within the floodplain of the Missouri River, stands of mixed deciduous trees in the valley breaks, wild plant foods with edible roots such as textile onion, biscuitroot, prairie turnip, ground plum, and other edible plants including chokecherries, buffaloberries, gooseberries, and wild plums. Faunal resources historically available in the SMSU include large mammals such as white-tailed deer, mule deer, Bison, elk, and antelope; semiaquatic mammals such as beaver; aquatic animals including numerous fish species, turtles, and various mussels; and a variety of avian species including eagles, hawks, owls, pelicans, magpies, and diverse waterfowl. Predators in this study unit include the wolf, coyote, and fox. Pleistocene megafauna, such as mammoths and camels, were available in the SMSU until their extinction in the early Holocene.

Lithic Resources

KRF was the preferred raw material for making chipped stone tools in the northern half of the SMSU. Tongue River silicified sediment was an important lithic raw material utilized by both Plains Village and earlier peoples living to the south near the Missouri-Cannonball confluence.

Other Lithic materials such as granite and rocks of coalburn origin (clinker and scoria) were important for secular and ceremonial functions. Granite cobbles were used both as construction materials and as sources of heat transfer in food preparation and ceremonial sweatbathing. Granite was also used to fashion large hammering, grinding, and abrading tools. Clinker and scoria were used for domestic chores as well as ritual functions in the Plains Village ceremonial practices.

Site Types

Within the SMSU, site types such as cultural material scatters, earthworks, fortifications, graves, hearths, mounds, pits, and trails are frequently found on the terraces of the Missouri River and its major tributaries. The majority of earthlodge village sites found within the SMSU are located on terraces. Site types including stone rings, other rock features, and rock art sites more commonly found on hills, knolls, bluffs, and ridges. This section presents the common site types associated with each of the major precontact/protohistoric cultural traditions identified in North Dakota.

Paleo-Indian Tradition

During the Paleo-Indian Tradition, this study unit would have been dominated by spruce-aspen forests and wetlands. Landforms available for settlement would have included the remnant surfaces of old river terraces, and the rim of the uplands overlooking the Missouri River Valley. Site types associated with the Paleo-Indian Tradition in this study unit are limited to scattered finds of chipped stone projectile points.

Plains Archaic Tradition

During the Plains Archaic Tradition, the ecosystem transitioned to prairie as the boreal forest conditions withdrew. The terrace settings of the Missouri River and its tributaries would have been open prairie during this time. During dryer climatic conditions during this period, settlement in this study unit may have been limited to the Missouri River Trench. Site types associated with the Plains Archaic Tradition in this study unit are limited to chipped stone projectile points.

Plains Woodland Tradition

During the Plains Woodland period, the Missouri River Trench was the focus of residential settlement. Plains Woodland functional site types identified in the SMSU include mortuary sites, field camps, and residential bases. Site/feature types associated with the Plains Woodland Tradition found within the SMSU include cultural material scatters, earthworks, graves, hearths, mounds and animal processing sites. Based on studies in other study units, site/feature types associated with the Plains Woodland Tradition likely to be found in the SMSU include bison jump sites, lithic procurement areas, and stone circles.

Plains Village Tradition

The SMSU contains the majority of North Dakota's Plains Village period earthlodge villages and other settlements. These settlements were more intensively and continuously occupied here than in any other part of the state. Plains Village site/feature types identified in the SMSU include cultural material scatters, earthlodge villages, earthworks, fortifications, graves, hearths, mounds, and pits.

Nomadic Equestrian Tradition

The most common sites attributed to the Nomadic Equestrian period are stone circle sites located on the Coteau east of the river. These sites can be found along ridges or hill crests, often with commanding views of the surrounding country. Previous archaeological investigations indicate that some sites with large numbers of ring features were used recurrently.

James River

The James River archaeological study unit (JRSU) is centered on the James River, flowing north to south in eastern North Dakota (Photo 2). This study unit falls within the Central Lowlands physiographic province and traverses the Glaciated Plains physiographic region (Bluemle and Biek 2007). The following discussion of the JRSU is adapted from *The North Dakota Comprehensive Plan for Historic Preservation: Archaeological Component: James River Study Unit* (Swenson and Bleier 2008).



Photo 2: General Landscape in the James River Archaeological Study Unit

Landscape

Following the recession of the Wisconsin glacier, the terrain of this study unit was colonized by a boreal forest with openings dominated by sagebrush. By the mid-Holocene, the boreal forest had shifted east of the Red River, and was replaced by prairie grasslands. This prairie grassland ecosystem has persisted into the present. A variety of landforms are present in the study unit and include uplands, valley wall side slopes, valley wall foot slopes, alluvial fans, river terraces, flood plains, and lake plains. The rolling uplands are characterized by ground moraines, end moraines, and valley trains.

Floral and Faunal Resources

Floral resources historically available in the JRSU include the willow, elm, ash, box elder, cottonwood, and bur oak trees that comprise the gallery forests of the James River and associated drainages, along with edible plants such as prairie turnips, chokecherries, wild plums, currants, raspberries, snowberries, junberries, and gooseberries. Faunal resources historically available in the JRSU included large and small mammals such as bison, elk, pronghorn antelope, white-tailed deer, beaver, badger, raccoon, muskrat, fox, coyote, wolf, skunk, jack rabbit, cottontail rabbit, mink, weasel, ground squirrel, and some insectivores; aquatic species included painted turtles, snapping turtles, bullheads, yellow perch, northern pike, and numerous species of mollusks; and avian species included geese, ducks, raptors, and song birds. Pleistocene megafauna such as mammoths and camels were available in the JRSU until their extinction in the early Holocene.

Lithic Resources

Lithic raw material sources available in this unit can be found in both stream gravels and the glacial till and include Tongue River silicified sediment, Swan River chert, chalcedony, quartzite, and occasionally KRF. The glacial till also provided small boulders that were used for securing tipi covers, building cairns, capping caches and burials, and creating game drive alignments, among other purposes. Granite was used to make ground- and pecked stone artifacts. Rocks were also used for stone boiling and sweat bathing.

Site Types

Within the JRSU, common site/feature types include cultural material scatters and mounds. A number of other site/feature types including graves, other rock features, and stone circles are also present within this study unit, along with two earthlodge villages. The majority of the recorded sites in the JRSU are located on hills, knolls, or bluffs, although a number of sites are located on floodplains, ridges, and upland plains as well. This section presents the common site types associated with each of the major precontact/protohistoric cultural traditions identified in North Dakota.

Paleo-Indian Tradition

Sites dating to the Paleo-Indian period are rare in the JRSU. A few scattered surface finds consisting of lithic tools or projectile points have been found throughout the unit, mostly in the uplands and on valley rims. Only one subsurface Paleo-Indian site has been found within the study unit. This site consisted of a partially excavated mammoth with no associated artifacts located just west of the James valley in Stutsman County. Although no artifacts were found, a portion of this site remains intact for future study.

Plains Archaic Tradition

As of 2008, the only site/feature types associated with the Plains Archaic Tradition identified in the JRSU were cultural material scatters, one burial site, and isolated finds of projectile points. Based on studies in other study units, site/feature types associated with the Plains Archaic Tradition likely to be found in the JRSU include hearths, bison jump sites, rock cairns, rock alignments, stone circles, and storage and refuse pits.

Plains Woodland Tradition

Plains Woodland functional site types identified in the JRSU include mortuary sites, field camps, and residential bases. Most of the mortuary sites are located in mounds in the uplands. The residential bases, special purpose mortuary sites, and temporary campsites should be present near these mound sites in both the floodplain and uplands. Site/feature types associated with the Plains Woodland Tradition identified in the JRSU include cultural material scatters, earthworks, graves, hearths, mounds, rock cairns, and storage and refuse pits. Based on studies in other study units, site/feature types associated with the Plains Woodland Tradition likely to be found in the JRSU include bison jump sites, lithic procurement areas, and stone circles.

Plains Village Tradition

Previously recorded Plains Village residential sites have all been located on floodplain and terrace settings. Mounds attributed to the Plains Village Tradition are mostly situated along the bluffs of the James River Valley, although some are located on terraces as well. Plains Village site/feature types identified in the JRSU include cultural material scatters, earthlodge villages, earthworks, fortifications, graves, hearths, mounds, pits, and lithic procurement areas.

Nomadic Equestrian Tradition

Tribes likely to have been in the JRSU during early historic times include the Dakota (Yankton and Yanktonai), Cheyenne, Awaxawi Hidatsa, and Assiniboine. The most common sites attributed to the Nomadic Equestrian Tradition are stone circle sites. These sites can be found along ridges or hill crests, often with commanding views of the surrounding country. Previous archaeological investigations indicate that some sites with large numbers of ring features were used recurrently.

Sheyenne River

The Sheyenne River archaeological study unit (SRSU) is centered on the Sheyenne River as it flows east to west, then north to south through eastern North Dakota (Photo 3). This study unit falls within the Central Lowlands physiographic province and the majority of it traverses the Glaciated Plains physiographic region, with a small portion traversing the Missouri Coteau physiographic region to the west, and a small portion traversing the Red River Valley physiographic region to the southeast (Bluemle and Biek 2007). The following discussion of the SRSU is adapted from *The North Dakota Comprehensive Plan for Historic Preservation: Archaeological Component: Sheyenne River Study Unit* (Swenson and Bleier 2008).



Photo 3: General Landscape in the Sheyenne River Archaeological Study Unit

Landscape

The landscape of this region is characterized by gently rolling hills, low ridges, swales, and prairie pothole lakes and wetlands. The southeastern part of the SRSU encompasses part of the flat, featureless plain of the Red River Valley. The Sheyenne River flows through a deep, wide, entrenched valley formed by water flowing along the front of the ice sheets during the Late Wisconsinan glaciations. Large volumes of water and sediment dumped into the river from glacial lakes Souris and Minnewaukan created many of the morphological features of the modern channel. Landforms found in the SRSU include floodplains, terraces, beach ridges, valley walls, alluvial/colluvial fans, and upland plains.

Floral and Faunal Resources

Floral resources historically available in the SRSU include American elm, green ash, burr oak, and basswood trees in the wooded areas along portions of the older terraces, valley slopes, and floodplain along the Sheyenne River; prairie turnips, sage and wolfberry in the uplands; and fruit-bearing shrubs such as chokecherry, plum rose, and currant. Faunal resources historically available in the SRSU include bison, elk, pronghorn antelope, foxes, coyotes, wolves, jack rabbits, ground squirrels, and at times, moose and caribou in the grasslands. White-tailed deer, bear, raccoons, wolf, wildcat, martin, mink, skunk, and cottontail rabbits were found in the forests. Beaver, muskrat, shore birds, and migratory waterfowl were found in the riparian areas. Avian species included raptors, songbirds, and game birds such as wild turkey, grouse, prairie chickens, and mourning doves. Aquatic species included northern

pike, perch, and freshwater mussels. Pleistocene megafauna such as mammoths and camels were available in the SRSU until their extinction in the early Holocene.

Lithic Resources

Lithic raw material sources available in this unit can be found in both stream gravels and the glacial till and include Tongue River silicified sediment, Swan River chert, and other cherts. The glacial till also provided small boulders that were used for securing tipi covers, building cairns, capping caches and burials, and creating game drive alignments, among other purposes. Granite was used to make ground- and pecked-stone artifacts. Rocks were also used for stone boiling and sweat bathing.

Site Types

Within the SRSU, common site/feature types include cultural material scatters, mounds, stone circles, and other rock features. The majority of the recorded sites in the SRSU are located on upland plains, hills, knolls, bluffs, and ridges. This section presents the common site/feature types associated with each of the major precontact/protohistoric cultural traditions identified in North Dakota.

Paleo-Indian Tradition

Site types associated with the Paleo-Indian Tradition in this study unit are limited to scattered finds of chipped-stone projectile points.

Plains Archaic Tradition

Plains Archaic site types identified in the SRSU include isolated finds of projectile points, cultural material scatters, and a possible burial location. Based on studies in other study units, feature types associated with the Plains Archaic Tradition likely to be found in the JRSU include hearths, bison jump sites, rock cairns, rock alignments, stone circles, and storage and refuse pits. Site types including field camps, residential bases, locations, stations, caches, and ceremonial areas are likely to be present as well.

Plains Woodland Tradition

Plains Woodland functional site types identified in the SRSU include mortuary sites, field camps, residential bases, and animal processing sites. Site/feature types associated with the Plains Woodland Tradition identified in the JRSU include cultural material scatters, earthworks, graves, hearths, mounds, rock cairns, and storage and refuse pits.

Plains Village Tradition

Several Plains Village sites are located in the Devils Lake area and along the Sheyenne River and its tributaries. Fortified Plains Village encampments are located along the Sheyenne and Maple rivers in the SRSU. Plains Village groups in the SRSU resided in earthlodges nearly identical to those of the Mandan, Hidatsa, and Arikara along the Missouri River. Plains Village functional site types identified in the SRSU include residential bases, mortuary sites, and bison kill and processing areas. Plains Village site/feature types identified in the SRSU include cultural material scatters, earthlodge villages, earthworks, fortifications, graves, hearths, mounds, pits, and lithic procurement areas.

Nomadic Equestrian Tradition

Tribes likely to have been in the SRSU during early historic times include Dakota (Yankton and Yanktonai), Cheyenne, Assiniboine, and Plains Ojibwa and Ottawa. The most common sites attributed to the Nomadic Equestrian Tradition are stone circle sites. These sites can be found along ridges or hill

crests, often with commanding views of the surrounding country. Previous archaeological investigations indicate that some sites with large numbers of ring features were used recurrently.

Northern Red River

The Northern Red River archaeological study unit (NRRSU) is located in the northeastern corner of North Dakota with the south to north flowing Red River comprising the eastern boundary of both the study unit and the state (Photo 4). This study unit falls within the Central Lowlands physiographic province and traverses the Glaciated Plains, Glacial Lake Agassiz Sand Deltas and Beach Ridges, and Red River Valley physiographic regions (Bluemle and Biek 2007, USGS 2006). The following discussion of the NRRSU is adapted from *The North Dakota Comprehensive Plan for Historic Preservation: Archaeological Component: Northern Red River Study Unit* (Picha et al. 2008).



Photo 4: General Landscape in the Northern Red River Archaeological Study Unit

Landscape

Several prominent landforms are present within the NRRSU: upland plains, glacial beach ridges and sand deltas, terraces, floodplains, and the Glacial Lake Agassiz plain. The upland plains are characterized by rolling hills, low ridges, swales, and prairie pothole lakes and wetlands. The topographically prominent glacial beach ridges are the beach lines that mark the former levels of Glacial Lake Agassiz along the western edge of the Red River Valley, and the sand deltas are sandy deposits marking the confluence of major rivers with Glacial Lake Agassiz. The former floodplains of rivers which lie at elevations above their modern, entrenched counterparts comprise the terraces in this study unit. Some of the present-day tributaries of the Red River occupy former glacial meltwater channels which drained into Lake Agassiz. The nearly level Glacial Lake Agassiz plain encompasses much of the eastern portion of the study unit. The broad expanses of bottomlands along the Red River and its major tributaries comprise the floodplains of the NRRSU.

Floral and Faunal Resources

Floral resources historically available in the NRRSU include aspen trees, woody shrubs, and grasses on the slopes of the Pembina Escarpment along the west edge of the Red River Valley, and elm, ash, box-elder, and bur oak trees, numerous shrubs and forbs, and a variety of nuts, berries, and tubers in the

floodplain gallery forests in the bottomlands along the Red River and its principal tributaries. Faunal resources historically available in the NRRSU include large game animals such as elk, deer, antelope, moose, caribou, and bison. Grizzly bears were also reported to have been in the Devils Lake region. Fur-bearing mammals in the NRRSU include muskrat, beaver, rabbit, lynx, wolf, fox, ermine, mink, marten, fisher, wolverine, otter, skunk, badger, and raccoon. Waterfowl in riparian settings along the Red River, wetland marshes, and prairie potholes throughout the NRRSU include various species of ducks and geese. Other avian species available in the NRRSU include eagles, hawks, and other raptors. Pleistocene megafauna, such as mammoths and camels, were available in the NRRSU, west of Glacial Lake Agassiz, until their extinction in the early Holocene.

Lithic and Other Resources

Lithic resources in the NRRSU are sparse, with most lithic raw materials being available only in the glacial till. Most of the rocks used for cooking and sweatbathing at sites along the Red River were transported from the beach ridges at the margins of the glacial lake plain. Alkali lakes and streams within the NRRSU were sources of salt for early traders and trappers.

Site Types

Within the NRRSU common site/feature types include cultural material scatters, mounds, and graves. The majority of recorded sites in the NRRSU are located in upland erosional settings such as upland plains, terraces, hills, knolls, bluffs, and ridges. Ecologically diverse areas such as the "Hair Hills," an area of upland terrain dissected by steep valleys located west of the Pembina Escarpment, were ideal locations for precontact settlement. Flood-free and resource-rich terrace settings along major tributaries such as the Pembina and Tongue rivers were also ideal locations for precontact settlement. This section presents the common site/feature types associated with each of the major precontact/protohistoric cultural traditions identified in North Dakota.

Paleo-Indian Tradition

After Glacial Lake Agassiz was formed following the retreat of the Wisconsinan glacier, the western portions of the NRRSU were open to peoples of the Paleo-Indian Tradition for initial settlement. Toward the end of the Paleo-Indian Tradition, after the drainage of Glacial Lake Agassiz, all of the NRRSU was open to settlement. Only a few known site locations dating to the Paleo-Indian Tradition are located in this study unit. These sites consist of diagnostic lithic artifacts and are located on landforms adjacent to glacial meltwater paleochannels, and on early Holocene terraces.

Plains Archaic Tradition

Plains Archaic site types identified in the NRRSU consist of cultural resource scatters, mostly made up of lithic materials, although bison and canid bones were recovered from one site, a bone tool was recovered from another site, and copper tools were found in several sites.

Plains Woodland Tradition

Plains Woodland functional site types identified in the SRSU include campsites and mounds.

Plains Village Tradition

Three Plains Village sites have been identified in the NRRSU. Site/feature types associated with the Plains Village Tradition found in the NRRSU include temporary camps, stone chipping scatters, bison butchering stations, and mortuary and other ceremonial sites. No fortified Plains Village encampments similar to those found in neighboring study units have been found in the NRRSU.

Nomadic Equestrian Tradition

Tribes likely to have been in the NRRSU during early historic times include the Dakota, Chippewa, Plains Cree, Plains Ojibwa, and Assiniboine. Several possible fur-trade related archeological sites have been identified along the Red River.

Records Search and Literature Review

HDR conducted the initial records search and literature review in December 2009 for the 6-mile macro corridor. In January 2011, the file pull was updated to reflect project changes and include the preferred alignment with a 1-mile buffer for archaeological sites and architectural history properties.

Shape files were once again updated to reflect project changes and data was received from SHSND in February 2011. This research focused on previously identified archaeological sites and surveys, along with architectural structures. In May 2011, HDR employee Judy Davis retrieved North Dakota state site forms for previously identified archaeological sites and architectural structures from SHSND.

In addition to the file pull, HDR reviewed General Land Office (GLO) maps and available plat maps accessed online through the North Dakota State Water Commission at <http://survey.swc.nd.gov/> and Historic Map Works at <http://historicmapworks.com>. HDR also performed online research of the National Park Service's NRHP to identify registered sites and districts located within the APE.

Previous Surveys

A total of 41 cultural resources investigations have been completed within the 1,000-ft APE and/or within potential laydown areas (Table 1). Previous investigations include surveys for highway projects, transmission lines, pipelines, levee/canal and water resource related projects, telecommunication towers, gravel pits and borrow areas, wind farms, county upgrade and development projects, and historic trail testing. Of the 41 previous investigations, 32 intersect the 150-ft preferred ROW corridor and/or a laydown area. Sites intersecting the 150-ft corridor are denoted by an asterisk following the manuscript number.

Table 1: Previous Cultural Resources Investigations within the APE

| Manuscript Number | Report Date | Manuscript Title | Author |
|--------------------------|--------------------|---|-------------------------------|
| 000153 | 1975 | Report of the Archaeological and Historical Site Reconnaissance Survey of Project No. F-3-052() 198, U.S. Highway 52, Carrington West, Foster County and Wells County, North Dakota | Franke, N. |
| 000309* | 1978 | Preliminary Cultural Resources Survey in the Path of the Proposed State Route 1806 in Oliver County, North Dakota | Weston, T.; J. Kjos; S. Ahler |
| 002234 | 1980 | Additional Cultural Resource Work for the Proposed MDU Transmission Line Route Between the Coyote Station and the Milton Young Plant, Oliver Co., North Dakota | Simon, A.; J. Borchert |
| 002412 | 1981 | Oliver County Lewis & Clark Trail Testing Program | Rippeteau, B. |
| 003665 | 1986 | Cultural Resources Survey in the Sheyenne River Drainage (Contribution No. 230, Ransom, Cass, Barnes, & Griggs Co., ND | Haury, C.; F. E. Schneider |

Center to Grand Forks Transmission Line
Class III Intensive Archaeological Resources Inventory

| Manuscript Number | Report Date | Manuscript Title | Author |
|--------------------------|--------------------|---|--|
| 004897* | 1989 | McLean-Sheridan Rural Water Pipeline Cultural Resources Survey Report | Foster, J.; D. Kuehn |
| 005443* | 1990 | Cenex Pipeline Company Fargo Extension, Steele, Griggs, Foster, Cass, Barnes, Eddy, Wells, Pierce, McHenry, and Ward Counties, Class III Cultural Resource Survey (also see MS 5591) | Schweigert, K. |
| 005576* | 1991 | The 1991 McLean-Sheridan Water Pipeline Sheridan County, North Dakota | Burbidge, G.; J. Borchert |
| 006509* | 1995 | North Dakota Department of Transportation Material Source Projects Cultural Resource Review 1989-1994 | Borchert, J. |
| 006636* | 1996 | Report of Findings From an Intensive Cultural Resource Inventory in Emmons, Burleigh and McLean Counties, Conducted on Portions of a Proposed Water Project for the Burleigh Water Users Cooperative with Addendum | Larson, T.; D. Penny |
| 006657* | 1995 | BEK's Wilton Exchange: A Class II Cultural Resource Inventory in Burleigh and McLean Counties, North Dakota | Kulevsky, A. |
| 006849 | 1997 | Phase I Cultural Resources Investigation of the Additional Levee and Floodwall Alignments, a Road Raise, Two Pump Stations, and a Diversion Ditch for English Coulee Proposed for the City of Grand Forks, Grand Forks County, ND | Ketz, K.; T. Dolence |
| 007000* | 1997 | West River Telecommunications Cooperative WO#97-408 and 97-121 Mercer to McClusky Interexchange Toll in McLean and Sheridan Counties, North Dakota UW #1981 | Wermers, G. |
| 007227* | 1998 | A Class III Cultural Resource Inventory of the North Dakota Segment of the Alliance Pipeline (Milepost 0 to 323.87) Final Report | Stine, E.; D. Forsberg; A. Kulevsky; B. Perkl; P. Trocki |
| 007268* | 1998 | A Class III Cultural Resource Inventory of both ROWs of ND Highway 25 From I-94 to Center, ND, in Morton and Oliver Counties, ND. NDDOT Project No. SS-1-025(007)000 | Kinney, W. |
| 007283* | 1998 | Results of a Class II and Class III Cultural Resource Inventory for NDDOT Project Area SS-6-018(028)152 Grand Forks County, ND | Larson, T. |
| 007379* | 1999 | Results of Class II and Class III Cultural Resource Inventories for Upgrades to Telecommunications Lines: The Center Exchange in Oliver and Mercer Counties, ND | Rothwell, S.; T. Larson |
| 007415* | 1999 | A Report on Cultural Resource Investigations for Dakota Water Users, Inc.: The Class II Sample Survey for the Sharon System Exchange | Larson, T. |
| 007493* | 1999 | McClusky Canal 1998 Cultural Resources Inventory of Selected Areas in Burleigh, Sheridan and McLean Counties, ND | Wermers, G.; D. Klinner |
| 007494* | 1998 | McClusky Canal Cultural Resources Inventory of Selected Areas in Burleigh and McLean Counties, ND | Wermers, G.; D. Klinner |
| 007506 | 1999 | Sheyenne River Debris Removal Class III Cultural Resources Survey Report, Griggs County, North Dakota. | Flemmer, D. |

Center to Grand Forks Transmission Line
 Class III Intensive Archaeological Resources Inventory

| Manuscript Number | Report Date | Manuscript Title | Author |
|-------------------|-------------|--|---|
| 007561* | 2000 | Results of a Phase I Cultural Resource Investigation for Proposed Levee and Floodwall Alignments at the City of Grand Forks, Grand Forks Co., ND | Larson, T.; D. Penny |
| 007646* | 2000 | Thirteen NDDOT Living Snow Fence Planting Areas in Adams, Oliver, Burleigh, Barnes, and Cass Co., ND | Wermers, G. |
| 007658* | 2000 | Tri-County Water Users, Inc. Phase 1 System Improvements, Contract 99-1, Class III Inventory Results | Klinner, D. |
| 008099 | 2001 | A Cultural Resources Inventory of the Sheyenne River Emergency Watershed Protection Project, Griggs County, North Dakota | Springer, K. |
| 008419* | 2002 | Tri-County Water District Phase II Expansion Project, Walsh, Grand Forks, Nelson, Ramsey and Steele Counties, North Dakota: Class II and III Inventory Results | Wermers, G. |
| 008427* | 2003 | Polar Communications Mutual Aid Corporation & Polar Telecommunications, Inc., Fiber Optic Cable Survey: A Class I Literature Search and Class III Cultural Resources Inventory of CS, CV, GF, GG, NE, PB, RY, ST, TR & WA Counties, ND | Bluemle, W. |
| 008910* | 2004 | Highway 32: A Class III Cultural Resource Inventory, Steele Co., ND | Bleier, A. |
| 009324* | 2005 | Oliver County Road: A Class III Cultural Resource Inventory in Oliver Co., ND | Stine, E.; L Hafermehl; B. Meidinger; A. Potter |
| 009491* | 2005 | Binford Water Supply Project Class II and III Cultural Resource Inventories, Griggs Co., ND | Jackson, M. |
| 009567* | 2005 | A Class III Inventory of a 13.01 - Mile Segment of Highway 281 in Eddy and Foster Counties, ND | Boughton, J.; S. Wagers |
| 009587* | 2005 | Burleigh County Wind Farm: A Class III Cultural Resource Inventory in Burleigh Co., ND | Stine, E.; D. Hiemstra; A. Kulevsky |
| 009675* | 2006 | Oliver County Wind Farm: A Class III Cultural Resource Inventory in Oliver Co., ND | Stine, E.; Kulevsky, A. |
| 009715* | 2006 | Capital Electric Cooperative's Four Year Construction Plan: A Class II and Class III Cultural Resources Inventory in Burleigh and Sheridan Co., ND Addendum A | Stine, E. |
| 010226* | 2007 | South 48 th Street, Grand Forks, North Dakota NDDOT Project Number AC-SU-6-986(082)086 A Class III Cultural Resource Inventory | Kinney, W. |
| 010296* | 2007 | FPL Energy's Oliver County Wind Farm II: A Class III Cultural Resource Inventory in Oliver Co., ND | Stine, E.; A. Kulevsky |
| 010355* | 2008 | South Central Regional Water District 2007 Class I-II-III Cultural Resources Inventories, Burleigh and McLean Counties, ND | Kordecki, C.; M. Jackson |
| 010850 | 2009 | A Class II Cultural Resource Inventory for the Proposed Jamestown-Grand Forks 230-kV Transmission Line Rebuild in East Central, ND, Barnes, Griggs, Steele, Stutsman, Grand Forks Counties | Kluth, D. |

Center to Grand Forks Transmission Line
Class III Intensive Archaeological Resources Inventory

| Manuscript Number | Report Date | Manuscript Title | Author |
|----------------------|-------------|--|-----------------|
| 011214 | 2009 | Schafer Gravel Pit: A Class III Cultural Resource Inventory in McLean Co., ND | Bluemle, W. |
| 011278* | 2009 | Highway 15 SS-6-015(015)089: PCN 17833 Grand Forks Co., ND | Leuchtman, A. |
| Reference # 09-0673* | 2010 | Sheridan Ridge I & II Wind Farm Projects Class III Report, Sheridan County, North Dakota | Eigenberger, D. |

*Denotes previous surveys that intersect both the 1,000-ft APE and the 150-ft ROW

Previously Recorded Archaeological Sites

The files provided by SHSND indicate there are 15 previously identified archaeological sites within the APE (Table 2). These sites include six precontact sites, seven historic sites, and two sites with unknown cultural affiliation. In addition, eight of the 13 sites are within the 150-ft ROW. Sites intersecting the 150-ft ROW could be impacted by construction and are denoted by an asterisk following the site number.

The literature search demonstrates that archaeological sites are distributed across the length of the project corridor. Precontact sites are recorded on high promontory ridges with commanding views, or along rivers or streams. Sites associated with historic Euroamerican settlement are also distributed throughout the corridor, and also tend to be associated with rivers and streams.

Table 2: Previous Cultural Resources within the APE

| Site Number | Site Type | Township | Range | Section | NRHP Recommendations/ Comments |
|-------------|---|----------|-------|---------|--|
| 32BLX146* | Precontact Stone Circles | 144 | 79 | 5 | Unevaluated |
| 32GF120* | Octagonal Granary and Historic Site | 150 | 53 | 20 | Unevaluated. Recommended Eligible |
| 32GF3485 | Precontact Cultural Material Scatter | 150 | 52 | 15 | Unevaluated. Recommended Not Eligible |
| 32GF3487 | Historic Artifact Scatter | 150 | 52 | 21 | Unevaluated. Recommended Not Eligible |
| 32GFX24* | Cultural Material Scatter of Unknown Cultural Affiliation | 150 | 52 | 19 | Unevaluated |
| 32GG56 | Romness Methodist Church, Historic Features, and Artifact Scatter | 147 | 58 | 16 | Unevaluated |
| 32GGx31 | Romners [sic] Post Office | 147 | 58 | 16 | Unevaluated |
| 32GGX117* | Precontact Mound | 147 | 59 | 1 | Unevaluated |
| 32OL388* | Historic Depression | 142 | 81 | 28 | Unevaluated |
| 32OL389 | Historic Depression | 142 | 81 | 28 | Unevaluated |
| 32OL416 | Precontact Cultural Material Scatter | 142 | 81 | 28 | Unevaluated |
| 32SHX12* | Mound of Unknown Cultural Affiliation | 147 | 78 | 26 | Unevaluated |
| 32SHX85 | Precontact Stone Features | 147 | 76 | 10 | Unevaluated |

| Site Number | Site Type | Township | Range | Section | NRHP Recommendations/ Comments |
|-------------|---|----------|-------|---------|--------------------------------|
| 32SHX88* | Precontact Stone Features | 147 | 76 | 9 | Unevaluated |
| 32WEX38* | Stavenger Lutheran Church Historic Site | 148 | 68 | 28 | Unevaluated |

*Denotes previously identified sites that intersect both the 1,000-ft APE and the 150-ft ROW

Research Design

Objectives

The objective of the Class III Inventory is to identify as many historic properties, as defined by the National Historic Preservation Act, as practicable within the project’s APE. RUS, as lead federal, has approved a program to:

- Identify previously recorded sites and assess condition
- Identify new sites not previously recorded within the APE

All work was conducted in accordance with Historic Preservation in North Dakota Volume II: A Statewide Comprehensive Plan (SHSND 2003), North Dakota SHPO Guidelines Manual for Cultural Resource Inventory Projects (SHSND 2006), and The Secretary of the Interior’s Standards and Guidelines for Archeology and Historic Preservation [48 Federal Register 44716-44740] (National Park Service [NPS] 1983).

Methods

In order to meet the objective, multiple pathways to knowledge were followed. The previous Class I inventory provided useful information on where known sites were located, gave an indication of where previous investigations were concentrated, and which areas lacked systematic study. Because of the length of the proposed project, RUS suggested that for practical, logistical, and financial reasons, not all of the land areas needed intensive survey. RUS is of the opinion that the regulations require a good faith effort to identify historic properties, which does not equate with identifying every possible archaeological site on the landscape. RUS contends that previous years of archaeological research have given us a fairly good idea of where on the landscape important archeological sites may be concentrated. Therefore, the following protocol was administered following consultation with SHSND, other federal agencies, and Native American tribal historic preservation offices. Following the literature search, probability modeling was done with the aim of focusing field work on areas most likely to contain significant resources. Then, intensive field work was completed to locate buried and near-surface archaeological and cultural sites, and to test the model.

Predictive Model

At the request of Minnkota and RUS, in September 2010 HDR developed an initial predictive model to statistically illustrate areas of precontact archaeological site probability across the preferred alignment. The predictive model is based on geographic information about the project area that is provided by multiple sources, such as the US Geological Survey, Department of the Interior, Department of Agriculture, and the North Dakota State Historic Preservation Office. Some basic landscape data, such as surface slope, directional exposure, and distance to nearest stream or river, were derived from these larger data sets by Geographic Information System (GIS) analysts at HDR. Information such as surface

slope, soil type, vegetation cover, distance to water, etc., were examined in relation to known sites, and areas of high and low site density were identified by statistical analysis. The significant variables were combined in a multivariate procedure called logistic regression, which generates probabilities of site occurrences for (in this case) various combinations of soil types and vegetation covers.

These scores were then grouped into high, moderate, and low probability zones. HDR analysts generated a color coded map representing the location of these probability zones within the proposed corridor (Appendix D). A low probability zone is an area, based on the analysis of the model, with a less than 10 percent probability to contain precontact archaeological deposits or features identifiable through surface expressions or near-surface shovel probing. A moderate probability zone reflects between 10 and 50 percent probability. A high probability zone reflects a location with a greater than 50 percent probability to contain archaeological deposits. Zones shown as Unknown are those areas where available data was insufficient to estimate probability. This model can not provide any data regarding the potential significance or integrity (and therefore eligibility for listing on the National Register of Historic Places) of archaeological sites.

HDR prepared the Zones Map to target specific areas for survey across the length of the preferred 150-ft ROW that could hold precontact archaeological resources. The Zones Map does not account for potential contact or historic-period archaeological resources; nor does it explicitly account for potential sites of traditional cultural value that may (and are often likely to) be isolated from archaeological deposits and therefore underrepresented in the available archaeological database. This initial predictive model is presented in Appendix D.

In September 2010, HDR recommended Class III survey (pedestrian and subsurface) of the Project, using suggested target survey ranges of 20 to 30 percent of low probability zones, 40 to 50 percent of moderate probability zones, and 90 to 100 percent of high and unknown probability zones in order to better understand the probability of these Zones to contain archaeological site locations (Table 3).

Using the model as a base, segments of the ROW that captured clusters of similar probability zones were demarcated and scheduled for field survey. Since no model is perfect, the HDR survey strategy effectively sampled across the entire ROW with varying degrees of accuracy in capturing the target probability zones. For example, the model predicts small, 30 m parcels of high probability that are scattered throughout the corridor. Some are closely clustered together as to form a solid block and others are more widely scattered with moderate and low probability areas interspersed between them. As it would be too inefficient to skip around trying to hit every occurrence of high probability, those that were not clustered were considered outliers and disregarded during physical survey. Likewise, there were areas that may not have been labeled as high probability on the model that were recognized as high probability during the field survey and subsequently tested.

Table 3: Target Range of Acres for Survey by Probability Zone Based on 1st Model

| Study Unit | Low Probability Zone Acres (at 20 to 30%) | Moderate Probability Zone Acres (at 40 to 50%) | High and Unknown Probability Zone Acres (at 90 to 100%) | High Probability Only |
|-------------------------|---|--|---|-----------------------|
| Southern Missouri River | 142 - 213 | 72 - 90 | 346 - 384 | 145 - 161 |
| Sheyenne River | 160 - 239 | 32 - 41 | 243 - 270 | 30 - 33 |
| James River | 201 - 302 | 10 - 13 | 184 - 204 | 2 |
| Northern Red River | 204 - 306 | 10 - 12 | 145 - 161 | 2 |
| Total Zone Acres | 706 - 1060 | 124 - 155 | 918 - 1020 | 179-199 |
| Total Project Acres | 1749 – 2235 | | | 1009 - 1414 |

Due to varying degrees of access to the survey parcels, in Fall 2010 HDR was able to complete Class III survey in 13 percent of low probability zones (149.5 acres), 39 percent of moderate probability zones (970.7 acres), 56 percent of high and 20 percent of unknown probability zones depicted on the model in September 2010. The data collected during the 2010 Class III survey was incorporated into the predictive model and used to refine the probability zones. In addition, elevation data was added as a variable into the model, greatly reducing the area of unknown probability. A final predictive model, including a new map of probability zones, was developed to direct the Class III survey efforts in Spring 2011. The final predictive model is presented in Appendix E.

By the end of June, 2011, with multiple changes to the route, HDR was able to complete survey of the following areas as shown in Table 4, with additional planned survey to take place in areas not yet accessible.

Table 4: Project Survey Area Based on Final Model

| Model Probability | Study Unit | Project Area ¹ (acres) | Survey Complete (acres) | Planned Future Survey (acres) | Total Survey Area (acres) | Total Survey Area (Percentage of Project Area) | Area Outside Survey Segments (acres) |
|-------------------|-------------------------|-----------------------------------|-------------------------|-------------------------------|---------------------------|--|--------------------------------------|
| High or Unknown | Southern Missouri River | 611 | 318 | 64 | 382 | 62.5% | 228 |
| | Sheyenne River | 288 | 133 | 22 | 155 | 53.8% | 133 |
| | James River | 139 | 51 | 1 | 52 | 37.4% | 87 |
| | Northern Red River | 112 | 14 | 2 | 16 | 14.3% | 97 |
| | Total | 1150 | 515 | 88 | 603 | 52.4% | 544 |
| Moderate | Southern Missouri River | 508 | 171 | 57 | 228 | 44.9% | 278 |
| | Sheyenne River | 685 | 171 | 11 | 182 | 26.6% | 502 |
| | James River | 646 | 125 | 7 | 132 | 20.4% | 515 |
| | Northern Red River | 650 | 73 | 56 | 129 | 19.8% | 521 |

| Model Probability | Study Unit | Project Area ¹ (acres) | Survey Complete (acres) | Planned Future Survey (acres) | Total Survey Area (acres) | Total Survey Area (Percentage of Project Area) | Area Outside Survey Segments (acres) |
|-------------------|-------------------------|-----------------------------------|-------------------------|-------------------------------|---------------------------|--|--------------------------------------|
| | Total | 2489 | 540 | 131 | 671 | 27.0% | 1815 |
| Low | Southern Missouri River | 140 | 67 | 19 | 86 | 61.4% | 54 |
| | Sheyenne River | 108 | 16 | 4 | 20 | 18.5% | 87 |
| | James River | 502 | 27 | 48 | 75 | 14.9% | 427 |
| | Northern Red River | 314 | 70 | 1 | 71 | 22.6% | 244 |
| | Total | 1063 | 179 | 72 | 251 | 23.6% | 811 |
| Total | | 4702 | 1235 | 292 | 1527 | 32.5% | 3171 |

Field Survey

As earlier stated, the APE for the project is the 1,000-ft corridor chosen by Minnkota as the preferred alignment. This is the area where ground-disturbing activities may occur and within which the 150-ft ROW will be negotiated that will become the final route of the transmission line. Pedestrian survey and subsurface testing was limited to the 150-ft ROW.

Within the 150-ft ROW, pedestrian survey employed transects spaced at no greater than 15 meter (m) intervals. When surface features or artifacts were identified, additional transects were surveyed at 5 or 10 m intervals, depending on the ground surface visibility. When found, cultural materials were recorded and photographed, and GPS coordinates were collected for future mapping. Pedestrian survey also identified additional areas where subsurface testing would be recommended. These areas were recorded and photographed, and GPS coordinates were collected and added to field maps.

Subsurface testing, or shovel testing, was used in high probability areas and where the ground surface was obscured by vegetation. Shovel tests were spaced at no greater than 15 m intervals and followed the center of the transmission line corridor, or the natural landform when appropriate, to properly test the area. Tests were excavated to a maximum depth of 100 cm, or until either a buried C horizon or two culturally sterile soil strata were encountered. All excavated soils were passed through a ¼ inch mesh hardware cloth. Artifacts identified during shovel testing were recorded, photographed if diagnostic, placed in plastic bags, and reburied at the approximate level found in the test. UTM coordinates were recorded with a Trimble GPS unit for later mapping.

Data gathered during the survey were recorded on shovel test forms and in the field notebook of the principal investigator. Items noted included the location of survey areas, the location of individual shovel tests, the depth of each shovel test and its associated soil profile, the presence or absence of cultural materials within each test, and the excavated soil texture, inclusions, and Munsell color.

Human Remains/Burials

In the event of a discovery believed to contain human remains, the investigators would comply with the procedures required by North Dakota Century Code § 23-06-27 and administrative rules North Dakota Administrative Code Chapter 40-02-03, Protection of Prehistoric and Historic Human Burial Sites, Human

Remains, and Burial Goods. These rules require that any work be halted within a 100-ft radius from the point of discovery; that measures to protect the discovery from looting and vandalism are implemented until the completion of requirements under state law; and that the local law enforcement agency, the SHSND, the North Dakota Department of Health (NDDH), RUS, and the tribes identified in Stipulation IX.B of the in-place Programmatic Agreement are notified.

Site Forms

Site forms were completed following the June 2011 field survey. Forms were access via the SHSND website (<http://www.history.nd.gov/hp/index.html>) and followed the provided guidelines. Site numbers were requested from SHSND following the submittal of the draft Class III report.

Collection Policy

RUS is a funding agency, not a land managing agency. As such, the agency has no place to curate artifacts when collected in the field. The policy for this project was to not collect, but to record objects in the field. Cultural materials identified during the pedestrian survey were recorded, photographed if diagnostic or showed evidence of modification or use, , and placed back on the ground surface. Cultural materials identified during shovel testing were recorded, photographed if diagnostic or showed evidence of modification or use,, double bagged, labeled with provenience and project information, and placed back in the shovel test at the approximate recovery level.

Results of Investigations

Summary

Due to the size of the Project and multiple layout changes, the Class III archaeological survey was conducted over multiple mobilizations from October 3 to November 18, 2010, and from May 16 to July 1, 2011.

Areas identified within the transmission line corridor as needing survey were designated as Survey Segments and labeled with consecutive letters. These segments were created based on the probability zones determined by the predictive model, and on field observations of the corridor. The following work summary is subdivided by county, then by township, range, and section, and finally by Survey Segment. The Survey Segment descriptions move from west to east, starting at the Center substation near Center, North Dakota, and terminating at the Prairie Substation, west of Grand Forks, North Dakota. Individual Survey Segment descriptions include specific location, land use, ground surface visibility, and survey methods used. Archaeological sites, shovel test areas, shovel testing results, and additional survey recommendations are also presented within individual Survey Segments.

In addition to Survey Segments, HDR completed a review of 18 potential laydown areas. The laydown areas and the results of the fieldwork follow the Survey Segment descriptions. Laydown areas are represented in a similar manner to the Survey Segments, as the descriptions move from west to east.

If cultural resources were identified within a Survey Segment or laydown area, the site is noted briefly in the segment or area write-up. Complete archaeological site descriptions and recommendations are provided in the Identified Sites section of the report. If shovel testing was used, this is also noted briefly in the description. Individual shovel test information and profiles can be found in Appendix B. Areas recommended for monitoring for deeply buried sites can be found in Appendix C. The FCGFAPM information for each Survey Segment can be found in Appendix E.

In addition to newly identified archaeological sites, multiple Areas of Avoidance were recorded. These areas include features that can not be assigned definitive cultural affiliation. Features include stone piles and alignments (likely associated with Euro-American field clearing activities), depressions, and earthen formations (such as earthen berms or field clearing piles). Areas of Avoidance were identified in the field and assigned feature numbers, however, these areas are not considered archaeological sites and will not receive an official North Dakota State Site number. Although cultural affiliation cannot be determined, it is HDR's opinion that these areas should be avoided by construction activities. Areas of Avoidance are listed with the associated Survey Segment.

Over the course of the Project, HDR received multiple route changes and updates from the project engineers as the planning proceeded. In 2010, the archaeological crew followed the September 2010 layout provided by Minnkota to initiate the field survey. In May 2011, an updated project layout was presented to HDR by Minnkota. This new layout included multiple route changes and updates, and new survey and laydown areas. Route changes addressed in the Survey Segment Coverage section below are divided into the 2010 survey and the 2011 survey. In many cases, the route originally surveyed in 2010 did not change and therefore does not include a 2011 update. In addition, permission to survey was not granted by all landowners. Locational information for these segments is provided, as well as survey recommendations.

Survey Segment Coverage

Oliver County

Township 142N, Range 83W, Sections 26, 27, 28, 33, 35, and 36

Survey Segment A (Sections 27, 28, and 33)

Survey Segment A begins at the Center 345 kV electrical substation in Section 33 just to the west of Nelson Lake (Appendix A, Figure 4, Page 1). The segment extends north/northeast from the substation through a small cattle pasture and a harvested grain field for approximately 0.5 miles until it reaches 33rd Avenue SW. The survey segment continues east, approximately 0.5 miles, crosses a small unnamed drainage, and then ends at the eastern edge of the SW quarter of Section 27. The landscape is lightly rolling, and Lake Nelson is visible to the west. The portion of the Survey Segment closest to the substation appeared unnaturally flat and is likely disturbed from substation construction. According to the FCGFAPM, Survey Segment A traverses a mix of low, moderate, and high probability zones.

Pedestrian survey of Survey Segment A was conducted along six transects spaced at 7 m intervals. Visibility in the cattle pasture was patchy, but gopher mounds were available for examination. The harvested grain fields offered approximately 25 percent visibility. No cultural materials were identified within this survey segment, no areas were recommended for shovel testing, and one area was recommended for deep testing (Deep Testing Locality 1).

Deep Testing Locality 1

Locality 1 is in the east half of Section 33 in Survey Segment A, adjacent to Nelson Lake. According to the FCGFAPM, Deep Testing Locality 1 traverses a mix of low, moderate, and high probability zones. According to the deep testing model, this area holds a high probability to contain buried soils and potentially intact cultural deposits that may range in depth from 1 to 2 m (Appendix C). Shovel testing can efficiently identify subsurface cultural deposits to a depth of 1 m; however, as this area contains the potential for deposits ranging from 1 to 2 m, deep testing would be required.

Survey Segment AA (Section 27)

Survey Segment AA begins at the center of the southern boundary of Section 27 along 23rd Street SW and continues east to 32nd Avenue SW, extending a total of 0.5 miles (Appendix A, Figure 4, Page 1). The segment extends through a hayfield in a gently rolling landscape. According to the FCGFAPM, Survey Segment AA is located within a moderate to high probability zone.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility was good, ranging from 50 to 75 percent. No sites were identified during the pedestrian survey and no areas were recommended for shovel testing.

Survey Segment B - West portion (Sections 26, 35 and 36)

The west portion of Survey Segment B begins just east of 32nd Avenue SW and continues due east 2 miles through rolling upland prairie/pasture (Appendix A, Figure 4, Page 1). This portion of Survey Segment B crosses two small drainages before a small stream is encountered at the east end of Section 36. According to the FCGFAPM, the west portion of Survey Segment B traverses mostly high probability zones, although it does cross a few moderate probability zones.

Pedestrian survey was conducted along six transects spaced at 7 m intervals. Although prairie grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. No features or cultural materials were identified during the pedestrian survey. Four areas within this portion of Survey Segment B were identified for shovel testing (Shovel Test Areas B-1, B-2, B-3, and B-4).

Shovel Test Area B-1

Shovel Test Area B-1 traverses both moderate and high probability zones. It is located on gently rolling prairie/pasture upland covered in tall grass with a small drainage located to the east. A total of ten shovel tests were excavated in one transect. Two shovel tests each were placed at 15 m intervals on the higher knolls found along the length of the area. The typical soil profile of these tests consisted of an average of 22 cm of very dark grayish brown (10YR 3/2) silt loam over a brown (10YR 4/3) silt loam. Gravel and cobbles were encountered in most tests. All tests were negative for cultural material.

Shovel Test Area B-2

Shovel Test Area B-2 traverses both moderate and high probability zones. It is located on gently rolling prairie/pasture upland with a small drainage located just to the west, and a small ephemeral drainage to the east. A total of 13 shovel tests were excavated in one transect at 15 m intervals on the higher knolls/ridges. Shovel tests (ST) 1 to 8 were placed on the westernmost knoll/ridge overlooking a small ephemeral drainage to the east. ST 9 and 10 were placed on a knoll to the west of ST 1 to 8, and ST 11 to 13 were placed on a knoll/ridge overlooking a small drainage to the west. The typical soil profile of these tests consisted of an average of 23 cm of very dark grayish brown (10YR 3/2) silt loam over dark grayish brown (10YR 4/2) to brown (10YR 4/3) silt loam with gravel and cobbles. All tests were negative for cultural material.

Shovel Test Area B-3

Shovel Test Area B-3 traverses both moderate and high probability zones. It is located on a prairie/pasture ridge overlooking a small drainage to the south and a small stream and its associated terrace to the east. A total of eight shovel tests were excavated in one transect along this ridge. All tests were placed at 15 m intervals with the exception of shovel test 6, which was placed approximately 45 m west of shovel test 5 to avoid a slope for an ephemeral drainage located along the ridge. The typical soil profile of these tests consists of an average of 25 cm of very dark grayish brown (10YR 3/2) silt loam

over dark grayish brown (10YR 4/2) to brown (10YR 4/3) silt loam with gravel and cobbles. All tests were negative for cultural material.

Shovel Test Area B-4

Shovel Test Area B-4 traverses both moderate and high probability zones. It is located on a grass-covered terrace to the west of a small stream along the east edge of Section 36. Seven shovel tests were excavated at 15 m intervals in one transect across the terrace. The typical soil profile of these tests consists of an average of 24 cm of very dark, grayish brown, (10YR 3/2) silt loam over dark grayish brown (10YR 4/2) to brown (10YR 4/3) silt loam to clay loam with heavy gravel and cobbles. All tests were negative for cultural material.

Township 142N, Range 82W, Sections 25, 26, 27, 31, 32, 33, 34, 35, and 36

Survey Segment B - East portion (Sections 31 and 32)

The east portion of Survey Segment B begins in a rolling prairie/pasture just west of small stream encountered along the west edge of Section 31 and continues due east approximately 1.25 miles (Appendix A, Figure 4, Page 1). The segment crosses the edges of multiple ridges and a small drainage within a steep sided ravine before traversing a series of ridges with dramatic views to the south. The survey segment comes to an end east of a field road and south of 23rd Street SW in Section 32. According to the FCGFAPM, the east portion of Survey Segment B traverses contains mostly high with a few moderate probability zones.

Pedestrian survey was conducted along six transects spaced at 7 m intervals. Although prairie grasses obscured surface visibility in this segment, gopher mounds were opportunistically examined along the route. One stone circle was identified along a ridge with a commanding view to the south. The location of this stone feature was recorded as site 32OL641 (CGF-B-1). Four areas within this portion of Survey Segment B, including the vicinity around site 32OL641, were identified for shovel testing (Shovel Test Areas B-5, B-6, B-7, and B-8) and two Areas of Avoidance were recorded.

Shovel Test Area B-5

Shovel Test Area B-5 traverses both moderate and high probability zones along the southern edge of a prairie/pasture ridge to the east of a small stream. A total of eight shovel tests were excavated in one transect along this ridge. All tests were placed at 15 m intervals with the exception of shovel test 6, which was placed approximately 75 m east of shovel test 5 to avoid a swale along the ridge. The typical soil profile of these tests consists of an average of 20 cm of very dark grayish brown (10YR 3/2) silt loam over brown (10YR 4/3) silt loam with gravel and cobbles. All tests were negative for cultural material.

Shovel Test Area B-6

Shovel Test Area B-6 traverses a high probability zone on a prairie/pasture ridge, west of a small drainage. A total of eight shovel tests spaced at 15 m intervals were excavated in one transect along this ridge. The typical soil profile of these tests consists of an average of 17 cm of very dark grayish brown (10YR 3/2) silt loam over brown (10YR 4/3) silt loam with gravel and cobbles. All tests were negative for cultural material.

Shovel Test Area B-7

Shovel Test Area B-7 traverses both moderate and high probability zones along the southern portion of a large prairie/pasture ridge to the east of the small drainage with the steep sided ravine. The ridge is broken up into several higher areas by small swales and offers dramatic views to the south. One transect of 19 shovel tests was excavated across this ridge at 15 m intervals with the exception of shovel test 17, which was placed approximately 60 m to the east of shovel test 16 to avoid a stone arc (Feature [F] 002)

identified during shovel testing. At shovel test 12, the transect was shifted to the north to avoid the stone circle identified during the pedestrian survey (F 001). Two shovel tests excavated in this area were positive for cultural material, consisting of one tertiary (ST 007) and one secondary (ST 004) flake of KRF. An additional eight tests were excavated in the cardinal directions around the positive tests. Of these additional tests, three were positive for cultural material, consisting of one secondary flake of KRF (ST 015), one tertiary flake of KRF (ST 017), and one KRF biface (ST 008).

These positive shovel tests, along with the stone features found along the ridge, were recorded as site 32OL641. The typical soil profile of the tests excavated in this area consists of an average of 16 cm of very dark grayish brown (10YR 3/2) silt loam over brown (10YR 4/3) silt loam with gravel and cobbles.

Shovel Test Area B-8

Shovel Test Area B-8 traverses a high probability zone and is located along a prairie/pasture ridge overlooking a small drainage to the east. One northwest/southeast orientated transect of nine shovel tests was excavated along the ridgeline at 15 m intervals. The typical soil profile of these tests consists of an average of 18 cm of very dark grayish brown (10YR 3/2) silt loam over dark grayish brown (10YR 4/2) to brown (10YR 4/3) silt loam with gravel and cobbles. All tests were negative for cultural material.

Survey Segment BB (Section 32)

Permission to survey was not granted by the landowner for Survey Segment BB (Appendix A, Figure 4, Page 1). HDR recommends revisiting Survey Segment BB once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Survey Segment BB (Section 33)

No Survey Segments

Survey Segment C (Section 34) 2010 Survey

This portion of Survey Segment C in Section 34 is no longer the preferred route. This area was surveyed prior to route updates.

Survey Segment C begins at the intersection of State Highway 25 and 23rd Street SW and follows the northern boundary of Section 34, extending for approximately 0.5 miles before terminating (Appendix A, Figure 4, Page 1).

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility was poor, at 0 percent. No sites were identified during the pedestrian survey and no areas were recommended for shovel testing.

Survey Segment C (Section 27) 2011 Survey

Survey Segment C begins at the intersection of State Highway 25 and 23rd Street SW and follows the southern boundary of Section 27, extending for approximately 0.5 miles before terminating (Appendix A, Figure 4, Page 1). The segment is within a gently rolling pasture. According to the FCGFAPM, Survey Segment C is within a moderate to high probability zone.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Ground surface visibility was poor, at 0 percent, and gopher mounds were opportunistically examined along the route. During the pedestrian survey, two precontact stone features were identified (32OL642) and three areas were recommended for shovel testing (Shovel Test Areas C-1, C-2, and C-3).

Shovel Test Area C-1

Shovel Test Area C-1 in Section 27 traverses a high probability zone in a rolling pasture with 0 percent visibility. A total of four shovel tests were excavated at 15 m intervals. The typical soil profile included a very dark grayish brown (10YR 3/2) silt loam that extended to an average depth of 27 cm over a dark grayish brown (10YR 4/2) or a dark brown (10YR 3/3) silt loam. At an average depth of 41 cm a brown (10YR 4/3) silt loam with gravel and cobbles was encountered. All tests were negative for cultural material.

Shovel Test Area C-2

Shovel Test Area C-2 in Section 27 traverses a moderate to high probability zone in a rolling pasture with 0 percent visibility. A total of eight shovel tests were excavated at 15 m intervals. The typical soil profile included a very dark grayish brown (10YR 3/2) silt loam that extended to an average depth of 18 cm over a dark grayish brown (10YR 4/2) or brown (10YR 4/3) silt loam. At an average depth of 40 cm a grayish brown (10YR 5/2) silt loam with gravel was encountered. All tests were negative for cultural material.

Shovel Test Area C-3

Shovel Test Area C-3 in Section 27 traverses a high probability zone in a rolling pasture with 0 percent visibility. Shovel testing was recommended for this area after the discovery of Site 32OL642, two precontact stone features and an associated lithic scatter. A total of 12 shovel tests were excavated at 15 m intervals to further delineate site boundaries. The typical soil profile included a very dark grayish brown (10YR 3/2) silt loam that extended to an average depth of 26 cm over a dark grayish brown (10YR 4/2) or brown (10YR 4/3) silt loam. At an average depth of 45 cm a brown (10YR 4/3) silt loam with gravel was encountered. All tests were negative for cultural material.

Survey Segment D - West portion (Sections 25, 35, and 36) 2010 Survey

The west portion of Survey Segment D begins in Section 35, to the south of and adjacent to 23rd Street SW and continues due east approximately 0.75 miles, crossing through Section 36 before turning northeast for approximately 1.0 mile as it enters Section 25 (Appendix A, Figure 4, Page 1). The survey segment traverses a wheat field, a rolling prairie/pasture, and crosses a small intermittent stream as it enters Section 36. The segment continues east for a short distance through rolling prairie/pasture and crosses several small drainages in Section 36. According to the FCGFAPM, the west portion of Survey Segment D traverses a mix of low, moderate, and high probability zones.

Pedestrian survey of this portion of Survey Segment D was conducted along six transects spaced at 7 m intervals. The cultivated wheat field exhibited 25 percent visibility. Although prairie grasses obscured surface visibility throughout the remainder of this portion of Segment D, gopher mounds were opportunistically examined along the route. During the pedestrian survey, four areas were identified for shovel testing (Shovel Test Areas D-1, D-2, D-3, and D-4), one area of avoidance was recorded in Section 35, and three Areas of Avoidance were recorded in Section 25.

Shovel Test Area D-1

Shovel Test Area D-1 in Section 35 traverses a low probability zone on a hill in prairie/pasture adjacent to a cultivated wheat field to the east, and a small drainage to the west. One transect of five shovel tests was excavated at 15 m intervals. The typical soil profile of these tests consists of an average of 11 cm of very dark grayish brown (10YR 3/2) silt loam with gravel over dark grayish brown (10YR 4/2) to brown (10YR 4/3) silt loam with gravel. All tests were negative for cultural material.

Shovel Test Area D-2

Shovel Test Area D-2 in Section 25 traverses a low probability zone on a hill in prairie/pasture. One transect of five shovel tests was excavated at 15 m intervals. The typical soil profile of these tests

consists of an average of 13 cm of very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) silt loam horizon that extended to an average depth of 25 cm when brown (10YR 5/3) sand loam was encountered. All tests were negative for cultural material.

Shovel Test Area D-3

Shovel Test Area D-3 in Section 25 traverses a high probability zone on a rise in a prairie/pasture. One transect of six shovel tests was excavated at 15 m intervals. The typical soil profile of these tests consists of an average of 17 cm of very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) silt loam horizon that extended to an average depth of 35 cm when brown (10YR 4/3) silt loam was encountered. All tests were negative for cultural material.

Shovel Test Area D-4

Shovel Test Area D-4 in Section 25 traverses a high probability zone. It is located on a wide flat prairie/pasture terrace overlooking a wooded drainage to the south and east. One transect of ten shovel tests was excavated at 15 m intervals. The typical soil profile of these tests consists of an average of 18 cm of very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) silt loam horizon that extended to an average depth of 40 cm when brown (10YR 4/3) silt loam was encountered. All tests were negative for cultural material.

Survey Segment D - West portion (Sections 25 and 26) 2011 Survey

The west portion of Survey Segment D begins near the center of the southern boundary of Section 26 and continues approximately 0.75 miles crossing into Section 25 transecting a soybean field and then transitioning to a pasture in rolling topography (Appendix A, Figure 4, Page 1). According to the FCGFAPM, the west portion of Survey Segment D traverses a mix of low, moderate, and high probability zones.

Pedestrian survey was conducted along six transects spaced at 7 m intervals. Ground surface visibility in the soybean field in Section 26 was good, ranging from 50 to 75 percent. Visibility in the pasture was poor, at 0 percent and gopher mounds were opportunistically examined along the route. During the pedestrian survey, no sites were identified, five areas were identified for shovel testing (Shovel Test Areas D-1, D-2, D-3, D-4, and D-5), and two Areas of Avoidance were recorded.

Shovel Test Area D-1

Shovel Test Area D-1 in Section 26 traverses a moderate to high probability zone within a pasture on a general upland. One transect of 13 shovel tests was excavated at 15 m intervals. The typical soil profile included a very dark grayish brown (10YR 3/2) silt loam that extended to an average depth of 24 cm over a brown (10YR 4/3) silt loam. At an average depth of 41 cm a grayish brown (10YR 5/2) silt loam was encountered. All tests were negative for cultural material.

Shovel Test Area D-2

Shovel Test Area D-2 in Section 26 traverses a low probability zone within a pasture on a flat terrace. One transect of three shovel tests was excavated at 15 m intervals. The typical soil profile included a very dark grayish brown (10YR 3/2) silt loam that extended to an average depth of 28 cm over a brown (10YR 4/3) or grayish brown (10YR 5/2) silt loam or clay loam. All tests were negative for cultural material.

Shovel Test Area D-3

Shovel Test Area D-3 in Section 26 traverses a low probability zone on a finger ridge within a pasture. Rather than follow the east/west corridor, shovel tests were excavated following the northeast/southwest finger ridge to fully test the landform. One transect of four shovel tests was

excavated at 15 m intervals. The typical soil profile included a very dark grayish brown (10YR 3/2) silt loam that extended to an average depth of 23 cm over a dark grayish brown (10YR 4/2) silt loam with gravel. All tests were negative for cultural material.

Shovel Test Area D-4

Shovel Test Area D-4 in Section 26 traverses a moderate probability zone on a small, flat landform within a pasture. One transect of three shovel tests was excavated at 15 m intervals to cover the landform. The typical soil profile included a very dark grayish brown (10YR 3/2) silt loam that extended to an average depth of 60 cm over a yellowish brown (10YR 5/4) silt loam with heavy gravels. All tests were negative for cultural material.

Shovel Test Area D-5

Shovel Test Area D-5 in Section 25 traverses a low to moderate probability zone on a general upland within a pasture. One transect of eight shovel tests was excavated at 15 m intervals. The typical soil profile included a very dark grayish brown (10YR 3/2) silt loam that extended to an average depth of 16 cm over a brown (10YR 4/3) silt loam. At an average depth of 41 cm a dark grayish brown (10YR 4/2) or yellowish brown (10YR 5/4) silt loam with gravels was encountered. All tests were negative for cultural material.

Township 142N, Range 81W, Sections 19, 28, 29, and 30

Survey Segment D - East portion (Sections 19 and 30) 2010 Survey

The east portion of Survey Segment D begins at the west edge of Section 30 and continues to the northeast (Appendix A, Figure 4, Page 1). At the time of the 2010 survey, two survey corridors were under consideration for the preferred route. After the survey segment crossed 24th Avenue SW, it branched into the two separate survey corridors. One survey corridor continued to the northeast through the northwest quarter of Section 30 and through the SW quarter of Section 19 before ending at the east edge of the section.

A second survey corridor ran due east through Section 30 before it ended at the east edge of the section. The southwest to northeast survey corridor crossed two prominent buttes just to the northeast of 24th Avenue SW before traversing rolling prairie/pasture. The west to east survey corridor also traversed rolling prairie/pasture. According to the FCGFAPM, the east portion of Survey Segment D traverses a mix of high and moderate probability zones.

Pedestrian survey of eastern portion of Survey Segment D was conducted along six transects spaced at 7 m intervals. Although surface visibility was poor, at 0 percent, gopher mounds were opportunistically examined along the route. During pedestrian survey two precontact stone cairns (32OL643) and one historic dugout and associated depressions (32OL644) were identified. The two cairns were [REDACTED] in close proximity to one another. The dugout and associated depressions were identified [REDACTED]. Four areas within this portion of Survey Segment D, including the vicinity around site 32OL643, were identified for shovel testing (Shovel Test Areas D-5, D-6, D-7, and D-8). In addition, one area of avoidance was recorded.

Shovel Test Area D-5

Shovel Test Area D-5 in Section 30 traverses a high probability zone and is just east of 24th Avenue SW at the intersection of the two survey corridors, on a prairie/pasture ridge just to the southwest of two prominent buttes. Fourteen shovel tests were excavated at 15 m intervals in a grid pattern to cover the landform. The typical soil profile of these tests consists of an average of 32 cm of a very dark grayish

brown (10YR 3/2) sandy loam to loamy clay over a brown (10YR 4/3) sandy loam with gravel and cobbles. All tests were negative for cultural material.

Shovel Test Area D-6

Shovel Test Area D-6 in Section 30 traverses a high probability zone within the east to west survey corridor on a prairie/pasture ridge. Fourteen shovel tests were excavated along two transects at 15 m intervals. ST 001 to 005 were placed along the crest of the ridge in one transect. The second transect, ST 006 to 014, was placed 15 m north of the first transect to follow the high portion of the ridge. The typical soil profile of these tests consists of an average of 20 cm of a very dark grayish brown (10YR 3/2) loamy clay over a brown (10YR 4/3) sandy clay with gravel and cobbles. All tests were negative for cultural material.

Shovel Test Area D-7

Shovel Test Area D-7 in Section 19 traverses both moderate and high probability zones within the southwest/northeast survey corridor along several prairie/pasture finger ridges. One transect of 16 shovel tests was excavated across this area. This transect was broken up into several distinct areas due to the ravines separating the finger ridges. Shovel tests were excavated at 15 m intervals with the exception of ST 005 and 009, which were spaced at further distances to avoid ravines. Shovel test 005 was placed approximately 75 m southwest of shovel test 004, and shovel test 009 was placed approximately 65 m southwest of shovel test 008. The typical soil profile of these tests consists of an average of 18 cm of a very dark grayish brown (10YR 3/2) sandy loam over a dark grayish brown (10YR 4/2) sandy loam horizon that extended to an average depth of 45 cm when a brown (10YR 4/3) sandy loam with gravel and cobbles was encountered. All tests were negative for cultural material.

Shovel Test Area D-8

Shovel Test Area D-8 in Section 19 traverses low to moderate probability zones within the southwest/northeast survey corridor on a prairie/pasture ridge overlooking a drainage to the south. One transect of six shovel tests was excavated at 15 m intervals. The typical soil profile of these tests consists of an average of 17 cm of a very dark grayish brown (10YR 3/2) sandy loam over a dark grayish brown (10YR 4/2) sandy loam that extended to an average depth of 32 cm when a brown (10YR 4/3) sandy loam with heavy gravel and cobbles was encountered. All tests were negative for cultural material.

Survey Segment D - East portion (Section 30) 2011 Survey

The east portion of Survey Segment D begins at the west edge of Section 30 and continues east, 1.0 mile, transecting a rolling pasture (Appendix A, Figure 4, Page 1). According to the FCGFAPM, the east portion of Survey Segment D traverses a mix of low, moderate, and high probability zones.

Pedestrian survey was conducted in six transects spaced at 7 m intervals. Ground surface visibility was poor, at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. During the pedestrian survey, one depression (32OL645) was identified. In addition, one area was identified for shovel testing (Shovel Test Area D-6) and two Areas of Avoidance were recorded.

Shovel Test Area D-6

Shovel Test Area D-6 in Section 30 traverses a moderate probability zone on a small rise within a rolling pasture. To cover the landform, a total of four shovel tests were excavated in an L-shaped pattern at 15 m intervals. The typical soil profile of these tests consists of an average of 21 cm of a very dark grayish brown (10YR 3/2) silt loam with heavy gravel over a brown (10YR 4/3) silt loam with gravel. At an

average depth of 24 cm a dark grayish brown (10YR 4/2) or light brownish gray (10YR 6/2) silt loam with gravel was encountered. All tests were negative for cultural material.

Survey Segment CC (Section 29)

Permission to survey was not granted by the landowner for Survey Segment CC in Section 29 (Appendix A, Figure 4, Page 1). HDR recommends revisiting Survey Segment CC once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials. In addition, one area was recommended for deep testing (Deep Testing Locality 5).

Deep Testing Locality 5

Deep Testing Locality 5 is in the western portion of Section 29 in Survey Segment CC. According to the FCGFAPM, the area traverses low and moderate probability zones. According to the Deep Testing Model, this area holds a high probability to contain buried soils and potentially intact cultural deposits that may range in depth from 1 to 2 m (Appendix C). Shovel testing can efficiently identify subsurface cultural deposits to a depth of 1 m; however, as this area contains the potential for deposits ranging from 1 to 2 m, deep testing would be required.

Survey Segment CC (Section 28)

Survey Segment CC in Section 28 begins at the western boundary of Section 28 and crosses the northern half of the section, extending approximately 1.0 mile before terminating at the Missouri River (Appendix A, Figure 4, Page 1). Near the half-way point, the segment crosses the Northern Pacific Railroad. West of the railroad, the segment transects a rolling pasture area. East of the railroad the segment transects a low area with marshy vegetation. According to the FCGFAPM, Survey Segment CC traverses a mix of low, moderate, and high probability zones west of the railroad and moderate and high probability zones east of the railroad, adjacent to the Missouri River.

A pedestrian survey was completed in six transects at 7 m intervals. Ground surface visibility was poor in the pasture at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. Ground surface visibility was also poor in the marshy areas, at 0 percent. During the pedestrian survey, no sites were identified, one area was recommended for shovel testing (Shovel Test Area CC-1), and one area was recommended for deep testing (Deep Testing Locality 7a).

One previously identified archaeological site (32OL388) was identified within the 150-ft ROW and within Shovel Test Area CC-1. Site 32OL388 consists of single historic depression with an unknown function. During the pedestrian survey, the depression was relocated. No cultural materials were observed in the area and the function of the depression remains unknown. Shovel testing was not completed within the previously identified site and current shovel tests were spaced 50 ft from the site boundaries.

Shovel Test Area CC-1

Shovel Test Area CC-1 is on a prominent ridge overlooking the Missouri River. The area traverses a moderate probability zone in a pasture. A total of nine shovel tests at 15 m intervals were excavated across the corridor to cover the landform. The typical soil profile included a very dark grayish brown (10YR 3/2) silt loam that extended to an average depth of 43 cm over a brown (10YR 4/3) silt loam. At an average depth of 58 cm a yellowish brown (10YR 5/4) silt loam with gravel was encountered. All tests were negative for cultural material.

Deep Testing Locality 7a

Deep Testing Locality 7a is in the northeast corner of Section 28 in Survey Segment CC., adjacent to the Missouri River. According to the FCGFAPM, the area traverses moderate and high probability zones in a grassy/marshy area with poor ground surface visibility (0 percent). According to the Deep Testing Model, this area holds a high probability to contain buried soils and potentially intact cultural deposits that may range in depth from 1 to 3 m (Appendix C). Shovel testing can efficiently identify subsurface cultural deposits to a depth of 1 m; however, as this area contains the potential for deposits ranging from 1 to 3 m, deep testing would be required.

Burleigh County

Township 142N, Range 81W, Sections 13, 14, 22, 23, 24, and 27

Section 27

No Survey Segments

Survey Segment E (Section 22) 2010 Survey

This portion of Survey Segment E in Section 22 is no longer the preferred route. This area was surveyed prior to route updates.

Survey Segment E begins at two points along the east bank of the Missouri River in Section 22 (Appendix A, Figure 4, Page 1). The northern portion of Survey Segment E travels east from the Missouri River through the half section, crossing a grassy/wooded area and a small patch of planted sunflowers. The southern portion of Survey Segment E follows the southern boundary of Section 22, then turns north near the half-section point. The segment travels approximately 0.5 miles north before intersecting the northern portion of Survey Segment E just west of Highway 1804.

The southern portion crosses a grassy/wooded area and a small patch of planted sunflowers. East of Highway 1804, the remainder of Survey Segment E forms a square-shaped survey area entirely within a planted sunflower field.

Pedestrian survey of Survey Segment E was completed in six transects spaced at 7 m intervals. Visibility was poor west of Highway 1804 within the grassy/wooded areas, at 0 percent. Visibility in the planted sunflowers was excellent, ranging from 75 to 100 percent. However, areas in planted crops were not surveyed. No cultural materials were identified during the pedestrian survey. However, as the segment is within the Missouri River floodplain, there is a high potential for buried soils.

East of Highway 1804, Visibility in the planted sunflowers was excellent, ranging from 75 to 100 percent. This area was also not surveyed due to standing crops.

Survey Segment E (Section 22) 2011 Survey

Survey Segment E begins on the east bank of the Missouri River in Section 22 and travels northeast through the section approximately 1.0 mile, crossing Highway 1804, and terminating at the eastern boundary of Section 22 (Appendix A, Figure 4, Page 1). Southwest of Highway 1804, the segment transects a wooded area and a harvested sunflower field. The majority of this area has a high probability of buried soils as it is within the Missouri River floodplain. Northeast of Highway 1804, the segment travels uphill and transects a harvested sunflower field. According to the FCGFAPM, the southwestern portion of Survey Segment E transects a moderate probability zone and the northeastern portion transects a high probability zone.

Pedestrian survey of Survey Segment E was conducted along six transects spaced at 7 m intervals. Southwest of Highway 1804, visibility in the harvested sunflower field was good, at approximately 25 to 50 percent. No cultural materials were identified within the cultivated field. The grassy/wooded area southwest of the cultivated field had poor visibility, at 0 percent. The area contained multiple brush piles as well as an abandoned house and multiple vehicles and garbage near the transition area from cultivated field to the grassy/wooded lot. No cultural materials were identified during the pedestrian survey and one area was recommended for deep testing (Deep Testing Locality 7a).

Ground surface visibility northeast of Highway 1804 was good, ranging from 25 to 50 percent in the harvested corn field. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Deep Testing Locality 7a

Deep Testing Locality 7a is in the southwest corner of Section 22 in Survey Segment E, adjacent to the Missouri River. According to the FCGFAPM, the area traverses moderate and high probability zones in a grassy area with poor ground surface visibility (0 percent) and a harvested corn field with good visibility (25 to 50 percent). According to the Deep Testing Model, this area holds a high probability to contain buried soils and potentially intact cultural deposits that may range in depth from 1 to 3 m (Appendix C). Shovel testing can efficiently identify subsurface cultural deposits to a depth of 1 m; however, as this area contains the potential for deposits ranging from 1 to 3 m, deep testing would be required.

Survey Segment DD (Sections 13, 14, 23, and 24)

Survey Segment DD is approximately 5.4 miles long and transects two townships and nine sections (Appendix A, Figure 4, Page 1). For ease of explanation, this segment will be discussed by section and divided into segments.

Survey Segment DD (Sections 14 and 23)

Survey Segment DD begins in the northwest quarter of Section 23 extending approximately 0.5 miles before intersecting Section 14, and traveling east, following the southern boundary of the section (Appendix A, Figure 4, Page 1). The segment begins in a harvested sunflower field, then transitions into rolling pasture transected by drainages. Near the end of this portion of the segment, a gravel pit and disturbed area was encountered. According to the FCGFAPM, this portion of Survey Segment DD transects moderate to high probability zones.

Pedestrian survey of this portion of Survey Segment DD was completed in six transects spaced at 7 m intervals. Ground surface visibility was good in the sunflower field and ranged from 50 to 75 percent. Visibility in the pasture was poor, at 0 percent. During the survey, no cultural materials were identified and one area was recommended for shovel testing (Shovel Test Area DD-1).

Shovel Test Area DD-1

Shovel Test Area DD-1 traverses a high probability zone on a hilltop within a pasture area. Topography consists of rolling hills, transected by drainages. To cover the landform, a total of six shovel tests were excavated in one transect spaced at 15 m intervals. The typical soil profile consists of an average of 25 cm of a very dark grayish brown (10YR 3/2) silt loam over a yellowish brown (10YR 5/4) silt loam. All tests were negative for cultural material.

Survey Segment DD (Sections 13 and 24)

The next portion of Survey Segment DD begins at the southwest corner of Section 13 and the northwestern corner of Section 24 (Appendix A, Figure 4, Page 1). The segment follows the northern boundary of Section 24 for one mile and is within a grassland. Topography consists of rolling hills

transected by drainages. According to the FCGFAPM, this portion of Survey Segment DD transects moderate to high probability zones.

Pedestrian survey of this portion of Survey Segment DD was completed in six transects spaced at 7 m intervals. Ground surface visibility was poor, at 0 percent. During the survey, no cultural materials were identified and three areas were recommended for shovel testing (Shovel Test Areas DD-2, DD-3, and DD-4).

Shovel Test Area DD-2

Shovel Test Area DD-2 traverses a high probability zone and is on a hilltop within a grassland. The area overlooks a small creek to the east. To cover the landform, a total of eight shovel tests in two transects were excavated at 15 m intervals. The typical soil profile consists of an average of 35 cm of very dark grayish brown (10YR 3/2) silt loam over a yellowish brown (10YR 5/4) silt loam with gravel and cobbles. All tests were negative for cultural material.

Shovel Test Area DD-3

Shovel Test Area DD-3 traverses moderate and high probability zones within a grassland. The area is on a flat, lower terrace, overlooking a small creek to the west. Shovel testing was completed in two transects and included a total of eight shovel tests spaced at 15 m intervals. The typical soil profile consists of an average of 49 cm of a very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) or brown (10YR 4/3) silt loam with gravel and cobbles. All tests were negative for cultural material.

Shovel Test Area DD-4

Shovel Test Area DD-4 traverses moderate and high probability zones within a grassland and covers two distinct hilltops. Three shovel tests were excavated on the first hilltop in one transect spaced at 15 m intervals. Spacing between the first and second hilltop was approximately 50 m. Seven shovel tests were excavated on the second hill top. The typical soil profile consists of an average of 25 cm of a very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) or yellowish brown (10YR 5/4) sand silt loam. All tests were negative for cultural material.

Township 142N Range 80W Sections 6, 7, 18, and 19

Survey Segment DD (Sections 18 and 19)

At the northwest corner of Section 19, Survey Segment DD extends approximately 0.5 miles east, and runs parallel to the northern boundary of the section (Appendix A, Figure 4, Page 1). Near the half-mile mark, the segment heads north into Section 18 approximately 0.75 miles before turning north/northwest and terminating along the northern edge of Section 18. The segment in Section 19 is within several harvested wheat fields divided by small strips of grass. In Section 18, the segment included pasture, wooded areas, and grassland on gently rolling topography. According to the FCGFAPM, this portion of Survey Segment DD transects a mix of low, moderate, and high probability zones.

Pedestrian survey of this portion of Survey Segment DD was completed in six transects spaced at 7 m intervals. Ground surface visibility was good to excellent in the harvested wheat field, at 50 to 100 percent, and poor at 0 percent in the pasture, grassy, and wooded areas. During the pedestrian survey one site was identified (32BLX287), no areas were recommended for shovel testing, and four Areas of Avoidance were recorded.

Survey Segment DD (Section 7)

This portion of Survey Segment DD starts at the center of the southern edge of Section 7 and extends north/northwest approximately 1.0 mile (Appendix A, Figure 4, Page 1). Land use in Section 7 included a harvested wheat field, grassland, and fallow field in a gently rolling landscape. According to the FCGFAPM, this portion of Survey Segment DD transects a mix of low, moderate, and high probability zones.

Pedestrian survey was completed in four transects spaced at 7 m intervals. Ground surface visibility was poor in the grassland and fallow fields, at 0 percent. In the harvested wheat field, the visibility ranged from 0 to 25 percent. During the pedestrian survey, no sites were identified and three areas were recommended for shovel testing (Shovel Test Areas DD-5, DD-6, and DD-7).

Shovel Test Area DD-5

Shovel Test Area DD-5 traverses a high probability zone within a grassland. The test area is on a rise overlooking 54th Street NW and an alfalfa field. One transect of eight shovel tests was completed, with excavations at 15 m intervals. The typical soil profile consists of an average of 18 cm of a very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) silt loam. At an average depth of 43 cm a dark grayish brown (10YR 4/2) or yellowish brown (10YR 5/4) silt loam was encountered. All tests were negative for cultural material.

Shovel Test Area DD-6

Shovel Test Area DD-6 traverses a high probability zone within a grassland on a small rise. One transect of five shovel tests was completed with excavations at 15 m intervals. The typical soil profile consists of an average of 18 cm of a very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) silt loam. At an average depth of 36 cm a yellowish brown (10YR 5/4) silt loam was encountered. All tests were negative for cultural material.

Shovel Test Area DD-7

Shovel Test Area DD-7 traverses a moderate and high probability zone within a grassland. The test area is adjacent to 305th Avenue NW, on a ridge overlooking a low, wet valley. One transect of seven shovel tests was completed with excavations at 15 m intervals. The typical soil profile consists of an average of 20 cm of a very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) silt loam. At an average depth of 35 cm a yellowish brown (10YR 5/4) silt loam was encountered. All tests were negative for cultural material.

Survey Segment DD (Section 6)

This portion of Survey Segment DD begins in the southwest quarter of Section 6, along 305th Avenue NW and travels approximately 0.75 miles before terminating at the western edge of Section 6 along 54th Street NW (Appendix A, Figure 4, Page 1). The segment is located within a grassland in a rolling landscape. According to the FCGFAPM, this portion of Survey Segment DD transects moderate and high probability zones.

Pedestrian survey was completed in four transects spaced at 10 m intervals. Ground surface visibility was poor, at 0 percent. During the pedestrian survey, no sites were identified and two areas were recommended for shovel testing (Shovel Test Areas DD-8 and DD-9).

Shovel Test Area DD-8

Shovel Test Area DD-8 traverses a high probability zone within a grassland. The area is on a prominent ridge [REDACTED] and is on the same landform as Shovel Test Area DD-7. The pedestrian survey failed to identify any cultural materials on the ground surface; however, the area was

recommended for shovel testing due to the prominent landform. Six shovel tests were excavated along a northwest/southeast trending ridgeline. One of the six shovel tests was positive (ST 002) and contained one broken tertiary KRF flake at 0-33 cm below the ground surface (cmbs) (32BL718). No additional cultural materials were identified in ST 002.

Cardinal shovel tests (north, south, east, and west) were excavated at 5 m intervals to further delineate the site boundary. One of the four shovel tests was positive (ST 002 5-East) and contained one secondary KRF flake at 0-30 cmbs.

Additional cardinal shovel tests were excavated at 10 m intervals. ST 002 10-South was not excavated as the test would have been within the road right-of-way. The remaining 10 m cardinal shovel tests were negative.

Remaining cardinal tests surrounding ST 002 5-East were excavated at 5 m (ST 002 5-East 5-North and ST 002 5-East 5-South), 10 m (ST 002 5-East 10-North), and 15 m (ST 002 15-East) to define site boundaries. These tests were also negative. In total, 17 shovel tests were excavated at 32BL718, two of which were positive.

The typical soil profile consists of an average of 21 cm of a very dark grayish brown (10YR 3/2) silt loam over a brown (10YR 4/3) silt loam. At an average depth of 40 cm a yellowish brown (10YR 5/4) silt loam was encountered. No additional subsurface testing was completed.

Shovel Test Area DD-9

Shovel Test Area DD-9 traverses a high probability zone within a grassland. The area is on a slight rise adjacent to an intermittent drainage. A total of seven shovel tests were excavated at 15 m intervals to cover the landform. The typical soil profile consists of an average of 16 cm of a very dark grayish brown (10YR 3/2) silt loam over a brown (10YR 4/3) silt loam. At an average depth of 37 cm a yellowish brown (10YR 5/4) silt loam was encountered. All tests were negative for cultural material. No additional subsurface testing was completed.

Township 142N, Range 81W, Sections 1 and 2

Survey Segment F (Sections 1 and 2) 2010 Survey

Portions of Survey Segment F in Sections 1 and 2 are no longer part of the preferred route. This area was surveyed prior to route updates.

Survey Segment F begins at the west edge of Section 2 and runs due east 2 miles through Sections 2 and 1 before heading north for 0.5 miles and ending in the northeast corner of Section 1 (Appendix A, Figure 4, Page 1). In Section 2, the survey segment traversed rolling terrain that consisted mostly of cultivated grain fields interspersed with a patchwork of hayfields, fallow fields, and prairie/pasture on the crests of some hills. The survey segment crosses a small drainage near the middle of Section 2. After the segment crosses 67th Street NW into Section 1, it traverses a small butte, and then slopes down to a cultivated grain field and small drainage before sloping up to a broad prairie/pasture upland where it continues to the east edge of the section. The survey segment then turns north and begins a long descent down through prairie/pasture areas and a hayfield. According to the FCGFAPM, Survey Segment F traversed both high and moderate probability zones.

Pedestrian survey of Survey Segment F was conducted along six transects spaced at 7 m intervals. The cultivated grain fields in Section 2 had visibility ranging from 25 to 50 percent, and the cultivated grain field in Section 1 and hayfield in Section 2 had visibility ranging from 25 to 75 percent. Although prairie grasses obscured surface visibility in some areas, gopher mounds were opportunistically examined along

the route. During pedestrian survey of Survey Segment F one precontact stone cairn (32BL719) was identified in a prairie/pasture area overlooking a small drainage to the west [REDACTED]. Three areas within this portion of Survey Segment F were identified for shovel testing (Shovel Test Areas F-1, F-2, and F-3).

Shovel Test Area F-1

Shovel Test Area F-1 traverses a high probability zone on a prairie/pasture hilltop to the north of and adjacent to a cultivated grain field. This area overlooks a small intermittent drainage to the east. One transect of seven shovel tests, spaced at 15 m intervals, was excavated. The typical soil profile of these tests consists of an average of 14 cm of a very dark grayish brown (10YR 3/2) sandy loam over a dark grayish brown (10YR 4/2) sandy loam that extended to an average depth of 34 cm when brown (10YR 4/3) sandy loam with gravel was encountered. All tests were negative for cultural material.

Shovel Test Area F-2

Shovel Test Area F-2 traverses a moderate probability zone on a small butte in prairie/pasture overlooking a small intermittent drainage to the east. One transect of four shovel tests was excavated at 15 m intervals. The typical soil profile of these tests consists of an average of 12 cm of a very dark grayish brown (10YR 3/2) sandy loam over a dark grayish brown (10YR 4/2) sandy loam that extended to an average depth of 23 cm when a brown (10YR 4/3) sandy loam with gravel was encountered. All tests were negative for cultural material.

Shovel Test Area F-3

Shovel Test Area F-3 traverses a high probability zone on a broad, high, prairie/pasture upland to the east of a small intermittent drainage. One transect of 11 shovel tests was excavated at 15 m intervals across the top of this upland. The typical soil profile of these tests consists of an average of 18 cm of a very dark grayish brown (10YR 3/2) sandy loam over a dark grayish brown (10YR 4/2) sandy loam that extended to an average depth of 36 cm when brown (10YR 4/3) sandy loam was encountered. All tests were negative for cultural material.

Survey Segment F (Sections 1) 2011 Survey

Survey Segment F begins at in the northeast quarter of Section 1 and extends approximately 0.25 miles (Appendix A, Figure 4, Page 1). This portion of Survey Segment F was originally covered during the 2010 survey. Survey Segment F originally included Sections 1 and 2 and now only includes a small portion of Section 1. Land use includes a cultivated field within rolling topography. According to the FCGFAPM, Survey Segment F traversed a mix of high probability zone.

Pedestrian survey of Survey Segment F was conducted along six transects spaced at 7 m intervals. The cultivated grain field in Section 1 had 25 to 75 percent visibility. During pedestrian survey of Survey Segment F one isolated find (32BL720) was identified on a gradual slope in a hayfield in Section 1. No areas were recommended for shovel testing.

McLean County

Township 143N, Range 81W, Sections 13, 24, 25, and 36

Survey Segment EE – South Portion (Section 36)

The south portion of Survey Segment EE begins at the southern edge of Section 36, along the McLean/Burleigh county line and 18th Street SW, and continues north, approximately 1.0 mile, transecting a gently rolling grassland (Appendix A, Figure 4, Page 1). According to the FCGFAPM, the south portion of Survey Segment EE traverses a moderate and high probability zone.

Pedestrian survey of the southern portion of Survey Segment EE was conducted in six transects spaced at 7 m intervals. Ground surface visibility was poor, at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. During the pedestrian survey, three separate lithic artifacts (FS 001, FS 002, and FS 003) were identified in the back dirt piles of gopher mounds. The locations of these artifacts were recorded as sites 32MLX767 (SF 001), 32MLX768 (SF 002), and 32ML1237 (SF 003) and are described in more detail below. A close-interval pedestrian survey in a 15 m area around the surface finds revealed no additional artifacts. These areas were identified for shovel testing as was one additional area in the southeast corner of Section 36 (Shovel Test Areas EE-1, EE2-1, EE2-2, and EE2-3).

Shovel Test Area EE-1

Shovel Test Area EE-1 in Section 36 traverses a high probability zone within a gently rolling pasture. To cover the landform, a total of 12 shovel tests were excavated at 15 m intervals along the center of the survey corridor. The typical soil profile of these tests consists of an average of 24 cm of a very dark grayish brown (10YR 3/2) silt loam over a brown (10YR 4/3) silt loam. At an average depth of 46 cm a yellowish brown (10YR 5/4) silt loam was encountered. All tests were negative for cultural material.

Shovel Test Area EE2-1

Shovel Test Area EE2-1 in Section 36 traverses a high probability zone within a generally flat pasture. ST 001 and 002 were placed 5 m north and south of SF 001 (32MLX767), an isolated piece of KRF shatter identified in a gopher mound within a pasture. These shovel tests were excavated to determine the subsurface integrity of the site. The typical soil profile of these tests consists of an average of 50 cm of a very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) clay silt loam. At an average depth of 70 cm a yellowish brown (10YR 5/4) clay silt loam was encountered. Both tests were negative for cultural material and additional subsurface testing was not completed.

Shovel Test Area EE2-2

Shovel Test Area EE2-2 in Section 36 traverses a high probability zone within a gently rolling pasture. ST 003 and 004 were placed 5 m north and south of SF 002 (32MLX768), a tertiary flake of unidentified chert found on a gopher mound within a pasture. These shovel tests were excavated to determine the subsurface integrity of the site. The northern test (ST 003) was negative and the southern test (ST 004) was positive. Shovel test 004 contained one secondary KRF flake and one tertiary KRF flake at 0-20 cmbs. Additional tests (ST 005 to 008) were excavated at 5 m and 10 m intervals to delineate the site boundaries. The typical soil profile of these tests consists of an average of 25 cm of a dark grayish brown (10YR 4/2) silt loam over a yellowish brown (10YR 5/4) silty clay with gravels. All additional tests were negative and no additional subsurface testing was completed.

Shovel Test Area EE2-3

Shovel Test Area EE2-3 in Section 36 traverses a high probability zone within a gently rolling pasture, just north of an unnamed creek. ST 009 to 013 were excavated around SF 003 (32ML1237), a tertiary KRF flake identified in a gopher mound within a pasture. These shovel tests were excavated to determine the subsurface integrity of the site. To delineate site boundaries, a line of shovel tests was excavated north of the surface find at 5 m intervals. A total of five shovel tests were excavated, four of which were positive. Positive shovel tests included ST 009 (two tertiary KRF flakes at 0-30 cmbs), ST 010 (one tertiary KRF flake at 0-15 cmbs), ST 011 (one tertiary KRF flake at 0-23 cmbs), and ST 013 (two tertiary KRF flakes and one tertiary Tongue River Silica (TRS) flake at 0-35 cmbs, five large mammal bone fragments at 50 cmbs, and one calcined bone fragment at 60 cmbs). The typical soil profile of these tests consists of an average of 42 cm of a very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) silt loam. At an average depth of 58 cm a yellowish brown (10YR 5/4) silt loam was encountered.

Due to time constraints, additional shovel tests were not excavated. This site will require an additional visit to determine site boundaries.

Survey Segment EE – North Portion (Sections 24 and 25)

Permission to survey was not granted by the landowner for Survey Segment EE in Section 25 (Appendix A, Figure 4, Page 1). HDR recommends revisiting Survey Segment EE once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Survey Segment G (Section 24)

Survey Segment G begins north of Highway 83, near the southern boundary of Section 24 and extends for approximately 0.75 miles through pasture, terminating at the northern edge of Section 24 (Appendix A, Figure 4, Page 1). According to the FCGFAPM, Survey Segment G traverses a low probability zone.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility was patchy, ranging from 0 to 25 percent. During the pedestrian survey, two sites were identified (32ML1238 (CGF-G-1) and 32ML1239 (CGF-G-2)) and three areas were recommended for shovel testing (Shovel Test Areas G-1, G-2, and G-3).

Shovel Test Area G-1

Shovel Test Area G-1 traverses a low probability zone in a rolling pasture overlooking Yanktonai Creek. Shovel testing was anticipated in this area to cover the small hilltop considered to have a higher potential for cultural resources. However, following the application of the site buffer (32ML1238), the hill top was encapsulated and additional shovel testing was unnecessary as the site boundaries were defined as the landform.

Shovel Test Area G-2

Shovel Test Area G-2 traverses a pasture within a low probability zone on a hilltop overlooking Yanktonai Creek. During the pedestrian survey, one cairn was identified (32ML1239). To avoid the site, a 15 m buffer was created prior to the completion of shovel tests. A total of five shovel tests spaced at 15 m intervals were excavated to cover the hilltop. The typical soil profile consisted of an average of 15 cm of a very dark grayish brown (10YR 3/2) silt loam with gravel over a brown (10YR 4/3) silt loam with gravel that extended to an average depth of 33 cm when a brown (10YR 5/3) silt loam with gravel was encountered. All tests were negative for cultural material.

Shovel Test Area G-3

Shovel Test Area G-3 traverses a pasture within a low probability zone on a hilltop overlooking Yanktonai Creek. A total of nine shovel tests were excavated to cover the landform. Shovel tests were spaced at 15 m intervals. The typical soil profile consisted of an average of 11 cm of a very dark grayish brown (10YR 3/2) silt loam with gravel over a brown (10YR 4/3) silt loam with gravel that extended to an average depth of 24 cm when a brown (10YR 5/3) silt loam with gravel was encountered. All tests were negative for cultural material.

Survey Segment FF (Section 13)

Permission to survey was not granted by the landowner for Survey Segment FF in Section 13 (Appendix A, Figure 4, Page 1). HDR recommends revisiting Survey Segment FF once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Township 143N, Range 80W, Sections 13, 14, 15, 16, 17, and 18

Survey Segment FF (Section 18)

Permission to survey was not granted by the landowner for Survey Segment FF in Section 18 (Appendix A, Figure 4, Page 1). HDR recommends revisiting Survey Segment FF once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Survey Segment H (Section 17)

Survey Segment H begins near the intersection of 17th Avenue SW and the Soo Line Railroad on the western edge of Section 17, extending for 1.0 mile and terminating at the eastern edge of the section at 16th Avenue SW. (Appendix A, Figure 4, Page 1). Survey Segment H straddles the half-section line, with the northern portion of the segment traversing a cultivated wheat field and the southern portion traversing a grassland/pasture. According to the FCGFAPM, the western portion of Survey Segment H traverses a moderate to high probability zone and the eastern portion traverses a low probability zone.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility ranged from 0 to 25 percent in the wheat field and 0 percent in the grassland/pasture. Within the grassland/pasture gopher mounds were opportunistically examined. No cultural materials were identified during the survey and no areas were recommended for shovel testing.

Survey Segment H (Section 16)

No Survey Segments

Survey Segment I (Sections 13, 14, and 15)

Survey Segment I begins at the center point of Section 15 and continues east, approximately 1.7 miles, passing through Section 14 and terminating in Section 13 (Appendix A, Figure 4, Page 1). The segment traverses several different land use areas including pasture and cultivated wheat in Section 15, pasture in Section 14, and cultivated wheat in Section 13. According to the FCGFAPM, Survey Segment I traverses moderate to high probability zones.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Surface visibility was poor, at 0 percent, in the pastures, and good in the cultivated wheat fields, ranging from 25 to 75 percent. During the pedestrian survey, no sites were identified and two areas were recommended for shovel testing (Shovel Test Areas I-1 and I-2)

Shovel Test Area I-1

Shovel Test Area I-1 traverses a moderate to high probability zone within a harvested wheat field. At the time of the survey, ground surface visibility was good, ranging from 50 to 75 percent. As the view of the ground surface was unobstructed, it was decided that shovel testing would not be necessary within the wheat field. Therefore, shovel testing was not completed in this area. Additional pedestrian survey was completed in six transects spaced at 7 m intervals. No cultural materials were identified.

Shovel Test Area I-2

Shovel Test Area I-2 traverses a pasture within a moderate probability zone. Ground surface visibility was poor, at 0 percent. A total of seven shovel tests were excavated on two landforms divided by a small drainage. ST 001 to 002 covered a hill/ridge overlooking the drainage and ST 003 to 007 covered a high, flat plain adjacent to the hill. Tests were excavated at 15 m intervals with the exception of the distance between ST 002 and 003, which was spaced at approximately 45 m to avoid a drainage. The typical soil profile consisted of an average of 13 cm of a very dark grayish brown (10YR 3/2) silt loam with gravel over a dark grayish brown (10YR 4/2) silt loam with gravel that extended to an average

depth of 27 cm when a brown (10YR 5/3) silt loam with gravel was encountered. All tests were negative for cultural material.

Survey Segment GG (Section 12)

Survey Segment GG begins on the southern edge of Section 12, along 370th Avenue NE, and travels north through the section approximately 0.2 miles, transecting a rolling pasture (Appendix A, Figure 4, Page 1). According to the FCGFAPM, Survey Segment GG traverses a high probability zone.

Pedestrian survey of Survey Segment GG was conducted along six transects spaced at 7 m intervals. Ground surface visibility was poor, at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. No sites were identified and one area was identified for shovel testing (Shovel Test Area GG-1).

Shovel Test Area GG-1

Shovel Test Area GG-1 in Section 12 traverses a high probability zone. The area is located atop a general upland area within a rolling pasture. To cover the landform, a total of nine shovel tests were excavated in a north-south line along the center of the survey corridor at 15 m intervals. The typical soil profile of these tests consists of an average of 22 cm of a very dark grayish brown (10YR 3/2) silt loam over a brown (10YR 4/3) silt clay loam. At an average depth of 42 cm a yellowish brown (10YR 5/4) silt clay loam was encountered. All tests were negative for cultural material.

Section 1

No Survey Segments

Township 144N, Range 80W, Sections 1, 12, 13, 24, 25, and 36

Survey Segment J (Section 36) 2010 Survey

The south portion of Survey Segment J begins near the center of Section 36 and continues north, 0.5 miles, transecting a gently rolling cultivated wheat field and a gently rolling standing corn field (Appendix A, Figure 4, Page 2). According to the FCGFAPM, the south portion of Survey Segment J traverses moderate and high probability zones.

Pedestrian survey was conducted in six transects spaced at 7 m intervals. Ground surface visibility was good in the wheat field, at 25 percent. The corn field was not surveyed due to the presence of standing crops. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Survey Segment J (Section 36) 2011 Survey

Permission to survey was not granted by the landowner for Survey Segment J in Section 36 (Appendix A, Figure 4, Page 2). HDR recommends revisiting Survey Segment J once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Survey Segment J (Section 25) 2010 Survey

The north portion of Survey Segment J begins at the southern edge of Section 25, along 409th Avenue NE and extends north 0.8 miles through a gently rolling fallow field, alfalfa field, wheat field, and grassland (Appendix A, Figure 4, Page 2). According to the FCGFAPM the north portion of Survey Segment J traverses moderate and high probability zones.

Pedestrian survey was conducted in six transects spaced at 7 m intervals. Ground surface visibility was poor, at 0 percent in the fallow field, alfalfa field, and grassland. Although grasses obscured surface

visibility in these areas, gopher mounds were opportunistically examined along the route. The wheat field was not surveyed as the crop was still standing. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Survey Segment J (Section 25) 2011 Survey

Survey Segment J begins at the southern edge of Section 25, along 409th Avenue NE and extends north approximately 0.8 miles through a gently rolling and sloped prairie (Appendix A, Figure 4, Page 2). According to the FCGFAPM, the portion of Survey Segment J within Section 25 traverses a moderate and high probability zone.

Pedestrian survey was conducted in six transects spaced at 7 m intervals. Ground surface visibility was poor, at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Survey Segment HH (Section 24)

Survey Segment HH begins at the southern edge of Section 24, along 422nd Avenue NE, running north-south, and ends at the northern edge of Section 24, along 435th Avenue NE (Appendix A, Figure 4, Page 2). The segment transects a fairly flat pasture. According to the FCGFAPM, Survey Segment HH traverses moderate and high probability zones.

Permission to survey was not granted by the landowner for the southern half of Survey Segment HH in Section 24. HDR recommends revisiting the southern half of Survey Segment HH once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Pedestrian survey of northern portion of Survey Segment HH was conducted in six transects spaced at 7 m intervals. Ground surface visibility was poor, at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. During the pedestrian survey, two cairns (32ML1240) were identified. In addition, one area was identified for shovel testing (Shovel Test Area HH-1).

Shovel Test Area HH-1

Shovel Test Area HH-1 traverses a high probability zone. The area is located within a generally flat pasture and was approximately 15 m east of the two cairns identified (32ML1240). To cover the landform, a total of seven shovel tests were excavated along the center of the survey corridor at 15 m intervals. The typical soil profile of these tests consists of an average of 30 cm of a very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) silt loam. At an average depth of 64 cm a yellowish brown (10YR 5/4) silt loam was encountered. All tests were negative for cultural material.

Sections 1, 12, and 13

No Survey Segments

Burleigh County

Township 144N, Range 79W, Sections 5 and 6

Survey Segment K – South portion (Sections 5 and 6)

The south portion of Survey Segment K begins at the west edge of Section 6 and continues 1.6 miles due east through Section 5, where the survey segment turns due north 0.2 miles and enters Section 35 (Appendix A, Figure 4, Page 2). West of ND-41 the segment traverses an alfalfa field. East of ND-41 the

segment traverses a cultivated wheat field and a prairie/pasture area that continues through Section 6. As the segment enters Section 5, it traverses a standing wheat field, a standing flax field, and several large wetland areas. The segment then traverses a cultivated wheat field before it turns north and exits the section. The portion of Survey Segment K in the eastern half of Section 5 transects a previously recorded site lead (32BLx146) that consists of at least 20 stone circles observed during a fly-over survey in 1980. The current boundaries for 32BLx146 cover half of a section. During the pedestrian survey of the 150-ft corridor, no stone features were identified. According to the FCGFAPM, the south portion of Survey Segment K traverses a moderate probability zone.

Pedestrian survey of Survey Segment K was conducted along six transects spaced at 7 m intervals. The cultivated wheat field east of ND-41 had 25 to 50 percent visibility, and the cultivated wheat field in the northeast quarter of Section 5 had patchy 25 percent visibility. Although prairie grasses obscured surface visibility throughout this segment, gopher mounds were opportunistically examined along the route. During pedestrian survey, a single lithic flake (32BLX288) was identified on a gopher mound in the alfalfa field. In addition, three areas were identified for shovel testing (Shovel Test Areas K-1, K-2, and K-3) and two Areas of Avoidance were recorded.

Shovel Test Area K-1

Shovel Test Area K-1 traverses a moderate probability zone in a gently rolling alfalfa field. During the pedestrian survey, one piece of lithic shatter was identified on the back dirt pile of a gopher mound (32BLX288). A total of four shovel tests spaced at 15 m intervals were excavated, two each to the east and west of the isolated find. The typical soil profile consists of an average of 20 cm of a very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) silt loam that extended to an average depth of 32 cm when a brown (10YR 5/3) silt loam was encountered. All tests were negative for cultural material.

Shovel Test Area K-2

Shovel Test Area K-2 is within a moderate probability zone in a pasture adjacent to ND-41. A total of 10 shovel tests covering two areas were excavated. ST 001 to 005 and ST 006 to 010 comprised the two testing areas. Tests were spaced at 15 m intervals with the exception of the distance between ST 005 and 006, which was approximately 45 m to span an Area of Avoidance. The typical soil profile included an average of 15 cm of a very dark grayish brown (10YR 3/2) silt loam with gravel over a dark grayish brown (10YR 4/3) silt loam with gravel. This layer extended to an average depth of 29 cm when a brown (10YR 5/3) silt loam with gravel was encountered. All tests were negative for cultural material.

Shovel Test Area K-3

Shovel Test Area K-3 traverses a moderate probability zone in a pasture adjacent to ND-41. A total of 20 shovel tests covering four areas were excavated. ST 001 to 005, 006 to 015, 016 to 018, and 019 to 020 comprised the four testing areas. Tests were spaced at 15 m intervals with the exception of the distance between ST 005 and 006 (approximately 60 m), ST 015 and 016 (approximately 300 m), and ST 018 and 020 (approximately 30 m). Tests were spaced to cover appropriate landforms and avoid ditches and low areas. The typical soil profile included an average of 15 cm of a very dark grayish brown (10YR 3/2) silt loam with gravel over a dark grayish brown (10YR 4/2) silt loam with gravel that extended to an average depth of 29 cm when a brown (10YR 5/3) silt loam with gravels was encountered. All tests were negative for cultural material.

McLean County

Township 145N, Range 79W, Section 2, 11, 14, 23, and 35

Survey Segment K – North Portion (Section 35)

The northern portion of Survey Segment K begins east of the intersection of 8th Avenue NW/ND-41 and 6th Street SW, extending for approximately 0.2 miles through a cultivated wheat field (Appendix A, Figure 4, Page 2). According to the FCGFAPM, the north portion of Survey Segment K traverses a moderate probability zone.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility was patchy, ranging from 0 to 25 percent. No cultural materials were identified during the survey and no areas were recommended for shovel testing.

Section 23

No Survey Segments

Grassland Easement 1 (Section 2)

Permission to survey was not granted by the landowner for Grassland Easement 1 in Section 2 (Appendix A, Figure 4, Page 2). HDR recommends revisiting Grassland Easement 1 once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Township 146N, Range 79W, Sections 23, 24, 26, and 35

Grassland Easement 1 (Section 35)

Permission to survey was not granted by the landowner for Grassland Easement 1 in Section 35 (Appendix A, Figure 4, Page 2). HDR recommends revisiting Grassland Easement 1 once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Sections 23, 24, and 26

No Survey Segments

Sheridan County

Township 146N, Range 78W, Sections 4, 5, 7, 8, and 18

Survey Segment II – (Sections 7 and 18)

Survey Segment II begins in the northeast quarter of Section 18 and continues northeast, approximately 0.75 miles, transecting a rolling hayfield (Appendix A, Figure 4, Page 3). A large wetland and gently rolling pasture were encountered before the segment terminates at 5th Avenue NW, along the eastern edge of Section 7. According to the FCGFAPM, Survey Segment II traverses moderate and high probability zones.

Pedestrian survey of Survey Segment II was conducted in six transects spaced at 7 m intervals. Ground surface visibility within the hayfield was good at approximately 25 percent. Although grasses obscured surface visibility within the pasture at 0 percent, gopher mounds were opportunistically examined along the route. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Survey Segment L – South Portion (Sections 4, 5, and 8)

The southern portion of Survey Segment L begins in Section 8 near the intersection of 5th Avenue NW and ND-200, transects the southeast quarter of Section 5, and extends approximately 2 miles before

terminating in Section 4 along 6th Street NW (Appendix A, Figure 4, Page 3). The segment cuts across pasture and cultivated fields over rolling topography transected by multiple wetlands and small bodies of water. According to the FCGFAPM, the southern portion of Survey Segment L traverses mostly high probability zones.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility ranged from 0 to 25 percent and gopher mounds were examined in the pasture where available. During the survey two stone features (32SH268) and one historic site (32SH269) were identified and recorded. No areas in the southern portion of Survey Segment L were recommended for shovel testing and one Area of Avoidance was recorded.

Township 147N, Range 78W, Sections 13, 23, 24, 26, 27, 33, and 34

Survey Segment L – North portion (Section 33)

The northern portion of Survey Segment L begins in the southeast quarter of Section 33 at 6th Street NW and extends northeast approximately 0.3 miles through pasture over rolling topography transected by wetlands and small bodies of water (Appendix A, Figure 4, Page 3). According to the FCGFAPM, the northern portion of Survey Segment L traverses moderate to high probability zone.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility ranged from 0 to 25 percent and gopher mounds were examined along the route where possible. No cultural materials were identified during the survey and one area was recommended for shovel testing (Shovel Test Area L-1).

Shovel Test Area L-1

Shovel Test Area L-1 traverses a high probability zone in a pasture adjacent to wetlands and small bodies of water. A total of nine shovel tests spaced at 15 m intervals were excavated. The typical soil profile included a very dark grayish brown (10YR 3/2) clay or silt loam that extended to an average depth of 15 cm over a brown (10YR 4/3) silt loam or very compact clay loam. All tests were negative for cultural material.

Survey Segment JJ (Section 34)

Survey Segment JJ begins in the northwest quarter of Section 34 and continues northeast, approximately 0.3 miles to the half-section line, transecting a rolling grassland with several wetlands (Appendix A, Figure 4, Page 3). According to the FCGFAPM, Survey Segment JJ traverses moderate and high probability zones.

Pedestrian survey of Survey Segment JJ was conducted in six transects spaced at 7 m intervals. Ground surface visibility was poor, at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. During the pedestrian survey, no sites were identified, one area was identified for shovel testing (Shovel Test Area JJ-1), and one Area of Avoidance was recorded.

Shovel Test Area JJ-1

Shovel Test Area JJ-1 in Section 34 traverses a high probability zone. The area is on a small rise within a rolling grassland. To cover the landform, a total of four shovel tests were excavated along the survey corridor in 15 m intervals. The typical soil profile of these tests consists of an average of 23 cm of a very dark grayish brown (10YR 3/2) silt loam over a brown (10YR 4/3) sandy silt. At an average depth of 50 cm a yellowish brown (10YR 5/4) sandy loam was encountered. All tests were negative for cultural material.

Survey Segment M (Sections 27 and 34)

Survey Segment M begins in the northwest quarter of Section 34 and extends approximately 0.75 miles northeast, transecting the southeast quarter of Section 27 and terminating at 2nd Avenue NW (Appendix A, Figure 4, Page 3). The segment transects a grassland within rolling topography transected by multiple small wetlands. According to the FCGFAPM, Survey Segment M traverses low to high probability zones.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility was poor, at 0 percent and gopher mounds were examined along the route where available. No cultural materials were identified during the survey and two areas were recommended for shovel testing (Shovel Test Areas M-1 and M-2).

Shovel Test Area M-1

Shovel Test Area M-1 traverses a high probability zone in a grassland transected by multiple small wetlands. A total of 13 shovel tests were excavated in four groups at irregular intervals to adjust for the topography and properly cover landforms with high potential. The four groups included ST 001 to 005, 006 to 007, 008 to 010, and 011 to 013. Tests within each group were excavated at 15 m intervals. The typical soil profile included a very dark grayish brown (10YR 3/2) silt loam with heavy gravel that extended to an average depth of 17 cm over a brown (10YR 5/3) silt loam with heavy gravel. All tests were negative for cultural material.

Shovel Test Area M-2

Shovel Test Area M-2 crosses a low probability zone in a grassland transected by multiple small wetlands. A total of nine shovel tests were excavated at 15 m intervals. The typical soil profile included a very dark grayish brown (10YR 3/2) silt loam with heavy gravel that extended to an average depth of 11 cm over a dark grayish brown (10YR 4/2) silt loam with gravel. At an average of 19 cm a brown (10YR 4/3) silt loam was encountered. All tests were negative for cultural material.

Survey Segment KK1 (Sections 23 and 26)

Permission to survey was not granted by the landowner for Survey Segment KK1 in Sections 23 and 26 (Appendix A, Figure 4, Page 3). HDR recommends revisiting Survey Segment KK1 once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Survey Segment KK2 (Section 24)

Survey Segment KK2 begins in the northwest quarter of Section 24 and continues northeast, approximately 0.1 miles, transecting a sloped rolling pasture (Appendix A, Figure 4, Page 3). According to the FCGFAPM, Survey Segment KK2 traverses a low probability zone.

Pedestrian survey of Survey Segment KK2 was conducted in six transects spaced at 7 m intervals. Ground surface visibility was poor, at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Survey Segment KK2 (Section 13)

Permission to survey was not granted by the landowner for Survey Segment KK2 in Section 13 (Appendix A, Figure 4, Page 3). HDR recommends revisiting Survey Segment KK2 once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Township 147N, Range 77W, Sections 7, 8, 9, 10, 11, 12, and 18

Sections 7 and 18

No Survey Segments

Survey Segment KK3 (Section 8)

Survey Segment KK3 begins at the west edge of Section 8 and continues one mile to the east edge, transecting rolling hayfields and pasture (Appendix A, Figure 4, Page 3). According to the FCGFAPM, Survey Segment KK3 traverses a mix of low, moderate, and high probability zones.

Pedestrian survey of Survey Segment KK3 was conducted in six transects spaced at 7 m intervals. The hayfields had good visibility, at approximately 50 percent. Ground surface visibility in the pasture was poor, at 0 percent. Although grasses obscured surface visibility in the pasture, gopher mounds were opportunistically examined along the route. During the pedestrian survey, no sites were identified, no areas were identified for shovel testing, and four Areas of Avoidance were recorded.

Sections 9, 10, 11, and 12

No Survey Segments

Township 147N, Range 76W, Sections 7, 8, 9, 10, 11, and 12

Section 7

No Survey Segments

Grassland Easement 2 (Section 8)

Grassland Easement 2 begins at the west edge of Section 8, along 7th Avenue NE, and continues east, 0.5 miles, transecting a fairly flat pasture (Appendix A, Figure 4, Page 3). According to the FCGFAPM, Grassland Easement 2 traverses a moderate and high probability zone.

Pedestrian survey of Survey Segment Grassland Easement 2 was conducted in six transects spaced at 7 m intervals. Ground surface visibility was poor, at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Survey Segment N (Sections 8 and 9)

Survey Segment N begins at the half-section of Section 8 and continues east approximately 1.5 miles, terminating along 9th Avenue NE at the eastern edge of Section 9 (Appendix A, Figure 4, Page 3). The segment transects a grassland in Section 8, a cultivated wheat field in the western portion of Section 9 and a grassland in the remaining portions of Section 9. Topography consists of gently rolling hills transected by multiple wetlands and drainages. According to the FCGFAPM, the majority of Survey Segment N transects high probability zones.

A portion of the corridor [REDACTED] transects a previously recorded site lead (32SHx88), that consists of nine precontact stone features including five stone circles, three cairns, and one stone arc. The site lead is considered potentially eligible to the NRHP, although it has not been evaluated.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility ranged from 0 to 25 percent in the cultivated wheat field and 0 percent in the grassland. Gopher mounds were examined along the route where available. During the pedestrian survey, six stone features were identified (32SH270) and one area was recommended for shovel testing (Shovel Test Area N-1).

Shovel Test Area N-1

Shovel Test Area N-1 traverses a high probability zone within a grassland in gently rolling terrain. The test area is adjacent to multiple small wetlands and transects one previously recorded site lead (32SHx88). A total of 20 shovel tests were excavated in six groups at irregular intervals to properly cover the landform and to avoid features recorded during the pedestrian survey. Groups included ST 001 to 003, 004 to 009, 010 to 013, 014 to 017, and 018 to 020. Shovel tests within each group were excavated at 15 m intervals. The typical soil profile included a very dark grayish brown (10YR 3/2) silt loam with gravel that extended to an average of 17 cm over a brown (10YR 4/3) silt loam with gravel and cobbles. All tests were negative for cultural material.

Survey Segment LL (Sections 10 and 11)

Survey Segment LL begins in Section 10 and continues east about 0.8 miles, terminating approximately 0.1 miles east of 10th Avenue NE in Section 11 (Appendix A, Figure 4, Page 3). The segment transects a rolling pasture with several wetlands in Section 10, and a gently rolling cultivated sunflower field in Section 11. According to the FCGFAPM, Survey Segment LL transects a mix of low, moderate, and high probability zones.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility ranged from 50 percent in the cultivated sunflower field to 0 percent in the pasture. Gopher mounds were opportunistically examined along the route where available. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Section 12

No Survey Segments

Township 147N, Range 75W, Sections 7, 8, 9, 10, 11, and 12

No Survey Segments

Township 147N, Range 74W, Sections 7, 8, 9, 10, 11, and 12

Sections 7, 8, 9, and 10

No Survey Segments

Survey Segment MM (Sections 11 and 12)

Permission to survey was not granted by the landowner for Survey Segment MM in Sections 11 and 12 (Appendix A, Figure 4, Page 4). HDR recommends revisiting Survey Segment MM once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Survey Segment O (Section 12)

Permission to survey was not granted by the landowner for Survey Segment O in Section 12 (Appendix A, Figure 4, Page 4). HDR recommends revisiting Survey Segment O once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Wells County

Township 147N, Range 73W, Sections 2, 7, 8, 9, 10, and 11

Survey Segment O (Section 7)

Permission to survey was not granted by the landowner for Survey Segment O in Section 7 (Appendix A, Figure 4, Page 4). HDR recommends revisiting Survey Segment O once landowner permission has been

granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Survey Segment NN (Section 8)

Survey Segment NN begins at the west edge of Section 8, along 25th Avenue SE, and continues east, 1.0 mile, to the east edge of Section 8, along 26th Avenue SE (Appendix A, Figure 4, Page 4). The segment transects a fallow alfalfa field, a harvested soy field, and a rolling grassland. According to the FCGFAPM, Survey Segment NN traverses a mix of low, moderate, and high probability zones.

Pedestrian survey was conducted in six transects spaced at 7 m intervals. Ground surface visibility within the fallow alfalfa field and the grassland was poor, at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. Ground surface visibility within the harvested soy field was poor, at 0 to 25 percent. During the pedestrian survey, one area within the grassland was identified for shovel testing (Shovel Test Area NN-1).

Shovel Test Area NN-1

Shovel Test Area NN-1 in Section 8 traverses a high probability zone on a hilltop overlooking multiple ponds and wetlands within a rolling grassland. To cover the landform, a total of eight shovel tests were excavated at 15 m intervals. The typical soil profile of these tests consists of an average of 22 cm of a dark brown (10YR 3/3) silt loam with heavy gravel over a light brownish gray (10YR 6/2) silt clay. All tests were negative for cultural material.

Sections 9 and 10

No Survey Segments

Survey Segment OO (Sections 2 and 11)

Survey Segment OO begins in the southeast quarter of Section 11 and continues east before quickly turning north just short of 1.0 mile, crossing 11th Street NE and terminating in Section 2 (Appendix A, Figure 4, Page 4). Survey Segment OO transects several fallow fields, a rolling pasture, and a tilled soy field in Section 11, and a rolling pasture in Section 2. According to the FCGFAPM, Survey Segment OO traverses moderate and high probability zones.

Pedestrian survey was conducted in six transects spaced at 7 m intervals. Ground surface visibility within the fallow fields in Section 11 was good, at 50 to 75 percent. The pasture in Section 11 yielded poor visibility, at 0 percent. The tilled soy field in Section 11 afforded excellent visibility at 75 to 100 percent. Ground surface visibility within the pasture in Section 2 was poor, at 0 percent. Although grasses obscured surface visibility within the pastures in Section 2 and 11, gopher mounds were opportunistically examined along the route. During the pedestrian survey, two areas were identified for shovel testing (Shovel Test Areas OO-1 and OO-2) and four Areas of Avoidance were recorded.

Shovel Test Area OO-1

Shovel Test Area OO-1 in Section 11 traverses a high probability zone on a small rise within a rolling pasture. To cover the landform, a total of eight shovel tests were excavated at 15 m intervals with the exception of ST 004 and 005 which were placed 30 m apart to span an old overgrown road transecting the survey segment. The typical soil profile of these tests consists of an average of 20 cm of a very dark grayish brown (10YR 3/2) silt loam over a brown (10YR 4/3) silt loam. At an average depth of 42 cm a brown (10YR 5/3) silt clay loam was encountered. All tests were negative for cultural material.

Shovel Test Area 00-2

Shovel Test Area 00-2 in Section 2 traverses a high probability zone on a general upland within a rolling pasture. To cover the landform, a total of 12 shovel tests were excavated at 15 m intervals with the exception of ST 009 and 010 which were placed 30 m apart to span a small dip in the landform. The typical soil profile of these tests consists of an average of 17 cm of a very dark grayish brown (10YR 3/2) silt loam over a brown (10YR 4/3) silt loam. At an average depth of 31 cm a brown (10YR 5/3) silt loam was encountered. All tests were negative for cultural material.

Township 148N, Range 72W, Sections 31, 32, 33, 34, 35, and 36

Sections 31, 32, and 33

No Survey Segments

Survey Segment PP (Section 32, 33, and 34)

Permission to survey was not granted by the landowner for Survey Segment PP in Sections 32, 33, and 34 (Appendix A, Figure 4, Page 4). HDR recommends revisiting Survey Segment PP once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials. In addition, one area is recommended for deep testing (Deep Testing Locality 16).

Deep Testing Locality 16

Deep Testing Locality 16 covers the majority of Survey Segment PP in Sections 32, 33, and 34. According to the FCGFAPM, the area traverses low probability zone. According to the Deep Testing Model, this area holds a high probability to contain buried soils and potentially intact cultural deposits that may range in depth from 1 to 2 m (Appendix C). Shovel testing can efficiently identify subsurface cultural deposits to a depth of 1 m; however, as this area contains the potential for deposits ranging from 1 to 3 m, deep testing would be required.

Sections 35 and 36

No Survey Segments

Township 148N, Range 71W, Sections 31, 32, 33, and 34

No Survey Segments

Township 147N, Range 71W, Sections 1, 2, and 3

No Survey Segments

Township 147N, Range 70W, Sections 4, 5, and 6

No Survey Segments

Township 148N, Range 70W, Sections 25, 26, 27, 28, and 33

No Survey Segments

Township 148N, Range 69W, Sections 25, 26, 27, 28, 29, and 30

No Survey Segments

Township 148N, Range 68W, Sections 25, 26, 27, 28, 29, and 30

Survey Segment QQ (Sections 29 and 30)

Survey Segment QQ begins just east of the half-section line within Section 30 and continues east about 1.0 mile, terminating approximately 0.6 miles east of 55th Avenue NE in Section 29 (Appendix A, Figure 4,

Page 5). The segment transects a low and flat soy field in Section 30, and a low and flat hayfield in Section 29. According to the FCGFAPM, Survey Segment QQ traverses a moderate probability zone.

Pedestrian survey of eastern portion of Survey Segment QQ was conducted in six transects spaced at 7 m intervals. Ground surface visibility within the soy field in Section 30 was good, at 75 percent. Ground surface visibility within the hayfield in Section 29 was also good, at 50 percent. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Sections 25, 26, 27, and 28

No Survey Segments

Eddy County

Township 148N, Range 67W, Sections 25, 26, 27, 28, 29, and 30

Survey Segment RR (Section 30)

Permission to survey was not granted by the landowner for Survey Segment RR in Section 30 (Appendix A, Figure 4, Page 5). HDR recommends revisiting Survey Segment RR once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Survey Segment RR (Section 29)

Survey Segment RR begins at the west edge of Section 29, along 61st Avenue NE, and continues east 0.25 miles, transecting a flat cultivated soy field (Appendix A, Figure 4, Page 5). According to the FCGFAPM, Survey Segment RR traverses a low probability zone.

Pedestrian survey was conducted in six transects spaced at 7 m intervals. Ground surface visibility was excellent, at 75 to 100 percent. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Sections 25, 26, 27, and 28

No Survey Segments

Township 148N, Range 66W, Sections 25, 26, 27, 28, 29, 30, and 36

No Survey Segments

Township 148N, Range 65W, Sections 31, 32, 33, 34, 35, and 36

Survey Segment P (Sections 31, 32, 33, and 34)

Survey Segment P transects four sections, covering 3.5 miles, with varied land uses (Appendix A, Figure 4, Page 6). The segment begins on the western edge of Section 31, transects Section 32, crosses the James River in Section 33, and terminates near the center of Section 34. Land use consisted of a tilled soybean field in Section 31, and harvested sunflowers and pasture in Section 32. Land use in Section 33 changed at each quarter section line and included pasture, cultivated wheat, and harvested sunflowers. Section 34 consisted of a tilled wheat field. Generally, topography consisted of gently rolling hills transected by small wetlands and low areas. According to the FCGFAPM, the majority of Survey Segment P transects a moderate probability zone with small amounts of higher probability areas adjacent to the James River.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Ground surface visibility in the tilled soybean field and tilled wheat field was good to excellent, ranging from 50 to 100 percent. The harvested sunflower field afforded good visibility, at 75 percent, and the cultivated wheat exhibited

good visibility, at 25 percent. The pasture areas along the survey segment had poor visibility, at 0 percent. Although grasses obscured surface visibility within the pasture areas, gopher mounds were opportunistically examined along the route. During the pedestrian survey, no cultural resources were identified, one area was recommended for shovel testing (Shovel Test Area P-1), and one area was recommended for deep testing (Deep Testing Locality 24).

Shovel Test Area P-1

Shovel Test Area P-1 in Section 33 traverses a moderate probability zone overlooking the James River. The segment falls within a pasture with 0 percent visibility and a cultivated wheat field with 0 to 25 percent visibility. A total of 15 shovel tests were excavated. The shovel tests were divided into two groups to cover two landforms divided by a drainage. ST 001 to 013 were excavated within the pasture area and ST 014 to 015 were excavated within the cultivated wheat field. Shovel tests were spaced at 15 m intervals, with the exception of ST 013 and 014, which were spaced at 70 m. The typical soil profile included a very dark grayish brown (10YR 3/2) silt loam that extended to an average depth of 12 cm over a dark grayish brown (10YR 4/2) silt loam. At an average depth of 24 cm a brown (10YR 4/3) silt loam with gravels was encountered. All tests were negative for cultural material.

Deep Testing Locality 24

Deep Testing Locality 24 is in the northeast corner of Section 33 in Survey Segment P, adjacent to the James River. According to the FCGFAPM, the area traverses moderate and high probability zones in a pasture with 0 percent visibility. According to the Deep Testing Model, this area holds a high probability to contain buried soils and potentially intact cultural deposits that may range in depth from 1 to 2 m (Appendix C). Shovel testing can efficiently identify subsurface cultural deposits to a depth of 1 m; however, as this area contains the potential for deposits ranging from 1 to 2 m, deep testing would be required.

Sections 35 and 36

No Survey Segments

Eddy County

Township 148N, Range 64W, Sections 31, 32, 33, 34, 35, and 36

Sections 31, 32, 33, 43, and 35

No Survey Segments

Survey Segment SS (Section 36)

Permission to survey was not granted by the landowner for Survey Segment SS in Section 36 (Appendix A, Figure 4, Page 6). HDR recommends revisiting Survey Segment SS once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Township 148N, Range 63W, Sections 31, 32, 33, and 34

Survey Segment SS (Section 31)

Survey Segment SS begins in the southwest quarter of Section 31, and continues east 0.25 miles, traversing a pasture (Appendix A, Figure 4, Page 6). According to the FCGFAPM, this portion of Survey Segment SS traverses a moderate probability zone.

During the pedestrian survey, many areas were underwater and hummocky. Visibility within the pasture was poor, at 0 percent.

Due to the wet condition of the pasture, the survey could not be fully completed. With the combination of land use, inundated conditions of the field, and low probability of finding intact cultural resources, HDR does not recommend additional survey in this area.

Section 32

No Survey Segments

Survey Segment TT1 (Section 33)

Survey Segment TT1 begins at the west edge of Section 33 in the southwest quarter, along 86th Avenue NE, and continues east approximately 0.6 miles, transecting a rolling pasture (Appendix A, Figure 4, Page 6). According to the FCGFAPM, Survey Segment TT1 traverses both moderate and high probability zones.

Pedestrian survey of Survey Segment TT1 was conducted in four transects spaced at 10 m intervals. Ground surface visibility was poor, at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Survey Segment TT2 (Sections 33 and 34)

Survey Segment TT2 begins in the southeast quarter of Section 33 and continues east, approximately 0.25 miles, crossing into Section 34, and transecting a rolling pasture (Appendix A, Figure 4, Page 6). According to the FCGFAPM, Survey Segment TT2 traverses a mix of moderate and high probability zones.

Pedestrian survey of Survey Segment TT2 was conducted in four transects spaced at 10 m intervals. Ground surface visibility was poor, at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. During the pedestrian survey, two areas were identified for shovel testing (Shovel Test Areas TT2-1 and TT2-2).

Shovel Test Area TT2-1

Shovel Test Area TT2-1 in Section 33 traverses a high probability zone on a hilltop overlooking a wetland within a rolling pasture. To cover the landform, a total of four shovel tests were excavated at 15 m intervals. The typical soil profile of these tests consists of an average of 14 cm of a very dark grayish brown (10YR 3/2) silt loam with gravel over a dark grayish brown (10YR 4/2) silt loam with gravel. At an average depth of 28 cm a light brownish gray (10YR 6/2) silt with gravel was encountered. All tests were negative for cultural material.

Shovel Test Area TT2-2

Shovel Test Area TT2-2 in Section 33 traverses a high probability zone on a hilltop overlooking a wetland within a rolling pasture. To cover the landform, a total of six shovel tests were excavated at 15 m intervals. The typical soil profile of these tests consists of an average of 16 cm of a very dark grayish brown (10YR 3/2) silt loam with gravel over a dark grayish brown (10YR 4/2) silt loam with gravel. At an average depth of 29 cm a light brownish gray (10YR 6/2) silt with gravel was encountered. All tests were negative for cultural material.

Survey Segment TT3 (Section 34)

The north portion of Survey Segment TT3 begins in the southeast quarter of Section 34, along the north-south half-section line, and continues east, approximately 0.1 miles before turning and continuing south approximately 0.25 miles, transecting an alfalfa field (Appendix A, Figure 4, Page 6). According to the FCGFAPM, the north portion of Survey Segment TT3 traverses a moderate and high probability zone.

Pedestrian survey of the north portion of Survey Segment TT3 was conducted in four transects spaced at 10 m intervals. Ground surface visibility was fair, at 0 to 25 percent. Although the alfalfa obscured surface visibility, gopher mounds were opportunistically examined along the route. No cultural materials were identified during the pedestrian survey, no shovel testing areas were identified, and two Areas of Avoidance were recorded.

Foster County

Township 147N, Range 63W, Sections 3, 10, 13, 14, and 15

Survey Segment TT3 (Section 3)

The south portion of Survey Segment TT3 begins in the northeast quarter of Section 3 and continues south, approximately 0.4 miles, transecting a planted wheat field (Appendix A, Figure 4, Page 6). According to the FCGFAPM, the south portion of Survey Segment TT3 traverses both moderate and high probability zones.

Pedestrian survey of the south portion of Survey Segment TT3 was conducted in four transects spaced at 10 m intervals. Ground surface visibility was good, at 25 to 50 percent. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Survey Segment UU (Sections 10 and 15)

Survey Segment UU begins in the southeast quarter of Section 10 and continues south, just over 0.75 miles, crossing 4th Street NE into Section 15 (Appendix A, Figure 4, Page 6). The segment transects a soybean field. According to the FCGFAPM, Survey Segment UU traverses both moderate and high probability zones.

Pedestrian survey of Survey Segment UU was conducted in six transects spaced at 7 m intervals. Ground surface visibility was good, at 50 percent. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Survey Segment VV (Sections 14 and 15)

Survey Segment VV begins along the southern edge of Section 15, at the half-section line, and continues east, approximately 0.9 miles into Section 14, transecting several fallow fields (Appendix A, Figure 4, Page 6). According to the FCGFAPM, Survey Segment VV traverses both moderate and high probability zones.

Pedestrian survey of Survey Segment VV was conducted in six transects spaced at 7 m intervals. Ground surface visibility ranged from good, at 50 to 75 percent in the tilled fallow field in Section 15 to good, at 25 to 50 percent in the fallow field in Section 14. No cultural materials were identified during the pedestrian survey, no shovel testing areas were identified, and one Area of Avoidance was recorded.

Section 13

No Survey Segments

Township 147N, Range 62W, Sections 13, 14, 15, 16, 17, and 18

No Survey Segments

Griggs County

Township 147N, Range 61W, Sections 1, 2, 3, 10, 15, 16, 17, and 18

Section 18

No Survey Segments

Survey Segment WW1 (Section 17)

Permission to survey was not granted by the landowner for Survey Segment WW1 in Section 17 (Appendix A, Figure 4, Page 7). HDR recommends revisiting Survey Segment WW1 once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Survey Segment WW2 (Section 16)

Permission to survey was not granted by the landowner for Survey Segment WW2 in Section 16 (Appendix A, Figure 4, Page 7). HDR recommends revisiting Survey Segment WW2 once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Survey Segment WW3 (Section 16)

Permission to survey was not granted by the landowner for Survey Segment WW3 in Section 16 (Appendix A, Figure 4, Page 7). HDR recommends revisiting Survey Segment WW3 once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Survey Segment XX (Section 15)

Survey Segment XX begins along the east edge of Section 15 at the half-section line, and continues north, 0.5 miles, to 10th Street NE, transecting a rolling soy field and rolling prairie (Appendix A, Figure 4, Page 7). According to the FCGFAPM, Survey Segment XX traverses both moderate and high probability zones.

Pedestrian survey of Survey Segment XX was conducted in six transects spaced at 7 m intervals. Ground surface visibility was good, at 50 to 75 percent within the soy field. Ground surface visibility was poor, at 0 percent within the prairie. Although grasses obscured surface visibility within the prairie, gopher mounds were opportunistically examined along the route. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Section 10

No Survey Segments

Survey Segment YY (Sections 2 and 3)

Survey Segment YY begins in the northeast quarter of Section 3, and continues north 0.4 miles, before turning east and crossing into Section 2 for 0.75 miles, transecting a rolling prairie (Appendix A, Figure 4, Page 7). According to the FCGFAPM, Survey Segment YY traverses mix of moderate and high probability zones.

Pedestrian survey was conducted in four transects spaced at 10 m intervals. Ground surface visibility was poor, at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. During the pedestrian survey, one area was identified for shovel testing (Shovel Test Area YY-1) and three Areas of Avoidance were recorded.

Shovel Test Area YY-1

Shovel Test Area YY-1 in Section 2 traverses both moderate and high probability zones. The area is on a rise within a rolling prairie. To cover the landform, a total of nine shovel tests were excavated in an east-west line along the center of the survey corridor at 15 m intervals. The typical soil profile of these tests consists of an average of 22 cm of a very dark grayish brown (10YR 3/2) silt loam or sandy loam over a

brown (10YR 4/3) silt loam or sandy loam. At an average depth of 40 cm a light brownish gray (10YR 6/2) sandy loam with gravel was encountered. All tests were negative for cultural material.

Survey Segment ZZ (Section 1)

The west portion of Survey Segment ZZ begins in the northeast quarter of Section 1 and continues east, approximately 0.4 miles, transecting a rolling soybean field (Appendix A, Figure 4, Page 7). According to the FCGFAPM, the west portion of Survey Segment ZZ traverses moderate and high probability zones.

Pedestrian survey was conducted in six transects spaced at 7 m intervals. Ground surface visibility was fair, at 25 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Township 147N, Range 60W, Sections 1, 2, 3, 4, 5, and 6

Survey Segment ZZ (Section 6)

The east portion of Survey Segment ZZ begins along the western edge of Section 6 and continues east 0.5 miles, transecting a gently rolling prairie followed by a gently rolling soybean field (Appendix A, Figure 4, Page 7). According to the FCGFAPM, the east portion of Survey Segment ZZ traverses moderate and high probability zones.

Pedestrian survey was conducted in six transects spaced at 7 m intervals. Ground surface visibility within the prairie was poor, at 0 percent. Although grasses obscured surface visibility within the prairie, gopher mounds were opportunistically examined along the route. Ground surface visibility within the soy field was good, at 75 percent. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Section 5

No Survey Segments

Survey Segment Q (Section 4)

Survey Segment Q begins along the half-section line of Section 4 and continues east 0.5 miles, transecting a tilled sunflower field and a rolling pasture (Appendix A, Figure 4, Page 7). According to the FCGFAPM, Survey Segment Q traverses both moderate and high probability zones.

Pedestrian survey of Survey Segment Q was conducted in six transects spaced at 7 m intervals. Ground surface visibility was excellent, at 75 to 100 percent in the sunflower field, and poor, ranging from 0 to 25 percent in the pasture. Although grasses obscured surface visibility in the pasture, gopher mounds were opportunistically examined along the route. No cultural materials were identified during the pedestrian survey, no shovel testing areas were identified, and one Area of Avoidance was recorded.

Survey Segment R1 (Section 3)

Survey Segment R1 begins at the half-section, along the northern edge of Section 3, and extends for 0.5 miles (Appendix A, Figure 4, Page 7). The segment crosses a hayfield and fallow field in hilly topography interspersed with pothole lakes, ponds, and marshes. According to the FCGFAPM, the segment transects a moderate to high probability zone.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility was poor, at 0 percent and gopher mounds were examined along the route where available. During the pedestrian survey, one historic site was identified (32GG179) and two areas were recommended for shovel testing (Shovel Test Areas R1-1 and R1-2).

Shovel Test Area R1-1

Shovel Test Area R1-1 traverses a high probability zone adjacent to a small, unnamed lake. The segment crosses a hayfield with 0 percent ground surface visibility. A total of eight shovel tests were excavated in two groups to cover two separate landforms. Groups included ST 001 to 006, excavated on a flat terrace overlooking the small lake, and 007 to 008, excavated on a hilltop overlooking the terrace. Spacing between ST 006 and 007 was approximately 165 m. The remaining tests were spaced at 15 m intervals. The typical soil profile included a very dark grayish brown (10YR 3/2) silt loam with light gravel to an average depth of 26 cm over a dark grayish brown (10YR 4/2) or dark yellowish brown (10YR 4/4) silt loam with gravel encountered at an average depth of 42 cm. This layer was followed by a brown (10YR 4/3) or grayish brown (10YR 5/2) silt loam with gravel. All tests were negative for cultural material.

Shovel Test Area R1-2

Shovel Test Area R1-2 traverses a high probability zone on a hilltop overlooking small, unnamed lakes to the east and west. The segment crosses a fallow field with 0 percent ground surface visibility. A total of six shovel tests were excavated in two groups to cover separate landforms. ST 001 to 004 transected a hilltop and ST 005 to 006 were excavated on a lower terrace. Spacing between ST 005 and 006 was at approximately 45 m to avoid testing on a slope. Spacing between the remaining tests was at 15 m intervals. The typical soil profile included a black (10YR 2/1) silt loam with gravel to an average depth of 24 cm over a dark grayish brown (10YR 4/2) silt loam with gravel encountered at an average depth of 42 cm. This layer was followed by a brown (10YR 4/3) silt loam with gravel. All tests were negative for cultural material.

Survey Segment R2 (Section 2)

Survey Segment R2 begins approximately 0.1 miles east of the intersection of 12th Street NE and 106th Avenue NE in Section 2 (Appendix A, Figure 4, Page 7). The segment transects a farmyard with standing structures, and a harvested wheat field. Topography consisted of gently rolling hills with multiple wetlands and lakes nearby. According to the FCGFAPM, the segment transects a mostly moderate probability zone.

A pedestrian survey was completed in six transects spaced at 7 m intervals and visibility ranged from 25 to 50 percent. During the survey no cultural materials were identified within the cultivated fields. The standing structures within the farmstead were noted and recorded but did not receive an archaeological field number as the building complex was considered an architectural history property. Features associated with the farmstead were recorded as 32GG180. For a description of the buildings, refer to the Historic Building Inventory and Evaluation (Palmer 2011). One area was recommended for shovel testing (Shovel Test Area R2-1).

Shovel Test Area R2-1

Shovel Test Area R2-1 traverses a moderate probability zone on a hilltop overlooking Lake Norway. The area falls within a farmyard with multiple standing structures and features present. A total of five shovel tests were excavated in two transects. Tests were spaced at 15 m intervals. The typical soil profile included a very dark grayish brown (10YR 3/2) silt loam to an average depth of 24 cm over a dark grayish brown (10YR 4/2) silt loam to an average depth of 46 cm when a brown (10YR 4/3) silt loam with gravel was encountered. Two of the five shovel tests (ST 003 and 004) were positive (32GG180). Shovel test 003 contained one wire nail from 0-20 cmbs, and shovel test 004 contained one cut bone fragment in the sod cap. Artifacts were not collected and additional materials were not identified during testing. Additional shovel tests were not excavated as the artifacts were clearly associated with the adjacent farmstead and the property boundaries were well defined. Features associated with the farmstead and

artifacts identified during shovel testing were recorded as 32GG180. No additional testing is recommended.

Survey Segment R3 (Sections 1 and 2)

Survey Segment R3 begins east of Lake Norway and runs parallel to 12th Street NE (Appendix A, Figure 4, Page 7). The segment extends approximately 0.25 miles and terminates in Section 1 at a small unnamed lake. Survey Segment R3 covers a hilltop within a harvested wheat field with 25 to 50 percent visibility. According to the FCGFAPM, the segment transects a moderate to high probability zone.

A pedestrian survey was completed in six transects spaced at 7 m intervals. During the pedestrian survey, no sites were identified and no areas were recommended for shovel testing.

Township 147N, Range 59W, Sections 1, 2, 3, 4, 5, and 6

Sections 4, 5, and 6

No Survey Segments

Survey Segment AAA (Section 3)

Survey Segment AAA begins along the northern edge of Section 3 just west of the half-section line, and continues east, just short of 0.5 miles, transecting a rolling alfalfa field and a creek, followed by a rolling grassland, a small rolling tilled fallow field, and another rolling grassland (Appendix A, Figure 4, Page 8). According to the FCGFAPM, Survey Segment AAA traverses both moderate and high probability zones.

Pedestrian survey of Survey Segment AAA was conducted in six transects spaced at 7 m intervals. Ground surface visibility was poor, at 0 percent within the alfalfa field and the grasslands. Although alfalfa and grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. The ground surface visibility within the tilled fallow field was excellent, at 75 to 100 percent. No cultural materials were identified during the pedestrian survey, no shovel testing areas were identified, and two Areas of Avoidance were recorded.

Survey Segment S1 - West portion (Sections 1 and 2)

The western portion of Survey Segment S1 begins at the top of a butte near the northern boundary of Section 2 (Appendix A, Figure 4, Page 8). The segment extends 1.75 miles and terminates along 11th Avenue NE at the eastern edge of Section 1. Land use in Section 2 consisted of grassland and a harvested wheat field. Land use in Section 1 consisted of cultivated wheat fields and grassland. Topography generally consisted of rolling hills with multiple wetlands, drainages, and small water bodies in the immediate vicinity. According to the FCGFAPM, the Survey Segment transects a low probability zone in Section 2 and a moderate to high probability zone in Section 1. In addition, the segment transects a previously identified archaeological site lead (32GGx117) [REDACTED]. The site lead consists of one probable precontact mound.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility ranged from 0 percent in the grassland, to 0 to 25 percent in the harvested wheat fields. Gopher mounds were examined along the route where possible. Site lead 32GGx117 was identified during the pedestrian survey and the mound was recorded. No additional cultural resources were identified and two areas were recommended for shovel testing (Shovel Test Areas S1-2 and S1-3). In addition, one area of avoidance was recorded.

Shovel Test Area S1-2

Shovel Test Area S1-2 traverses a low probability zone on a flat plain adjacent to a prominent butte. The segment crosses a harvested wheat field with visibility ranging from 0 to 25 percent. A total of 14 shovel

tests, spaced at 15 m intervals, were excavated to cover the landform. The typical soil profile included a very dark grayish brown (10YR 3/2) silt loam extending to an average depth of 22 cm over a dark grayish brown (10YR 4/2) silt loam to an average depth of 42 cm when a brown (10YR 4/3) clay loam was encountered. All tests were negative for cultural material.

Shovel Test Area S1-3

Shovel Test Area S1-3 traverses a moderate probability zone on a ridge overlooking the Sheyenne River approximately 0.50 miles to the east. A total of four shovel tests, spaced at 15 m intervals were excavated to cover the landform. The typical soil profile included a very dark grayish brown (10YR 3/2) silt loam with gravel to an average depth of 23 cm over a dark grayish brown (10YR 4/2) silt loam with gravel to an average depth of 34 cm when a brown (10YR 4/3) silt loam was encountered. All tests were negative for cultural material.

Township 147N, Range 58W, Sections 1, 2, 3, 4, 5, 6, 7, 8, and 9

Survey Segment S1 – East portion (Section 6) 2010 Survey

The eastern portion of Survey Segment S1 begins near the northwest corner of Section 6 and extends for approximately 0.50 miles, terminating near the eastern side of the Sheyenne River (Appendix A, Figure 4, Page 8). The segment starts on a grassy ridge and gradually slopes downhill to a harvested soybean field. A wetland was encountered adjacent to the Sheyenne River. According to the FCGFAPM, the eastern portion of Survey Segment S1 transects a moderate probability zone on the upland and a high probability zone adjacent to the river.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility ranged from 0 percent in the grassland to 25 to 50 percent in the soybean field. No cultural materials were identified during the pedestrian survey and one area was recommended for deep testing (Deep Testing Locality 33).

Deep Testing Locality 33

Deep Testing Locality 33 is in the northern half of Section 6 in Survey Segment S1, adjacent to the Sheyenne River. According to the FCGFAPM, the area traverses moderate and high probability zones in a grassland and soybean field. According to the Deep Testing Model, this area holds a high probability to contain buried soils and potentially intact cultural deposits that may range in depth from 1 to 2 m (Appendix C). Shovel testing can efficiently identify subsurface cultural deposits to a depth of 1 m; however, as this area contains the potential for deposits ranging from 1 to 2 m, deep testing would be required.

Survey Segment S1 – East portion (Section 6) 2011 Survey

The eastern portion of Survey Segment S1 begins in the northwest corner of Section 6 and extends for approximately 0.5 miles, terminating near the eastern side of the Sheyenne River (Appendix A, Figure 4, Page 8). The segment starts on a grassy ridge with many wet areas and gradually slopes downhill to a harvested soybean field which abuts the Sheyenne River. According to the FCGFAPM, the eastern portion of Survey Segment S1 transects a moderate probability zone on the upland and a high probability zone adjacent to the river.

A pedestrian survey was completed in four transects spaced at 10 m intervals. Visibility ranged from 0 percent in the grassland to 75 to 100 percent in the soybean field. No cultural materials were identified during the pedestrian survey, one shovel testing areas was identified (Shovel Test Area S1-2), and one area was recommended for deep testing (Deep Testing Locality 33).

Shovel Test Area S1-2

Shovel Test Area S1-2 traverses a moderate probability zone, located on a grassy ridge overlooking the Sheyenne River approximately 0.5 miles to the east. A total of seven shovel tests, spaced at 15 m intervals and placed in a "T" pattern were excavated to cover the landform. The typical soil profile included a very dark gray (10YR 3/1) silt loam, to an average depth of 31 cm, over a dark grayish brown (10YR 4/2) silt clay loam. At an average depth of 49 cm a brown (10YR 4/3) clay loam was encountered. All tests were negative for cultural material.

Deep Testing Locality 33

Deep Testing Locality 33 is in the north half of Section 6 in Survey Segment S1, adjacent to the Sheyenne River. According to the FCGFAPM, the area traverses moderate and high probability zones in a grassland and a soybean field. According to the Deep Testing Model, this area holds a high probability to contain buried soils and potentially intact cultural deposits that may range in depth from 1 to 2 m (Appendix C). Shovel testing can efficiently identify subsurface cultural deposits to a depth of 1 m; however, as this area contains the potential for deposits ranging from 1 to 2 m, deep testing would be required.

Survey Segment BBB (Sections 5 and 6)

Survey Segment BBB begins 0.25 miles west of the east edge, and just south of the north edge, of Section 6 and continues east 1.25 miles, terminating along the east edge of Section 5, along 116th Avenue NE (Appendix A, Figure 4, Page 8). The segment transects a flat, partially low hayfield in Section 6, and a flat, partially low to rolling pasture in Section 5. According to the FCGFAPM, Survey Segment BBB transects moderate and high probability zones.

A pedestrian survey of Survey Segment BBB was completed in six transects spaced at 7 m intervals. Ground surface visibility was good, at 50 percent in the hayfield in Section 6, and poor, at 0 percent in the pasture in Section 5. Gopher mounds were opportunistically examined along the route where available. No cultural materials were identified during the pedestrian survey, no shovel testing areas were identified, and one area was recommended for deep testing (Deep Testing Locality 33).

Deep Testing Locality 33

Deep Testing Locality 33 is in the northeast corner of Section 6 in Survey Segment BBB, adjacent to the Sheyenne River. According to the FCGFAPM, the area traverses moderate and high probability zones in a grassland (0 percent visibility) and a soybean field (75 to 100 percent visibility). According to the Deep Testing Model, this area holds a high probability to contain buried soils and potentially intact cultural deposits that may range in depth from 1 to 2 m (Appendix C). Shovel testing can efficiently identify subsurface cultural deposits to a depth of 1 m; however, as this area contains the potential for deposits ranging from 1 to 2 m, deep testing would be required.

Survey Segment S2 (Sections 6 and 7) 2010 Survey

Survey Segment S2 in Sections 6 and 7 is no longer part of the preferred route. This area was surveyed prior to route updates.

Survey Segment S2 begins near the northwest corner of Section 6 and intersects the eastern portion of Survey Segment S1 (Appendix A, Figure 4, Page 8). The segment extends approximately 2.0 miles south, parallel to the township line, and terminates at the southwest corner of Section 7. Topography consists of rolling hills transected by multiple creeks and drainages. Land use included grassland and a harvested wheat field in Section 7.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility ranged from 0 percent in the grassland to 25 percent in the harvested wheat field. During the survey, one historic site

was identified (32GG181). In addition, five areas were recommended for shovel testing (Shovel Test Areas S2-1, S2-2, S2-3, S2-4, and S2-5). However, as the route shifted prior to the completion of shovel testing in Segment S2, these areas were not revisited and shovel testing was not completed.

Survey Segment S3 (Sections 16, 17, and 18) 2010 Survey

Survey Segment S3 in Sections 16, 17, and 18 is no longer part of the preferred route. This area was surveyed prior to route updates.

Survey Segment S3 begins at the NW corner of Section 18 and continues east for approximately 2.5 miles, running parallel to the northern edge of the sections. The segment terminates near 116 ½ Avenue NE after crossing the Sheyenne River (Appendix A, Figure 4, Page 8). Topography consists of rolling cultivated soybean fields, wheat fields, and grasslands transected by multiple creeks and drainages.

Pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility ranged from 0 percent in the grassland to 25 percent in the cultivated fields. No sites were identified during the pedestrian survey and two areas were recommended for shovel testing (Shovel Test Areas S3-1 and S3-2). However, as the route shifted prior to the completion of shovel testing in Segment S3, these areas were not revisited and shovel testing was not completed. In addition, as a portion of Survey Segment S3 is adjacent to the Sheyenne River, there is a high potential for buried soils.

Survey Segment S4 (Sections 4, 9, and 16) 2010 Survey

Survey Segment S4 in Sections 4, 9, and 16 is no longer part of the preferred route. This area was surveyed prior to route updates.

Survey Segment S4 begins at the northern edge of Section 16, near the center of the section, and continues east 0.25 miles before turning north approximately 2.0 miles, terminating near the northern edge of Section 4 (Appendix A, Figure 4, Page 8). The segment runs parallel to the half-section line of Sections 4 and 9. Topography consists of rolling grasslands and cultivated fields transected by multiple creeks and drainages.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility ranged from 0 percent in the grassland to 25 to 50 percent in the harvested wheat and soybean fields. No sites were identified during the pedestrian survey and no areas were recommended for shovel testing. In addition, as a portion of Survey Segment S4 is adjacent to the Sheyenne River, there is a high potential for buried soils.

Survey Segment S5 (Section 4)

Survey Segment S5 begins near the northwest corner of Section 4 and runs parallel to the northern edge of the section for 1.0 mile (Appendix A, Figure 4, Page 8). The segment crosses a relatively flat tilled wheat field transected by a creek.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Ground surface visibility was excellent and ranged from 75 to 100 percent. No sites were identified during the pedestrian survey and no areas were recommended for shovel testing.

Survey Segment T (Sections 1 and 2)

Survey Segment T begins at the center line of Section 2 and runs parallel to the northern edge of the section continuing 1.0 mile and terminating at the center line of Section 1, (Appendix A, Figure 4, Page 8). Land use consisted of tilled wheat, pasture, and harvested corn on relatively flat topography transected by Pickerel Lake Creek.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility ranged from 75 to 100 percent in the tilled wheat field and 0 to 25 percent in the pasture and harvested cornfield. No sites were identified during the pedestrian survey and one area was recommended for shovel testing (Shovel Test Area T-1).

Shovel Test Area T-1

Shovel Test Area T-1 traverses a high probability zone in a fallow field on a terrace overlooking Pickerel Lake Creek in the northwest quarter of Section 1. The area appeared to have been disturbed by heavy farm machinery parked there. A total of four shovel tests were excavated at 15 m intervals in one transect across the terrace. The typical soil profile of these tests consists of an average of 46 cm of a brown (10YR 4/3) sand loam with gravel over a yellowish brown (10YR 5/4) sand with gravel. All tests were negative for cultural material.

Steele County

Township 147N, Range 57W, Section 6

No Survey Segments

Township 148N, Range 57W, Sections 6, 7, 18, 19, 30, and 31

No Survey Segments

Nelson County

Township 149N, Range 57W, Sections 1, 11, 12, 14, 15, 22, 27, 28, 32, and 33

Sections 11, 12, 14, 15, 22, 27, 28, 32, and 33

No Survey Segments

Survey Segment CCC (Section 1)

The west portion of Survey Segment CCC begins near the half-section line and the south edge of Section 1 and continues northeast, approximately 0.6 miles, transecting a fairly flat cultivated hayfield and a planted alfalfa field (Appendix A, Figure 4, Page 10). Survey Segment CCC also crosses Goose Creek just south of the alfalfa field. According to the FCGFAPM, the west portion of Survey Segment CCC traverses both moderate and high probability zones.

Pedestrian survey of western portion of Survey Segment CCC was conducted in six transects spaced at 7 m intervals. Ground surface visibility within the hayfield was excellent, at 75 to 100 percent. Ground surface visibility within the alfalfa field was poor, at 0 percent. The alfalfa field was not surveyed due to the presence of the planted alfalfa. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Grand Forks County

Township 149N, Range 56W, Section 6

Survey Segment CCC (Section 6)

The east portion of Survey Segment CCC begins along the western edge of Section 6 and continues northeast approximately 0.1 mile, transecting a fairly flat soybean field (Appendix A, Figure 4, Page 10). According to the FCGFAPM, the east portion of Survey Segment CCC traverses both moderate and high probability zones.

Pedestrian survey of eastern portion of Survey Segment CCC was conducted in six transects spaced at 7 m intervals. Ground surface visibility within the soybean field was good, at 75 percent. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Township 150N, Range 56W, Sections 31, 32, 33, 34, 35, and 36

Sections 31, 32, 33, 34, and 35

No Survey Segments

Survey Segment DDD (Section 36)

Survey Segment DDD begins in the southwest quarter of Section 36, along the southern edge, and continues east, just short of 0.25 miles, transecting a rolling grassland (Appendix A, Figure 4, Page 10). According to the FCGFAPM, Survey Segment DDD traverses both moderate and high probability zones.

Pedestrian survey of Survey Segment DDD was conducted in four transects spaced at 10 m intervals. Ground surface visibility was poor, at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. During the pedestrian survey, one area was identified for shovel testing (Shovel Test Area DDD-1).

Shovel Test Area DDD-1

Shovel Test Area DDD-1 in Section 36 traverses both moderate and high probability zones on a hilltop within a gently rolling grassland. To cover the landform, a total of seven shovel tests were excavated in a grid-shaped pattern at 15 m intervals. The typical soil profile of these tests consists of an average of 22 cm of a very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) sand with gravel. At an average depth of 36 cm a gray (10YR 5/1) sand with gravel and shale was encountered. All tests were negative for cultural material.

Township 150N, Range 55W, Sections 31, 32, 33, 34, 35, and 36

Survey Segment EEE (Section 31)

Survey Segment EEE begins along the southern edge of Section 31, within the southeast quarter and extends for just over 0.25 miles to the eastern edge of Section 31, along 42nd Street NE (Appendix A, Figure 4, Page 10). The survey segment transects a tilled soy field. According to the FCGFAPM, Survey Segment EEE transects a moderate probability zone.

Pedestrian survey of Survey Segment EEE was conducted in four transects spaced at 10 m intervals. Ground surface visibility was excellent, at 75 to 100 percent. During the pedestrian survey, one historic site, the remnants of a farmstead just north of the corridor was identified (32GF3551). No cultural materials were identified, no shovel testing areas were identified within the survey corridor, and two Areas of Avoidance were recorded.

Sections 32 and 33

No Survey Segments

Survey Segment U – Southern Route (Section 34) 2010 Survey

Survey Segment U begins at the southwest corner of Section 34 at the intersection of 6th Avenue NE and 40th Street NE (Appendix A, Figure 4, Page 10). The segment continues for 1.0 mile and terminates at the southeast corner of Section 34 at the intersection of 39th Street NE and 6th Avenue S. Land use consisted of tilled wheat, harvested corn, and tilled soybean fields transecting mostly flat terrain divided by multiple small wetlands and drainages. According to the FCGFAPM, Survey Segment U traverses a low probability zone.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Ground surface visibility was excellent, and ranged from 75 to 100 percent in the tilled wheat and soybean fields to approximately 50 percent in the harvested cornfield. No sites were identified during the pedestrian survey and no areas were recommended for shovel testing.

Survey Segment U – Northern Route (Section 34) 2011 Survey

Survey Segment U begins at the west edge of Section 34, along 40th Street NE, approximately 0.1 mile north of the southern edge, and continues east for 1.0 mile before terminating at the eastern edge of Section 34, along 39th Street NE (Appendix A, Figure 4, Page 10). The survey segment transects a gently rolling hayfield, a wetland, a flat to gently rolling corn field, and a flat to gently rolling soy field. According to the FCGFAPM, Survey Segment U traverses a low probability zone.

A pedestrian survey of Survey Segment U was completed in six transects spaced at 7 m intervals. Visibility ranged from 50 percent in the hay and corn fields, to 75 percent in the soy field. No sites were identified during the pedestrian survey and no areas were recommended for shovel testing.

Survey Segment FFF (Sections 35 and 36)

The west portion of Survey Segment FFF begins at the half-section line of Section 35 and continues east, 1.5 miles, to the east edge of Section 36, along ND-18, transecting a gently rolling to flat corn field in Section 35 (Appendix A, Figure 4, Page 10). In Section 36, Survey Segment FFF transects a flat pasture, and the Goose River, followed by a flat soy field, and a flat corn field. According to the FCGFAPM, the west portion of Survey Segment FFF traverses a low probability zone.

Pedestrian survey was conducted in six transects spaced at 7 m intervals. Ground surface visibility was good, at 50 percent in the corn field in Section 35. In Section 36, the pasture afforded poor visibility, at 10 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. The soy field and corn field within Section 36 both had good visibility, at 75 percent. No cultural materials were identified during the pedestrian survey, two shovel testing areas were identified (FFF-1 and FFF1-2), and one area was recommended for deep testing (Deep Testing Locality 39).

Shovel Test Area FFF-1

Shovel Test Area FFF-1 in Section 36 traverses a low probability zone in a pasture west of the Goose River. To cover the landform, a total of nine shovel tests were excavated in a grid-shaped pattern at 15 m intervals following the contours of the Goose River. The typical soil profile of these tests consists of an average of 42 cm of a very dark grayish brown (10YR 3/2) silt loam over a very dark grayish brown (10YR 3/2) clay loam. Due to the proximity to the Goose River, all tests were excavated to 100 cm. All tests were negative for cultural material.

Shovel Test Area FFF1-2

Shovel Test Area FFF1-2 in Section 36 traverses a low probability zone in a flat pasture east of the Goose River. To cover the landform, a total of six shovel tests were excavated at 15 m intervals following the contours of the Goose River. The typical soil profile of these tests consists of an average of 46 cm of a very dark grayish brown (10YR 3/2) damp silt loam over a dark grayish brown (10YR 4/2) damp silt loam. At an average depth of 79 cm a grayish brown (10YR 5/2) damp silt clay was encountered. All tests were negative for cultural material.

Deep Testing Locality 39

Deep Testing Locality 39 is in the southeast corner of Section 35 and the southwest corner of Section 36 in Survey Segment FFF, adjacent to the Goose River. According to the FCGFAPM, the area traverses a low probability zone in a pasture. According to the Deep Testing Model, this area holds a high

probability to contain buried soils and potentially intact cultural deposits that may range in depth from 1 to 2 m (Appendix C). Shovel testing can efficiently identify subsurface cultural deposits to a depth of 1 m; however, as this area contains the potential for deposits ranging from 1 to 2 m, deep testing would be required.

Survey Segment V – West portion (Sections 35, and 36) 2010 Survey

Survey Segment V in Sections 35 and 36 is no longer part of the preferred route. This area was surveyed prior to route updates.

The western portion of Survey Segment V begins near the centerline of Section 35 and runs parallel to the southern edge of the section for approximately 0.75 miles before terminating in Section 36 after crossing the Goose River (Appendix A, Figure 4, Page 10). Topography is generally flat and land use consisted of harvested corn.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility ranged from 75 to 100 percent. No sites were identified during the survey and one area was recommended for shovel testing (Shovel Test Area V-1). However, as the route shifted, this area was not revisited and shovel testing was not completed. In addition, as a portion of Survey Segment V is adjacent to the Goose River, there is a high potential for buried soils.

Township 150N, Range 54W, Sections 24, 25, 31, 32, 33, 34, 35, and 36

Survey Segment FFF (Section 31)

The east portion of Survey Segment FFF begins at the west edge of Section 31 and continues east, 0.5 miles, transecting a flat hayfield and the Little Goose River (Appendix A, Figure 4, Page 10). According to the FCGFAPM, the east portion of Survey Segment FFF traverses a low probability zone.

Pedestrian survey of the eastern portion of Survey Segment FFF was conducted in six transects spaced at 7 m intervals. Ground surface visibility was good, at 75 percent. No cultural materials were identified during the pedestrian survey, no shovel testing areas were identified, and one area was recommended for deep testing (Deep Testing Locality 40).

Deep Testing Locality 40

Deep Testing Locality 40 is in the southwest corner of Section 31 in Survey Segment FFF, adjacent to the Little Goose River. According to the FCGFAPM, the area traverses a low probability zone. According to the Deep Testing Model, this area holds a high probability to contain buried soils and potentially intact cultural deposits that may range in depth from 1 to 2 m (Appendix C). Shovel testing can efficiently identify subsurface cultural deposits to a depth of 1 m; however, as this area contains the potential for deposits ranging from 1 to 2 m, deep testing would be required.

Survey Segment V – East portion (Section 31) 2010 Survey

Survey Segment V in Section 31 is no longer part of the preferred route. This area was surveyed prior to route updates.

The eastern portion of Survey Segment V begins near the intersection of 6th Avenue NE and ND-18, near the southwest corner of Section 31 (Appendix A, Figure 4, Page 10). The approximately 0.5-mile segment terminates after crossing the Little Goose River. Topography was generally flat, harvested soybean fields with the only relief adjacent to the river. A pedestrian survey was completed in six transects spaced at 7 m intervals. No sites were identified during the survey and one area was recommended for shovel testing (Shovel Test Area V-2). However, as the route shifted, this area was not revisited and shovel

testing was not completed. In addition, as a portion of Survey Segment V is adjacent to the Little Goose River, there is a high potential for buried soils.

Township 150N, Range 53W, Sections 19, 20, 21, 22, 23, and 24

Section 19

No Survey Segments

Survey Segment W (Section 20)

Survey Segment W begins just north of the intersection of 8th Avenue NE and 30th Street NE in the southwest corner of Section 20 (Appendix A, Figure 4, Page 11). The segment is 0.5 miles long and transects flat soybean fields divided by wooded field breaks. According to the FCGFAPM, Survey Segment W is located within a moderate probability zone.

The eastern half of the segment transects the boundaries of a previously recorded architectural history property/historic site (32GF120). A description of the standing structures and management recommendations can be found in the Historic Building Inventory and Evaluation Report (Palmer 2011). The historic component of the site includes a historic scatter and associated depressions. The occupation dates for the site range from 1893 to 1964. The site originally included four features, a house, a Quonset hut, an octagonal barn, and a machine shop. Of the original buildings, only the Quonset hut now remains. In addition, the artifact scatter appears to have been dispersed into the adjacent soybean field that nearly encapsulates the Quonset hut. Identified materials included glass, ceramics, and metal fragments. Depressions originally associated with the site were not relocated and were likely tilled under during the expansion of the cultivated field.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility ranged from 75 to 100 percent. No new sites were identified during the survey and one area was recommended for shovel testing (Shovel Test Area W-1). However, as the route shifted prior to the completion of shovel testing in Segment W, this area was not revisited and shovel testing was not completed.

Survey Segment X (Section 20)

Survey Segment X in Section 20 is no longer part of the preferred route. This area was surveyed prior to route updates.

Survey Segment X begins at 30th Street NE, just south of the Section 20 half-section. The segment continues east for approximately 0.5 miles and terminates at 29½ Street NE (Appendix A, Figure 4, Page 11). Topography is very flat and land use consisted of tilled soybean fields divided by wooded field breaks.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility ranged from 75 to 100 percent. No sites were identified during the survey and no areas were recommended for shovel testing.

Survey Segment Y – West portion (Section 24)

The western portion of Survey Segment Y begins at 26th Street NE near the center line of Section 24 and continues east for 1.0 mile before terminating at 25th Street NE. Topography is generally flat corn and soybean fields transected by drainages (Appendix A, Figure 4, Page 11).

The ROW for Survey Segment Y was originally 300 ft wide, and as a result, the pedestrian survey was completed in 12 transects spaced at 7 m intervals. Visibility ranged from 50 to 75 percent in the corn and 75 to 100 percent in the harvested soybean field. No sites were identified during the survey, no

areas were recommended for shovel testing, and one area was recommended for deep testing (Deep Testing Locality 44).

Deep Testing Locality 44

Deep Testing Locality 44 is in the east half of Section 31 in Survey Segment Y, adjacent to the English Coulee. According to the FCGFAPM, the area traverses a moderate probability zone within corn and soybean fields. According to the Deep Testing Model, this area holds a high probability to contain buried soils and potentially intact cultural deposits that may range in depth from 1 to 2 m (Appendix C). Shovel testing can efficiently identify subsurface cultural deposits to a depth of 1 m; however, as this area contains the potential for deposits ranging from 1 to 2 m, deep testing would be required.

Township 150N, Range 52W, Sections 1, 10, 11, 12, 15, 16, 19, 20, and 21

Survey Segment Y – East Portion (Sections 19, 20, and 21)

The eastern portion of Survey Segment Y begins at 25th Street NE near the center line of Section 19. The segment continues approximately 2.75 miles and terminates in the southeast corner of Section 21, south of 9th Avenue NE (Appendix A, Figure 4, Page 11). Topography is flat and transected by multiple drainages, including the English Coulee. Land use included grassland and harvested soybean fields.

The ROW for Survey Segment Y was 300 ft, and as a result, the pedestrian survey was completed in 12 transects spaced at 7 m intervals. Visibility ranged from 0 percent in the grasslands to 75 to 100 percent in the harvested soybean fields. One portion of the segment (the west half of Section 19) was not surveyed due to the lack of landowner permission. During the pedestrian survey, one site was identified (32GF3552). The site is described in more detail below. In addition, two areas were recommended for shovel testing (Shovel Test Areas Y-1 and Y-2) and two areas were recommended for deep testing (Deep Testing Locality 44 and Deep Testing Locality 45).

Shovel Test Area Y-1 south of the English Coulee in Section 19 traverses a moderate probability zone. The area is located on a flat grassland adjacent to the English Coulee. To cover the landform, a total of four shovel tests were excavated at 15 m intervals, following the contours of the coulee. The typical soil profile of these tests consists of an average of 37 cm of a very dark gray (10YR 3/1) sand silt over a dark grayish brown (10YR 4/2) silt clay. At an average depth of 51 cm a yellowish brown (10YR 5/4) silt clay was encountered. All tests were negative for cultural material.

Shovel Test Area Y-1- North of English Coulee

Shovel Test Area Y-1 north of the English Coulee in Section 19 traverses a moderate probability zone. The area is located on a flat grassland adjacent to the English Coulee. To cover the landform, a total of four shovel tests were excavated at 15 m intervals, following the contours of the coulee. The typical soil profile of these tests consists of an average of 70 cm of a very dark gray (10YR 3/1) sand silt over a dark grayish brown (10YR 4/2) silt clay. All tests were negative for cultural material.

Shovel Test Area Y-2

Shovel Test Area Y-2 in Section 19 traverses a moderate probability zone. The area is located within a patch of willow trees transected by multiple drainages. Shovel testing of Area Y-2 was not completed as the area was inundated. No further work is recommended.

Deep Testing Locality 44

Deep Testing Locality 44 is in the north half of Sections 19 and 20 in Survey Segment Y, adjacent to the English Coulee. According to the FCGFAPM, the area traverses a moderate probability zone. According to the Deep Testing Model, this area holds a high probability to contain buried soils and potentially

intact cultural deposits that may range in depth from 1 to 2 m (Appendix C). Shovel testing can efficiently identify subsurface cultural deposits to a depth of 1 m; however, as this area contains the potential for deposits ranging from 1 to 2 m, deep testing would be required.

Deep Testing Locality 45

Deep Testing Locality 45 is in the northwest corner of Section 21 in Survey Segment Y, adjacent to the English Coulee. According to the FCGFAPM, the area traverses a moderate probability zone in a grassland. According to the Deep Testing Model, this area holds a high probability to contain buried soils and potentially intact cultural deposits that may range in depth from 1 to 2 m (Appendix C). Shovel testing can efficiently identify subsurface cultural deposits to a depth of 1 m; however, as this area contains the potential for deposits ranging from 1 to 2 m, deep testing would be required.

Survey Segment GGG (Section 15)

Survey Segment GGG begins in the southwest quarter of Section 15, along the west edge, and continues northeast, approximately 0.25 mile, transecting a flat grassland divided from a flat tilled soy field by a man-made pond (Appendix A, Figure 4, Page 11). According to the FCGFAPM, Survey Segment GGG traverses a moderate probability zone.

Pedestrian survey of Survey Segment GGG was conducted in four transects spaced at 10 m intervals. Ground surface visibility was excellent, at 75 to 100 percent within the soy field, and poor, at 0 percent within the grassland. Although grasses obscured surface visibility in the grassland, gopher mounds were opportunistically examined along the route. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Sections 10, 11, and 12

No Survey Segments

Survey Segment Z – South portion (Section 1)

The southern portion of Survey Segment Z begins near the center of the northeast quarter of Section 1 (Appendix A, Figure 4, Page 11). The segment continues for approximately 0.25 miles, and terminates at 12th Avenue NE. Topography consists of flat pastures transected by multiple drainages and wetlands.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility was poor, at 0 percent. Gopher mounds and bare patches of soil were examined where possible. No cultural resources were identified during the survey and no areas were recommended for shovel testing.

Township 151N, Range 52W, Sections 13, 24, 25, and 36

Survey Segment Z – North portion (Section 36)

The northern portion of Survey Segment Z begins approximately 0.25 miles west of the intersection of 12th Avenue NE and 19th Street NE (Appendix A, Figure 4, Page 11). The segment continues for 1.0 mile and terminates at 13th Avenue NE. Topography consists of a flat pasture transected by multiple drainages and wetlands.

A pedestrian survey was completed in six transects spaced at 7 m intervals. Visibility was poor, at 0 percent. Gopher mounds and bare patches of soil were examined where possible. No cultural resources were identified during the survey and no areas were recommended for shovel testing.

Sections 13, 24, and 25

No Survey Segments

Township 151N, Range 51W, Sections 11, 12, 14, 15, 16, 17, and 18

Sections 11, 14, 15, 16, 17, and 18

No Survey Segments

Laydown Areas

Eight laydown areas will be established for the proposed Project. Eighteen potential sites were surveyed to determine the appropriate locations (see descriptions below). Six staging areas will be located along the proposed route; one staging area will be located at the Center 345 kV Substation, and one staging area will be located at the Prairie Substation.

Oliver County

Township 142N, Range 83W

Laydown Area 1 (A1) (Section 33)

Laydown Area 1 is adjacent to the Center 345 kV substation, and covers approximately 22 acres (Appendix A, Figure 4, Page 1). The northern portion of the laydown area is within a cut hayfield and the southern portion is within grassland/prairie approximately 300 m east of Nelson Lake. According to the FCGFAPM, the laydown area is within a low probability zone.

Pedestrian survey was completed in 36 transects spaced at 7 m intervals. Ground surface visibility was poor in the grassland/prairie at 0 percent. Although prairie grasses obscured surface visibility in this segment, gopher mounds were opportunistically examined along the route. Ground surface visibility in the hayfield was good, ranging from 50 to 75 percent. No cultural materials were identified within this survey segment and one Area of Avoidance was recorded. No areas were recommended for shovel testing, and one area was recommended for deep testing (Deep Testing Locality 1).

Deep Testing Locality 1

Deep Testing Locality 1 is in Section 33 in the western portion of Laydown Area 1, adjacent to the Center 345 kV substation and 300 m east of Nelson Lake. According to the FCGFAPM, Laydown Area A1 traverses a low probability zone. According to the Deep Testing Model, this area holds a high probability to contain buried soils and potentially intact cultural deposits that may range in depth from 1 to 2 m (Appendix C). Shovel testing can efficiently identify subsurface cultural deposits to a depth of 1 m; however, as this area contains the potential for deposits ranging from 1 to 2 m, deep testing would be required.

McLean County

Township 145N, Range 79W

Laydown Area B2 (Section 34)

Laydown Area B2 in Section 34 is no longer a preferred area for staging and will not be used. This area was surveyed prior to project updates.

Laydown Area B2 is located in the southwest quarter of Section 34, at the intersection of ND-41 and 9th Avenue SW, covering 10 acres (Appendix A, Figure 4, Page 2). The laydown area is within a harvested soy field. Several portions of the laydown area adjacent to ND-41 and the wetland to the north were underwater. According to the FCGFAPM, Laydown Area B2 is within both moderate and high probability zones.

Pedestrian survey of Laydown Area B2 was completed in 12 transects spaced at 7 m intervals. Ground surface visibility was poor, at 0 to 25 percent. No cultural materials were identified within this survey segment, and no areas were recommended for shovel testing. No further work is recommended.

Laydown Area B3 (Section 34)

Laydown Area B3 in Section 34 is no longer a preferred area for staging and will not be used. This area was surveyed prior to Project updates.

Laydown Area B3 is located along the northern edge of the southeast quarter of Section 34, just west of ND-41, covering 10 acres (Appendix A, Figure 4, Page 2). The laydown area is within a flat, harvested soy field. According to the FCGFAPM, Laydown Area B3 is within both moderate and high probability zones.

Pedestrian survey of Laydown Area B3 was completed in 16 transects spaced at 7 m intervals. Ground surface visibility was good, at 25 to 50 percent. No cultural materials were identified within this survey segment, no areas were recommended for shovel testing, and one Area of Avoidance was recorded. No further work is recommended.

Laydown Area B1 (Section 26)

Laydown Area B1 is located along the western edge of the northwest quarter of Section 26, just east of ND-41, covering 10 acres (Appendix A, Figure 4, Page 2). The laydown area is within a flat, harvested soy field. According to the FCGFAPM, Laydown Area B1 is within a moderate probability zone.

Pedestrian survey of Laydown Area B1 was completed in 20 transects spaced at 7 m intervals. Ground surface visibility was excellent, at 75 to 100 percent. No cultural materials were identified within this survey segment, and no areas were recommended for shovel testing. No further work is recommended.

Laydown Area 2 (Section 15)

Laydown Area 2 in Section 15 is no longer a preferred area for staging and will not be used. This area was surveyed prior to Project updates.

Laydown Area 2 is located in the southeast corner of the southeast quarter of Section 15, just west of ND-41 (Appendix A, Figure 4, Page 2). The laydown area is within a flat, cultivated corn field. According to the FCGFAPM, Laydown Area 2 is within moderate and high probability zones.

Pedestrian survey of Laydown Area 2 was not completed due to standing water in the field. Due to the low probability of intact cultural features, no areas were recommended for shovel testing. No further work is recommended.

Wells County

Township 148N, Range 73W

Laydown Area 3 (Section 35)

Laydown Area 3 in Section 35 is no longer a preferred area for staging and will not be used. This area was surveyed prior to project updates.

Laydown Area 3 is located along the northern edge of the northeast quarter of Section 35, just west of ND-3, (Appendix A, Figure 4, Page 4). The laydown area is within a flat, harvested soy field. According to the FCGFAPM, Laydown Area 3 is within a low probability zone.

Pedestrian survey of Laydown Area 3 was completed in six transects spaced at 7 m intervals. Ground surface visibility was excellent, at 75 to 100 percent. No cultural materials were identified within this survey segment, and no areas were recommended for shovel testing. No further work is recommended.

Laydown Area C1 (Section 36)

Laydown Area C1 is located along the northern edge of the northwest quarter of Section 36, just east of ND-3, covering 10 acres (Appendix A, Figure 4, Page 4). The laydown area is within a flat, fallow field. According to the FCGFAPM, Laydown Area C1 is within a low probability zone.

Pedestrian survey of Laydown Area C1 was not completed due to standing water in the field. Due to the low probability of intact cultural features, no areas were recommended for shovel testing. No further work is recommended.

Foster County

Township 146N, Range 67W

Laydown Area D3 (Section 16)

Laydown Area D3 in Section 16 is no longer a preferred area for staging and will not be used. This area was surveyed prior to Project updates.

Laydown Area D3 is located along the southern edge of the southeast quarter of Section 16, at the intersection of ND-52 and 63rd Avenue SE, covering 10 acres (Appendix A, Figure 4, Page 5). The laydown area is within a flat, tilled soy field. According to the FCGFAPM, Laydown Area D3 is within a low and moderate probability zone.

Pedestrian survey of Laydown Area D3 was not completed due to standing water in the field. Due to the low probability of identifying intact cultural features in a cultivated field, no areas were recommended for shovel testing. No further work is recommended.

Township 147N, Range 66W

Laydown Area D2 (Section 7)

Laydown Area D2 in Section 7 is no longer a preferred area for staging and will not be used. This area was surveyed prior to Project updates.

Laydown Area D2 is located along the northern edge of Section 7, south of 5th Street NE, covering 10 acres (Appendix A, Figure 4, Page 6). The laydown area is within a fallow field that was mostly inundated, and a farm staging area with equipment and silos. A large portion of the laydown area was previously disturbed due to farming practices. According to the FCGFAPM, Laydown Area D2 is within a moderate probability zone.

Pedestrian survey of Laydown Area D2 was completed in six transects spaced at 7 m intervals. Ground surface visibility was poor, at 0 percent. Due to previous ground disturbance and the presence of standing water, no further work is recommended for this area.

Township 147N, Range 65W

Laydown Area D1 (Section 4)

Laydown Area D1 is located in the southwest quarter of Section 4 (Appendix A, Figure 4, Page 6). The laydown area consists of three areas within a gravel pit covering approximately 14 acres. According to the FCGFAPM, Laydown Area D1 is within a moderate probability zone.

Pedestrian survey of Laydown Area D1 was not completed due to previous ground disturbance related to gravel pit activities. No further work is recommended.

Griggs County

Township 147N, Range 60W

Laydown Area E1 (Section 20)

Laydown Area E1 is located in the southeast corner of Section 20, to the west of ND-1, covering 10 acres (Appendix A, Figure 4, Page 7). The laydown area is within a flat, fallow field with alfalfa. According to the FCGFAPM, Laydown Area E1 is within a moderate probability zone.

Pedestrian survey of Laydown Area E1 was completed in six transects spaced at 7 m intervals. Ground surface visibility was poor, at 0 percent. Due to the low probability of intact cultural features, no areas were recommended for shovel testing. No further work is recommended.

Township 147N, Range 58W

Laydown Area E3 (Section 21)

Laydown Area E3 in Section 21 is no longer a preferred area for staging and will not be used. This area was surveyed prior to project updates.

Laydown Area E3 is located along the northern edge of Section 21, at the intersection of ND-45 and 116½ Avenue NE, covering 10 acres (Appendix A, Figure 4, Page 8). The laydown area is within a gravel pit, and many of the surrounding areas were inundated. According to the FCGFAPM, Laydown Area E3 is within a moderate probability zone.

Pedestrian survey of Laydown Area E3 was not completed due to previous ground disturbance related to gravel pit activities. No further work is recommended.

Township 146N, Range 58W

Laydown Area E4 (Section 26)

Laydown Area E4 in Section 26 is no longer a preferred area for staging and will not be used. This area was surveyed prior to Project updates.

Laydown Area E4 is located in the northeast corner of Section 26, north of ND-200, and is transected by 119th Avenue NE/CR-23, covering 12.5 acres (Appendix A, Figure 4, Page 8). The laydown area is within an alfalfa field and farm equipment storage area on a flat terrace overlooking the Sheyenne River to the west, and in an alfalfa field atop a rolling hillside to the east. According to the FCGFAPM, Laydown Area E4 is within moderate and high probability zones.

Pedestrian survey of Laydown Area E4 was completed in 12 transects spaced at 10 m intervals east of 119th Avenue NE/CR-23, and in 10 transects spaced at 10 m intervals to the west. Ground surface visibility on both sides of 119th Avenue NE/CR-23 was poor, at 0 percent. No cultural materials were identified within this survey segment. In addition, due to the proximity of Laydown Area E4 to the Sheyenne River, there is a high potential for buried soils.

Laydown Area E5 (Section 26)

Laydown Area E5 in Section 26 is no longer a preferred area for staging and will not be used. This area was surveyed prior to Project updates.

Laydown Area E5 is located along the north edge of Section 26, north of ND-200, covering approximately 10 acres (Appendix A, Figure 4, Page 8). The laydown area is within a tilled soy field atop a flat terrace adjacent to the Sheyenne River to the east. According to the FCGFAPM, Laydown Area E5 is within both moderate and high probability zones.

Pedestrian survey of Laydown Area E5 was completed in 12 transects spaced at 10 m intervals. Ground surface visibility was excellent, at 75 to 100 percent. No cultural materials were identified within this survey segment. In addition, due to the proximity of Laydown Area E5 to the Sheyenne River, there is a high potential for buried soils.

Township 146N, Range 58W

Laydown Area E2 (Section 25)

Laydown Area E2 in Section 25 is no longer a preferred area for staging and will not be used. This area was surveyed prior to Project updates.

Laydown Area E2 is located in the northeast quarter, along the east edge of Section 25, west of ND-32, covering approximately 2 acres (Appendix A, Figure 4, Page 8). The laydown area is within a fallow field surrounded by a wooded area. According to the FCGFAPM, Laydown Area E2 is within a low probability zone.

Pedestrian survey of Laydown Area E2 was completed in six transects spaced at 10 m intervals. Ground surface visibility was poor, at 0 percent. No cultural materials were identified within this survey segment, and no areas were recommended for shovel testing. No further work is recommended.

Grand Forks County

Township 149N, Range 55W

Laydown Area F1 (Section 6)

Laydown Area F1 is located in the southeast quarter of Section 6, at the intersection of ND-15 and 42nd Street NE, covering 10 acres (Appendix A, Figure 4, Page 10). The laydown area is within a wetland and tilled wheat field. According to the FCGFAPM, Laydown Area F1 is located within both moderate and high probability zones.

Pedestrian survey of Laydown Area F1 was completed in 12 transects spaced at 10 m intervals, avoiding the wet areas. Ground surface visibility was good, at 50 to 75 percent. No cultural materials were identified within this survey segment, and no areas were recommended for shovel testing. No further work is recommended.

Township 151N, Range 51W

Laydown Area G1 (Section 12)

Laydown Area G1 is located adjacent to the Grand Forks 345 kV substation in the southeast corner of Section 12, north of 17th Avenue S, covering approximately 16 acres (Appendix A, Figure 4, Page 11). The laydown area is within mostly low and flat grassland and much of the area has been previously disturbed due to substation construction and maintenance. According to the FCGFAPM, Laydown Area G1 is within a low probability zone.

Pedestrian survey of Laydown Area G1 was completed in 30 transects spaced at 7 m intervals, avoiding the wet areas. Ground surface visibility was poor, at 0 percent. Although grasses obscured surface visibility in this segment, gopher mounds were opportunistically examined along the route. No cultural materials were identified within this survey segment. Due to previous disturbance and the low

probability of intact cultural features, no areas were recommended for shovel testing. No further work is recommended.

Trail County

Township 146N, Range 52W

Laydown Area N1 (Section 29)

Laydown Area N1 is located in the northwest corner of Section 29, at the intersection of ND-18 and 2nd Street NE, covering 10 acres (Appendix A, Figure 4, Page 9). The laydown area is within a wet, tilled soy field. According to the FCGFAPM, Laydown Area N1 is within a moderate probability zone.

Pedestrian survey of Laydown Area N1 was completed in 12 transects spaced at 10 m intervals. Ground surface visibility was good, at 50 to 75 percent. No cultural materials were identified within this survey segment, and no areas were recommended for shovel testing. No further work is recommended.

Identified Sites

During the Class III archaeological inventory of the Center to Grand Forks 345 kV Transmission Line Project, 25 sites were identified. They include 17 newly recorded precontact sites, seven newly recorded historic sites, and one newly recorded multi-component (both precontact and historic components) site (Table 5).

Newly identified sites within the 150-ft ROW have the potential to be impacted by construction activities. With the exception of the four isolated finds, none of the remaining sites have been evaluated for NRHP eligibility. HDR recommends avoidance of all newly recorded archaeological sites. If sites cannot be avoided, additional investigations will be needed to further evaluate significance.

Table 5: Identified Sites

| Site Number | Field Number | Feature Number (GIS Number) | Site Type | Potential Impacts | Project Recommendations | NRHP Recommendations |
|-------------|--------------|-----------------------------|--|----------------------------------|--|----------------------|
| 32OL641 | CGF-B-1 | 1309 | Precontact Stone Features and Artifact Scatter | 1 pole within site boundary | Site within south part of ROW, construction access will have to avoid site | Unevaluated |
| 32OL642 | CGF-C-1 | 1316 | Precontact Stone Features and Artifact Scatter | 2 poles within site boundary | Site across entire ROW, construction access will have to avoid by going beyond ROW | Unevaluated |
| 32OL643 | CGF-D-1 | 1323 | Precontact Stone Features | No poles within site boundary | No longer in preferred route | Unevaluated |
| 32OL644 | CGF-D-2 | 1319 | Historic Dugout and Depressions | No poles within site boundary | No longer in preferred route | Unevaluated |
| 32OL645 | CGF-D-3 | 1331 | Historic Depression | No poles within site boundary | Site boundary roughly 25 feet south of ROW | Unevaluated |
| 32BL719 | CGF-F-1 | 1328 | Precontact Stone Feature | No poles within site boundary | No longer in preferred route | Unevaluated |
| 32BL720 | CGF-F-2 | 1324 | Precontact Isolated Find | No poles within site boundary | Site within ROW, construction access will have to avoid site | Not Eligible |
| 32ML1238 | CGF-G-1 | 1310 | Precontact Stone Features and Artifact Scatter | One pole is within the boundary | Site across entire ROW, construction access will have to avoid | Unevaluated |
| 32ML1239 | CGF-G-2 | 1325 | Precontact Stone Feature | No poles are within the boundary | Site on edge of ROW, construction access will have to avoid site | Unevaluated |
| 32BLx288 | CGF-K-1 | 1326 | Precontact Isolated Find | No poles are within the boundary | Site within ROW, construction access will have to avoid site | Not Eligible |
| 32SH268 | CGF-L-1 | 1327 | Precontact Stone Features | No poles are within the boundary | Site within ROW, construction access will have to avoid site | Unevaluated |

Center to Grand Forks Transmission Line
 Class III Intensive Archaeological Resources Inventory

| Site Number | Field Number | Feature Number (GIS Number) | Site Type | Potential Impacts | Project Recommendations | NRHP Recommendations |
|-------------|--------------|-----------------------------|--|----------------------------------|--|----------------------|
| 32SH269 | CGF-L-2 | 1311 | Foundations and Historic Artifact Scatter | No poles are within the boundary | No longer in preferred route | Unevaluated |
| 32SH270 | CGF-N-1 | 1321 | Precontact Stone Features | One pole is within the boundary | Site across entire ROW, construction access will have to avoid by going beyond ROW | Unevaluated |
| 32SH271 | CGF-N-2 | 1312 | Precontact Stone Features | No poles are within the boundary | Site across entire ROW, construction access will have to avoid by going beyond ROW | Unevaluated |
| 32BLx287 | CGF-DD-1 | 1330 | Precontact Isolated Find | No poles within site boundary | Site on edge of ROW, construction access will have to avoid site | Not Eligible |
| 32BL718 | CGF-DD8-1 | 1322 | Precontact Lithic Scatter | No poles are within the boundary | Site across entire ROW, construction access will have to avoid | Unevaluated |
| 32MLx767 | CGF-EE-1 | 1329 | Precontact Isolated Find | No poles are within the boundary | Site within ROW, construction access will have to avoid site | Not Eligible |
| 32MLx768 | CGF-EE-2 | 1318 | Precontact Lithic Scatter | No poles are within the boundary | Site across entire ROW, construction access will have to avoid by going beyond ROW | Unevaluated |
| 32ML1237 | CGF-EE-3 | 1317 | Precontact Lithic Scatter | No poles are within the boundary | Site across entire ROW, construction access will have to avoid by going beyond ROW | Unevaluated |
| 32MJ1240 | CGF-HH-1 | 1332 | Precontact Stone Features | No poles are within the boundary | Site nearly across entire ROW, construction access may have to avoid by going beyond ROW | Unevaluated |
| 32GG179 | CGF-R1-1 | 1313 | Precontact Stone Feature and Historic Dump | No poles are within the boundary | Site just outside of ROW, construction access will have to avoid site | Unevaluated |
| 32GG180 | CGF-R2-1 | 1314 | Historic Depression and Artifact Scatter | One pole is within the boundary | Site across entire ROW, construction access will have to avoid by going beyond ROW 32GG180 | Unevaluated |

Center to Grand Forks Transmission Line
Class III Intensive Archaeological Resources Inventory

| Site Number | Field Number | Feature Number (GIS Number) | Site Type | Potential Impacts | Project Recommendations | NRHP Recommendations |
|-----------------------|--------------|-----------------------------|---|--------------------------------------|---|----------------------|
| 32GG181 | CGF-S2-1 | 1333 | Historic Artifact Scatter | No poles are within the boundary | Not in current route | Unevaluated |
| 32GF3551 | CGF-EEE-1 | 1320 | Foundations and Historic Artifact Scatter | No poles within site boundary | Site boundary roughly 60 ft north of ROW | Unevaluated |
| 32GF3552 | CGF-Y-1 | 1315 | Historic Depressions and Artifact Scatter | No poles are within the boundary | Site extends into ROW, construction access will have to avoid site | Unevaluated |
| Site lead 32BLx146 | | 1367 | at least 20 stone circles | 1 pole within boundary | Site extends into ROW, but no stone features observed | Unevaluated |
| Site 32GF120 | | 1387 | Historic Depressions and Artifact Scatter | 2 poles within boundary | Site extends into ROW | Unevaluated |
| Site 32GF3485 | | 1256 | Precontact artifact scatter | No poles within boundary | Site extends into corridor but no artifacts observed | Unevaluated |
| Site 32GF3487 | | 1258 | historic artifact scatter | No poles within boundary | Site extends into corridor but no artifacts or features observed | Unevaluated |
| Site lead 32GFx24 | | 1388 | cultural material scatter and mound | 5 poles within boundary | Site lead extends into ROW, but no artifacts observed, overlaps with 32GF3552 | Unevaluated |
| Site lead 32GGx117 | | 1384 | precontact mound | 1 pole at edge of site lead boundary | Site boundary extends into ROW, consult to verify boundary | Unevaluated |
| Site 32OL388 | | 729 | one historic depression | 1 pole at edge of boundary | Site extends into ROW | Unevaluated |
| Site 32OL389 | | 730 | one historic depression | No poles within boundary | Site extends not in ROW, but within 1000' | Unevaluated |
| Site 32OL416 | | 788 | precontact lithic scatter | No poles within boundary | Site extends not in ROW, but within 1000' | Unevaluated |
| Site lead 32SHx12 | | 1370 | mound of unknown cultural affiliation | 1 pole at edge of boundary | Site extends into ROW | Unevaluated |

Center to Grand Forks Transmission Line
 Class III Intensive Archaeological Resources Inventory

| Site Number | Field Number | Feature Number (GIS Number) | Site Type | Potential Impacts | Project Recommendations | NRHP Recommendations |
|----------------------|--------------|-----------------------------|---|----------------------------|--|----------------------|
| Site lead 32SHx85 | | 643 | precontact cultural material scatter | No poles within boundary | Site extends not in ROW, but within 1000' | Unevaluated |
| Site lead 32SHx88 | | 646 | nine precontact stone features | 1 pole at edge of boundary | Site boundary extends into ROW, but features only within 1000' | Unevaluated |
| Site lead 32WEx38 | | 1375 | Stavenger Lutheran Church historic site | 1 pole within boundary | site lead boundaries are within the ROW | Unevaluated |

Precontact Sites

During the Class III archaeological inventory of the Center to Grand Forks 345 kV Transmission Line Project, 17 newly recorded precontact sites were identified (Table 5).

320L641

Site 320L641 consists of two stone features and a precontact artifact scatter identified during pedestrian survey of [REDACTED] Survey Segment B, and shovel testing of Shovel Test Area B7 (Appendix A, Figure 5). This site is located along the southern portion of a large prairie/pasture ridge to the east of a small drainage within a steep-sided ravine. The ridge is broken up into several higher areas by small swales and offers dramatic views to the south.

The two stone features were identified along this ridge. Feature 001 (Photo 5), located [REDACTED] [REDACTED], is a stone circle made up of approximately 36 cobbles and measuring approximately 5 m in diameter. Feature 002, located [REDACTED] east of Feature 001, is a stone arc made up of 13 well-sodded cobbles with an opening to the east. This feature measures approximately 3 m from the crest of the arc to the opening.

A single west-east transect of 19 shovel tests was placed on the ridge. These tests were excavated at 15 m intervals with the exception of ST 017, which was placed approximately 60 m to the east of ST 016 to avoid Feature 002. At ST 012, the transect shifted north to avoid Feature 001. Two shovel tests (004 and 007) along this transect were positive for cultural material. A single secondary flake made of KRF was recovered from ST 004 at 0-20 cmbs, and a single tertiary flake made of KRF was recovered from ST 007 at 0-10 cmbs.

ST 004 was bracketed by six additional tests. Two tests each were excavated at 5 m intervals to the north, south, and west of ST 004. Tests were not excavated to the east of ST 004. Of these additional tests, ST 004 10-S was positive with a single secondary flake of KRF recovered from 0-14 cmbs, and ST 004 10-W was positive with two tertiary flakes of KRF recovered from 0-14 cmbs.

ST 007 was bracketed by two additional shovel tests excavated at 5 m intervals to the north. Of these additional tests, ST 007 5-N was positive, with a biface made of KRF recovered from 0-19 cmbs. The biface measured 7 cm long by 3 cm wide.

The typical soil profile of the tests excavated in this area consists of an average of 17 cm of a very dark grayish brown (10YR 3/2) silt loam over a brown (10YR 4/3) silt loam with gravel and cobbles.

Six artifacts were recovered from site 320L641. All of the artifacts were recovered from the upper 20 cm of each test. These artifacts included two secondary lithic flakes, three tertiary lithic flakes, and one biface. All artifacts were made from KRF.

Additional shovel tests were not excavated in this area as sufficient data had been gathered to determine the site boundary in relation to the survey corridor. Based on the shovel test results and the location of the stone features, the site boundary has been confined to the [REDACTED].



Photo 5: Feature 001, Segment B, view to NE

Recommendations

HDR recommends avoidance of this site. If this site cannot be avoided, additional investigations will be needed to further evaluate its significance.

The recommended NRHP eligibility of site 32OL641 has not been determined. More investigation is needed to further define the site boundaries. The northern extent of the site has not been defined as no investigations occurred north of the survey corridor due to access restrictions. Although the site boundary has been defined as the [REDACTED], there is space for additional testing to occur within the site boundary. Further work within the site boundary is recommended before NRHP eligibility for site 32OL641 can be determined.

Features similar to those recorded at site 32OL641 may be important expressions of Native American traditional religious and cultural activities. Consequently, 32OL641 may be NRHP-eligible under Criterion A as a property of traditional religious and cultural importance. Consultation with tribes may be needed to determine if this site exhibits traditional values and if the tribes can offer interpretational information concerning the features. HDR suggests that 32OL641 may also be eligible for the NRHP under Criterion D for its potential to yield important information regarding the nature and distribution of feature types as expressions of social, economic, and subsistence activities characteristic of sites in the region. Further investigation is needed before eligibility can be determined for this site under any of the criteria.

32OL642

Site 32OL642 includes two precontact stone features and a lithic scatter identified during the pedestrian survey of Survey Segment C (Appendix A, Figure 6). The site is within a gently rolling pasture area and also extends to include a [REDACTED], a two-track dirt road (Photo 6). The two precontact stone features include two cairns (F 001 and F 002) within the pasture. The site is approximately 420 m east/west by 80 m north/south. The two cairns are located on the western side of the site and the lithic scatter covers the majority of the southern boundary.

Feature 001 is an oval shaped cairn, measuring approximately 3 by 4 m and trending east/west (Photo 7). The cairn is [REDACTED] and is made up of approximately 40 medium-to-large, well-sodded stones.

Feature 002 is a circular shaped cairn, measuring approximately 3 m in diameter with approximately 30 medium-to-large stones. Feature 002 is approximately 100 m northwest of Feature 001.

The precontact lithic scatter was identified during the pedestrian survey of the dirt roadbed and is located south and southeast of the two cairns. The scatter includes one partial projectile point (Photo 8, surface find [SF] 001), one broken KRF biface (SF 012), one primary KRF flake (SF 006), one retouched secondary KRF flake (SF 011), three secondary KRF flakes (SF 003, SF 007, and SF 008), and five tertiary KRF flakes (SF 002, SF 004, SF 005, SF 009, and SF 010). Artifacts are generally clustered together, with the exception of SF 012, which is approximately 80 m west of the main portion of the lithic scatter. This biface (Photo 9) is down-slope from the main grouping of artifacts and likely eroded down the roadbed.

The broken projectile point is most closely associated with the Besant Complex, which generally ranges in age from 1-700 A.D., and is thought to be representative of the Late Archaic Period. Besant Side Notched Projectile Points are characterized as being short and broad in body with shallow side notches and a slightly concave base. The shoulders generally are straight or sloping. The body edges are usually convex and widest just above the base, and the stems are usually broad and flared (Bureau of Land Management 2009, Gibbon 2009 and Gregg, et al 2008). The point is crafted from KRF and one side is covered with a white/gray patina. The point has a side-notch and slightly concave base and one of the shoulders is broken, as well as the majority of the blade. The maximum length is 2.5 cm, the maximum width is 3 cm, and the maximum thickness is 0.5 cm.

One transect of shovel tests was excavated at 15 m intervals in the pasture area. The tests ran parallel to the lithic scatter [REDACTED] north of the roadbed. A total of 12 shovel tests were excavated and all tests were negative. Additional shovel tests were not excavated in this area as sufficient data had been gathered to determine the site boundary in relation to the survey corridor.



Photo 6: Overview of Artifact Scatter, Segment C, view to E



Photo 7: Feature 001, Segment C, view to W

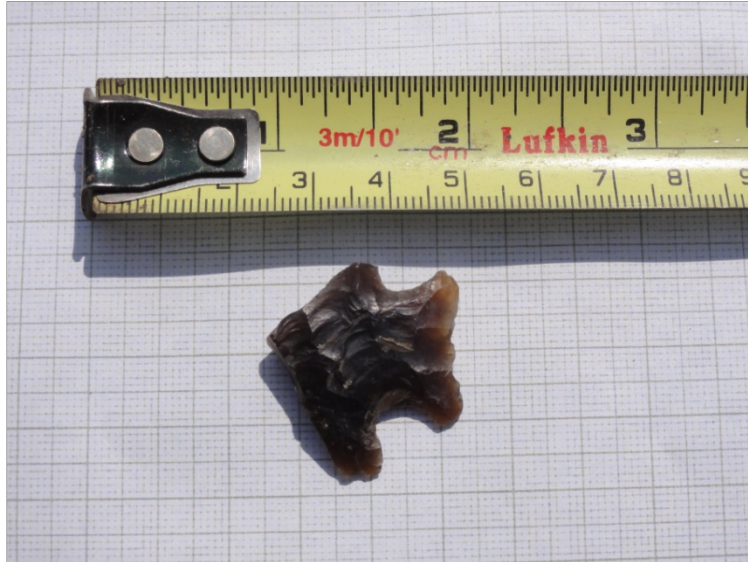


Photo 8: Partial Projectile Point, Segment C



Photo 9: Biface Fragment, Segment C

Recommendations

Although the majority of Site 32OL642 falls within a two-track dirt road, HDR recommends avoidance of this site due to the presence of precontact stone features and the lithic scatter that includes a diagnostic artifact. If this site cannot be avoided, additional investigations will be needed to further evaluate the significance of this site.

Features similar to those recorded at site 32OL642 may be important expressions of Native American traditional religious and cultural activities. Consequently, 32OL642 may be NRHP-eligible under Criterion A as a property of traditional religious and cultural importance. Consultation with tribes may be needed

to determine if this site exhibits traditional values and if the tribes can offer interpretational information concerning the features. HDR suggests that 32OL642 may also be eligible for the NRHP under Criterion D for its potential to yield important information regarding the nature and distribution of feature types as expressions of social, economic, and subsistence activities characteristic of sites in the region. Further investigation is needed before eligibility can be determined for this site under any of the criteria.

32OL643

Site 32OL643 consists of two precontact stone features identified during pedestrian survey of the east portion of Survey Segment D (Appendix A, Figure 7). This site is located within a prairie/pasture area [REDACTED]. The stone features (Feature 008 and Feature 009) consist of two cairns and were identified near the base of the [REDACTED] butte.

Feature 008 is a cairn made up of approximately 25 small to medium sized cobbles in roughly rectangular area measuring approximately 2 m by 4 m (Photo 10).

Feature 009 is large cairn located approximately 1.5 m northeast of Feature 001, a stone pile (Photo 11). This cairn is made up of approximately 100 large to medium sized cobbles in an approximately 4 by 5 m area. Although the large size of Feature 009 indicates possible Euro-American additions, its proximity to Feature 001 and the buttes indicate that it is likely Native American in origin.



Photo 10: Overview of Feature 008, Segment D, view to S



Photo 11: Overview of Feature 009, Segment D, view to SW

Recommendations

HDR recommends avoidance of this site. If this site cannot be avoided, additional investigations will be needed to further evaluate its significance.

Features similar to those recorded at site 32OL643 may be important expressions of Native American traditional religious and cultural activities. Consequently, 32OL643 may be NRHP-eligible under Criterion A as a property of traditional religious and cultural importance. Consultation with tribes may be needed to determine if this site exhibits traditional values and if the tribes can offer interpretational information concerning the features. HDR suggests that 32OL643 may also be eligible for the NRHP under Criterion D for its potential to yield important information regarding the nature and distribution of feature types as expressions of social, economic, and subsistence activities characteristic of sites in the region. Further investigation is needed before eligibility can be determined for this site under any of the criteria.

32BL719

Site 32BL719 is a precontact stone feature identified during pedestrian survey of Survey Segment F (Appendix A, Figure 12). This site is located in a prairie/pasture area overlooking a small drainage to the west and is situated on a south facing gentle slope.

Feature 001 is a cairn made up of approximately 20 small to medium sized cobbles and measures approximately 1 by 1.5 m (Photo 12).



Photo 12: Overview of Feature 001, Segment F, view to SE

Recommendations

HDR recommends avoidance of this site. If this site cannot be avoided, additional investigations will be needed to further evaluate its significance.

Features similar to those recorded at site 32BL719 may be important expressions of Native American traditional religious and cultural activities. Consequently, 32BL719 may be NRHP-eligible under Criterion A as a property of traditional religious and cultural importance. Consultation with tribes may be needed to determine if this site exhibits traditional values and if the tribes can offer interpretational information concerning the features. HDR suggests that 32BL719 may also be eligible for the NRHP under Criterion D for its potential to yield important information regarding the nature and distribution of feature types as expressions of social, economic, and subsistence activities characteristic of sites in the region. Further investigation is needed before eligibility can be determined for this site under any of the criteria.

32BL720

Site 32BL720 is a precontact isolated find (SF 001) identified during pedestrian survey of Survey Segment F (Appendix A, Figure 13) (Photo 13). This site is located on a gradual slope in a cultivated hayfield (Photo 14). This precontact isolated find consists of one tertiary flake of KRF. Possible utilization scars are present along one edge. A close-interval pedestrian survey in a 15 m area around this flake revealed no additional artifacts.

Recommendations

At this time site 32BL720 is considered an isolated find and is recommended as not eligible for listing on the NRHP. No further work is recommended for this location. HDR recommends that Site 32BL720 be avoided during transmission line construction.

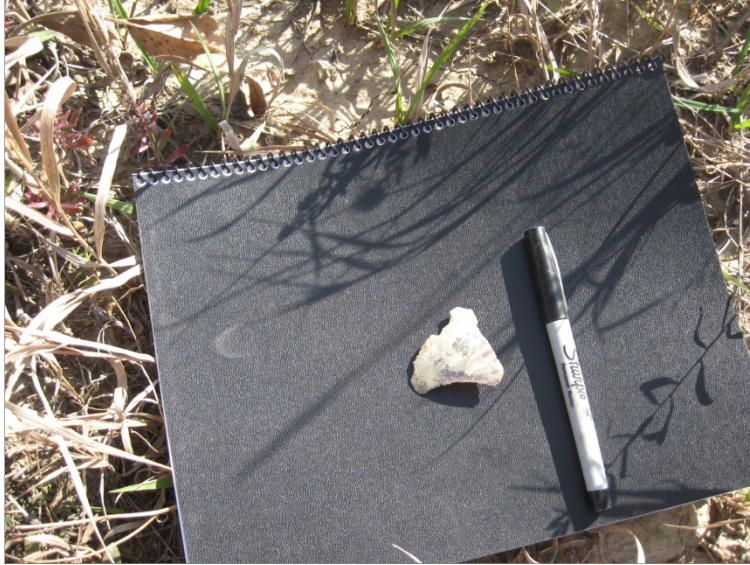


Photo 13: Surface Find 001, Segment F



Photo 14: Overview of Surface Find 001, Segment F, view to W

32ML1238

Site 32ML1238 consists of two precontact stone cairns (Features 001 and 002), two tertiary KRF flakes (SF 001), and one Swan River Chert (SRC) tertiary flake (SF 002) (Appendix A, Figure 17). This precontact site was identified during the pedestrian survey of Survey Segment G, within gently rolling prairie [REDACTED] and north of a bend of Yanktonai Creek. The landscape slopes up to a ridgetop that also slopes to the west to a small, dry tributary of the creek.

Surface Find 001 and SF 002 were identified on gopher mounds, approximately 30 m south of the two stone cairns. Feature 001, a stone cairn was found at the edge of a gradual north slope overlooking a small dry drainage (Photo 15). The cairn consists of approximately four large cobbles and 30 smaller cobbles, and measures approximately 3 m north-south by 2 m east-west. Feature 002, a stone cairn was

found along the western slope of a ridge below Feature 001 (Photo 16). The cairn consists of approximately 100 to 150 small to medium cobbles, and measures approximately 2 m north-south by 3 m east-west.



Photo 15: Feature 001, Segment G, view to S



Photo 16: Feature 002, Segment G, view to E

Recommendations

HDR recommends avoidance of this site. If this site cannot be avoided, additional investigations will be needed to further evaluate its significance.

Features similar to those recorded at site 32ML1238 may be important expressions of Native American traditional religious and cultural activities. Consequently, 32ML1238 may be NRHP-eligible under

Criterion A as a property of traditional religious and cultural importance. Consultation with tribes may be needed to determine if this site exhibits traditional values and if the tribes can offer interpretational information concerning the features. HDR suggests that 32ML1238 may also be eligible for the NRHP under Criterion D for its potential to yield important information regarding the nature and distribution of feature types as expressions of social, economic, and subsistence activities characteristic of sites in the region. Further investigation is needed before eligibility can be determined for this site under any of the criteria.

32ML1239

Site 32ML1239 is a precontact stone cairn (F 003) identified during the pedestrian survey of Survey Segment G (Appendix A, Figure 18) (Photo 17 and Photo 18). The site is located in a small swale along the western edge of a ridge. Feature 001, a stone cairn, was found along the western slope of a ridge, approximately 125 m north of Site 32ML1238. The cairn consists of approximately 45 small to medium-sized cobbles, along with a few larger cobbles, measures approximately 3 by 1 m, and is aligned northeast-southwest.

To fully test the landform, a total of five shovel tests were excavated adjacent to Site GCF-G-2 at 15 m intervals. All tests were negative for cultural material. Shovel tests were not excavated within the site boundary.



Photo 17: Feature 003, Segment G, view to SW



Photo 18: Overview of Feature 003 area, Segment G, view to NW

Recommendations

HDR recommends avoidance of this site. If this site cannot be avoided, additional investigations will be needed to further evaluate its significance.

Features similar to those recorded at site 32ML1239 may be important expressions of Native American traditional religious and cultural activities. Consequently, 32ML1239 may be NRHP-eligible under Criterion A as a property of traditional religious and cultural importance. Consultation with tribes may be needed to determine if this site exhibits traditional values and if the tribes can offer interpretational information concerning the features. HDR suggests that 32ML1239 may also be eligible for the NRHP under Criterion D for its potential to yield important information regarding the nature and distribution of feature types as expressions of social, economic, and subsistence activities characteristic of sites in the region. Further investigation is needed before eligibility can be determined for this site under any of the criteria.

32BLX288

Site 32BLX288 is a precontact isolated find (SF 001) identified during the pedestrian survey of Survey Segment K (Appendix A, Figure 20) (Photo 19). This site is located on flat landform within an alfalfa field (Photo 20). This precontact isolated find consists of a piece of red/orange lithic shatter/flake that most closely resembles SRC. No cortex was observed and it was not utilized. The shatter/flake measured approximately 5 cm in length. A close-interval pedestrian survey in a 15 m area around this shatter/flake revealed no additional artifacts.

Due to poor surface visibility in the alfalfa, shovel tests were excavated. A total of four shovel tests spaced at 15 m intervals were excavated, two on each side of the isolated find. All tests were negative for cultural material.



Photo 19: Surface Find 001, Segment K



Photo 20: Overview of Surface Find 001 area, Segment K, view to W

Recommendations

At this time site 32BLX288 is considered an isolated find and is recommended as not eligible for listing on the NRHP. No further work is recommended for this location. HDR recommends that Site 32BLX288 be avoided during transmission line construction.

32SH268

Site 32SH268 consists of two precontact stone features identified during the pedestrian survey of Survey Segment L (Appendix A, Figure 21). Features include two cairns (Features 001 and 002) on a small rise in a rolling grassland. The cairns are located [REDACTED] southwest of a pond. Feature 001 is a

circular cairn, measuring approximately 2 m in diameter, and Feature 002 is similarly shaped and slightly smaller, measuring approximately 1 m in diameter (Photo 21 and Photo 22).



Photo 21: Feature 001, Segment L, view to NW



Photo 22: Feature 002, Segment L, view to NW

Recommendations

HDR recommends avoidance of this site. If this site can not be avoided, additional investigations will be needed to further evaluate its significance.

Features similar to those recorded at site 32SH268 may be important expressions of Native American traditional religious and cultural activities. Consequently, 32SH268 may be NRHP-eligible under Criterion A as a property of traditional religious and cultural importance. Consultation with tribes may be needed

to determine if this site exhibits traditional values and if the tribes can offer interpretational information concerning the features. HDR suggests that 32SH268 may also be eligible for the NRHP under Criterion D for its potential to yield important information regarding the nature and distribution of feature types as expressions of social, economic, and subsistence activities characteristic of sites in the region. Further investigation is needed before eligibility can be determined for this site under any of the criteria.

32SH270

Site 32SH270 consists of three precontact stone features identified during the pedestrian survey of Survey Segment N (Appendix A, Figure 23). The site includes one Euro-American stone pile possibly covering a Native American cairn (Feature 003) and two cairns (Feature 004 and Feature 005). The site is within a pasture and covers the majority of a prominent ridgeline overlooking multiple wetlands and small lakes and a small portion off the main ridgeline down slope.

Feature 003 is Euro-American stone pile possibly covering a Native American cairn (Photo 23). The feature is down-slope from the main portion of the site and is near a small pond. The pile includes approximately 200 medium to large-sized stones and measures approximately 9 by 10 m.

Feature 004 is a cairn and is located approximately 20 m west of Feature 003 (Photo 24). The cairn includes 15 medium-sized stones, is circular, and approximately 2.5 m in diameter.

Feature 005 is near the center of the site and is a cairn with 16 stones of medium size (Photo 25). The cairn is oval and approximately 1 by 2.5 m

The stone features are concentrated in two areas, with two features grouped on the western side of the site, down-slope of the ridgeline (Features 003 and 004), one feature near the center of the site on the main part of the ridgeline (Feature 005). In addition, a small portion of Site 32SH270 (near Feature 005) falls within previously identified site lead 32SHx88. Site 32SHx88 is listed as precontact stone features that include five stone circles, three cairns, and one stone arc. Although the site boundaries intersect, none of the recorded features at site lead 32SHx88 fall within the boundaries of 32SH270.

Seven shovel tests were excavated at Site 32SH270 in a single transect covering the ridge. Tests were excavated in two groups (ST 014 to 017 and 018 to 020) to avoid testing adjacent to stone features and to avoid excessive slope. Within these two groups, tests were spaced at 15-m intervals. Spacing between the shovel test groups depended on the size/shape and location of the stone features and the landform. All tests were negative for cultural material. Additional shovel tests were not excavated in this area as sufficient data had been gathered to determine the site boundary in relation to the survey corridor.



Photo 23: Feature 003, Segment N, view to NW



Photo 24: Feature 004, Segment N, view to NE



Photo 25: Feature 005, Segment N, view to SW

Recommendations

HDR recommends avoidance of this site. If this site cannot be avoided, additional investigations will be needed to further evaluate its significance.

Features similar to those recorded at site 32SH270 may be important expressions of Native American traditional religious and cultural activities. Consequently, 32SH270 may be NRHP-eligible under Criterion A as a property of traditional religious and cultural importance. Consultation with tribes may be needed to determine if this site exhibits traditional values and if the tribes can offer interpretational information concerning the features. HDR suggests that 32SH270 may also be eligible for the NRHP under Criterion D for its potential to yield important information regarding the nature and distribution of feature types as expressions of social, economic, and subsistence activities characteristic of sites in the region. Further investigation is needed before eligibility can be determined for this site under any of the criteria.

32SH271

Site 32SH271 consists of three precontact stone features identified during the pedestrian survey of Survey Segment N (Appendix A, Figure 23) including two stone arcs (F 001 and F 006) and one stone circle (F 002). The site is located within a pasture and covers the majority of a prominent ridgeline overlooking multiple wetlands and small lakes and a small portion off the main ridgeline downslope.

Feature 001 is a stone arc (Photo 26). The arc includes nine stones of medium size and is approximately 5 m long.

Feature 002 is a stone circle, approximately 65 m west of Feature 001 (Photo 27). The circle is made up of 10 stones of medium size and is approximately 5 m in diameter.

Feature 006 is a stone arc (Photo 28). The arc includes five small stones and is 5.5 m long.

Thirteen shovel tests were excavated at Site 32SH271 in a single transect across the ridge. Tests were excavated in three groups (ST 001 to 003, 004 to 009, and 010 to 013) to avoid testing adjacent to stone features and to avoid excessive slope. Within these groups, tests were spaced at 15-m intervals. Spacing

between the shovel test groups depended on the size/shape and location of the stone features and the landform. All tests were negative for cultural material. Additional shovel tests were not excavated in this area as sufficient data had been gathered to determine the site boundary in relation to the survey corridor.



Photo 26: Feature 001, Segment N, view to S



Photo 27: Overview of Feature 002, Segment N, view to E



Photo 28: Feature 006, Segment N, view to W

Recommendations

HDR recommends avoidance of this site. If this site cannot be avoided, additional investigations will be needed to further evaluate its significance.

Features similar to those recorded at site 32SH271 may be important expressions of Native American traditional religious and cultural activities. Consequently, 32SH271 may be NRHP-eligible under Criterion A as a property of traditional religious and cultural importance. Consultation with tribes may be needed to determine if this site exhibits traditional values and if the tribes can offer interpretational information concerning the features. HDR suggests that 32SH271 may also be eligible for the NRHP under Criterion D for its potential to yield important information regarding the nature and distribution of feature types as expressions of social, economic, and subsistence activities characteristic of sites in the region. Further investigation is needed before eligibility can be determined for this site under any of the criteria.

32BLX287

Site 32BLX287 is a precontact isolated find identified during the pedestrian survey of Survey Segment DD (Appendix A, Figure 10). This site is located within a tilled wheat field on a gently rolling landform, approximately 85 m east of a small drainage (Photo 29). The isolated find consists of one broken primary flake of KRF. A close-interval pedestrian survey in a 15 m area around this flake revealed no additional artifacts.



Photo 29: Overview of Segment DD, view to E

Recommendations

At this time site 32BLX287 is considered an isolated find and is recommended as not eligible for listing on the NRHP. No further work is recommended for this location. HDR recommends that Site 32BLX287 be avoided during transmission line construction.

32BL718

Site 32BL718 is a precontact lithic scatter identified during the shovel testing of Survey Segment DD8 (Appendix A, Figure 11). Survey Segment DD8 is within a grassland and covers a ridgeline overlooking an intermittent stream and a man-made pond. The pedestrian survey failed to identify any cultural materials on the ground surface; however, the area was recommended for shovel testing due to the prominent landform (Photo 30). Six shovel tests were excavated along a northwest/southeast trending ridgeline. One of the six shovel tests was positive (ST 002) and contained one broken tertiary KRF flake at 0-33 cmbs.

Cardinal shovel tests (north, south, east, and west) were excavated at 5 m intervals to further delineate the site boundary. One of the four shovel tests was positive (ST 002 East 5) and contained one secondary KRF flake at 0-30 cmbs.

Additional cardinal shovel tests were excavated at 10 m intervals. ST 002 10-South was not excavated as the test would have been within the road right-of-way. The remaining 10 m cardinal shovel tests were negative.

Remaining cardinal tests surrounding ST 002 5-East were excavated at 5 m (ST 002 5-East 5-North and ST 002 5-East 5-South), 10 m (ST 002 5-East 10-North), and 15 m (ST 002 15-East) were excavated to define site boundaries. These tests were also negative. In total, 17 shovel tests were excavated at 32BL718, two of these tests were positive. No additional subsurface testing was completed.



Photo 30: Overview of Shovel Test area, Segment DD8, view to NW

Recommendations

HDR recommends avoidance of this site. If this site can not be avoided, additional investigations will be needed to further evaluate the significance of this site.

32MLX767

Site 32MLX767 is a precontact isolated find identified during the pedestrian survey of Survey Segment EE (Appendix A, Figure 14) consisting of one piece of KRF shatter identified on a gopher mound within a pasture (Photo 31). The site is on a generally flat landform, [REDACTED] southwest of the southern portion of Yanktonai Lake (Photo 32). The pasture area has poor ground surface visibility, with the exception of the multiple gopher mounds that were inspected for cultural materials. A close-interval pedestrian survey in a 15 m area around this piece of shatter revealed no additional artifacts.

Two shovel tests were excavated to determine the subsurface integrity of the site. Shovel tests were placed to the north and to the south of the isolated find at 5 m intervals. Both shovel tests were negative and additional subsurface testing was not completed.



Photo 31: Surface Find 001, Segment EE



Photo 32: Overview of Surface Find 001 area, Segment EE, view to S

Recommendations

At this time site 32MLX767 is considered an isolated find and is recommended as not eligible for listing on the NRHP. No further work is recommended for this location. HDR recommends that Site 32MLX767 be avoided during transmission line construction.

32MLX768

Site 32MLX768 is a precontact lithic scatter identified during the pedestrian survey of Survey Segment EE (Appendix A, Figure 15). The site is within a pasture area with poor ground surface visibility, at 0 percent, with the exception of the multiple gopher mounds that were inspected for cultural materials. Initially, the site included one tertiary flake of unidentified chert (FS 002) identified on a gopher mound

(Photo 33). A close-interval pedestrian survey in a 15 m area around this flake revealed no additional artifacts.

Shovel tests were excavated at 5 m intervals to the north and south of the surface find (Photo 34). The northern test (ST 003) was negative and the southern test (ST 004) was positive. Shovel test 003 contained one secondary KRF flake and one tertiary KRF flake at 0-20 cmbs. Additional tests were excavated at 5 and 10 m intervals to delineate the site boundaries. All additional tests were negative and no additional subsurface testing was completed.



Photo 33: Surface Find 002, Segment EE



Photo 34: Overview of Surface Find 002 area, Segment EE, view to S

Recommendations

HDR recommends avoidance of this site. If this site can not be avoided, additional investigations will be needed to further evaluate the significance of this site.

32ML1237

Site 32ML1237 is a precontact lithic scatter identified during the pedestrian survey of Survey Segment EE (Appendix A, Figure 16). The site is within a pasture area with spotty visibility ranging from 0 to 25 percent. Initially, the site included one broken tertiary KRF flake (FS 003) identified on a gopher mound (Photo 35). A close-interval pedestrian survey in a 15 m area around the flake revealed no additional artifacts.

To delineate site boundaries, a line of shovel tests were excavated north of the find spot at 5 m intervals (Photo 36). A total of five shovel tests were excavated, four of which were positive. Positive shovel tests included ST 009 (two tertiary KRF flakes at 0-30 cmbs), ST 010 (one tertiary KRF flake at 0-15 cmbs), ST 011 (one tertiary KRF flake at 0-23 cmbs, and ST 013 (two tertiary KRF flakes and one tertiary TRS flake at 0-35 cmbs, five large mammal bone fragments at 50 cmbs, and one calcine bone fragment at 60 cmbs).

Due to time constraints, additional shovel tests were not excavated. This site will require an additional visit to determine site boundaries.

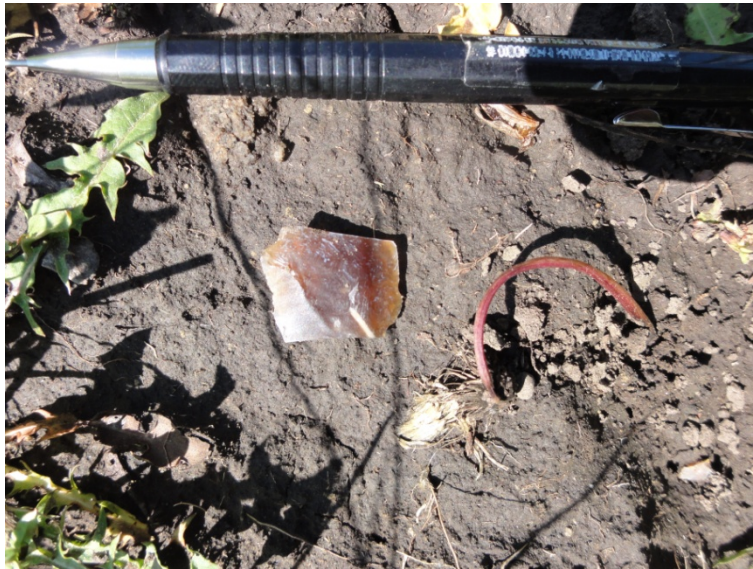


Photo 35: Surface Find 003, Segment EE



Photo 36: Overview of Surface Find 003 area, Segment EE, view to N

Recommendations

At this time, the boundaries of Site 32ML1237 are unclear and will require further subsurface testing. HDR recommends that 32ML1237 be revisited and additional testing be completed to determine the site's full extent. Once the site boundaries have been established, an NRHP recommendation will be made. HDR recommends that Site 32ML1237 be avoided during transmission line construction.

32ML1240

Site 32ML1240 consists of two precontact stone features identified during the pedestrian survey of Survey Segment HH (Appendix A, Figure 19). Stone features include one cairn surrounded by a stone circle (Feature 001) and one cairn (Feature 002) (Photos 37, 38, and 39). The features are on a slight rise within a gently rolling landscape within a pasture.

Feature 001 is a cairn measuring approximately 3.5 m north/south by 3 m east/west. The cairn consists of approximately 150 small to medium-sized stones, many of which are well-sodded into the ground. In addition, a stone circle was identified surrounding the cairn, approximately 1.5 m from the base.

Feature 002 is a circular shaped cairn measuring approximately 2.5 m in diameter. The cairn consists of approximately 30 small-sized stones that are well-sodded into the ground. Feature 002 is approximately 15 m east/northeast of Feature 001.

One transect of seven shovel tests were excavated at 15 m intervals to determine the subsurface integrity of Site 32ML1240. All tests were negative and additional testing was not completed.



Photo 37: Feature 001, Segment HH, view to S



Photo 38: Feature 002, Segment HH, view to W



Photo 39: Overview of Feature 001 and 002, Segment HH, view to WSW

Recommendations

HDR recommends avoidance of this site. If this site can not be avoided, additional investigations will be needed to further evaluate the significance of this site.

Features similar to those recorded at site 32ML1240 may be important expressions of Native American traditional religious and cultural activities. Consequently, 32ML1240 may be eligible under Criterion A as a property of traditional religious and cultural importance. Consultation with tribes may be needed to determine if these sites exhibit traditional values and if they can offer interpretational information concerning the features. HDR suggests that 32ML1240 may also be eligible for the NRHP under Criterion D for its potential to yield important information regarding the nature and distribution of feature types as expressions of social, economic, and subsistence activities characteristic of sites in the region. Further investigation is needed before eligibility can be determined for this site under any of the criteria.

Historic Period Sites

During the Class III archaeological inventory of the Center to Grand Forks 345 kilovolt (kV) Transmission Line project, seven newly recorded historic sites were identified (Table 5).

32OL644

Site 32OL644 consists of three depressions (F 002, F 003, and F 004) and an associated trash pile (Feature 001) identified during the pedestrian survey of Survey Segment D (Appendix A, Figure 8). The site is located at the base of a butte within a rolling prairie.

Feature 001 consists of a small trash pile that includes barbed wire fencing, broken fence posts, and barrel hoops (Photo 40). The pile measures approximately 8 ft north/south by 6 ft east/west and is overgrown with prairie vegetation.

Feature 002 is a depression approximately 50 m northeast of Feature 001, at the base of the butte (Photo 41). The depression measures approximately 18 ft north/south by 18 ft east/west and is 4.5 ft deep.

Feature 003 is a small, shallow depression adjacent to Feature 002 (Photo 42). The depression measures approximately 10 ft east/west by 8 ft north/south and 2 ft deep.

Feature 004 is a larger depression and is rectangular, with an opening out to the south (Photo 43). The depression measures approximately 23 ft east/west by 28 ft north/south and is 6 ft deep. Feature 004 cuts into the base of the butte and may represent the remnants of a dugout.

With the exception of the trash pile (Feature 001), no cultural materials were identified within or near the depressions. Many large boulders are scattered naturally around the area and the depressions were overgrown with prairie grasses.

A conversation with the land owner, Mr. Bruce Nelson, on November 11th, 2010 confirmed the presence of a homestead at the base of the southern side of the butte. Mr. Nelson mentioned finding nails and structural materials in the area surrounding the depressions and estimated the homestead was erected in the early 1900s.

A review of the earliest available plat map for the area revealed two structures in the northwest quarter of Section 30 associated with the name Olaus Nelson (Geo. A. Ogle and Company 1917). These structures may correspond with the identified depressions and trash pile. Additional plat maps were not available for review.



Photo 40: Feature 001, Trash Pile, view to N



Photo 41: Feature 002, Depression, view to N



Photo 42: Feature 003, Depression, view to SE



Photo 43: Feature 004, Depression, view to S

Recommendations

This site represents an example of early settlement patterns in North Dakota and it is possible that subsurface deposits may be intact. HDR recommends avoidance of this site. If this site can not be avoided, additional investigations will be needed to further evaluate the significance of this site.

32OL645

Site 32OL645 is a depression (Feature 002) identified during the pedestrian survey of Survey Segment D (Appendix A, Figure 9) (Photos 44 and 45). The site was identified on a small rise within a rolling prairie. The depression measures approximately 15 ft long and wide and is 6 ft deep. No cultural materials were noted within the depression or the surrounding area; however the shape of the depression is clearly angular, suggesting it was man-made. A review of the available plat map failed to identify any nearby structure or residences that may be associated with the depression (Geo. A. Ogle and Company 1917).



Photo 44: Feature 002, Segment D, view to S



Photo 45: Feature 002, Segment D, view to NE

Recommendations

At this time, the function of Site 32OL645 is unclear. HDR recommends avoidance of this site. If this site can not be avoided, additional investigations will be needed to further evaluate the significance of this site.

32SH269

Site 32SH269 is the remnants of a farmstead identified during the pedestrian survey of Survey Segment L (Appendix A, Figure 22) (Photo 46). Features include a house, well, and windmill located within a grassland and between a small lake to the east and a wetland to the west. The house is partially

standing, with two corners of the building on the foundation. The windmill is approximately 30 m southeast of the house and the well is approximately 40 m to the northwest of the house. Historic materials were noted on the ground surface during the pedestrian survey. No shovel testing was completed and site boundaries encompass the three features and the artifact scatter.

Two plat maps were available for review. The 1914 plat map depicts two structures and the owner is listed as Hans P. Anderson (Geo. A. Ogle and Company 1914). By the 1940s, the structures are no longer depicted and the owner is listed as Glenn Swendsen (L. Roe Directory Service 194x).



Photo 46: Overview of 32SH269, Segment L, view to S

Recommendations

Site 32SH269 is outside the 150-ft ROW and is partially within the 1,000-ft ROW. HDR recommends avoidance of this site. If this site can not be avoided, additional investigations will be needed to further evaluate the significance of this site.

32GG180

Site 32GG180 consists of a historic artifact scatter and one depression within and adjacent to an abandoned farmstead (Appendix A, Figure 25) (Photo 47). The site is associated with architectural history property 17607/43499 and was identified during the pedestrian survey of Survey Segment R2. Standing structures include a house, barn, small shed, large shed, an outbuilding, an outhouse, and four silos. The farmyard is bordered to the north by 12th Street NE, and to the east, west, and south by a cultivated field.

The artifact scatter is with the yard of the farmstead, between the multiple standing structures, and in the wooded lot west of the farmyard. Materials visible on the ground surface include miscellaneous metal fragments, screw-top glass bottles, metal buckets and containers, farm machinery, and ceramic fragments. A pedestrian survey of the cultivated field at 7 m intervals failed to produce additional historic artifacts.

The depression identified in the farm yard is approximately 50 m behind the house (to the west) and has been filled with stones. The depression measures approximately 2 m north/south by 1 m east/west.

Shovel testing was completed in the farmyard. A total of five shovel tests in two lines were excavated. Two of the five shovel tests were positive (ST 003 and ST 004) and contained historic materials. Shovel Test 003 contained one wire nail at 20 cmbs and ST 004 contained one cut bone fragment from 0-5 cmbs. Additional testing was not completed.

A review of historic atlases revealed the structures at 32GG180 were not present in 1910 and made their first appearance in the 1955 atlas, listed under the name surname Olson (Alden Publishing Company 1910, Thomas O. Nelson Company 1955). The structures are present from 1955 through 1999 and remain under the name Kenneth Olson until 1981 (Directory Service Company 1976 and 1981). From 1991 to 1999, no name is associated with the property (Farm and Home Publishers 1991 and 1999).



Photo 47: Overview of Farmstead and 32GG180, Segment R2, view to SW

Recommendations

The historic scatter, depression, and standing structures at Site 32GG180 are contained within a clearly defined farmyard. To the north, the site is bordered by 12th Street NE, and to the east, west, and south by a cultivated field. HDR recommends avoidance of this site. If this site can not be avoided, additional investigations will be needed to further evaluate the significance of this site.

As an architectural history property, the structures are considered not eligible for the NRHP as there is not a complete historic period building assemblage (the historic barn had been partially demolished) (Palmer 2011).

32GG181

Site 32GG181 is a historic trash scatter identified during the pedestrian survey of Survey Segment S2 (Appendix A, Figure 27). The site was identified in a grassland on a slight slope north of an intermittent drainage of the Sheyenne River and consists of metal farm equipment, a gas stove, multiple metal cans,

multiple glass bottles, and milled lumber (Photos 48 and 49). A close interval pedestrian survey failed to identify additional materials or foundations.

A review of historic atlases failed to identify an adjacent farmstead that may be associated with the trash pile (Alden Publishing Company 1910, Thomas O. Nelson Company 1955, Directory Service Company 1976 and 1981 and Farm and Home Publishers 1991 and 1999). The closest farmstead is near the center of Section 6, approximately 700 m to the southeast. It is possible that the trash pile may be associated with this farmstead.

Shovel testing was not completed at the site as construction plans excluded this particular route and testing was not necessary.



Photo 48: Surface Find 001, Segment S2, view to E



Photo 49: Overview of Surface Find 001 area, Segment S2, view to W

Recommendations

This segment is not longer in consideration for construction and the site boundary of 32GG181 is currently 230 m south of the 1,000-ft APE. HDR recommends avoidance of this site. If this site can not be avoided, additional investigations will be needed to further evaluate the significance of this site.

32GF3551

Site 32GF3551 is the remnants of a farmstead identified during the pedestrian survey of Survey Segment EEE (Appendix A, Figure 28). The farmstead is located within an overgrown grassy area adjacent to a cultivated field. Features at the site include a barn foundation constructed of poured concrete (Feature 003), a windmill (Feature 004), a house foundation of concrete and fieldstone (Feature 005), and a depression lined with concrete and field stone (Feature 006) (Photos 50, 51, and 52).

Historic materials were identified within the depressions and in the surrounding area. Materials include hundreds of wire nails, whiteware ceramic fragments, plastic containers and fragments, multiple glass bottles, appliances, and miscellaneous metal fragments.

A review of available plat maps revealed the structure was extant in 1893 and owned by Andrew J. Hegre (D.W. Ensign and Company 1893). Andrew J. Hegre continues to be listed as the land owner until 1951, when ownership changes to Clarence Hegre (Alden Publishing Company 1909, Geo. A. Ogle and Company 1927, and Thomas O. Nelson 1951). The next available atlas did not depict a structure or landowner (Farm and Home Publishers Limited 1988).



Photo 50: Feature 005, House Foundation Pit, Segment EEE, view to S



Photo 51: Feature 006, Depression, Segment EEE, view to W



Photo 52: Feature 003, Concrete Foundation, and Feature 004, Windmill, Segment EEE, view to E

Recommendations

Currently the site is outside the 150-ft ROW; however, it is within the 1,000-ft APE. Dates for the farmstead appear to range from the late 1800s and extend into the 1950-80s. As no subsurface testing was completed at 32GF3551, it is possible that intact cultural deposits may be present. HDR recommends avoidance of this site. If this site can not be avoided, additional investigations will be needed to further evaluate the significance of this site and determine NRHP eligibility.

32GF3552

Site 32GF3552 consists of historic artifact scatters and two depressions identified during the pedestrian survey of Survey Segment Y (Appendix A, Figure 29). The site is within a grassland divided by wooded shelter belts immediately adjacent to the English Coulee. The artifact scatters are divided into two separate groups (SF 001 and SF 002). Surface find 001 consists of a large rock pile with historic metal can fragments and SF 002 consists of a historic glass bottle scatter (Photos 53 and 54). Bottles include brown liquor bottles, green bottles, and clear bottles, some with plastic caps. Two bottles were identified by makers mark, including one brown Hiram Walker and Son's whiskey bottle and one green Berry Brothers and Rudd bottle. Dates for these bottles range from the early to mid 1900s. These surfaces scatters are on the southern portion of the site.

The two depressions are northwest of the surface scatters. Feature 001 is square-shaped and measures approximately 12 by 12 m. To the west of the depression are large berms of earth and stone. The second depression (F 002) is considerably smaller measuring approximately 1 by 1 m. Two pieces of metal were noted along the edge of the depression. Feature 002 is approximately 15 m north of F 001.

The earliest available plat map for Grand Forks County did not depict a structure in the vicinity of Site 32GF3552 (D.W. Ensign and Co. 1893). However, by 1909 a structure is present and associated with the

name Beers Johnstone (Alden Publishing Company 1909). The property remains under the name Beers Johnstone through 1927 (Geo. A. Ogle and Company 1927). In 1951, the property owner changes to Lawrence Christopher and the structure is still depicted (Thomas O. Nelson 1951). By 1976, the structure is no longer represented and no name is associated with the parcel (Directory Service Company 1976).



Photo 53: Surface Find 001, Segment Y, view to E



Photo 54: Surface Find 002, Segment Y, view to W

Recommendations

Dates for the farmstead appear to range from the early 1900s and possibly extend into the early 1970s. As no subsurface testing was completed at 32GF3552, it is possible that intact cultural deposits may be present. HDR recommends avoidance of this site. If this site can not be avoided, additional

investigations will be needed to further evaluate the significance of this site and determine NRHP eligibility.

Multi-Components Sites

During the Class III archaeological inventory of the Center to Grand Forks 345 kilovolt (kV) Transmission Line project, one newly recorded multi-component sites (sites with both precontact and historic components) were identified (Table 5).

32GG179

Site 32GG179 consists of two historic dumps and one precontact stone feature identified during the pedestrian survey of Survey Segment R1 (Appendix A, Figure 24). The site is on a hilltop within a grassland in rolling topography.

Feature 001 consists of a historic dumping area that includes hundreds of green and brown glass bottles, hundreds of metal cans, plastic bottles and containers, miscellaneous metal fragments, milled lumber, wooden fencing, tires, chairs, farm machinery, barbed wire spools and fragments, multiple water heaters, and a television (Photo 55). Items have been added to a dug out area, prior to dumping. Materials within the dump range in date from the mid-1900s to the present.

Feature 002 is approximately 20 m east of Feature 001 and is also a historic dumping area. Materials at Feature 002 are within a pit and include milled lumber, miscellaneous metal fragments, multiple appliances, cement fragments, buckets, windows, doors, and tires (Photo 56). Materials from Feature 002 appear to be more recent than materials from Feature 001, with dates ranging from the late 1900s to the present.

Feature 003 is a precontact stone cairn approximately 40 m northeast of Feature 002 comprised of approximately 30 small to large sized stones that are well sodded into the ground (Photo 57). The pile is circular in shape and measures approximately 3 m in diameter. Other stone piles were visible from Feature 003, however, these piles are considerably larger and directly adjacent to cultivated fields. At this time, Feature 003 is considered a Native American cairn that may be covered by a Euro-American stone pile.

Two groupings of shovel tests were excavated adjacent to Site 32GG179. The first set included four shovel tests covering the hilltop, approximately 50 m north of Features 001, 002, and 003. Tests were excavated in 15 m intervals and were negative. Two additional tests were excavated down slope on a level terrace approximately 40 m northeast of Feature 003. These two tests were also negative. No additional testing was completed.

A review of historic plat maps failed to identify a farmstead or structures possibly associated with the two dump areas (Alden Publishing Company 1910, Thomas O. Nelson Company 1955, Directory Service Company 1976 and 1981 and Farm and Home Publishers 1991 and 1999). The closest structures depicted were located across 12th Street NE, northwest of Site 32GG179.



Photo 55: Feature 001, Dump, Segment R1, view to W



Photo 56: Feature 002, Dump, Segment R1, view to S



Photo 57: Feature 003, Stone Pile, Segment R1, view to S

Recommendations

HDR recommends avoidance of this site. If this site can not be avoided, additional investigations will be needed to further evaluate the significance of this site, in particular the precontact stone feature.

Features similar to those recorded at site 32GG179 may be important expressions of Native American traditional religious and cultural activities. Consequently, 32GG179 may be eligible under Criterion A as a property of traditional religious and cultural importance. Consultation with tribes may be needed to determine if these sites exhibit traditional values and if they can offer interpretational information concerning the features. HDR suggests that 32GG179 may also be eligible for the NRHP under Criterion D for its potential to yield important information regarding the nature and distribution of feature types as expressions of social, economic, and subsistence activities characteristic of sites in the region. Further investigation is needed before eligibility can be determined for this site under any of the criteria.

Site Updates

The files provided by SHSND indicate there are 15 previously identified archaeological sites within the 1,000-ft APE (Table 2). These sites include six precontact sites, seven historic sites, and two sites with unknown cultural affiliation. In addition, eight of the 13 sites are within the 150-ft ROW.

When possible, attempts were made to find and/or identify archaeological sites transecting the 150-ft ROW. Many of the sites transecting the 150-ft ROW are site leads and encompass quarter-sections, half-sections, or entire sections of land and site evidence was not found or identified. One site lead (32GGx117) was confirmed during the survey and a site form update was completed. The remaining sites and site leads will not receive site updates, as no additional information was gleaned from the survey.

In addition, standing structures (architectural history sites) within the Project APE were not intentionally visited or identified during the archaeological survey. For information and site updates regarding previously identified architectural history sites, please refer to the Historic Building Inventory and Evaluation (Palmer 2011).

32BLx146

Site lead 32BLx146 consists of at least 20 stone circles observed during a fly-over survey in 1980. The current boundaries for 32BLx146 cover half of a section. Currently, the northwest corner of the site intersects the 150-ft ROW. During the pedestrian survey of the 150-ft ROW, no stone features were identified. It is likely that the recorded features are south/southeast of the proposed corridor. As no features were identified, a site form update will not be submitted to the SHSND. No additional information is available at this time.

Recommendations

Site lead 32BLx146 has not been evaluated for NRHP eligibility. As no cultural materials were identified within the current 150 ft ROW, HDR recommends construction crews stay within the cleared area. If construction activities will exceed the current 150-ft ROW, HDR recommends that a larger area be surveyed to clear the 1,000-ft APE.

32GF120

Site 32GF120 consists of a Farmstead, artifact scatter, and associated depressions identified during a Class III inventory and Class I literature review of sites containing round barns in 1986. A description of the standing structures and management recommendations can be found in the Historic Building Inventory and Evaluation Report (Palmer 2011).

The historic component of the site includes an artifact scatter and associated depressions. The occupation dates for the site range from 1893 to 1964. The site originally included four features; a house, a Quonset hut, an octagonal barn, and a machine shop. Of the original buildings, only the Quonset hut now remains. In addition, the artifact scatter appears to have been dispersed into the adjacent soybean field that nearly encapsulates the Quonset hut. Identified materials included glass, ceramics, and metal fragments. Depressions originally associated with the site were not identified and were likely tilled under during the expansion of the cultivated field. At this time, a site form update will not be submitted to the SHSND.

Recommendations

Site 32GF120 is unevaluated, however, it is recommended as not eligible for listing on the NRHP. Although artifacts were identified during the pedestrian survey, the likelihood of identifying intact cultural deposits is low. HDR recommends that an archaeological monitor is present during construction in this area.

32GF3485

Site 32GF3485 consists of a precontact artifact scatter identified during the Class II survey of the Jamestown to Grand Forks Transmission Line in 2008. The site is within the 1,000-ft APE and was not identified during the pedestrian survey.

Recommendations

Site 32GF3485 is unevaluated, however, it is recommended as not eligible for listing on the NRHP. HDR recommends this site receive a 50-ft buffer, delineated by high visibility fencing or similar, and be avoided during construction activities.

32GF3487

Site 32GF3487 consists of a historic artifact scatter identified during the Class II survey of the Jamestown to Grand Forks Transmission Line in 2008. The site is within the 1,000-ft APE and was not identified during the pedestrian survey.

Recommendations

Site 32GF3487 is unevaluated, however, it is recommended as not eligible for listing on the NRHP. HDR recommends this site receive a 50 ft buffer, delineated by high visibility fencing or similar, and be avoided during construction activities.

32GFx24

Site lead 32GFx24 consists of a cultural material scatter and mound with unknown cultural affiliation, recorded in 1980. The boundary of 32GFx24 includes an entire section and currently, the proposed 150-ft ROW transects the middle of the site lead. During the pedestrian survey 32GFx24 was not identified, no additional cultural material was found, and no additional information is available. At this time, a site form update will not be submitted to the SHSND.

Recommendations

Site lead 32GFx24 has not been evaluated for NRHP eligibility and the exact location is currently unknown. As no cultural materials were identified within the current 150-ft ROW, HDR recommends construction crews stay within the cleared area. If construction activities will exceed the current 150-ft ROW, HDR recommends that a larger area be surveyed to clear the 1,000-ft APE.

32GG56

Site 32GG56 is no longer within the preferred route.

Site 32GG56 includes the Romness Methodist Church, a cemetery, a stone foundation, outhouse remnants, and an associated artifact scatter. The site was identified during the Sheyenne River Survey Project in 1985. A description of the standing structures and management recommendations can be found in the Historic Building Inventory and Evaluation Report (Palmer 2011). The historic component of the site includes the stone foundation, outhouse remnants, and associated artifact scatter.

Recommendations

Site 32GG56 is no longer within the preferred route. If the preferred route changes and site 32GG56 is within the Project ROW, HDR recommends revisiting the site to determine potential effects. Management recommendations will be made at that time.

32GGx31

Site lead 32GGx31 is no longer within the preferred route.

Site lead 32GGx31 consists of the Romners [sic] Post Office, recorded in 1978. No additional information is available.

Recommendations

Site lead 32GGx31 is no longer within the preferred route. If the preferred route changes and site 32GGx31 is within the Project ROW, HDR recommends revisiting the site to determine potential effects. Management recommendations will be made at that time.

32GGx117

Site lead 32GGx117 consists of one precontact mound originally identified during a windshield survey for the Binford Water Supply Project in 2005. The site lead was recorded as an assumed precontact burial location, likely dating to the Plains Woodland period. During the windshield survey, 32GGx117 was not visited as the survey crew did not have permission to access the property. In 2010, the site lead was

revisited as part of the Center to Grand Forks 345 kV Transmission Line survey, as the boundaries intersect the project corridor (Appendix A, Figure 26).

The mound is within a rolling grassland and is approximately 10 m east/west by 7 m north/south and 1 m high. A large stone is on the north side of the mound, which is at the edge of a ridge (Photos 58 and 59). No additional features or cultural materials were identified during the pedestrian survey of the area.



Photo 58: Large rock on Site Lead 32GGx117, Segment S1, view to E



Photo 59: Overview of Site Lead 32GGx117, Segment S1, view to NW

Recommendations

At this time, site lead 32GGx117 is considered a Native American burial that may date to the Plains Woodland period. HDR recommends avoidance of this site. If this site can not be avoided, consultation

with the State Historic Preservation Office will be required. Under the direction of the SHSND, additional investigations may be needed to further evaluate the significance of this site.

32OL388

Site 32OL388 consists of one historic depression of unknown function. The site is currently within the 150-ft ROW. During the pedestrian survey, the depression was identified. A review of the area failed to produce associated artifacts and no structural remains were noted. A site form update will not be submitted to the SHSND and no additional information is available at this time.

Recommendations

Site 32OL388 has not been evaluated for NRHP eligibility. HDR recommends this site receive a 50 ft buffer, delineated by high visibility fencing or similar, and be avoided during construction activities.

32OL389

Site 32OL389 consists of one historic depression of unknown function. The site is currently within the 1,000-ft APE. During the pedestrian survey, the depression was identified. A review of the area failed to produce associated artifacts and no structural remains were noted. A site form update will not be submitted to the SHSND and no additional information is available at this time.

Recommendations

Site 32OL389 has not been evaluated for NRHP eligibility. HDR recommends this site receive a 50 ft buffer, delineated by high visibility fencing or similar, and be avoided during construction activities.

32OL416

Site 32OL416 consists of a sparse precontact lithic scatter identified in a two-track dirt road during the Oliver County Road survey in 1978. The site is currently within the 1,000-ft APE. The site form mentions that identified artifacts were systematically collected. A review of the area during the pedestrian survey failed to identify additional artifacts. A site form update will not be submitted to the SHSND and no additional information is available at this time.

Recommendations

Site 32OL416 has not been evaluated for NRHP eligibility. HDR recommends this site receive a 50 ft buffer, delineated by high visibility fencing or similar, and be avoided during construction activities.

32SHx12

Site lead 32SHx12 consists of a mound of unknown cultural affiliation recorded in 1930. The site lead boundary includes half of a section and the northwest corner is currently within the 150-ft ROW. Permission to survey was not granted by the landowner and this site lead was not revisited. At this time, a site form update will not be submitted to the SHSND.

Recommendations

As survey permission was not granted for this area, HDR recommends this area be surveyed. Site lead 32BLx146 has not been evaluated for NRHP eligibility.

32SHx85

Site lead 32SHx85 consists of a precontact cultural material scatter identified during the Class II survey of the Jamestown to Grand Forks Transmission Line in 2008. The site lead boundaries are within the current 1,000-ft APE. During the pedestrian survey, this site lead was not revisited. At this time, a site form update will not be submitted to the SHSND.

Recommendations

Site lead 32SHx85 has not been evaluated for NRHP eligibility. HDR recommends this site receive a 50 ft buffer, delineated by high visibility fencing or similar, and be avoided during construction activities.

32SHx88

Site lead 32SHx88 consists of nine precontact stone features identified during the Class II survey of the Sheridan Ridge I & II Wind Farm in 2010. The site lead boundaries are within the current 150-ft ROW. During the pedestrian survey, additional stone features were recorded outside the boundaries of 32SHx88 and recorded as two new precontact sites (32SH270 and 32SH271). Additional cultural materials were not identified within 32SHx88 in the 1,000-ft APE. At this time, a site form update will not be submitted to the SHSND.

Recommendations

Site lead 32SHx88 has not been evaluated for NRHP eligibility. HDR recommends this site receive a 50-ft buffer, delineated by high visibility fencing or similar, and be avoided during construction activities.

32WEx38

Site lead 32WEx38 consists of the Stavenger Lutheran Church historic site, recorded in 1978. The site lead boundaries are within the current 150-ft ROW. However, this site lead was not included in the designated Survey Segments; therefore, it was not visited during the survey. Reviews of available aerial photographs suggest the church is no longer extant and the area appears to now be a cultivated field. It is possible, however, that an associated artifact scatter may still be present. At this time, a site form update will not be submitted to the SHSND.

Recommendations

Site lead 32WEx38 has not been evaluated for NRHP eligibility. Aerial photographs suggest the church is no longer extant and the area is now a cultivated field. Although an associated artifact scatter may be present, the likelihood of identifying intact cultural deposits is low. HDR recommends this area be visited prior to construction activities to determine the presence/absence of cultural materials. Following the site visit, and if determined warranted, HDR recommends that an archaeological monitor is present during construction in this area.

Areas Remaining for Survey

The archaeological survey for the Project included multiple mobilizations from October 3rd to November 18th, 2010 and from May 16th to July 1st, 2011. Over the course of the Project, both pedestrian survey and shovel testing was completed.

During the 2010 survey, the archaeological crew avoided only those areas without landowner permission or access issues (i.e. poor road conditions). In 2011, additional Survey Segments were added to address route changes. The 2011 archaeological survey focused on completing remaining Survey Segments from the original 2010 layout and new Survey Segments from the updated 2011 layout. Once again, multiple landowners denied access to their property and those Survey Segments were not surveyed.

In addition to areas with denied or limited access, multiple areas were recommended for deep testing and/or monitoring due to the potential for deeply buried soils as indicated by the assessment presented in Appendix C. Areas recommended for potential deep testing/monitoring include areas considered to have high potential for deeply buried deposits on the Missouri River terraces, floodplains, and uplands,

recently glaciated areas and/or spillway terrain (James River, Sheyenne River, Goose River, Little Goose River, English Coulee, and other smaller streams), the Glacial Lake Agassiz shoreline, and alluvial valleys in the abandoned Glacial Lake Agassiz basin.

The depth of potential buried soils depends on the location and may range from 1 to 4 m adjacent to rivers and streams and from 1 to 6 m in the abandoned Lake Agassiz basin. Shovel testing can efficiently identify subsurface cultural deposits to a depth of 1 m; however, as this Project contains the potential for deposits ranging from 1 to 6 m in high potential areas, deep testing would be required to properly address these areas. Minnkota will monitor construction at the areas of high potential as per conditions stipulated in the Programmatic Agreement for this project.

Finally, additional testing is recommended for areas identified during the cultural survey with unclear site boundaries. Proposed testing would include shovel testing completed at 5 or 10 m intervals, excavated in cardinal directions (north, east, south, and west) from all positive tests. Testing would be completed until two negative tests are encountered in each direction, or until the boundary of the 150-ft ROW was encountered.

Survey Segments with denied access, recommended deep testing and/or monitoring, and recommended additional shovel testing, are presented in Table 6 below.

Table 6: Areas Remaining for Survey

| Survey Segment | Township | Range | Section | Access | Recommendations |
|-----------------|----------|-------|---------|----------------|---------------------------------------|
| A | 142N | 83W | 33 | Access Granted | Deep Testing/Monitoring Recommended |
| Laydown Area A1 | 142N | 83W | 33 | Access Granted | Deep Testing/Monitoring Recommended |
| BB | 142N | 82W | 32 | Access Denied | Survey Recommended |
| CC | 142N | 81W | 29 | Access Denied | Survey Recommended |
| | | | 29 | Access Denied | Deep Testing/Monitoring Recommended |
| | | | 28 | Access Granted | Deep Testing/Monitoring Recommended |
| E | 142N | 81W | 22 | Access Granted | Deep Testing/Monitoring Recommended |
| EE2-3 | 143N | 81W | 36 | Access Granted | Additional Shovel Testing Recommended |
| EE | 143N | 81W | 25 | Access Denied | Survey Recommended |
| | | | 24 | | |
| FF | 143N | 81W | 13 | Access Denied | Survey Recommended |
| | 143N | 80W | 18 | | |

Center to Grand Forks Transmission Line
 Class III Intensive Archaeological Resources Inventory

| Survey Segment | Township | Range | Section | Access | Recommendations |
|-----------------------|----------|-------|---------|----------------|-------------------------------------|
| HH | 144N | 80W | 24 | Access Denied | Survey Recommended |
| Grassland Easement #1 | 145N | 79W | 2 | Access Denied | Survey Recommended |
| | 146N | 79W | 35 | | |
| KK1 | 147N | 78W | 26 | Access Denied | Survey Recommended |
| | | | 23 | | |
| KK2 | 147N | 78W | 13 | Access Denied | Survey Recommended |
| MM | 147N | 74W | 11 | Access Denied | Survey Recommended |
| | | | 12 | | |
| O | 147N | 74W | 12 | Access Denied | Survey Recommended |
| | | 73W | 7 | | |
| PP | 148N | 72W | 34 | Access Denied | Survey Recommended |
| | | | 34 | Access Denied | Deep Testing/Monitoring Recommended |
| RR | 148N | 67W | 30 | Access Denied | Survey Recommended |
| P | 148N | 65W | 32 | Access Granted | Deep Testing/Monitoring Recommended |
| | | | 33 | | |
| SS | 148N | 64W | 36 | Access Denied | Survey Recommended |
| WW1 | 147N | 61W | 17 | Access Denied | Survey Recommended |
| WW2 | 147N | 61W | 16 | Access Denied | Survey Recommended |
| WW3 | 147N | 61W | 16 | Access Denied | Survey Recommended |
| S1-1 | 147N | 59W | 2 | Access Granted | Tribal Consultation Recommended |
| S1 | 147N | 58W | 6 | Access Granted | Deep Testing/Monitoring Recommended |
| BBB | 147N | 58W | 6 | Access Granted | Deep Testing/Monitoring Recommended |
| S3 | 147N | 58W | 17 | Access | Deep Testing/Monitoring |

Center to Grand Forks Transmission Line
Class III Intensive Archaeological Resources Inventory

| Survey Segment | Township | Range | Section | Access | Recommendations |
|-----------------|----------|-------|---------|-------------------|--|
| | | | 16 | Granted | Recommended |
| S4 | 147N | 58W | 9 | Access Granted | Deep Testing/Monitoring Recommended |
| Laydown Area E4 | 146N | 58W | 26 | Access Granted | Deep Testing/Monitoring Recommended |
| Laydown Area E5 | 146N | 58W | 26 | Access Granted | Deep Testing/Monitoring Recommended |
| CCC | 149N | 57W | 1 | Access Granted | Survey Recommended |
| FFF | 150N | 55W | 35 | Access Granted | Deep Testing/Monitoring Recommended |
| | | 55W | 36 | | |
| | | 54W | 31 | | |
| V | 149N | 55W | 2 | Access Granted | Deep Testing/Monitoring Recommended |
| | | 55W | 1 | | |
| | | 54W | 6 | | |
| Y | 150N | 52W | 19 | Access Denied | Survey Recommended |
| | | 53W | 24 | | |
| Y | 150N | 53W | 24 | Access Denied | Deep Testing/Monitoring Recommended |
| | | 52W | 19 | | |
| | | 52W | 20 | | |
| Y | 150N | 52W | 21 | Access Granted | Deep Testing/Monitoring Recommended |

Areas of Avoidance

Areas of Avoidance include features that can not be assigned definitive cultural affiliation, such as stone piles and alignments (likely associated with Euro-American field clearing activities), depressions, and earthen formations (such as earthen berms or field clearing piles) (Table 7).

These areas were identified in the field and assigned feature numbers, however, these areas are not considered archaeological sites and will not receive an official North Dakota State Site number. Although cultural affiliation can not be determined, it is HDR's opinion that these areas should be avoided by construction activities.

In addition to individual features listed as Areas of Avoidance, one landform is recommended for avoidance. The landform includes a prominent butte covered with hundreds of stones of various shapes and sizes. During the pedestrian survey, the butte was visited and inspected, and no clear cultural features (stone circles, stone effigies, etc.) were identified. However, without the guidance of a Tribal monitor it is possible that features more abstract in nature may have been overlooked. These features may include stone alignments in the pattern of constellations and/or features aligned with solar and lunar patterns (Harty, et al. 2010). Without Tribal guidance and the assistance of a Tribal monitor, these features are extremely difficult to recognize and may be dismissed as a scatter of stones lacking a cultural connection.

The nature of the landform also suggests that cultural features are likely present. Archaeological sites, specifically those containing stone features, are commonly recorded on prominent landforms such as hilltops and ridgelines. This is demonstrated by Butte Michaud, approximately 0.50 miles to the northeast. The butte is a dominating landform with two previously recorded precontact archaeological sites encompassing the top of the butte and seven additional sites in close proximity. Due to the nature of this area, HDR recommends the avoidance of the butte top. If the butte can not be avoided, HDR recommends Tribal consultation to determine the appropriate course of action.

Table 7: Areas of Avoidance

| Survey Segment | Township | Range | Section | Feature Type | Recommendations |
|-----------------|----------|-------|---------|---------------------------------|-----------------|
| Laydown Area A1 | 142N | 83W | 33 | Rock Pile | Avoidance |
| B | 142N | 82W | 32 | Rock Pile | Avoidance |
| B | 142N | 82W | 32 | Trash Pile (Metal and Concrete) | Avoidance |
| D | 142N | 82W | 35 | Rock Pile | Avoidance |
| D | 142N | 82W | 25 | Rock Pile | Avoidance |
| D | 142N | 82W | 25 | Rock Pile | Avoidance |
| D | 142N | 82W | 25 | Rock Pile | Avoidance |
| D | 142N | 82W | 25 | Rock Pile | Avoidance |
| D | 142N | 82W | 25 | Rock Piles | Avoidance |
| D | 142N | 81W | 25 | Dirt Mound | Avoidance |
| D | 142N | 81W | 30 | Rock Pile | Avoidance |
| D | 142N | 81W | 30 | Rock Pile | Avoidance |
| D | 142N | 81W | 30 | Rock Pile | Avoidance |

Center to Grand Forks Transmission Line
Class III Intensive Archaeological Resources Inventory

| Survey Segment | Township | Range | Section | Feature Type | Recommendations |
|-----------------|----------|-------|---------|--------------|-----------------|
| DD | 142N | 80W | 19 | Rock Pile | Avoidance |
| DD | 142N | 80W | 19 | Rock Pile | Avoidance |
| DD | 142N | 80W | 18 | Rock Pile | Avoidance |
| DD | 142N | 80W | 18 | Rock Pile | Avoidance |
| K | 144N | 79W | 6 | Rock Pile | Avoidance |
| K | 144N | 79W | 6 | Rock Pile | Avoidance |
| Laydown Area B3 | 145N | 79W | 34 | Rock Pile | Avoidance |
| L | 146N | 78W | 8 | Depression | Avoidance |
| JJ | 147N | 78W | 34 | Rock Pile | Avoidance |
| KK3 | 147N | 77W | 8 | Rock Pile | Avoidance |
| KK3 | 147N | 77W | 8 | Rock Pile | Avoidance |
| KK3 | 147N | 77W | 8 | Rock Pile | Avoidance |
| KK3 | 147N | 77W | 8 | Rock Pile | Avoidance |
| OO | 147N | 73W | 11 | Rock Pile | Avoidance |
| OO | 147N | 73W | 11 | Rock Pile | Avoidance |
| OO | 147N | 73W | 11 | Rock Pile | Avoidance |
| OO | 147N | 73W | 11 | Rock Pile | Avoidance |
| TT3 | 148N | 63W | 34 | Rock Pile | Avoidance |
| TT3 | 148N | 63W | 34 | Rock Pile | Avoidance |
| VV | 147N | 63W | 14 | Rock Pile | Avoidance |
| YY | 147N | 61W | 3 | Rock Pile | Avoidance |
| YY | 147N | 61W | 3 | Rock Pile | Avoidance |

| Survey Segment | Township | Range | Section | Feature Type | Recommendations |
|----------------|----------|-------|---------|--|--------------------------------------|
| YY | 147N | 61W | 3 | Rock Pile | Avoidance |
| Q | 147N | 60W | 4 | Rock Pile | Avoidance |
| AAA | 147N | 59W | 3 | Rock Pile | Avoidance |
| S1 | 147N | 59W | 2 | Butte Top/Possible Precontact Stone Features | Avoidance and/or Tribal Consultation |

Conclusions and Recommendations

This report is provided to RUS to assist with its responsibilities for compliance with Section 106 of the NHPA, as amended (36 CFR 800).

Minnkota proposes to build an approximately 248-mile-long 345 kV Transmission Line from the Center 345 kV Substation, near Center, North Dakota, to the Prairie Substation, located just west of Grand Forks, North Dakota. As RUS deemed a 100 percent survey unnecessary, HDR developed and implemented a predictive model to guide the survey. The corridor was divided into areas of high, moderate, and low potential for the presence of archaeological materials or sites. Various percentages of these zones were then subjected to subsurface and surface survey, resulting in 80 linear miles (1,700 acres) of the total corridor receiving intensive survey to date. HDR undertook a Class III archaeological inventory of a proposed 150-ft wide ROW for the project (where construction would take place) within a 1,000-ft APE (permitted corridor). The survey took place from fall 2010 to summer 2011.

The State Plan for archaeology divides the state into several Cultural Study Units. Probability for sites to occur within the study units does not appear to be equal. More sites have been found and more surveys have occurred in Study Units in the western part of the state than in the east, and the same is true for areas of the Project.

Areas adjacent to the major rivers that the Project corridor crosses, where there is potential for archaeological sites to be deeply buried, were not tested under this survey strategy because of the difficulty in obtaining landowner permissions to do so, and because of constraints relating to construction. These areas will be monitored during construction, as per stipulations of a Programmatic Agreement for the project.

Minnkota agreed to survey the high probability areas identified by the model. Not all of these areas were available for survey, nor was it reasonable to survey 100 percent as there were numerous outlier parcels. However, areas where the model indicated clusters of high probability parcels were surveyed. Additional survey will be done once access is granted to high probability parcels where access was denied, and those results will be presented in a supplemental report.

As expected and predicted by the model, and as suggested by the State Plan, Native American heritage sites were most often found in study units known to have a high percentage of sites, on hilltops that had commanding views of the region, or on elevated areas adjacent to water features. The Class III inventory resulted in the identification of 25 previously unrecorded cultural resources including 17 precontact sites, seven historic sites, and one multi-component site. Of the 25 previously unrecorded sites, four are

isolated finds and are considered not eligible for listing on the NRHP (32BL720, 32BLX288, 32BLX287, and 32MLX767). The remaining 21 sites have not been evaluated for the NRHP and further work would be needed to determine their eligibility.

HDR recommends all recorded sites within the ROW be avoided during construction activities (Table 8). If avoidance is not possible, HDR recommends that the sites be formally evaluated to determine their eligibility status. Those found eligible should be reviewed for adverse effects. If adverse effects are identified, strategies should be developed by the appropriate parties (the applicant, RUS, SHPO, and other interested parties if necessary), to resolve those effects. Such strategies may include avoidance, data recovery, or other mitigation to be determined.

Table 8: National Register Status of Sites within ROW

| Site Number | Field Number | Site Type | Project Recommendations | NRHP Recommendations |
|-------------|--------------|--|--|----------------------|
| 32OL641 | CGF-B-1 | Precontact Stone Features and Artifact Scatter | Site within south part of ROW, construction access will have to avoid site | Unevaluated |
| 32OL642 | CGF-C-1 | Precontact Stone Features and Artifact Scatter | Site across entire ROW, construction access will have to avoid by going beyond ROW | Unevaluated |
| 32BL720 | CGF-F-2 | Precontact Isolated Find | Site within ROW, construction access will have to avoid site | Not Eligible |
| 32ML1238 | CGF-G-1 | Precontact Stone Features and Artifact Scatter | Site across entire ROW, construction access will have to avoid | Unevaluated |
| 32ML1239 | CGF-G-2 | Precontact Stone Feature | Site on edge of ROW, construction access will have to avoid site | Unevaluated |
| 32BLx288 | CGF-K-1 | Precontact Isolated Find | Site within ROW, construction access will have to avoid site | Not Eligible |
| 32SH268 | CGF-L-1 | Precontact Stone Features | Site within ROW, construction access will have to avoid site | Unevaluated |
| 32SH270 | CGF-N-1 | Precontact Stone Features | Site across entire ROW, construction access will have to avoid by going beyond ROW | Unevaluated |
| 32SH271 | CGF-N-2 | Precontact Stone Features | Site across entire ROW, construction access will have to avoid by going beyond ROW | Unevaluated |
| 32BLx287 | CGF-DD-1 | Precontact Isolated Find | Site on edge of ROW, construction access will have to avoid site | Not Eligible |
| 32BL718 | CGF-DD8-1 | Precontact Lithic Scatter | Site across entire ROW, construction access will have to avoid | Unevaluated |
| 32MLx767 | CGF-EE-1 | Precontact Isolated Find | Site within ROW, construction access will have to avoid site | Not Eligible |
| 32MLx768 | CGF-EE-2 | Precontact Lithic Scatter | Site across entire ROW, construction access will have to avoid by going beyond ROW | Unevaluated |

Center to Grand Forks Transmission Line
 Class III Intensive Archaeological Resources Inventory

| Site Number | Field Number | Site Type | Project Recommendations | NRHP Recommendations |
|--------------------|--------------|---|--|----------------------|
| 32ML1237 | CGF-EE-3 | Precontact Lithic Scatter | Site across entire ROW, construction access will have to avoid by going beyond ROW | Unevaluated |
| 32MJ1240 | CGF-HH-1 | Precontact Stone Features | Site nearly across entire ROW, construction access may have to avoid by going beyond ROW | Unevaluated |
| 32GG180 | CGF-R2-1 | Historic Depression and Artifact Scatter | Site across entire ROW, construction access will have to avoid by going beyond ROW 32GG180 | Unevaluated |
| 32GF3552 | CGF-Y-1 | Historic Depressions and Artifact Scatter | Site extends into ROW, construction access will have to avoid site | Unevaluated |
| Site lead 32BLx146 | | at least 20 stone circles | Site extends into ROW, but no stone features observed | Unevaluated |
| Site 32GF120 | | Historic Depressions and Artifact Scatter | Site extends into ROW | Unevaluated |
| Site lead 32GFx24 | | cultural material scatter and mound | Site lead extends into ROW, but no artifacts observed, overlaps with 32GF3552 | Unevaluated |
| Site lead 32GGx117 | | precontact mound | Site boundary extends into ROW, consult to verify boundary | Unevaluated |
| Site 32OL388 | | one historic depression | Site extends into ROW | Unevaluated |
| Site lead 32SHx12 | | mound of unknown cultural affiliation | Site extends into ROW | Unevaluated |
| Site lead 32SHx88 | | nine precontact stone features | Site boundary extends into ROW, but features only within 1000' | Unevaluated |
| Site lead 32WEx38 | | Stavenger Lutheran Church historic site | site lead boundaries are within the ROW | Unevaluated |

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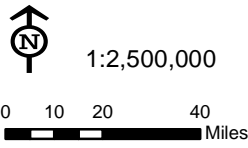
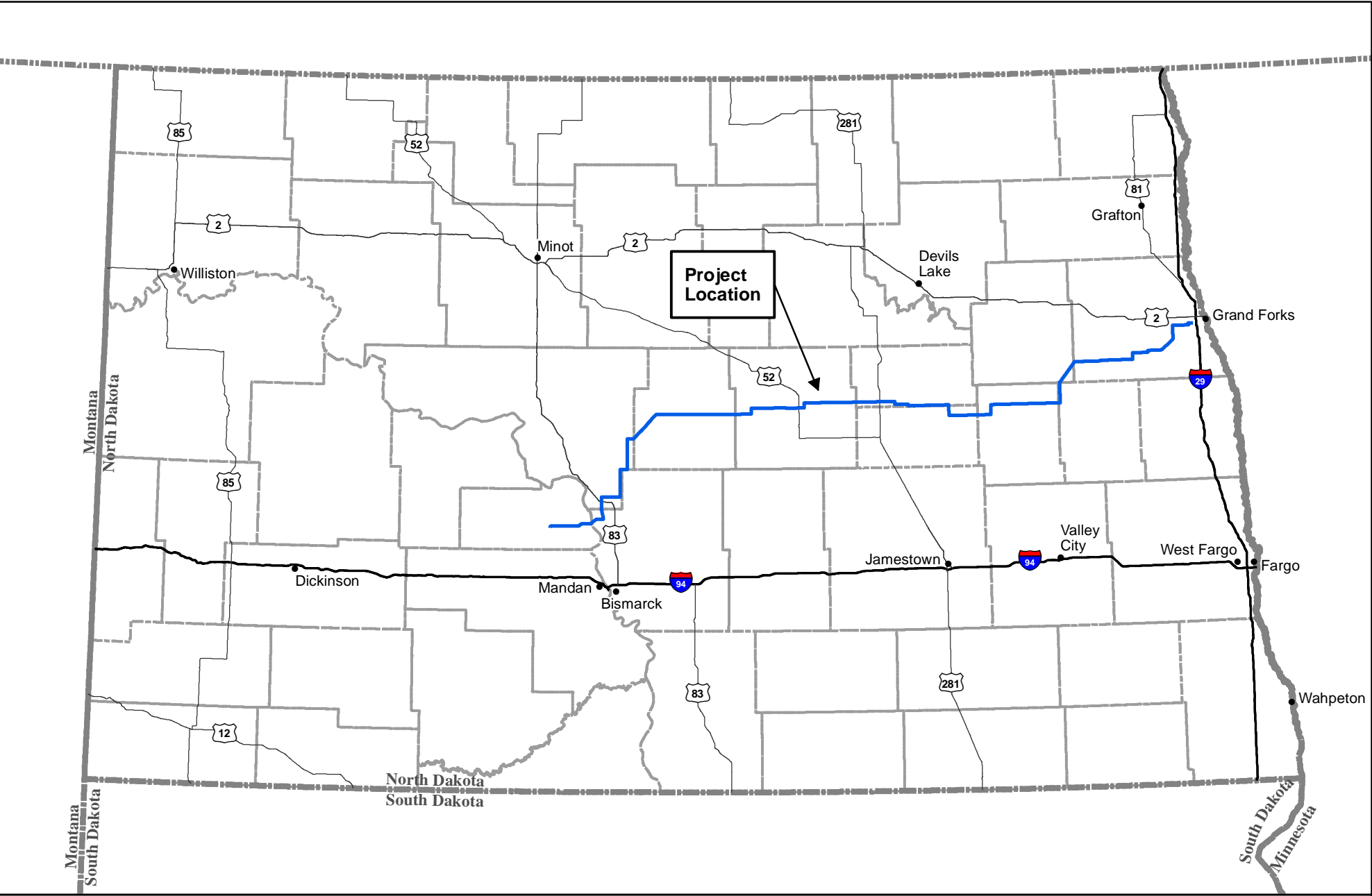
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Appendix A: Figures

**Figures 5a & b through 29a & b
(Alternating Topographical and Aerial Views)**

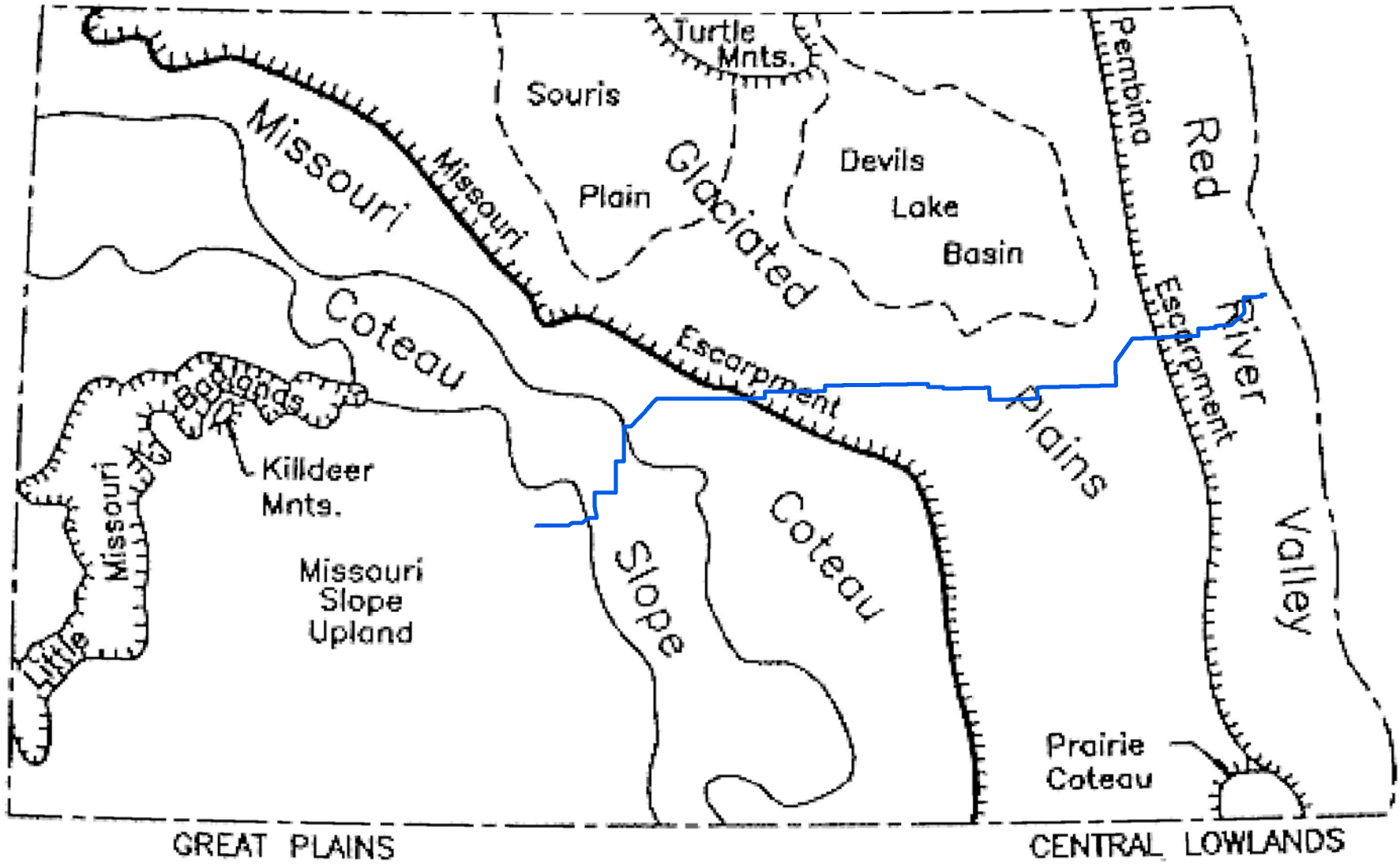
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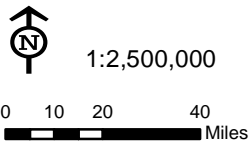
— Project Corridor

Figure 1
 Project Location
 Center to Grand Forks Project
 Minnkota Power Cooperative, Inc.

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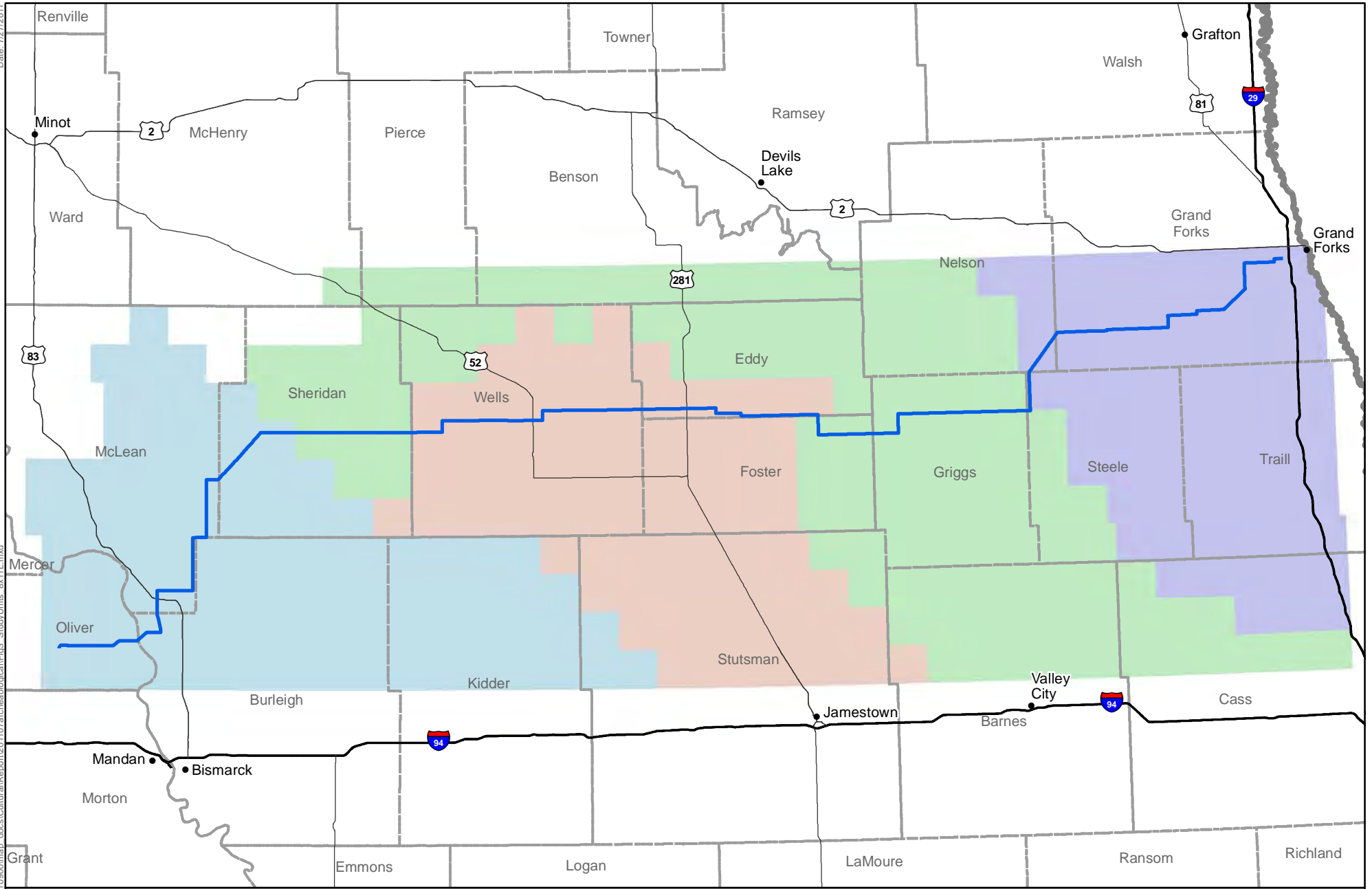
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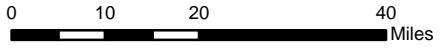
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Figure 2
Physiographic Provinces
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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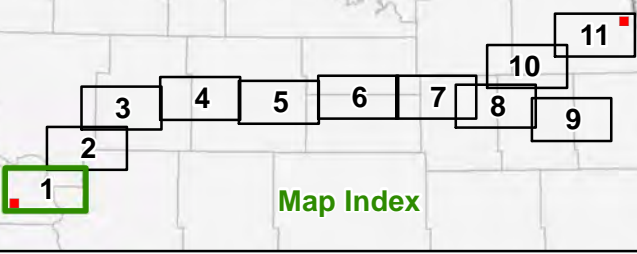
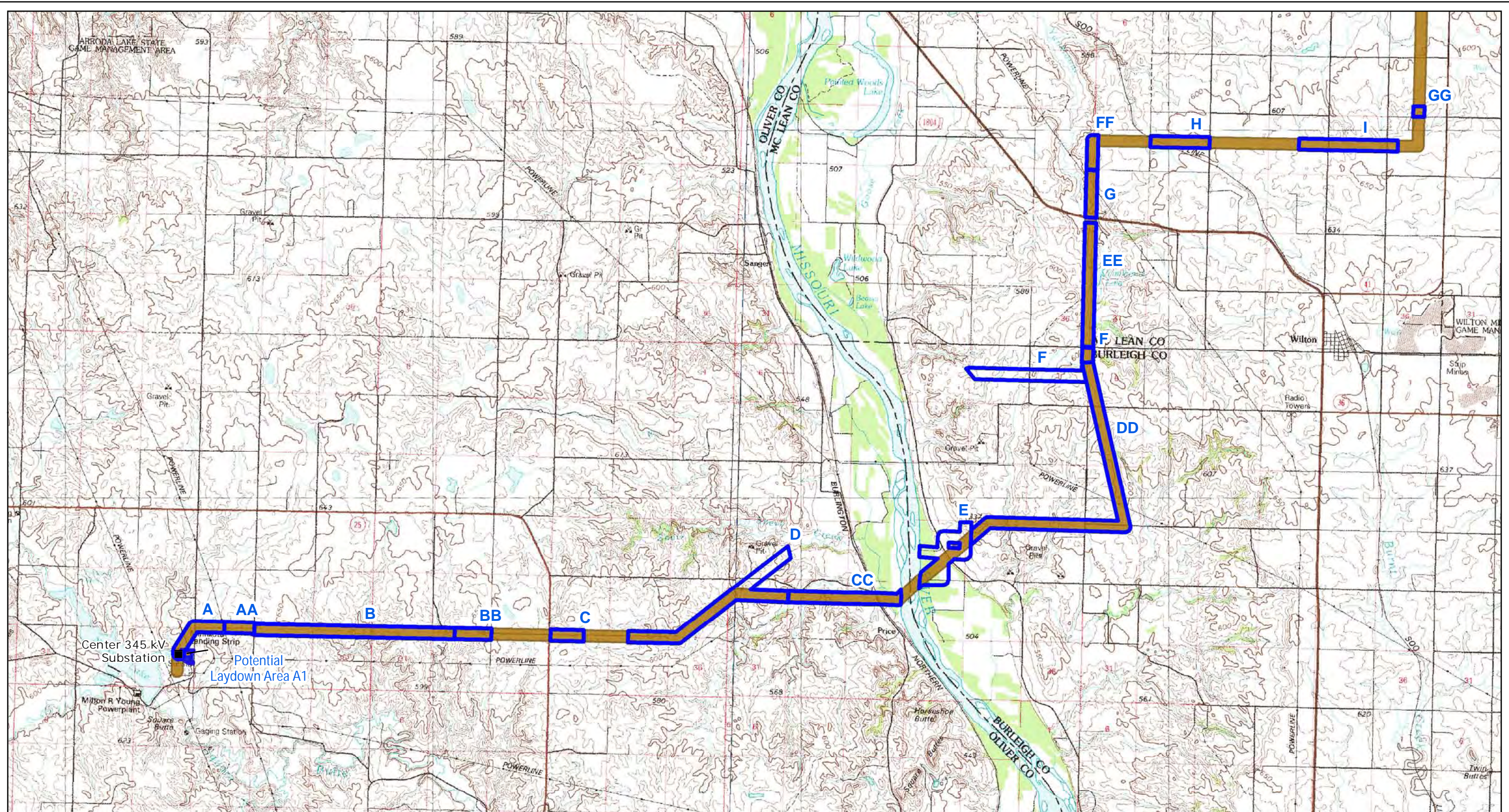
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- Project Corridor
- Cultural Context Units
 - James River
 - Northern Red River
 - Sheyenne River
 - Southern Missouri River

Figure 3
Study Units
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

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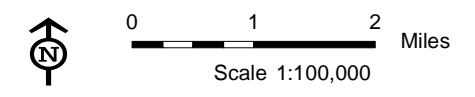
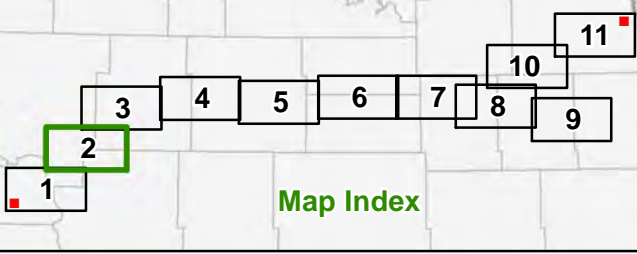
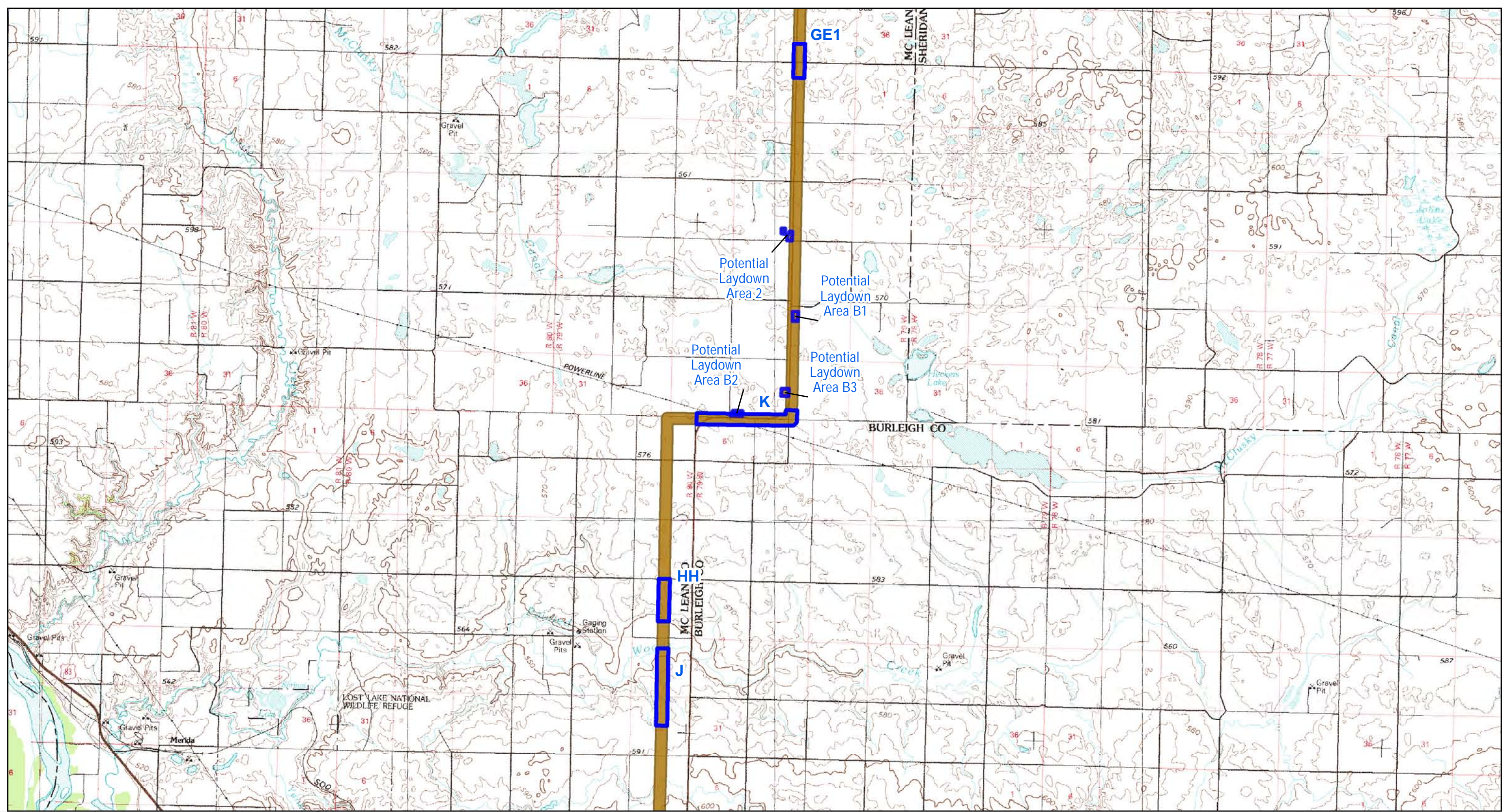
-  Project APE
-  Survey Segment

Figure 4: Page 1 of 11
Area of Potential Effects and Survey Segments
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.





- Project APE
- Survey Segment

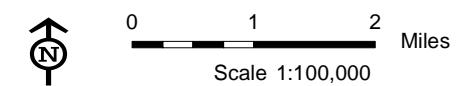
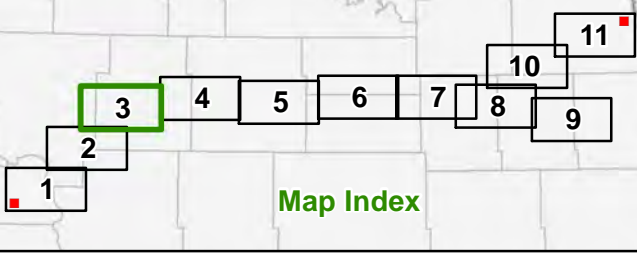
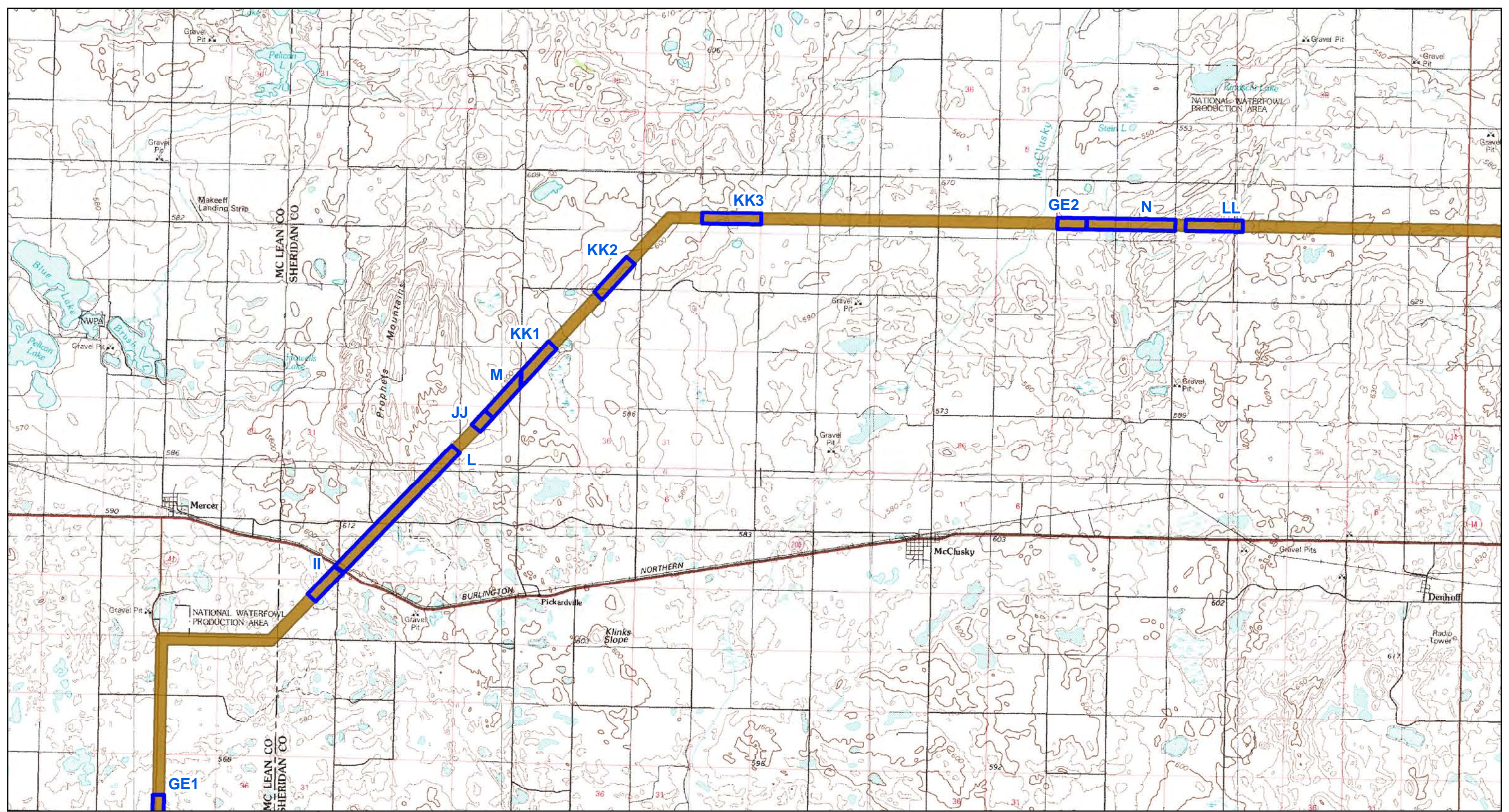


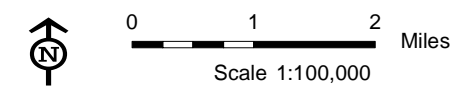
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 Area of Potential Effects and Survey Segments
 Center to Grand Forks Project
 Minnkota Power Cooperative, Inc.

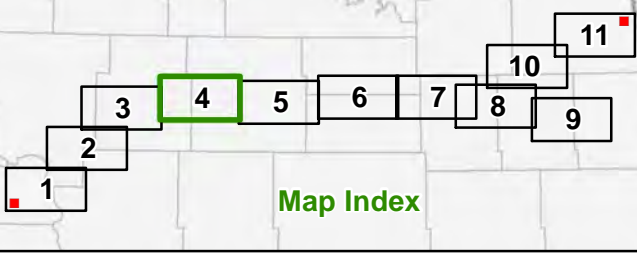
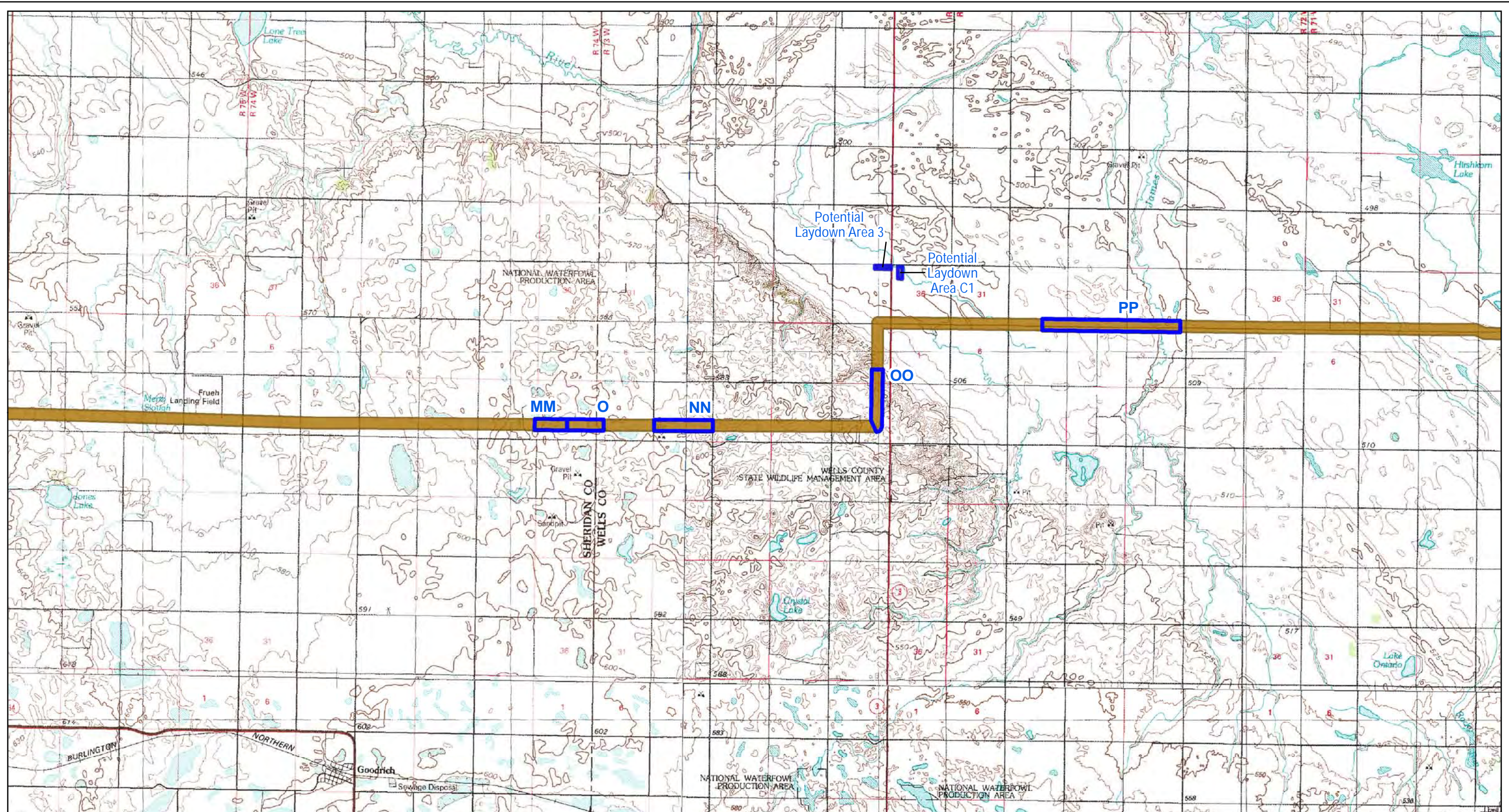
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Project APE
 Survey Segment

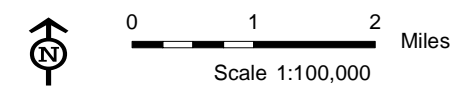
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 Area of Potential Effects and Survey Segments
 Center to Grand Forks Project
 Minnkota Power Cooperative, Inc.



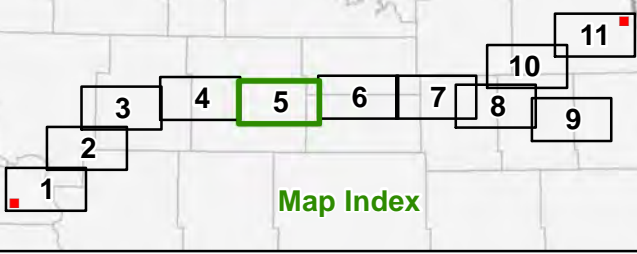
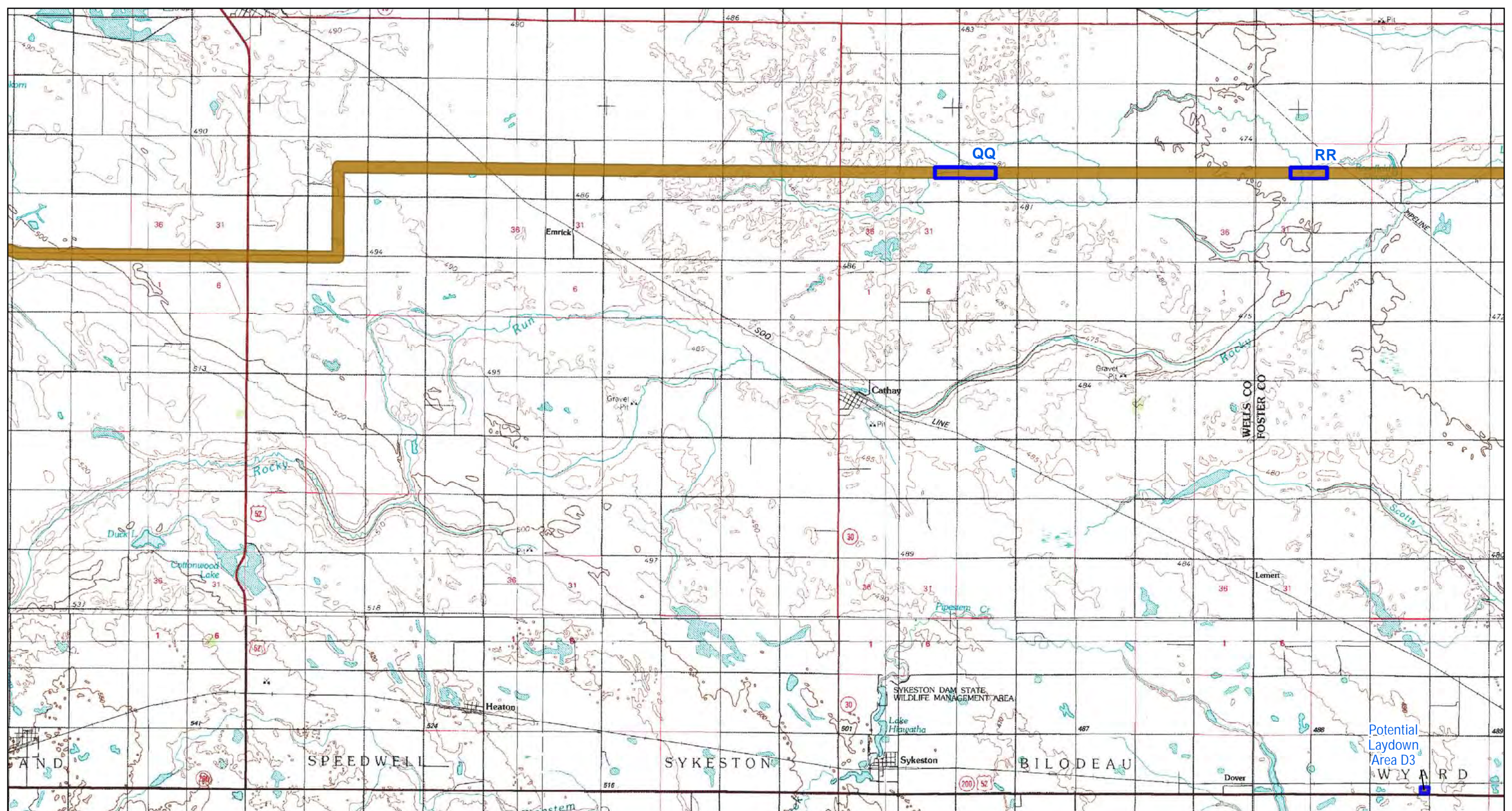


- Project APE
- Survey Segment

Figure 4: Page 4 of 11
 Area of Potential Effects and Survey Segments
 Center to Grand Forks Project
 Minnkota Power Cooperative, Inc.



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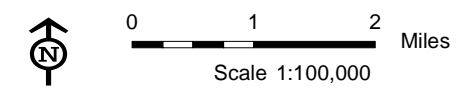
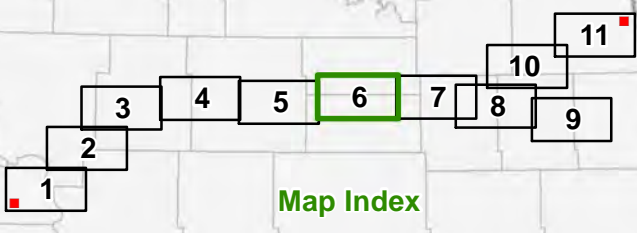
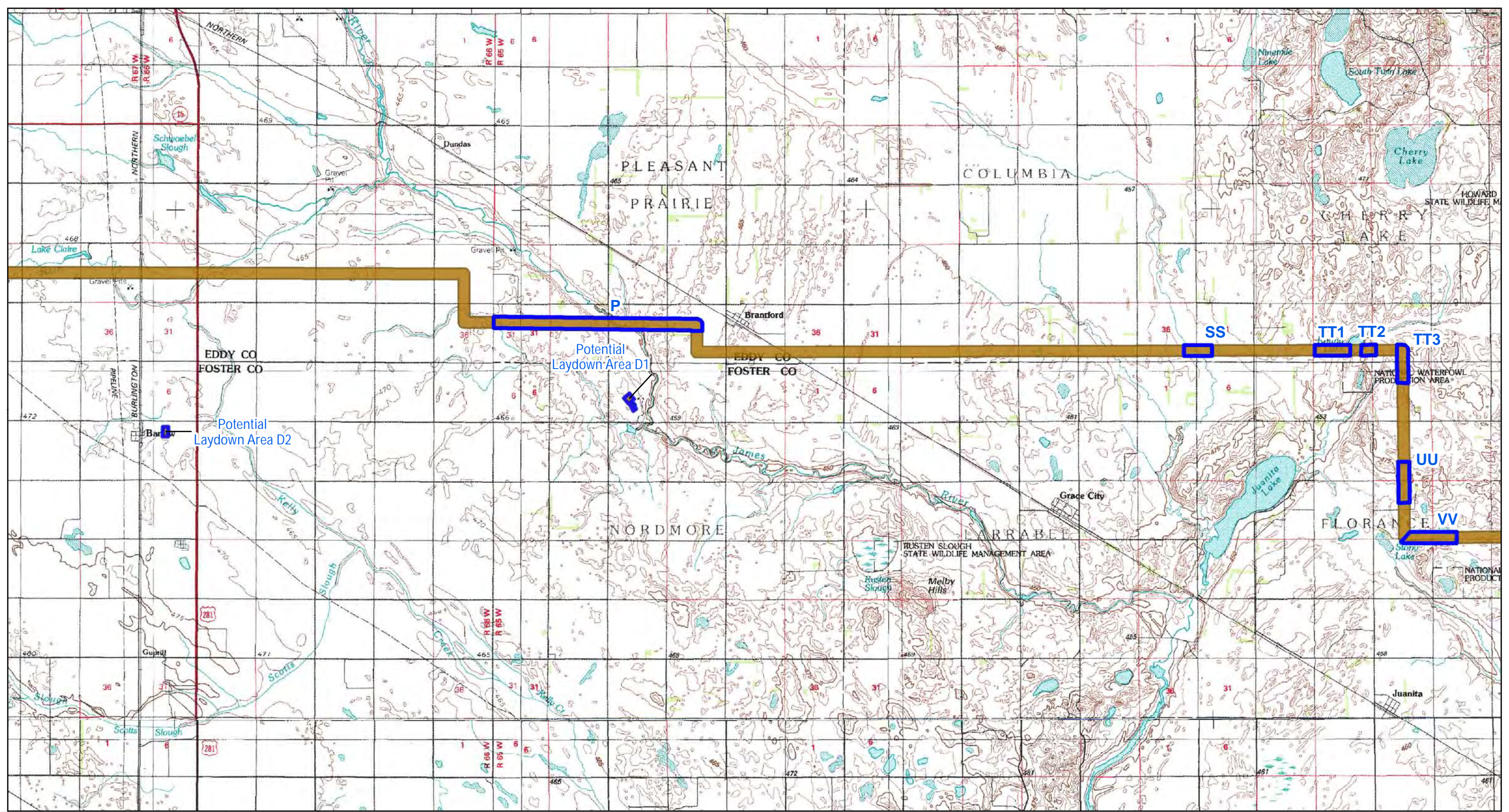
-  Project APE
-  Survey Segment

Figure 4: Page 5 of 11
Area of Potential Effects and Survey Segments
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.



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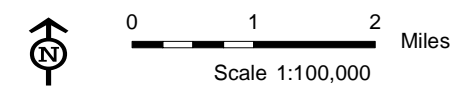
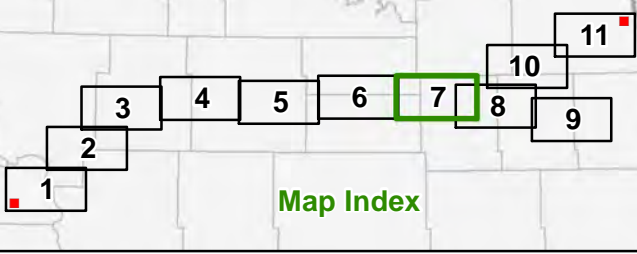
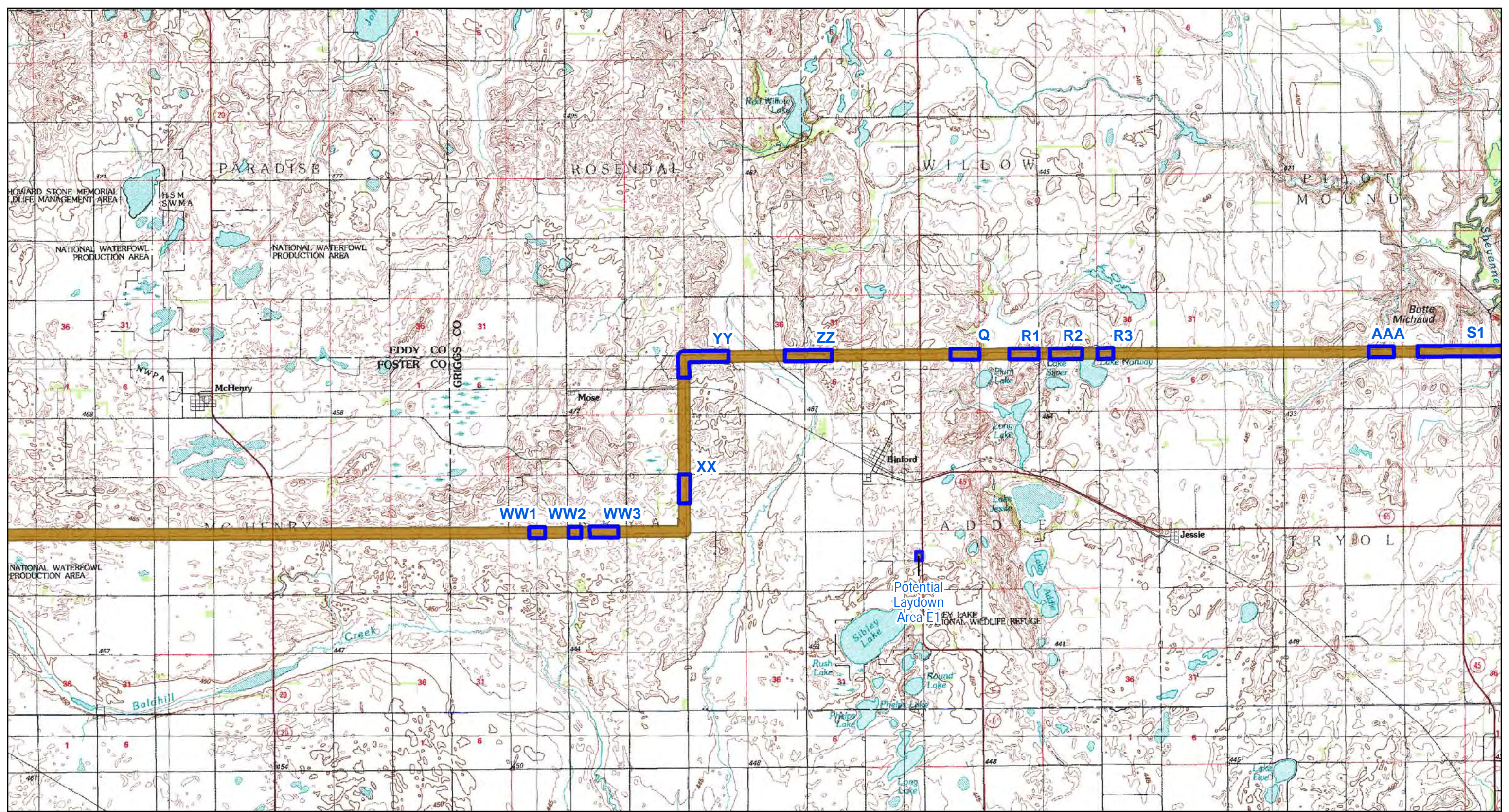
-  Project APE
-  Survey Segment

Figure 4: Page 6 of 11
Area of Potential Effects and Survey Segments
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

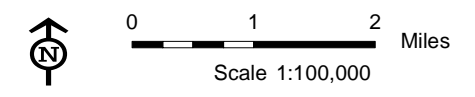


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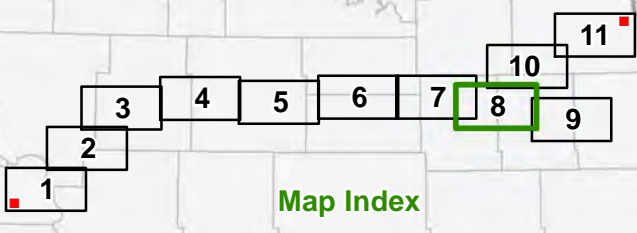
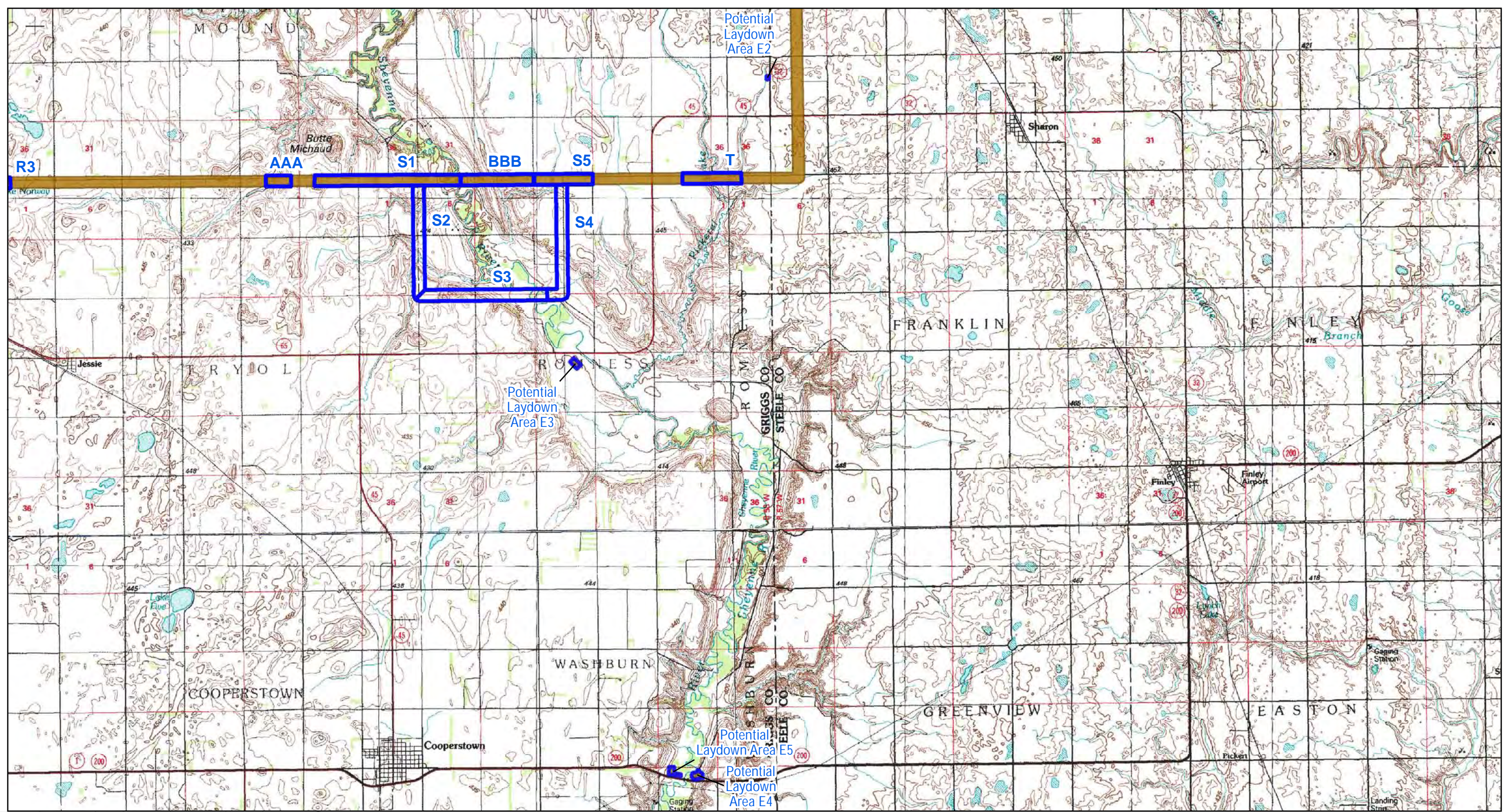




- Project APE
- Survey Segment

Figure 4: Page 7 of 11
 Area of Potential Effects and Survey Segments
 Center to Grand Forks Project
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-  Project APE
-  Survey Segment

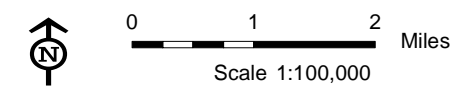
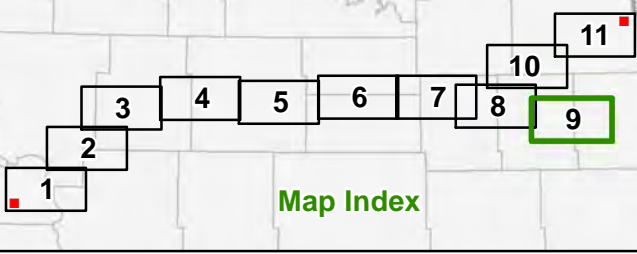
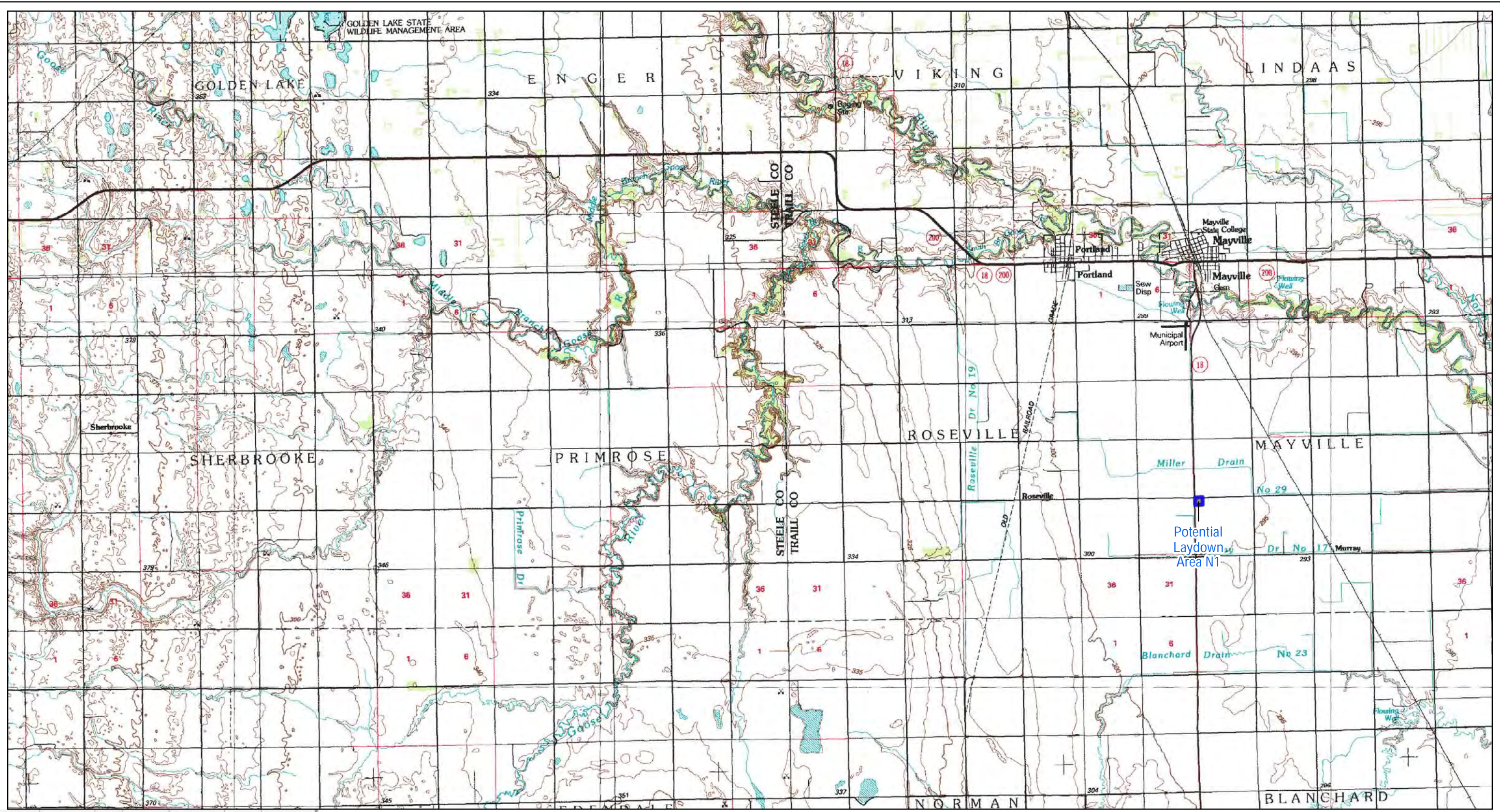


Figure 4: Page 8 of 11
Area of Potential Effects and Survey Segments
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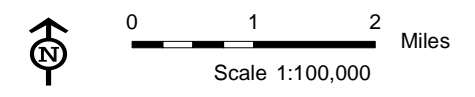
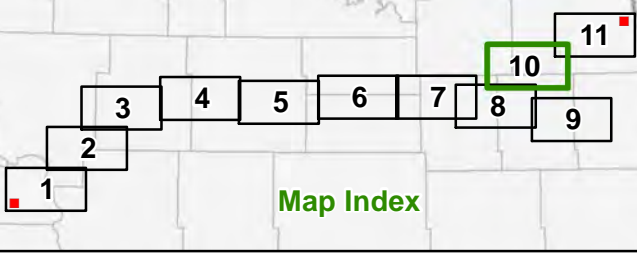
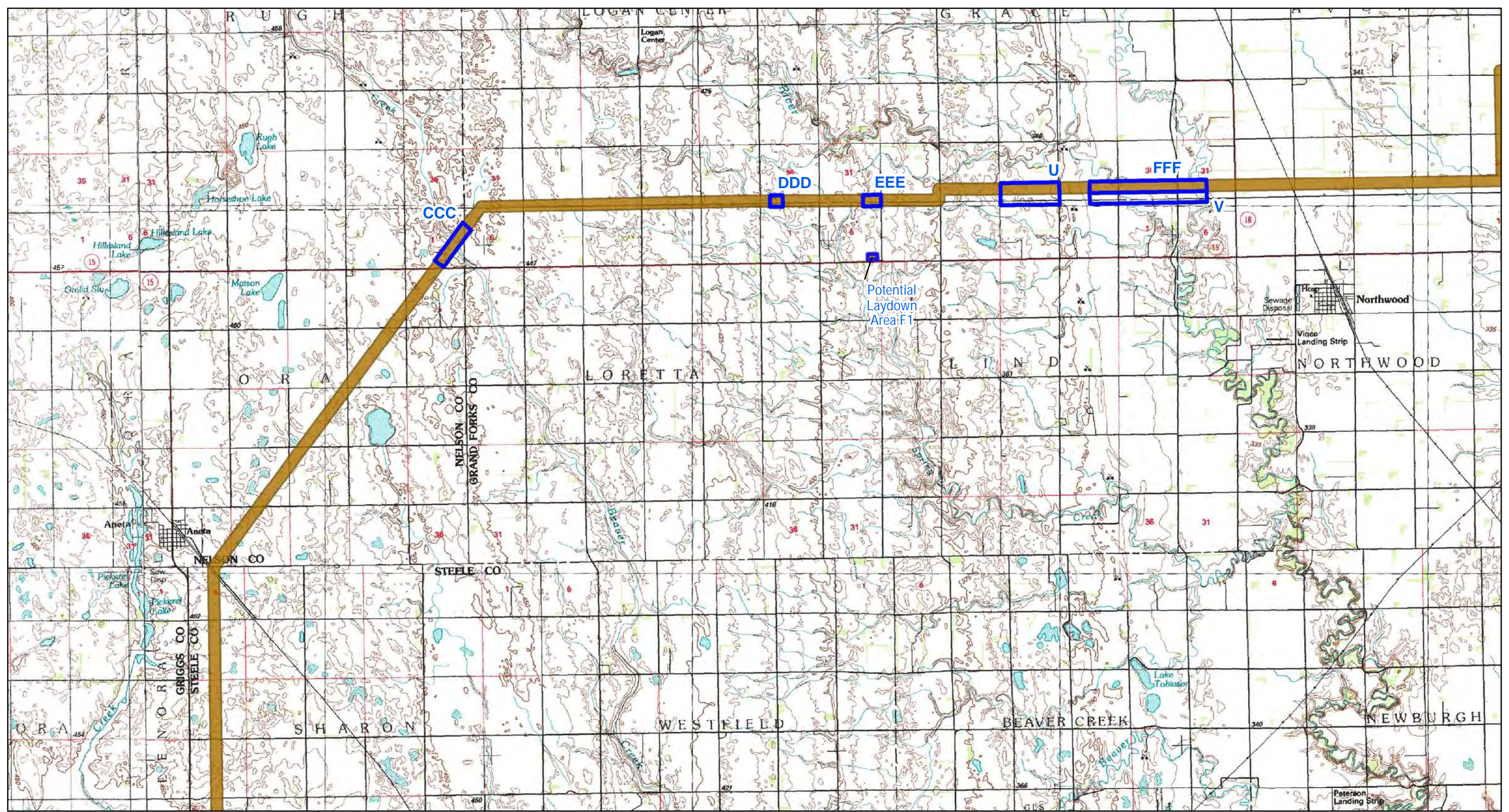
-  Project APE
-  Survey Segment

Figure 4: Page 9 of 11
Area of Potential Effects and Survey Segments
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.



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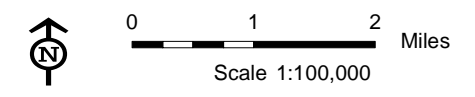
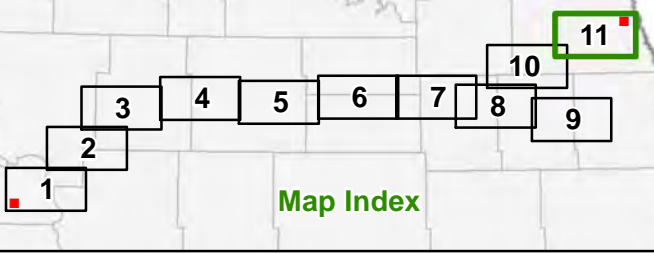
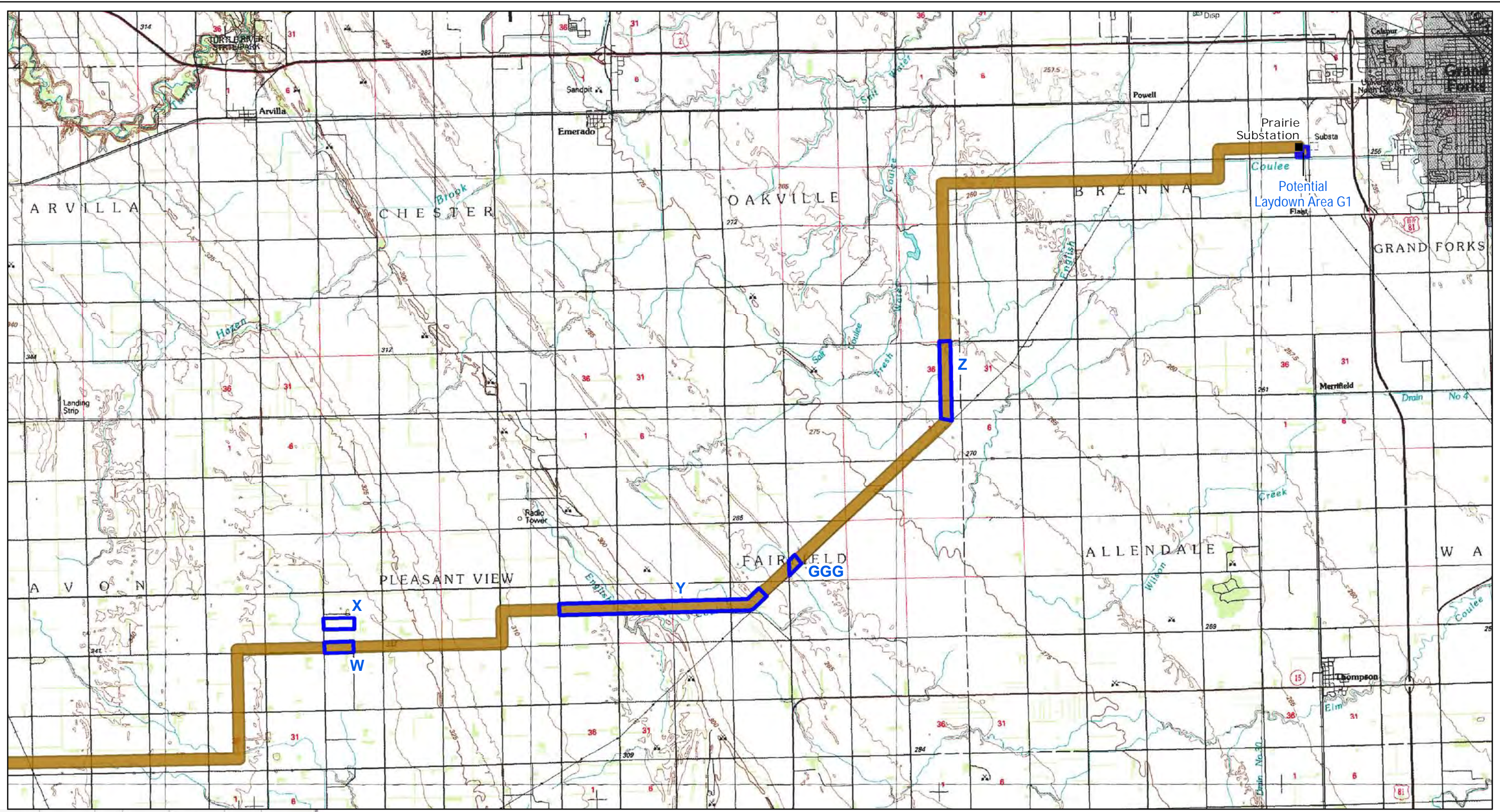
-  Project APE
-  Survey Segment

Figure 4: Page 10 of 11
Area of Potential Effects and Survey Segments
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.



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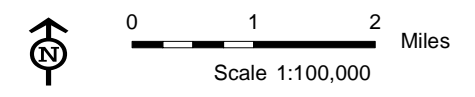
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-  Survey Segment

Figure 4: Page 11 of 11
Area of Potential Effects and Survey Segments
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.



Appendix B: Shovel Test Soil Profiles

Shovel Test Soil Profiles

| Location | ST # | Negative/Positive | Final Depth | Soil | Soil Color | Soil Texture | Date | Excavators | Comments |
|----------|------|-------------------|-------------|--|--|--|------------|----------------|--|
| B-1 | 1 | Negative | 36cm | 10YR 3/2, 21cm; 10YR 4/3, 36cm | Very Dark Grayish Brown, Brown | silt loam with gravel | 11/1/2010 | MG, JD, RJ, EE | ~30m S of fenceline |
| B-1 | 2 | Negative | 36cm | 10YR 3/2, 27cm; 10YR 4/3, 36cm | Very Dark Grayish Brown, Brown | sand loam with heavy gravel; silt loam | 11/1/2010 | MG, JD, RJ, EE | 15m W of ST1 |
| B-1 | 3 | Negative | 30cm | 10YR 3/2, 18cm; 10YR 4/3, 30cm | Very Dark Grayish Brown, Brown | silt loam with gravel and cobbles | 11/1/2010 | MG, JD, RJ, EE | ~45m W of ST2 |
| B-1 | 4 | Negative | 45cm | 10YR 3/2, 34cm; 10YR 4/3, 45cm | Very Dark Grayish Brown, Brown | silt loam | 11/1/2010 | MG, JD, RJ, EE | 15m W of ST3 |
| B-1 | 5 | Negative | 33cm | 10YR 3/2, 10cm; 10YR 4/2, 18cm; 10YR 4/3, 33cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam; silt loam with gravel; silt loam with gravel and cobble | 11/1/2010 | MG, JD, RJ, EE | ~180m W of ST4 |
| B-1 | 6 | Negative | 58cm | 10YR 3/2, 23cm; 10YR 4/3, 58cm | Very Dark Grayish Brown, Brown | sand loam | 11/1/2010 | MG, JD, RJ, EE | 15m W of ST5 |
| B-1 | 7 | Negative | 33cm | 10YR 3/2, 12cm; 10YR 4/2, 24cm; 10YR 4/3, 33cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam; silt loam with gravel; silt loam with gravel | 11/1/2010 | MG, JD, RJ, EE | ~60m W of ST6 |
| B-1 | 8 | Negative | 49cm | 10YR 3/2, 40cm; 10YR 4/3, 49cm | Very Dark Grayish Brown, Brown | silt loam | 11/1/2010 | MG, JD, RJ, EE | 15m W of ST7 |
| B-1 | 9 | Negative | 32cm | 10YR 3/2, 19cm; 10YR 4/3, 32cm | Very Dark Grayish Brown, Brown | silt loam; silt loam with gravel | 11/1/2010 | MG, JD, RJ, EE | ~130m W of ST8 |
| B-1 | 10 | Negative | 39cm | 10YR 3/2, 18cm; 10YR 4/2, 30cm; 10YR 4/3, 39cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam; silt loam; silt loam with gravel | 11/1/2010 | MG, JD, RJ, EE | 15m W of ST9 |
| B-2 | 1 | Negative | 42cm | 10YR 3/2, 27cm; 10YR 4/3, 42cm | Very Dark Grayish Brown, Brown | silt loam; silt loam with large cobbles | 11/1/2010 | MG, JD, RJ, EE | ~25m S of fenceline |
| B-2 | 2 | Negative | 44cm | 10YR 3/2, 27cm; 10YR 4/3, 44cm | Very Dark Grayish Brown, Brown | silt loam | 11/1/2010 | MG, JD, RJ, EE | 15m W of ST1 |
| B-2 | 3 | Negative | 54cm | 10YR 3/2, 21cm; 10YR 4/2, 36cm; 10YR 4/3, 54cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/1/2010 | MG, JD, RJ, EE | 15m W of ST2 |
| B-2 | 4 | Negative | 50cm | 10YR 3/2, 16cm; 10YR 4/3, 50cm | Very Dark Grayish Brown, Brown | silt loam; silt loam clay | 11/1/2010 | MG, JD, RJ, EE | 15m W of ST3 |
| B-2 | 5 | Negative | 54cm | 10YR 3/2, 27cm; 10YR 4/3, 45cm; 10YR 4/2, 54cm | Very Dark Grayish Brown, Brown, Dark Grayish Brown | silt loam | 11/1/2010 | MG, JD, RJ, EE | 15m W of ST4 |
| B-2 | 6 | Negative | 63cm | 10YR 3/2, 33cm; 10YR 4/3, 52cm; 10YR 4/2, 63cm | Very Dark Grayish Brown, Brown, Dark Grayish Brown | silt loam | 11/1/2010 | MG, JD, RJ, EE | 15m W of ST5 |
| B-2 | 7 | Negative | 52cm | 10YR 3/2, 15cm; 10YR 4/2, 38cm; 10YR 4/3, 52cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/1/2010 | MG, JD, RJ, EE | 15m W of ST6 |
| B-2 | 8 | Negative | 50cm | 10YR 3/2, 29cm; 10YR 4/3, 38cm; 10YR 4/2, 50cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/1/2010 | MG, JD, RJ, EE | 15m W of ST7 |
| B-2 | 9 | Negative | 51cm | 10YR 3/2, 18cm; 10YR 4/2, 39cm; 10YR 4/3, 51cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/1/2010 | MG, JD, RJ, EE | 35m W of ST8 |
| B-2 | 10 | Negative | 40cm | 10YR 3/2, 26cm; 10YR 4/3, 40cm | Very Dark Grayish Brown, Brown | silt loam and gravel; silt loam | 11/1/2010 | MG, JD, RJ, EE | 15m W of ST9 |
| B-2 | 11 | Negative | 33cm | 10YR 3/2, 13cm; 10YR 4/2, 18cm; 10YR 4/3, 33cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with heavy gravel throughout and cobbles at base | 11/1/2010 | MG, JD, RJ, EE | 55m W of ST10 |
| B-2 | 12 | Negative | 39cm | 10YR 3/2, 26cm; 10YR 4/3, 39cm | Very Dark Grayish Brown, Brown | silt loam; sand loam and gravel | 11/1/2010 | MG, JD, RJ, EE | 15m W of ST11 |
| B-2 | 13 | Negative | 30cm | 10YR 3/2, 18cm; 10YR 4/3, 30cm | Very Dark Grayish Brown, Brown | silt loam with gravel | 11/1/2010 | MG, JD, RJ, EE | 15m W of ST12 |
| B-3 | 1 | Negative | 36cm | 10YR 3/2, 21cm; 10YR 4/3, 36cm | Very Dark Grayish Brown, Brown | silty loam | 10/31/2010 | MG, JD, RJ, EE | 20m S of fenceline |
| B-3 | 2 | Negative | 40cm | 10YR 3/2, 28cm; 10YR 4/3, 40cm | Very Dark Grayish Brown, Brown | silty loam | 10/31/2010 | MG, JD, RJ, EE | 15m W of ST1 |
| B-3 | 3 | Negative | 38cm | 10YR 3/2, 21cm; 10YR 4/3, 38cm | Very Dark Grayish Brown, Brown | silt loam; silt loam with heavy gravel | 10/31/2010 | MG, JD, RJ, EE | 15m W of ST2 |
| B-3 | 4 | Negative | 42cm | 10YR 3/2, 23cm; 10YR 4/2, 42cm | Very Dark Grayish Brown, Brown | silt loam and clay loam | 10/31/2010 | MG, JD, RJ, EE | 15m W of ST3 |
| B-3 | 5 | Negative | 39cm | 10YR 3/2, 21cm; 10YR 4/3, 39cm | Very Dark Grayish Brown, Brown | silt loam; silt loam with gravel | 10/31/2010 | MG, JD, RJ, EE | 15m W of ST4 |
| B-3 | 6 | Negative | 50cm | 10YR 3/2, 39cm; 10YR 4/3, 50cm | Very Dark Grayish Brown, Brown | silty loam | 10/31/2010 | MG, JD, RJ, EE | ~45m W of ST5 |
| B-3 | 7 | Negative | 37cm | 10YR 3/2, 24cm; 10YR 4/3, 37cm | Very Dark Grayish Brown, Brown | silt loam | 10/31/2010 | MG, JD, RJ, EE | 15m W of ST6 |
| B-3 | 8 | Negative | 36cm | 10YR 3/2, 27cm; 10YR 4/3, 36cm | Very Dark Grayish Brown, Brown | silt loam | 10/31/2010 | MG, JD, RJ, EE | 15m W of ST7 |
| B-4 | 1 | Negative | 36cm | 10YR 3/2, 18cm; 10YR 4/3, 36cm | Very Dark Grayish Brown, Brown | silty loam | 10/31/2010 | MG, JD, RJ, EE | ~20m W of creek |
| B-4 | 2 | Negative | 59cm | 10YR 3/2, 15cm; 10YR 4/2, 49cm; 10YR 4/3, 59cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silty loam | 10/31/2010 | MG, JD, RJ, EE | 15m W of ST1 |
| B-4 | 3 | Negative | 46cm | 10YR 3/2, 33cm; 10YR 4/3, 46cm | Very Dark Grayish Brown, Brown | silt loam with cobbles | 10/31/2010 | MG, JD, RJ, EE | 15m W of ST2 |
| B-4 | 4 | Negative | 53cm | 10YR 3/2, 16cm; 10YR 4/2, 44cm; 10YR 4/3, 53cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silty loam | 10/31/2010 | MG, JD, RJ, EE | 15m W of ST3 |
| B-4 | 5 | Negative | 37cm | 10YR 3/2, 24cm; 10YR 4/3 mottled with 10YR 3/2, 30cm; 10YR 4/3, 37cm | Very Dark Grayish Brown, Brown mottled with Very Dark Grayish Brown, Brown | silt loam; silt loam mottled with gravels; silt loam with heavy gravel and large cobbles | 10/31/2010 | MG, JD, RJ, EE | 15m W of ST4 |
| B-4 | 6 | Negative | 53cm | 10YR 3/2, 20cm; 10YR 4/2, 45cm; 10YR 4/3, 53cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silty loam with cobbles | 10/31/2010 | MG, JD, RJ, EE | 15m W of ST5 |
| B-4 | 7 | Negative | 54cm | 10YR 3/2, 42cm; 10YR 3/1, 54cm | Very Dark Grayish Brown, Very Dark Gray | clay loam | 10/31/2010 | MG, JD, RJ, EE | 15m W of ST6 |
| B-5 | 1 | Negative | 27cm | 10YR 3/2, 18cm; 10YR 4/3, 27cm | Very Dark Grayish Brown, Brown | silty clay loam; silty clay loam with gravel | 11/2/2010 | MG, JD, RJ, EE | ~7m S of fence |
| B-5 | 2 | Negative | 36cm | 10YR 3/2, 24cm; 10YR 4/3, 36cm | Very Dark Grayish Brown, Brown | silt clay loam | 11/2/2010 | MG, JD, RJ, EE | 15m E of ST1 |
| B-5 | 3 | Negative | 32cm | 10YR 3/2, 15cm; 10YR 4/3, 32cm | Very Dark Grayish Brown, Brown | silt clay loam; silt clay loam with gravel and cobbles | 11/2/2010 | MG, JD, RJ, EE | 15m E of ST2 |
| B-5 | 4 | Negative | 40cm | 10YR 3/2, 23cm; 10YR 4/3, 40cm | Very Dark Grayish Brown, Brown | silt loam; sandy loam with grand meadow chert (non cultural) | 11/2/2010 | MG, JD, RJ, EE | 15m E of ST3 |
| B-5 | 5 | Negative | 30cm | 10YR 3/2, 15cm; 10YR 4/3, 30cm | Very Dark Grayish Brown, Brown | silt clay loam | 11/2/2010 | MG, JD, RJ, EE | 15m E of ST4 |
| B-5 | 6 | Negative | 36cm | 10YR 3/2, 13cm; 10YR 4/3, 36cm | Very Dark Grayish Brown, Brown | silt loam with gravel | 11/2/2010 | MG, JD, RJ, EE | ~75m NE of ST5 |
| B-5 | 7 | Negative | 53cm | 10YR 3/2, 22cm; 10YR 4/3, 53cm | Very Dark Grayish Brown, Brown | silt clay loam | 11/2/2010 | MG, JD, RJ, EE | 15m E of ST6 |
| B-5 | 8 | Negative | 33cm | 10YR 3/2, 24cm; 10YR 4/3, 33cm | Very Dark Grayish Brown, Brown | silt loam; silt loam with very little gravel | 11/2/2010 | MG, JD, RJ, EE | 15m E of ST7 |
| B-6 | 1 | Negative | 36cm | 10YR 3/2, 21cm 10YR 4/3, 36cm | Very Dark Grayish Brown, Brown | silt loam with gravel | 11/2/2010 | MG, JD, RJ, EE | ~35m S of fenceline |
| B-6 | 2 | Negative | 27cm | 10YR 3/2, 18cm 10YR 4/3, 27cm | Very Dark Grayish Brown, Brown | silt loam | 11/2/2010 | MG, JD, RJ, EE | 15m E of ST1 |
| B-6 | 3 | Negative | 28cm | 10YR 3/2, 13cm 10YR 4/3, 28cm | Very Dark Grayish Brown, Brown | silt loam; silt loam with gravel | 11/2/2010 | MG, JD, RJ, EE | 15m E of ST2 |
| B-6 | 4 | Negative | 38cm | 10YR 3/2, 18cm 10YR 4/3, 38cm | Very Dark Grayish Brown, Brown | silt loam | 11/2/2010 | MG, JD, RJ, EE | 15m E of ST3 |
| B-6 | 5 | Negative | 27cm | 10YR 3/2, 12cm 10YR 4/3, 27cm | Very Dark Grayish Brown, Brown | silt loam; silt loam with gravel | 11/2/2010 | MG, JD, RJ, EE | 15m E of ST4 |
| B-6 | 6 | Negative | 43cm | 10YR 3/2, 26cm 10YR 4/3, 43cm | Very Dark Grayish Brown, Brown | silt loam | 11/2/2010 | MG, JD, RJ, EE | 15m E of ST5 |
| B-6 | 7 | Negative | 34cm | 10YR 3/2, 10cm 10YR 4/3, 34cm | Very Dark Grayish Brown, Brown | silt loam with gravel and cobbles | 11/2/2010 | MG, JD, RJ, EE | 15m E of ST6 |
| B-6 | 8 | Negative | 30cm | 10YR 3/2, 18cm 10YR 4/3, 30cm | Very Dark Grayish Brown, Brown | silt loam with gravel | 11/2/2010 | MG, JD, RJ, EE | 15 m E of ST7 |
| B-7 | 1 | Negative | 33cm | 10YR 3/2, 18cm 10YR 4/3, 33cm | Very Dark Grayish Brown, Brown | silt loam with gravel | 11/2/2010 | MG, JD, RJ, EE | ~35m south of fenceline |
| B-7 | 2 | Negative | 36cm | 10YR 3/2, 23cm 10YR 4/3, 36cm | Very Dark Grayish Brown, Brown | silt loam | 11/2/2010 | MG, JD, RJ, EE | 15m E of ST1 |
| B-7 | 3 | Negative | 37cm | 10YR 3/2, 21cm 10YR 4/3, 37cm | Very Dark Grayish Brown, Brown | silt loam with gravel and cobbles | 11/2/2010 | MG, JD, RJ, EE | 15m E of ST2 |
| B-7 | 4 | Positive | 40cm | 10YR 3/2, 20cm 10YR 4/3, 40cm | Very Dark Grayish Brown, Brown | silt loam | 11/2/2010 | MG, JD, RJ, EE | 1 secondary KRF flake in upper 20 cm; 15m E of ST3 |
| B-7 | 5 | Negative | 35cm | 10YR 3/2, 18cm 10YR 4/3, 35cm | Very Dark Grayish Brown, Brown | silt loam with gravel | 11/2/2010 | MG, JD, RJ, EE | 15m E of ST4 |
| B-7 | 6 | Negative | 37cm | 10YR 3/2, 18cm 10YR 4/3, 37cm | Very Dark Grayish Brown, Brown | silt loam with gravel | 11/2/2010 | MG, JD, RJ, EE | 15m E of ST5 |

Shovel Test Soil Profiles

| Location | ST # | Negative/Positive | Final Depth | Soil | Soil Color | Soil Texture | Date | Excavators | Comments |
|----------|------|-------------------|-------------|---|--|--|------------|----------------|--|
| B-7 | 7 | Positive | 35cm | 10YR 3/2, 15cm 10YR 4/3, 35cm | Very Dark Grayish Brown, Brown | silt loam | 11/2/2010 | MG, JD, RJ, EE | 1 tertiary KRF flake at 9cm; 15m E of ST6 |
| B-7 | 8 | Positive | 36cm | 10YR 3/2, 21cm 10YR 4/3, 36cm | Very Dark Grayish Brown, Brown | silt loam; silt loam with gravel | 11/2/2010 | MG, JD, RJ, EE | 0-19 KRF biface frag, 5m N of ST 7 |
| B-7 | 9 | Negative | 34cm | 10YR 3/2, 19cm 10YR 4/3, 34cm | Very Dark Grayish Brown, Brown | silt loam | 11/2/2010 | MG, JD, RJ, EE | 10m N of ST7 |
| B-7 | 10 | n/a | n/a | n/a | n/a | n/a | 11/2/2010 | MG, JD, RJ, EE | 5m E of ST7 (NOT EXCAVATED) |
| B-7 | 11 | n/a | n/a | n/a | n/a | n/a | 11/2/2010 | MG, JD, RJ, EE | 10m E of ST7 (NOT EXCAVATED) |
| B-7 | 12 | Negative | 38cm | 10YR 3/2, 12cm 10YR 4/3, 38cm | Very Dark Grayish Brown, Brown | silt loam | 11/2/2010 | MG, JD, RJ, EE | 5m N of ST4 |
| B-7 | 13 | Negative | 40cm | 10YR 3/2, 15cm 10YR 4/3, 40cm | Very Dark Grayish Brown, Brown | silt loam | 11/2/2010 | MG, JD, RJ, EE | 10m N of ST4 |
| B-7 | 14 | Negative | 32cm | 10YR 3/2, 12cm 10YR 4/3, 32cm | Very Dark Grayish Brown, Brown | silt loam | 11/2/2010 | MG, JD, RJ, EE | 5m S of ST4 |
| B-7 | 15 | Positive | 38cm | 10YR 3/2, 18cm 10YR 4/3, 38cm | Very Dark Grayish Brown, Brown | silt loam | 11/2/2010 | MG, JD, RJ, EE | 1 secondary KRF flake at 14 cm, 10m S of ST4 |
| B-7 | 16 | Negative | 30cm | 10YR 3/2, 16cm 10YR 4/3, 30cm | Very Dark Grayish Brown, Brown | silt loam | 11/2/2010 | MG, JD, RJ, EE | 5m W of ST4 |
| B-7 | 17 | Positive | 42cm | 10YR 3/2, 25cm 10YR 4/3, 42cm | Very Dark Grayish Brown, Brown | silt loam | 11/2/2010 | MG, JD, RJ, EE | 2 tertiary KRF flakes 0-14 cm, 10m W of ST4 |
| B-7 | 18 | n/a | n/a | n/a | n/a | n/a | 11/2/2010 | MG, JD, RJ, EE | 5m E of ST4 (NOT EXCAVATED) |
| B-7 | 19 | n/a | n/a | n/a | n/a | n/a | 11/2/2010 | MG, JD, RJ, EE | 10m E of ST4 (NOT EXCAVATED) |
| B-7 | 20 | Negative | 35cm | 10YR 3/2, 14cm 10YR 4/3, 35cm | Very Dark Grayish Brown, Brown | silt loam | 11/10/2010 | MG, JD, LR, EE | 15 m E of ST7 |
| B-7 | 21 | Negative | 38cm | 10YR 3/2, 21cm 10YR 4/3, 38cm | Very Dark Grayish Brown, Brown | silt loam | 11/10/2010 | MG, JD, LR, EE | 15 m E of ST8 |
| B-7 | 22 | Negative | 20cm | 10YR 3/2, 10cm 10YR 4/3, 20cm | Very Dark Grayish Brown, Brown | silt loam | 11/10/2010 | MG, JD, LR, EE | 15 m E of ST9 |
| B-7 | 23 | Negative | 30cm | 10YR 3/2, 18cm 10YR 4/3, 30cm | Very Dark Grayish Brown, Brown | silt loam with cobbles | 11/10/2010 | MG, JD, LR, EE | 15 m E of ST10 |
| B-7 | 24 | Negative | 12cm | 10YR 3/2, 4cm 10YR 4/3, 12cm | Very Dark Grayish Brown, Brown | silt loam; silt loam with cobble | 11/10/2010 | MG, JD, LR, EE | 15 m E of ST11 |
| B-7 | 25 | Negative | 42cm | 10YR 3/2, 24cm 10YR 4/3, 42cm | Very Dark Grayish Brown, Brown | silt loam | 11/10/2010 | MG, JD, LR, EE | 15 m E of ST12 |
| B-7 | 26 | Negative | 29cm | 10YR 3/2, 11cm 10YR 4/3, 29cm | Very Dark Grayish Brown, Brown | silt loam | 11/10/2010 | MG, JD, LR, EE | 15 m E of ST13 |
| B-7 | 27 | Negative | 29cm | 10YR 3/2, 15cm 10YR 4/3, 29cm | Very Dark Grayish Brown, Brown | silt loam | 11/10/2010 | MG, JD, LR, EE | 15 m E of ST14 |
| B-7 | 28 | Negative | 23cm | 10YR 3/2, 12cm 10YR 4/3, 23cm | Very Dark Grayish Brown, Brown | silt loam | 11/10/2010 | MG, JD, LR, EE | 15 m E of ST15 |
| B-7 | 29 | Negative | 39cm | 10YR 3/2, 24cm 10YR 4/3, 39cm | Very Dark Grayish Brown, Brown | silt loam | 11/10/2010 | MG, JD, LR, EE | 60 m E of ST16 |
| B-7 | 30 | Negative | 29cm | 10YR 3/2, 13cm 10YR 4/3, 29cm | Very Dark Grayish Brown, Brown | silt loam | 11/10/2010 | MG, JD, LR, EE | 15 m E of ST17 |
| B-7 | 31 | Negative | 37cm | 10YR 3/2, 21cm 10YR 4/3, 37cm | Very Dark Grayish Brown, Brown | silt loam | 11/10/2010 | MG, JD, LR, EE | 15 m E of ST18 |
| B-8 | 1 | Negative | 38cm | 10YR 3/2, 24cm 10YR 4/3, 38cm | Very Dark Grayish Brown, Brown | silt loam | 11/10/2010 | MG, EE, JD, LR | ~3m S of E/W fence |
| B-8 | 2 | Negative | 23cm | 10YR 3/2, 10cm 10YR 4/3, 23cm | Very Dark Grayish Brown, Brown | silt loam | 11/10/2010 | MG, EE, JD, LR | 15m SE of ST1 |
| B-8 | 3 | Negative | 36cm | 10YR 3/2, 21cm 10YR 4/3, 36cm | Very Dark Grayish Brown, Brown | silt loam | 11/10/2010 | MG, EE, JD, LR | 15 m SE of ST2 |
| B-8 | 4 | Negative | 30cm | 10YR 3/2, 11cm 10YR 4/3, 30cm | Very Dark Grayish Brown, Brown | silt loam | 11/10/2010 | MG, EE, JD, LR | 15m SE of ST3 |
| B-8 | 5 | Negative | 33cm | 10YR 3/2, 24cm 10YR 4/3, 33cm | Very Dark Grayish Brown, Brown | silt loam | 11/10/2010 | MG, EE, JD, LR | 15m SE of ST4 |
| B-8 | 6 | Negative | 40cm | 10YR 3/2, 10cm 10YR 4/3, 30cm | Very Dark Grayish Brown, Brown | silt loam | 11/10/2010 | MG, EE, JD, LR | 15m SE of ST5 |
| B-8 | 7 | Negative | 36cm | 10YR 3/2, 18cm 10YR 4/3, 36cm | Very Dark Grayish Brown, Brown | silt loam with heavy gravel and cobbles | 11/10/2010 | MG, EE, JD, LR | 15m SE of ST6 |
| B-8 | 8 | Negative | 25cm | 10YR 3/2, 10cm 10YR 4/3, 25cm | Very Dark Grayish Brown, Brown | silt loam with heavy gravel and cobbles starting at 10cm | 11/10/2010 | MG, EE, JD, LR | 15m SE of ST7 |
| B-8 | 9 | Negative | 46cm | 10YR 3/2, 34cm 10YR 4/3, 46cm | Very Dark Grayish Brown, Brown | silt loam with heavy gravel and cobbles | 11/10/2010 | MG, EE, JD, LR | 15m SE of ST8 |
| D-1 | 1 | Negative | 37cm | 10YR 3/2, 9cm 10YR 4/2, 15cm 10YR 4/3, 37cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam; silt loam; sandy loam; gravel throughout | 11/11/2010 | MG, EE, JD, LR | ~30m S of E/W fence |
| D-1 | 2 | Negative | 33cm | 10YR 3/2, 7cm 10YR 4/2, 28cm 10YR 4/3, 33cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam; silt loam; sandy loam; gravel throughout | 11/11/2010 | MG, EE, JD, LR | 15m E of ST1 |
| D-1 | 3 | Negative | 37cm | 10YR 3/2, 13cm 10YR 4/2, 32cm 10YR 4/3, 37cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/11/2010 | MG, EE, JD, LR | 15m E of ST2 |
| D-1 | 4 | Negative | 42cm | 10YR 3/2, 15cm 10YR 4/2, 36cm 10YR 4/3, 42cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | 15m E of ST3 |
| D-1 | 5 | Negative | 31cm | 10YR 3/2, 13cm; 10YR 4/2, 21cm 10YR 4/3, 24cm; 10YR 5/3, 31cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | 15m E of ST4 |
| D-2 | 1 | Negative | 40cm | 10YR 3/2, 14cm 10YR 4/2, 23cm 10YR 5/3 with 10YR 4/2, 40cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown with Dark Grayish Brown | gravel loam; silt loam | 11/11/2010 | MG, EE, JD, LR | ~5m N of E/w fence |
| D-2 | 2 | Negative | 36cm | 10YR 3/2, 15cm 10YR 4/2, 24cm 10YR 5/3, 36cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with cobbles; silt loam; sand loam | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST1 |
| D-2 | 3 | Negative | 33cm | 10YR 3/2, 13cm 10YR 4/2, 26cm 10YR 5/3, 33cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with cobbles and gravel throughout | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST2 |
| D-2 | 4 | Negative | 33cm | 10YR 3/2, 9cm 10YR 4/2, 24cm 10YR 5/3, 33cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam; silt loam; sand loam | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST3 |
| D-2 | 5 | Negative | 39cm | 10YR 3/2, 13cm 10YR 4/2, 30cm 10YR 5/3, 39cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel; silt loam; silt sand | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST4 |
| D-3 | 1 | Negative | 60cm | 10YR 3/2, 15cm 10YR 4/2, 39cm 10YR 4/3, 60cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | 15m SW of ST2 |
| D-3 | 2 | Negative | 60cm | 10YR 3/2, 24cm 10YR 4/2, 45cm 10YR 4/3, 60cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST1 |
| D-3 | 3 | Negative | 54cm | 10YR 3/2, 24cm 10YR 4/2, 46cm 10YR 4/3, 54cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST2 |
| D-3 | 4 | Negative | 40cm | 10YR 3/2, 12cm 10YR 4/2, 30cm 10YR 4/3, 40cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST3 |
| D-3 | 5 | Negative | 42cm | 10YR 3/2, 12cm 10YR 4/2, 28cm 10YR 4/3, 42cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST4 |
| D-3 | 6 | Negative | 49cm | 10YR 3/2, 15cm 10YR 4/2, 21cm 10YR 4/3, 49cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST5 |
| D-4 | 1 | Negative | 62cm | 10YR 3/2, 27cm 10YR 4/2, 54cm 10YR 4/3, 62cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | ~45m NE of fenceline |
| D-4 | 2 | Negative | 53cm | 10YR 3/2, 15cm 10YR 4/2, 42cm 10YR 4/3, 53cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST1 |
| D-4 | 3 | Negative | 50cm | 10YR 3/2, 15cm 10YR 4/2, 37cm 10YR 4/3, 50cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST2 |
| D-4 | 4 | Negative | 58cm | 10YR 3/2, 17cm 10YR 4/2, 43cm 10YR 4/3, 58cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST3 |
| D-4 | 5 | Negative | 45cm | 10YR 3/2, 15cm 10YR 4/2, 40cm 10YR 4/3, 45cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST4 |
| D-4 | 6 | Negative | 45cm | 10YR 3/2, 18cm 10YR 4/2, 33cm 10YR 4/3, 45cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST5 |
| D-4 | 7 | Negative | 41cm | 10YR 3/2, 10 cm 10YR 4/2, 29cm 10YR 4/3, 41cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST6 |
| D-4 | 8 | Negative | 52cm | 10YR 3/2, 21cm 10YR 4/2, 33cm 10YR 4/3, 52cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST7 |
| D-4 | 9 | Negative | 50cm | 10YR 3/2, 18cm 10YR 4/2, 43cm 10YR 4/3, 50cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST8 |
| D-4 | 10 | Negative | 55cm | 10YR 3/2, 24cm 10YR 4/2, 42cm 10YR 4/3, 55cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/11/2010 | MG, EE, JD, LR | 15m NE of ST9 |
| D-5 | 1 | Negative | 47cm | 10YR 3/3, 47cm | Dark Brown | Loam/clay and gravel | 10/28/2010 | MG, JD, RJ, EE | |

Shovel Test Soil Profiles

| Location | ST # | Negative/Positive | Final Depth | Soil | Soil Color | Soil Texture | Date | Excavators | Comments |
|----------|------|-------------------|-------------|--|---|--|------------|----------------|------------------------------------|
| D-5 | 2 | Negative | 22cm | 10YR 3/3, 22cm | Dark Brown | Loam/clay and gravel | 10/28/2010 | MG, JD, RJ, EE | |
| D-5 | 3 | Negative | 32cm | 10YR 3/2, 19cm 10YR 4/3, 32 cm | Very Dark Grayish Brown, Brown | Loam/clay and gravel | 10/28/2010 | MG, JD, RJ, EE | |
| D-5 | 4 | Negative | 50cm | 10YR 3/2, 47cm 10YR 4/3 50cm | Very Dark Grayish Brown, Brown | Loam/clay and gravel | 10/28/2010 | MG, JD, RJ, EE | |
| D-5 | 5 | Negative | 44cm | 10YR 3/2, 44cm | Very Dark Grayish Brown | loam clay and sandstone cobble | 10/28/2010 | MG, JD, RJ, EE | |
| D-5 | 6 | Negative | 35cm | 10YR 3/2, 24cm 10YR 4/3 35cm | Very Dark Grayish Brown, Brown | loam clay and gravel | 10/28/2010 | MG, JD, RJ, EE | |
| D-5 | 7 | Negative | 18cm | 10YR 3/2, 9cm 10YR 4/3 18cm | Very Dark Grayish Brown, Brown | sandy loam/rock | 10/28/2010 | MG, JD, RJ, EE | |
| D-5 | 8 | Negative | 35cm | 10YR 3/2, 25cm 10YR 4/3, 35cm | Very Dark Grayish Brown, Brown | sandy loam with gravel | 10/28/2010 | MG, JD, RJ, EE | |
| D-5 | 9 | Negative | 50cm | 10YR 3/2, 50cm | Very Dark Grayish Brown | loam and small gravel | 10/28/2010 | MG, JD, RJ, EE | |
| D-5 | 10 | Negative | 33cm | 10YR 3/2, 30cm 10YR 4/3, 33cm | Very Dark Grayish Brown, Brown | sand loam | 10/28/2010 | MG, JD, RJ, EE | |
| D-5 | 11 | Negative | 50cm | 10YR 3/2, 50cm | Very Dark Grayish Brown | sandy loam cobbles | 10/28/2010 | MG, JD, RJ, EE | |
| D-5 | 12 | Negative | 32cm | 10YR 3/2, 25cm 10YR 4/6, 32cm | Very Dark Grayish Brown, Dark Yellowish Brown | sand loam; sand loam with gravel | 10/28/2010 | MG, JD, RJ, EE | |
| D-5 | 13 | Negative | 36cm | 10YR 3/2, 21cm 10YR 4/3, 36cm | Very Dark Grayish Brown, Brown | sandy loam with gravel | 10/28/2010 | MG, JD, RJ, EE | |
| D-5 | 14 | Negative | 32cm | 10YR 3/2, 32cm | Very Dark Grayish Brown | sandy loam with large cobbles | 10/28/2010 | MG, JD, RJ, EE | |
| D-6 | 1 | Negative | 32cm | 10YR 3/2, 15cm 10YR 4/3, 32cm | Very Dark Grayish Brown, Brown | loamy clay; sandy loam | 10/28/2010 | MG, JD, RJ, EE | |
| D-6 | 2 | Negative | 27cm | 10YR 3/2, 15 cm 10YR 4/3, 27cm | Very Dark Grayish Brown, Brown | sandy loam | 10/28/2010 | MG, JD, RJ, EE | |
| D-6 | 3 | Negative | 33cm | 10YR 3/2, 18cm 10YR 4/3, 33cm | Very Dark Grayish Brown, Brown | loamy clay and sandy clay | 10/28/2010 | MG, JD, RJ, EE | |
| D-6 | 4 | Negative | 38cm | 10YR 3/2, 12cm 10YR 4/3, 38cm | Very Dark Grayish Brown, Brown | sandy loam | 10/28/2010 | MG, JD, RJ, EE | |
| D-6 | 5 | Negative | 31cm | 10YR 3/2, 16cm 10YR 4/3, 31cm | Very Dark Grayish Brown, Brown | loamy clay and sandy clay | 10/28/2010 | MG, JD, RJ, EE | |
| D-6 | 6 | Negative | 53cm | 10YR 3/2, 35cm 10YR 4/3, 53cm | Very Dark Grayish Brown, Brown | loamy clay and sandy clay with gravel | 10/28/2010 | MG, JD, RJ, EE | |
| D-6 | 7 | Negative | 41cm | 10YR 3/2, 16cm 10YR 4/3, 41cm | Very Dark Grayish Brown, Brown | loamy clay and sandy clay | 10/28/2010 | MG, JD, RJ, EE | |
| D-6 | 8 | Negative | 58cm | 10YR 3/2, 20cm 10YR 4/2, 40cm 10YR 4/3, 58cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | loamy clay; loamy clay; sandy clay | 10/28/2010 | MG, JD, RJ, EE | |
| D-6 | 9 | Negative | 36cm | 10YR 3/2, 18cm 10YR 4/3, 36cm | Very Dark Grayish Brown, Brown | loamy clay and sandy clay | 10/28/2010 | MG, JD, RJ, EE | |
| D-6 | 10 | Negative | 49cm | 10YR 3/2, 13cm 10YR 4/2 18cm, 10YR 4/3, 49cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | loamy clay; loamy clay; sandy clay | 10/28/2010 | MG, JD, RJ, EE | |
| D-6 | 11 | Negative | 45cm | 10YR 3/2, 38cm 10YR 4/3, 45cm | Very Dark Grayish Brown, Brown | sandy loam; clay | 10/28/2010 | MG, JD, RJ, EE | |
| D-6 | 12 | Negative | 54cm | 10YR 3/2, 36cm 10YR 4/2, 45cm 10YR 4/3, 54cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | loamy clay and sandy clay | 10/28/2010 | MG, JD, RJ, EE | |
| D-6 | 13 | Negative | 65cm | 10YR 3/2, 15cm 10YR 4/2, 50cm 10YR 4/3, 65cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | loam clay | 10/28/2010 | MG, JD, RJ, EE | |
| D-6 | 14 | Negative | 36cm | 10YR 3/2, 18cm 10YR 4/3, 36cm | Very Dark Grayish Brown, Brown | loam clay and sandy clay | 10/28/2010 | MG, JD, RJ, EE | |
| D-7 | 1 | Negative | 44cm | 10YR 3/2, 17cm 10YR 4/2 and 10YR 4/3, 44cm | Very Dark Grayish Brown, Dark Grayish Brown and Brown | sand loam, mottle sand loam with gravel | 10/29/2010 | MG, JD, RJ, EE | ~40m SW of ravine/scrub-brush line |
| D-7 | 2 | Negative | 42cm | 10YR 3/2, 15cm 10YR 4/2, 30cm 10YR 4/3, 42cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; sand loam with gravel | 10/29/2010 | MG, JD, RJ, EE | 15m SW of ST1 |
| D-7 | 3 | Negative | 37cm | 10YR 3/2, 10cm 10YR 4/2, 16cm 10YR 4/3, 37cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; sand loam with gravel | 10/29/2010 | MG, JD, RJ, EE | 15m SW of ST2 |
| D-7 | 4 | Negative | 80cm | 10YR 3/2, 15cm 10YR 4/2, 75cm 10YR 4/3, 80cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; sand loam with gravel | 10/29/2010 | MG, JD, RJ, EE | 15m SW of ST3 |
| D-7 | 5 | Negative | 95cm | 10YR 3/2, 16cm 10YR 4/2, 70cm 10YR 4/3, 95cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; silt loam; silt loam | 10/29/2010 | MG, JD, RJ, EE | ~75m NW of ST4 |
| D-7 | 6 | Negative | 81cm | 10YR 3/2, 24cm 10YR 4/2, 72cm 10YR 4/3, 81cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; sand loam with gravel | 10/29/2010 | MG, JD, RJ, EE | 15m SW of ST5 |
| D-7 | 7 | Negative | 65cm | 10YR 3/2, 10cm 10YR 4/2, 55cm 10YR 4/3, 65cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; silt loam; silt loam with gravel | 10/29/2010 | MG, JD, RJ, EE | 15m SW of ST6 |
| D-7 | 8 | Negative | 36cm | 10YR 3/2, 18cm 10YR 4/2, 27cm 10YR 4/3, 36cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; sand loam with gravel | 10/29/2010 | MG, JD, RJ, EE | 15m SW of ST7 |
| D-7 | 9 | Negative | 38cm | 10YR 3/2, 19cm 10YR 4/2, 25cm 10YR 4/3, 38cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; silt loam with gravel | 10/29/2010 | MG, JD, RJ, EE | ~65m SW of ST8 |
| D-7 | 10 | Negative | 41cm | 10YR 3/2, 21cm 10YR 4/2, 32cm 10YR 4/3, 41cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; sand loam with gravel | 10/29/2010 | MG, JD, RJ, EE | 15m SW of ST9 |
| D-7 | 11 | Negative | 55cm | 10YR 3/2, 40cm 10YR 4/2, 50cm 10YR 4/3, 55cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; silt loam with gravel | 10/29/2010 | MG, JD, RJ, EE | 15m SW of ST10 |
| D-7 | 12 | Negative | 42cm | 10YR 3/2, 15cm 10YR 4/2, 36cm 10YR 4/3, 42cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; sand loam with gravel | 10/29/2010 | MG, JD, RJ, EE | 15m Sw of ST11 |
| D-7 | 13 | Negative | 60cm | 10YR 3/2, 20cm 10YR 4/2, 50cm 10YR 4/3, 60cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/29/2010 | MG, JD, RJ, EE | 15m SW of ST12 |
| D-7 | 14 | Negative | 66cm | 10YR 3/2, 24cm 10YR 4/2, 60cm 10YR 4/3, 66cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; sand loam with gravel | 10/29/2010 | MG, JD, RJ, EE | 15m SW of ST13 |
| D-7 | 15 | Negative | 61cm | 10YR 3/2, 18cm 10YR 4/2, 51cm 10YR 4/3, 61cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/29/2010 | MG, JD, RJ, EE | 15m SW of ST14 |
| D-7 | 16 | Negative | 36cm | 10YR 3/2, 12cm 10YR 4/2, 27cm 10YR 4/3, 36cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; sand loam with gravel | 10/29/2010 | MG, JD, RJ, EE | 15m SW of ST15 |
| D-8 | 1 | Negative | 45cm | 10YR 3/2, 15cm 10YR 4/2, 27cm 10YR 4/3, 45cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; sand loam and heavy gravel | 10/29/2010 | MG, JD, RJ, EE | ~25m W of fenceline |
| D-8 | 2 | Negative | 45cm | 10YR 3/2, 18cm 10YR 4/2, 30cm 10YR 4/3, 45cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; sand loam with gravel | 10/29/2010 | MG, JD, RJ, EE | 15m SW of ST1 |
| D-8 | 3 | Negative | 43cm | 10YR 3/2, 15cm 10YR 4/2, 31cm 10YR 4/3, 43cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; sand loam and heavy gravel | 10/29/2010 | MG, JD, RJ, EE | 15m SW of ST2 |
| D-8 | 4 | Negative | 43cm | 10YR 3/2, 15cm 10YR 4/2, 30cm 10YR 4/3, 43cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; sand loam and heavy gravel | 10/29/2010 | MG, JD, RJ, EE | 15m SW of ST3 |
| D-8 | 5 | Negative | 51cm | 10YR 3/2, 19cm 10YR 4/2, 36cm 10YR 4/3, 51cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/29/2010 | MG, JD, RJ, EE | 15m SW of ST4 |
| D-8 | 6 | Negative | 47cm | 10YR 3/2, 17cm 10YR 4/2, 36cm 10YR 4/3, 47cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; sand loam and heavy gravel | 10/29/2010 | MG, JD, RJ, EE | 15m SW of ST5 |
| F-1 | 1 | Negative | 54cm | 10YR 3/2, 15cm 10YR 4/2, 45cm 10YR 4/3, 54cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; sand loam with some gravel | 10/30/2010 | MG, JD, RJ, EE | ~15m north of fenceline |
| F-1 | 2 | Negative | 50cm | 10YR 3/2, 12cm 10YR 4/2, 40cm 10YR 4/3, 50cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST1 |
| F-1 | 3 | Negative | 40cm | 10YR 3/2, 17cm 10YR 4/2, 28cm 10YR 4/3, 40cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST2 |
| F-1 | 4 | Negative | 43cm | 10YR 3/2, 15cm 10YR 4/2, 37cm 10YR 4/3, 43cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam with some gravel | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST3 |
| F-1 | 5 | Negative | 46cm | 10YR 3/2, 18cm 10YR 4/2, 39cm 10YR 4/3, 46cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST4 |
| F-1 | 6 | Negative | 42cm | 10YR 3/2, 15cm 10YR 4/2, 30cm 10YR 4/3, 42cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST5 |
| F-1 | 7 | Negative | 33cm | 10YR 3/2, 9cm 10YR 4/2, 16cm 10YR 4/3, 33cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; sand loam with some gravel | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST6 |
| F-2 | 1 | Negative | 30cm | 10YR 3/2, 12cm 10YR 4/2, 21cm 10YR 4/3, 30cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam with increasing gravel with depth | 10/30/2010 | MG, JD, RJ, EE | ~70m E of road |
| F-2 | 2 | Negative | 24cm | 10YR 3/2, 14cm 10YR 4/2, 21cm 10YR 4/3, 24cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam with gravel | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST1 |
| F-2 | 3 | Negative | 36cm | 10YR 3/2, 9cm 10YR 4/2, 30cm 10YR 4/3, 36cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST2 |
| F-2 | 4 | Negative | 26cm | 10YR 3/2, 12cm 10YR 4/2, 18cm 10YR 4/3, 26cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST3 |
| F-3 | 1 | Negative | 54cm | 10YR 3/2, 24cm 10YR 4/2, 45cm 10YR 4/3, 54cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/30/2010 | MG, JD, RJ, EE | 15m W of ST2 |
| F-3 | 2 | Negative | 46cm | 10YR 3/2, 15cm 10YR 4/2, 29cm 10YR 4/3, 46cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST1 |
| F-3 | 3 | Negative | 60cm | 10YR 3/2, 21cm 10YR 4/2, 36cm 10YR 4/3, 60cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST2 |
| F-3 | 4 | Negative | 58cm | 10YR 3/2, 14cm 10YR 4/2, 46cm 10YR 4/3, 58cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST3 |

Shovel Test Soil Profiles

| Location | ST # | Negative/Positive | Final Depth | Soil | Soil Color | Soil Texture | Date | Excavators | Comments |
|----------|------|-------------------|-------------|---|--|--|------------|----------------|---------------------|
| F-3 | 5 | Negative | 50cm | 10YR 3/2, 22cm 10YR 4/2, 40cm 10YR 4/3, 50cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST4 |
| F-3 | 6 | Negative | 38cm | 10YR 3/2, 10cm 10YR 4/2, 18cm 10YR 4/3, 38cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST5 |
| F-3 | 7 | Negative | 61cm | 10YR 3/2, 24cm 10YR 4/2, 42cm 10YR 4/3, 61cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST6 |
| F-3 | 8 | Negative | 57cm | 10YR 3/2, 13cm 10YR 4/3, 43cm 10YR 4/2, 57cm | Very Dark Grayish Brown, Brown, Dark Grayish Brown | sand loam | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST7 |
| F-3 | 9 | Negative | 35cm | 10YR 3/2, 16cm 10YR 4/2, 24cm 10YR 4/3, 35cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST8 |
| F-3 | 10 | Negative | 48cm | 10YR 3/2, 17cm 10YR 4/3, 26cm 10YR 4/2, 48cm | Very Dark Grayish Brown, Brown, Dark Grayish Brown | sand loam | 10/30/2010 | MG, JD, RJ, EE | 15m E of ST9 |
| F-3 | 11 | Negative | 52cm | 10YR 3/2, 23cm 10YR 4/2, 47cm 10YR 4/3, 52cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam | 10/30/2010 | MG, JD, RJ, EE | ~40m W of fenceline |
| G-2 | 1 | Negative | 49cm | 10YR 3/2, 30cm 10YR 4/3, 49cm | Very Dark Grayish Brown, Brown | silt loam with some gravel throughout | 11/10/2010 | MG, EE, JD, LR | ~10m W of N/S fence |
| G-2 | 2 | Negative | 34cm | 10YR 3/2, 11cm 10YR 4/3, 20cm 10YR 5/3, 34cm | Very Dark Grayish Brown, Brown, Brown | silt loam with some gravel throughout | 11/10/2010 | MG, EE, JD, LR | 15m S of ST1 |
| G-2 | 3 | Negative | 30cm | 10YR 3/2, 11cm 10YR 4/3, 22cm 10YR 5/3, 30 cm | Very Dark Grayish Brown, Brown, Brown | silt loam | 11/10/2010 | MG, EE, JD, LR | 15m S of ST2 |
| G-2 | 4 | Negative | 51cm | 10YR 3/2, 12cm 10YR 4/3, 46cm 10YR 5/3, 51cm | Very Dark Grayish Brown, Brown, Brown | silt loam; silt sand; silt loam | 11/10/2010 | MG, EE, JD, LR | 15m S of ST3 |
| G-2 | 5 | Negative | 28cm | 10YR 4/3, 13cm 10YR 5/3, 28cm | Very Dark Grayish Brown, Brown | silt sand; silt loam some gravel throughout | 11/10/2010 | MG, EE, JD, LR | 15m S of ST4 |
| G-3 | 1 | Negative | 33cm | 10YR 3/2, 15cm 10YR 4/3, 33cm | Very Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/10/2010 | MG, EE, JD, LR | 10m W of N/S fence |
| G-3 | 2 | Negative | 28cm | 10YR 3/2, 6cm; mottled 15cm, 10YR 4/3, 28cm | Very Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/10/2010 | MG, EE, JD, LR | 15m S of ST1 |
| G-3 | 3 | Negative | 30cm | 10YR 3/2, 15cm 10YR 5/3, 30cm | Very Dark Grayish Brown, Brown | silt loam | 11/10/2010 | MG, EE, JD, LR | ~45m S of ST2 |
| G-3 | 4 | Negative | 32cm | 10YR 3/2, 15cm 10YR 4/3, 24cm 10YR 5/3, 32cm | Very Dark Grayish Brown, Brown, Brown | silt loam; silt sand; silt loam | 11/10/2010 | MG, EE, JD, LR | 15m S of ST3 |
| G-3 | 5 | Negative | 39cm | 10YR 3/2, 12cm 10YR 4/3, 21cm 10YR 5/3, 39 cm | Very Dark Grayish Brown, Brown, Brown | silt loam | 11/10/2010 | MG, EE, JD, LR | 15m S of ST4 |
| G-3 | 6 | Negative | 28cm | 10YR 3/2, 9cm 10YR 4/3, 16cm 10YR 5/3, 28cm | Very Dark Grayish Brown, Brown, Brown | silt loam; silt sand; silt loam; gravel throughout | 11/10/2010 | MG, EE, JD, LR | 15m S of ST5 |
| G-3 | 7 | Negative | 25cm | 10YR 3/2, 7cm 10YR 4/3, 15cm 10YR 5/3, 25cm | Very Dark Grayish Brown, Brown, Brown | silt loam; silt sand; silt loam; gravel throughout | 11/10/2010 | MG, EE, JD, LR | 15m S of ST6 |
| G-3 | 8 | Negative | 33cm | 10YR 3/2, 15cm 10YR 5/3, 33cm | Very Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/10/2010 | MG, EE, JD, LR | 15m S of ST7 |
| G-3 | 9 | Negative | 33cm | 10YR 3/2, 6cm 10YR 5/3, 33cm | Very Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/10/2010 | MG, EE, JD, LR | 15m S of ST8 |
| I-2 | 1 | Negative | 29cm | 10YR 3/2, 13cm 10YR 4/2, 20cm 10YR 5/3, 29cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with cobbles | 11/12/2010 | MG, EE, JD, LR | ~25m N of E/W fence |
| I-2 | 2 | Negative | 42cm | 10YR 3/2, 18cm 10YR 4/2, 30cm 10YR 5/3, 42cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel | 11/12/2010 | MG, EE, JD, LR | 15m W of ST1 |
| I-2 | 3 | Negative | 32cm | 10YR 3/2, 15cm 10YR 4/2, 25cm 10YR 5/3, 32cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silty loam with cobbles | 11/12/2010 | MG, EE, JD, LR | ~45m W of ST2 |
| I-2 | 4 | Negative | 30cm | 10YR 3/2, 9cm 10YR 4/2, 20cm 10YR 5/3, 30cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel | 11/12/2010 | MG, EE, JD, LR | 15m W of ST3 |
| I-2 | 5 | Negative | 50cm | 10YR 3/2, 11cm 10YR 4/2, 39cm 10YR 5/3, 50cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel | 11/12/2010 | MG, EE, JD, LR | 15m W of ST4 |
| I-2 | 6 | Negative | 47cm | 10YR 3/2, 18cm 10YR 4/2, 32cm 10YR 5/3, 47cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel | 11/12/2010 | MG, EE, JD, LR | 15m W of ST5 |
| I-2 | 7 | Negative | 34cm | 10YR 3/2, 9cm 10YR 4/2, 26cm 10YR 5/3, 34cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/12/2010 | MG, EE, JD, LR | 15m W of ST6 |
| K-1 | 1 | Negative | 50cm | 10YR 3/2, 23cm 10YR 4/2, 40cm 10YR 5/3, 50cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/12/2010 | MG, EE, JD, LR | ~45m N of Hwy 41 |
| K-1 | 2 | Negative | 42cm | 10YR 3/2, 21cm 10YR 4/2, 33cm 10YR 5/3, 42cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/12/2010 | MG, EE, JD, LR | 15m W of ST1 |
| K-1 | 3 | Negative | 38cm | 10YR 3/2, 20cm 10YR 4/2, 32cm 10YR 5/3, 38cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/12/2010 | MG, EE, JD, LR | 15m W of ST2 |
| K-1 | 4 | Negative | 27m | 10YR 3/2, 16cm 10YR 4/2, 22cm 10YR 5/3, 27cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/12/2010 | MG, EE, JD, LR | 15m W of ST3 |
| K-2 | 1 | Negative | 24cm | 10YR 3/2, 10cm 10YR 4/2, 18cm 10YR 5/3, 24cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/12/2010 | MG, EE, JD, LR | ~20m S of E/W fence |
| K-2 | 2 | Negative | 36cm | 10YR 4/2, 18cm, 10YR 5/3, 36cm | Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/12/2010 | MG, EE, JD, LR | 15m E of ST1 |
| K-2 | 3 | Negative | 37cm | 10YR 3/1, 14cm 10YR 2/1, 26cm, 10YR 4/3, 37cm | Very Dark Gray, Black, Brown | silt loam with gravel throughout | 11/12/2010 | MG, EE, JD, LR | 15m E of ST2 |
| K-2 | 4 | Negative | 60cm | 10YR 3/1, 18cm 10YR 2/1, 44cm 10YR 4/3, 60cm | Very Dark Gray, Black, Brown | silt loam with gravel throughout | 11/12/2010 | MG, EE, JD, LR | 15m E of ST3 |
| K-2 | 5 | Negative | 20cm | 10YR 3/2, 13cm 10YR 4/3, 20cm | Very Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/12/2010 | MG, EE, JD, LR | 15m E of ST4 |
| K-2 | 6 | Negative | 36cm | 10YR 3/2, 15cm 10YR 4/3, 36cm | Very Dark Grayish Brown, Brown | silt loam with gravel and cobbles throughout | 11/12/2010 | MG, EE, JD, LR | ~45m E of ST5 |
| K-2 | 7 | Negative | 19cm | 10YR 3/2, 14cm 10YR 4/3, 19cm | Very Dark Grayish Brown, Brown | silt loam with some gravel | 11/12/2010 | MG, EE, JD, LR | 15m E of ST6 |
| K-2 | 8 | Negative | 36cm | 10YR 3/2, 20cm 10YR 4/3, 36cm | Very Dark Grayish Brown, Brown | silt loam with some gravel | 11/12/2010 | MG, EE, JD, LR | 15m E of ST7 |
| K-2 | 9 | Negative | 25cm | 10YR 3/2, 18cm 10YR 4/3, 25cm | Very Dark Grayish Brown, Brown | silt loam with some gravel | 11/12/2010 | MG, EE, JD, LR | 15m E of ST8 |
| K-2 | 10 | Negative | 45cm | 10YR 3/2, 12cm 10YR 4/2, 30cm 10YR 5/3, 45cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with some gravel | 11/12/2010 | MG, EE, JD, LR | 15m E of ST9 |
| K-3 | 1 | Negative | 42cm | 10YR 3/2, 13cm 10YR 4/2, 31cm 10YR 5/3, 42cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/12/2010 | MG, EE, JD, LR | ~80m E of N/S fence |
| K-3 | 2 | Negative | 43cm | 10YR 3/2, 19cm 10YR 4/2, 32cm 10YR 5/3, 43cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/12/2010 | MG, EE, JD, LR | 15m E of ST1 |
| K-3 | 3 | Negative | 38cm | 10YR 3/2, 17cm 10YR 2/1, 38cm | Very Dark Grayish Brown, Black | silt loam/loam clay | 11/12/2010 | MG, EE, JD, LR | 15m E of ST2 |
| K-3 | 4 | Negative | 33cm | 10YR 3/2, 12cm 10YR 4/2, 21cm 10YR 5/3, 33cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/12/2010 | MG, EE, JD, LR | 15m E of ST3 |
| K-3 | 5 | Negative | 35cm | 10YR 3/2, 9cm 10YR 4/2, 22cm 10YR 5/3, 35cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/12/2010 | MG, EE, JD, LR | 15m E of ST4 |
| K-3 | 6 | Negative | 44cm | 10YR 3/2, 12cm 10YR 4/2, 33cm 10YR 5/3, 44cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam; silt loam; loam clay | 11/12/2010 | MG, EE, JD, LR | ~60m E of ST5 |
| K-3 | 7 | Negative | 36cm | 10YR 3/2, 15cm 10YR 4/3, 24cm 10YR 5/3, 36cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/12/2010 | MG, EE, JD, LR | 15m E of ST6 |
| K-3 | 8 | Negative | 21cm | 10YR 3/2, 12cm 10YR 4/2, 17cm 10YR 4/3, 21cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel | 11/12/2010 | MG, EE, JD, LR | 15m E of ST7 |
| K-3 | 9 | Negative | 34cm | 10YR 3/2, 22cm 10YR 2/1, 34cm | Very Dark Grayish Brown, Black | silt loam/loam clay | 11/12/2010 | MG, EE, JD, LR | 15m E of ST8 |
| K-3 | 10 | Negative | 55cm | 10YR 3/2, 27cm 10YR 4/2, 40cm 10YR 5/3, 55cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam; silt loam; loam clay | 11/12/2010 | MG, EE, JD, LR | 15m E of ST9 |
| K-3 | 11 | Negative | 32cm | 10YR 3/2, 11cm 10YR 4/3, 23cm 10YR 5/3, 32cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/12/2010 | MG, EE, JD, LR | 15m E of ST10 |
| K-3 | 12 | Negative | 25cm | 10YR 3/2, 10cm 10YR 4/2, 15cm 10YR 5/3, 25cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam; silt loam; loam clay with gravel throughout | 11/12/2010 | MG, EE, JD, LR | 15m E of ST11 |
| K-3 | 13 | Negative | 37cm | 10YR 3/2, 24cm 10YR 5/3, 37cm | Very Dark Grayish Brown, Brown | silt loam | 11/12/2010 | MG, EE, JD, LR | 15m E of ST12 |
| K-3 | 14 | Negative | 38cm | 10YR 3/2, 9cm 10YR 4/2, 23cm 10YR 5/3, 38cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam; silt loam; clay loam | 11/12/2010 | MG, EE, JD, LR | 15m E of ST13 |
| K-3 | 15 | Negative | 32cm | 10YR 3/2, 14cm 10YR 4/3, 24cm 10YR 5/3, 32cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/12/2010 | MG, EE, JD, LR | 15m E of ST14 |
| K-3 | 16 | Negative | 44cm | 10YR 3/2, 13cm 10YR 4/2, 30cm 10YR 5/3, 44cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/12/2010 | MG, EE, JD, LR | ~90m E of N/S fence |
| K-3 | 17 | Negative | 46cm | 10YR 3/2, 12cm 10YR 4/2, 34cm 10YR 4/3, 46cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/12/2010 | MG, EE, JD, LR | 15m E of ST16 |
| K-3 | 18 | Negative | 27cm | 10YR 3/2, 9cm 10YR 4/2, 15cm 10YR 5/3, 27cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/12/2010 | MG, EE, JD, LR | 15m E of ST17 |
| K-3 | 19 | Negative | 60cm | 10YR 3/2, 19cm 10YR 4/2, 50cm 10YR 4/3, 60cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam very compact toward bottom | 11/12/2010 | MG, EE, JD, LR | ~30m E of ST18 |
| K-3 | 20 | Negative | 36cm | 10YR 4/2, 18cm 10YR 5/3, 36cm | Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/12/2010 | MG, EE, JD, LR | 15m E of ST19 |
| L-1 | 1 | Negative | 23cm | 10YR 3/2, 12cm 10YR 5/3, 23cm | Very Dark Grayish Brown, Brown | clay loam | 11/13/2010 | MG, EE, JD, LR | 15m SW of ST2 |
| L-1 | 2 | Negative | 35cm | 10YR 3/2, 18cm 10YR 4/3, 35cm | Very Dark Grayish Brown, Brown | silt loam with no gravel | 11/13/2010 | MG, EE, JD, LR | 15m NE of ST1 |

Shovel Test Soil Profiles

| Location | ST # | Negative/Positive | Final Depth | Soil | Soil Color | Soil Texture | Date | Excavators | Comments |
|-------------|------|-------------------|-------------|---|--|--|------------|----------------|--|
| L-1 | 3 | Negative | 33cm | 10YR 3/2, 18cm 10YR 5/3, 33cm | Very Dark Grayish Brown, Brown | clay loam | 11/13/2010 | MG, EE, JD, LR | 15m NE of ST2 |
| L-1 | 4 | Negative | 26cm | 10YR 3/2, 8cm 10YR 4/3, 26cm | Very Dark Grayish Brown, Brown | silt loam with very compact clay loam | 11/13/2010 | MG, EE, JD, LR | 15m NE of ST3 |
| L-1 | 5 | Negative | 35cm | 10YR 3/2, 14cm 10YR 4/3, 25cm 10YR 5/3, 35cm | Very Dark Grayish Brown, Brown, Brown | silt loam | 11/13/2010 | MG, EE, JD, LR | 15m NE of ST4 |
| L-1 | 6 | Negative | 38cm | 10YR 3/2, 16cm 10YR 4/2, 27cm 10YR 4/3, 38cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/13/2010 | MG, EE, JD, LR | 15m NE of ST5 |
| L-1 | 7 | Negative | 30cm | 10YR 3/2, and 10YR 4/3 mottled 19cm 10YR 5/3, 30cm | Very Dark Grayish Brown/Brown, Brown | sandy loam | 11/13/2010 | MG, EE, JD, LR | 15m NE of ST6 |
| L-1 | 8 | Negative | 42cm | 10YR 3/2, 11cm mottled, 25cm 10YR 4/3, 42cm | Very Dark Grayish Brown, Brown | silt loam and very compact clay loam | 11/13/2010 | MG, EE, JD, LR | 15m NE of ST7 |
| L-1 | 9 | Negative | 30cm | 10YR 3/2, 20cm 10YR 4/3, 30cm | Very Dark Grayish Brown, Brown | silt loam and very compact clay loam | 11/13/2010 | MG, EE, JD, LR | 15m NE of ST8 |
| M-1 | 1 | Negative | 32cm | 10YR 3/2, 16cm 10YR 4/2, 32cm | Very Dark Grayish Brown, Dark Grayish Brown | silty loam with heavy gravel | 11/14/2010 | MG, EE, JD, LR | 15m SW of ST2 |
| M-1 | 2 | Negative | 31cm | 10YR 4/2, 31cm | Dark Grayish Brown | silty loam with heavy gravel | 11/14/2010 | MG, EE, JD, LR | 15m NE of ST1 |
| M-1 | 3 | Negative | 20cm | 10YR 4/2, 20cm | Dark Grayish Brown | silty loam with heavy gravel | 11/14/2010 | MG, EE, JD, LR | 15m NE of ST2 |
| M-1 | 4 | Negative | 13cm | 10YR 4/2, 13cm | Dark Grayish Brown | silty loam with heavy gravel | 11/14/2010 | MG, EE, JD, LR | 15m NE of ST3 |
| M-1 | 5 | Negative | 32cm | 10YR 3/2, 15cm 10YR 5/3, 32cm | Very Dark Grayish Brown, Brown | silty loam with heavy gravel | 11/14/2010 | MG, EE, JD, LR | 15m NE of ST4 |
| M-1 | 6 | Negative | 37cm | 10YR 3/2, 10cm 10YR 4/2, 27cm 10YR 4/3, 37cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silty loam with heavy gravel and some cobbles | 11/14/2010 | MG, EE, JD, LR | ~60m NE of ST5 |
| M-1 | 7 | Negative | 18cm | 10YR 3/2, 13cm 10YR 4/3, 18cm | Very Dark Grayish Brown, Brown | silt loam with heavy gravel | 11/14/2010 | MG, EE, JD, LR | 15m N of ST6 |
| M-1 | 8 | Negative | 34cm | 10YR 3/2, 15cm 10YR 4/3, 29cm 10YR 5/3, 34cm | Very Dark Grayish Brown, Brown, Brown | silt loam with heavy gravel | 11/14/2010 | MG, EE, JD, LR | 90m NE of ST7 |
| M-1 | 9 | Negative | 30cm | 10YR 3/2, 18cm 10YR 5/3, 30cm | Very Dark Grayish Brown, Brown | silt loam with heavy gravel | 11/14/2010 | MG, EE, JD, LR | 15m N of ST8 |
| M-1 | 10 | Negative | 28cm | 10YR 3/2, 18cm 10YR 5/3, 28cm | Very Dark Grayish Brown, Brown | silt loam | 11/14/2010 | MG, EE, JD, LR | 15m N of ST9 |
| M-1 | 11 | Negative | 32cm | 10YR 4/2, 12cm mottled, 16cm 10YR 5/3, 32cm | Dark Grayish Brown, Brown | silt loam with gravel and cobbles throughout | 11/14/2010 | MG, EE, JD, LR | ~200m NE of ST10 (check distance) |
| M-1 | 12 | Negative | 27cm | 10YR 3/2, 9cm 10YR 4/3, 14cm 10YR 5/3, 27cm | Very Dark Grayish Brown, Brown, Brown | silt loam with gravel throughout | 11/14/2010 | MG, EE, JD, LR | 15m E of ST11 |
| M-1 | 13 | Negative | 38cm | 10YR 3/2, 20cm 10YR 3/2 and 5/3 mottled, 32cm 10YR 5/3, 38cm | Very Dark Grayish Brown, Brown, Brown | silt loam with gravel and cobbles throughout | 11/14/2010 | MG, EE, JD, LR | 15m E of ST12 |
| M-2 | 1 | Negative | 32cm | 10YR 3/2, 12cm 10YR 3/2 mottled w/10YR 4/3, 19cm 10YR 4/3, 32cm | Very Dark Grayish Brown, Brown | silt loam with gravel throughout and increasing compactness towards bottom | 11/13/2010 | MG, EE, JD, LR | Shovel tests in this area follow natural ridge surrounding wetland. ~150m N of Road |
| M-2 | 2 | Negative | 37cm | 10YR 3/2, 9cm 10YR 4/2, 22cm 10YR 4/3, 37cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/13/2010 | MG, EE, JD, LR | 15m W of ST1 |
| M-2 | 3 | Negative | 27cm | 10YR 3/2, 9cm 10YR 4/2, 15cm 10YR 4/3, 27cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/13/2010 | MG, EE, JD, LR | 15m W of ST2 |
| M-2 | 4 | Negative | 35cm | 10YR 3/2, 15cm 10YR 4/2, 24cm 10YR 4/3, 35cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/13/2010 | MG, EE, JD, LR | 15m W of ST3 |
| M-2 | 5 | Negative | 28cm | 10YR 3/2, 8cm 10YR 4/2, 12cm 10YR 4/3, 28cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/13/2010 | MG, EE, JD, LR | 15m W of ST4 |
| M-2 | 6 | Negative | 35cm | 10YR 3/2, 9cm 10YR 4/2, 22cm 10YR 4/3, 35cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/13/2010 | MG, EE, JD, LR | 15m WSW of ST5 |
| M-2 | 7 | Negative | 29cm | Mottled 10YR 3/2 and 4/2, 16cm 10YR 4/3, 21cm 10YR 5/3, 29cm | Very Dark Grayish Brown, | silt loam with gravel throughout | 11/13/2010 | MG, EE, JD, LR | 15m SW of ST6 |
| M-2 | 8 | Negative | 39cm | 10YR 3/2, 6cm 10YR 4/2, 25cm 10YR 4/3, 39cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/13/2010 | MG, EE, JD, LR | 15m S of ST7 |
| M-2 | 9 | Negative | 31cm | 10YR 4/2, 16cm 10YR 4/3, 31cm | Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/13/2010 | MG, EE, JD, LR | 15m S of ST8 |
| N-1 | 1 | Negative | 28cm | 10YR 3/2, 15cm 10YR 4/3, 28cm | Very Dark Grayish Brown, Brown | silt loam | 11/14/2010 | MG, EE, JD, LR | ~300m W of Road |
| N-1 | 2 | Negative | 31cm | 10YR 3/2, 16cm 10YR 4/3, 31cm | Very Dark Grayish Brown, Brown | silt loam with gravel | 11/14/2010 | MG, EE, JD, LR | 15m W of ST1 |
| N-1 | 3 | Negative | 45cm | 10YR 3/2, 14cm 10YR 4/2, 30cm 10YR 4/3, 45cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/14/2010 | MG, EE, JD, LR | 15m W of ST2 |
| N-1 | 4 | Negative | 21cm | 10YR 3/2, 9cm 10YR 4/3, 21cm | Very Dark Grayish Brown, Brown | silt loam with heavy gravel | 11/14/2010 | MG, EE, JD, LR | ~45m W of ST |
| N-1 | 5 | Negative | 32cm | 10YR 3/2, 22cm 10YR 4/3, 32cm | Very Dark Grayish Brown, Brown | silt loam | 11/14/2010 | MG, EE, JD, LR | 15m W of ST4 |
| N-1 | 6 | Negative | 28cm | 10YR 3/2, 13cm 10YR 4/3, 28cm | Very Dark Grayish Brown, Brown | silt loam with gravel | 11/14/2010 | MG, EE, JD, LR | 15m W of ST5 |
| N-1 | 7 | Negative | 40cm | 10YR 3/2, 20cm 10YR 4/3, 40cm | Very Dark Grayish Brown, Brown | silty loam | 11/14/2010 | MG, EE, JD, LR | 15m W of ST6 |
| N-1 | 8 | Negative | 55cm | 10YR 3/2, 13cm 10YR 4/2, 40cm 10YR 4/3, 55cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel | 11/14/2010 | MG, EE, JD, LR | 15m W of ST7 |
| N-1 | 9 | Negative | 35cm | 10YR 3/2, 14cm 10YR 4/3, 35cm | Very Dark Grayish Brown, Brown | silt loam | 11/14/2010 | MG, EE, JD, LR | 15m W of ST8 |
| N-1 | 10 | Negative | 31cm | 10YR 3/2, 15cm 10YR 4/3, 31cm | Very Dark Grayish Brown, Brown | silt loam with gravel | 11/14/2010 | MG, EE, JD, LR | ~45m W of ST9 |
| N-1 | 11 | Negative | 39cm | 10YR 3/2, 25cm 10YR 4/3, 39cm | Very Dark Grayish Brown, Brown | silt loam | 11/14/2010 | MG, EE, JD, LR | 15m W of ST10 |
| N-1 | 12 | Negative | 42cm | 10YR 3/2, 12cm 10YR 4/2, 28cm 10YR 4/3, 42 cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/14/2010 | MG, EE, JD, LR | 15m W of ST11 |
| N-1 | 13 | Negative | 38cm | 10YR 3/2, 17cm 10YR 4/2, 28cm 10YR 4/3, 38cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/14/2010 | MG, EE, JD, LR | 15m W of ST12 |
| N-1 | 14 | Negative | 34cm | 10YR 3/2, 14cm 10YR 4/3, 34cm | Very Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/14/2010 | MG, EE, JD, LR | ~60m W of ST13 |
| N-1 | 15 | Negative | 33cm | 10YR 3/2, 15cm 10YR 4/3, 33cm | Very Dark Grayish Brown, Brown | silty loam with gravel | 11/14/2010 | MG, EE, JD, LR | 15m W of ST14 |
| N-1 | 16 | Negative | 42cm | 10YR 3/2, 13cm 10YR 4/2, 35cm 10YR 4/3, 42cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | sand loam; sand loam; sand; gravel and cobbles | 11/14/2010 | MG, EE, JD, LR | 15m W of ST15 |
| N-1 | 17 | Negative | 19cm | 10YR 4/2, 16cm 10YR 4/3, 19cm | Very Dark Grayish Brown, Brown | silt loam with heavy gravel throughout | 11/14/2010 | MG, EE, JD, LR | 15m W of ST16 |
| N-1 | 18 | Negative | 45cm | 10YR 3/2, 36cm 10YR 4/3, 45cm | Very Dark Grayish Brown, Brown | silt loam | 11/14/2010 | MG, EE, JD, LR | ~75m W of ST17 |
| N-1 | 19 | Negative | 75cm | 10YR 3/2, 16cm 10YR 4/2, 60cm 10YR 4/3, 75cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam; silt loam; very compact silt loam | 11/14/2010 | MG, EE, JD, LR | 15m W of ST18 |
| N-1 | 20 | Negative | 44cm | 10YR 3/2, 19cm 10YR 4/2, 27cm 10YR 4/6, 44cm | Very Dark Grayish Brown, Dark Grayish Brown, Dark Yellowisilt loam with gravel | | 11/14/2010 | MG, EE, JD, LR | 15m W of ST19 |
| P-1 Pasture | 1 | Negative | 28cm | 10YR 3/2, 14cm 10YR 4/3, 28cm | Very Dark Grayish Brown, Brown | silt loam with some gravel throughout | 11/15/2010 | MG, EE, JD, LR | ~35m W of N/S fence for sunflowers |
| P-1 Pasture | 2 | Negative | 35cm | 10YR 3/2, 12cm 10YR 4/3, 35cm | Very Dark Grayish Brown, Brown | silt loam with some gravel | 11/15/2010 | MG, EE, JD, LR | 15m W of ST1 |
| P-1 Pasture | 3 | Negative | 34cm | 10YR 3/2, 21cm 10YR 4/3, 34cm | Very Dark Grayish Brown, Brown | silt loam with some gravel | 11/15/2010 | MG, EE, JD, LR | 15m W of ST2 |
| P-1 Pasture | 4 | Negative | 32cm | 10YR 3/2, 9cm 10YR 4/2, 21cm 10YR 4/3, 32cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/15/2010 | MG, EE, JD, LR | ~70m W of ST3 |
| P-1 Pasture | 5 | Negative | 50cm | 10YR 3/2, 15cm 10YR 4/2, 37cm 10YR 4/3, 50cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/15/2010 | MG, EE, JD, LR | 15m W of ST4 |
| P-1 Pasture | 6 | Negative | 46cm | 10YR 3/2, 16cm 10YR 4/2, 33cm 10YR 4/3, 46cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/15/2010 | MG, EE, JD, LR | 15m W of ST5 |
| P-1 Pasture | 7 | Negative | 37cm | 10YR 3/2, 9cm 10YR 4/2, 21cm 10YR 4/3, 37cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/15/2010 | MG, EE, JD, LR | 15m W of ST6 |
| P-1 Pasture | 8 | Negative | 29cm | 10YR 3/2, 11cm 10YR 4/2, 19cm 10YR 4/3, 29cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/15/2010 | MG, EE, JD, LR | 15m W of ST7 |
| P-1 Pasture | 9 | Negative | 29cm | 10YR 3/2, 6cm 10YR 4/2, 10cm 10YR 4/3, 29cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with large cobbles and gravel throughout | 11/15/2010 | MG, EE, JD, LR | 15m W of ST8 |
| P-1 Pasture | 10 | Negative | 30cm | 10YR 3/2, 7cm 10YR 4/2, 15cm 10YR 4/3, 30cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/15/2010 | MG, EE, JD, LR | 15m W of ST9 |
| P-1 Pasture | 11 | Negative | 35cm | 10YR 3/2, 10cm 10YR 4/2, 16cm 10YR 4/3, 35cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with heavy gravel throughout | 11/15/2010 | MG, EE, JD, LR | 15m S of ST10 |
| P-1 Pasture | 12 | Negative | 38cm | 10YR 3/2, 11cm 10YR 4/2, 30 cm 10YR 4/3, 38cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/15/2010 | MG, EE, JD, LR | 15m W of ST11 |
| P-1 Pasture | 13 | Negative | 37cm | 10YR 3/2, 9cm 10YR 4/2, 16cm 10YR 4/3, 37cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/15/2010 | MG, EE, JD, LR | 15m W of ST12 |

Shovel Test Soil Profiles

| Location | ST # | Negative/Positive | Final Depth | Soil | Soil Color | Soil Texture | Date | Excavators | Comments |
|--------------|------|-------------------|-------------|--|--|--|------------|----------------|--|
| P-1 Hayfield | 1 | Negative | 30cm | 10YR 5/3, 15cm 10YR 4/3, 30cm | Brown, Brown | silt loam with a small amount of gravel throughout | 11/15/2010 | MG, EE, JD, LR | ~100m W of fence |
| P-1 Hayfield | 2 | Negative | 34cm | 10YR 3/2, 9cm mottle, 21cm 10YR 4/3, 34cm | Very Dark Grayish Brown, Brown | silt loam with a small amount of gravel throughout | 11/15/2010 | MG, EE, JD, LR | 15m S of ST1 |
| R1-1 | 1 | Negative | 64cm | 10YR 3/2, 52cm 10YR 4/3, 64cm | Very Dark Grayish Brown, Brown | silt loam with no gravel | 11/16/2010 | MG, EE, JD, LR | 5m E of N/S fenceline |
| R1-1 | 2 | Negative | 55cm | 10YR 3/4, 21cm 10YR 2/1, 29 cm 10YR 4/2 mottled with 5/2, 55cm | Very Dark Grayish Brown, Black, Grayish Brown | silt loam with gravel throughout the top 2 layers | 11/16/2010 | MG, EE, JD, LR | 15m E of ST1 |
| R1-1 | 3 | Negative | 75cm | 10YR 2/2, 18cm 10YR 4/4, 33cm 10YR 2/1, 75cm | Very Dark Brown, Dark Yellowish Brown, Black | silt loam; very compact towards bottom | 11/16/2010 | MG, EE, JD, LR | 15m E of ST2 |
| R1-1 | 4 | Negative | 70cm | 10YR 3/2, 8cm 10YR 2/1, 36cm 10YR 3/2, 50cm 10YR 5/3, 70cm | Very Dark Grayish Brown, Black, Very Dark Grayish Brown, Black | silt loam with light gravel throughout | 11/16/2010 | MG, EE, JD, LR | 15m E of ST3 |
| R1-1 | 5 | Negative | 52cm | 10YR 3/2, 25cm 10YR 4/2, 42cm 10YR 4/3, 52cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with no gravel | 11/16/2010 | MG, EE, JD, LR | 15m E of ST4 |
| R1-1 | 6 | Negative | 76cm | 10YR 3/2, 46cm 10YR 4/2, 65cm 10YR 4/3, 76cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with some gravel throughout | 11/16/2010 | MG, EE, JD, LR | 15m E of ST5 |
| R1-1 | 7 | Negative | 76cm | 10YR 3/2, 20cm 10YR 2/1, 40cm 10YR 4/3, 65cm 10YR 7/2, 76cm | Very Dark Grayish Brown, Black, Brown, Light Gray | silt loam with light gravel throughout | 11/16/2010 | MG, EE, JD, LR | ~150m E of ST6 |
| R1-1 | 8 | Negative | 48cm | 10YR 3/2, 17cm 10YR 4/2, 30cm 10YR 4/3, 39cm 10YR 5/2, 48cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown, Gray | silt loam with light gravel throughout | 11/16/2010 | MG, EE, JD, LR | 15m E of ST7 |
| R1-2 | 1 | Negative | 53cm | 10YR 3/2, 20cm 10YR 4/2, 39cm 10YR 4/3, 53cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with gravel throughout | 11/16/2010 | MG, EE, JD, LR | ~75m S of road |
| R1-2 | 2 | Negative | 35cm | 10YR 2/1, 15cm 10YR 3/2, 25cm 10YR 5/3, 35cm | Black, Dark Grayish Brown, Brown | silt loam with heavy gravel and cobbles | 11/16/2010 | MG, EE, JD, LR | 15m E of ST1 |
| R1-2 | 3 | Negative | 42cm | 10YR 2/1, 18cm 10YR 3/2, 30cm 10YR 4/3, 42cm | Black, Dark Grayish Brown, Brown | silt loam with little gravel | 11/16/2010 | MG, EE, JD, LR | 15m E of ST2 |
| R1-2 | 4 | Negative | 105cm | 10YR 2/1, 46cm 10YR 4/2, 69cm 10YR 4/3, 90cm 10YR 5/4, 105cm | Black, Dark Grayish Brown, Brown, Yellowish Brown | silt loam | 11/16/2010 | MG, EE, JD, LR | 15m E of ST3 |
| R1-2 | 5 | Negative | 68cm | 10YR 2/1, 24cm 2.5Y 4/2, 50cm 2.5Y 4/3, 68cm | Black, Dark Grayish Brown, Olive Brown | silt loam with redox towards bottom and heavy shale throughout | 11/16/2010 | MG, EE, JD, LR | ~45m E of ST4 |
| R1-2 | 6 | Negative | 70cm | 10YR 2/1, 19cm 10YR 4/2, 40cm 10YR 4/3, 70cm | Black, Dark Grayish Brown, Brown | silt loam with shale and some gravel | 11/16/2010 | MG, EE, JD, LR | 15m E of ST5 |
| R2-1 | 1 | Negative | 40cm | 10YR 3/2, 15cm 2.5Y 5/3, 29cm 2.5Y 4/4, 40cm | Very Dark Grayish Brown, Light Olive Brown; Olive Brown | silt loam with light gravel | 11/16/2010 | MG, EE, JD, LR | ~_m SW of house |
| R2-1 | 2 | Negative | 53cm | 10YR 3/2, 26cm, 2.5Y 5/3, 53cm | Very Dark Grayish Brown, Light Olive Brown | silt loam | 11/16/2010 | MG, EE, JD, LR | 15m E of ST1 |
| R2-1 | 3 | Positive | 52cm | 10YR 3/2, 25cm 2.5Y 5/3, 52cm | Very Dark Grayish Brown, Light Olive Brown | silt loam | 11/16/2010 | MG, EE, JD, LR | wire nail in top 20cm; 15m E of ST2 |
| R2-1 | 4 | Positive | 60cm | 10YR 3/2, 22cm 10YR 4/2, 40cm 10YR 4/3, 60cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam; sandy silt; very compact sandy loam | 11/16/2010 | MG, EE, JD, LR | 1 cut bone frag in sod cap; 15m N of ST3 |
| R2-1 | 5 | Negative | 54cm | 10YR 3/2, 30cm 10YR 4/3, 54cm | Very Dark Grayish Brown, Brown | silt loam | 11/16/2010 | MG, EE, JD, LR | 15m E of ST4 |
| S1-2 | 1 | Negative | 34cm | 10YR 3/2, 21cm 10YR 4/3 mottled with 5/3, 34cm | Very Dark Grayish Brown, Brown, Brown | silt loam | 11/17/2010 | MG, EE, JD, LR | ~75m S of Field Road |
| S1-2 | 2 | Negative | 66cm | 10YR 3/2, 23cm 10YR 4/2, 50cm 10YR 4/3, 66cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/17/2010 | MG, EE, JD, LR | 15m E of ST1 |
| S1-2 | 3 | Negative | 33cm | 10YR 3/2, 19cm 10YR 4/3, 33cm | Very Dark Grayish Brown, Brown | silt loam | 11/17/2010 | MG, EE, JD, LR | 15m E of ST2 |
| S1-2 | 4 | Negative | 33cm | 10YR 3/2, 18cm 10YR 4/3, 33cm | Very Dark Grayish Brown, Brown | silt loam | 11/17/2010 | MG, EE, JD, LR | 15m E of ST3 |
| S1-2 | 5 | Negative | 34cm | 10YR 3/2, 20cm 10YR 4/3, 34cm | Very Dark Grayish Brown, Brown | silt loam | 11/17/2010 | MG, EE, JD, LR | 15m E of ST4 |
| S1-2 | 6 | Negative | 69cm | 10YR 3/2, 22cm 10YR 4/2, 57cm 10YR 4/3, 69cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam; clay loam; clay loam | 11/17/2010 | MG, EE, JD, LR | 15m E of ST5 |
| S1-2 | 7 | Negative | 42cm | 10YR 3/2, 27cm 10YR 4/3, 42cm | Very Dark Grayish Brown, Brown | silt loam | 11/17/2010 | MG, EE, JD, LR | 15m E of ST6 |
| S1-2 | 8 | Negative | 40cm | 10YR 3/2, 25cm 10YR 4/3, 40cm | Very Dark Grayish Brown, Brown | silt loam; clay loam | 11/17/2010 | MG, EE, JD, LR | 15m E of ST7 |
| S1-2 | 9 | Negative | 48cm | 10YR 3/2, 29cm 10YR 4/3, 48cm | Very Dark Grayish Brown, Brown | silt loam/clay loam | 11/17/2010 | MG, EE, JD, LR | 15m E of ST8 |
| S1-2 | 10 | Negative | 46cm | 10YR 3/2, 15cm 10YR 4/2, 35cm, 10YR 4/3, 46cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam/silt clay loam; clay loam | 11/17/2010 | MG, EE, JD, LR | 15m E of ST9 |
| S1-2 | 11 | Negative | 71cm | 10YR 3/2, 27cm 10YR 4/2, 61cm 10YR 4/3, 71cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam | 11/17/2010 | MG, EE, JD, LR | 15m E of ST10 |
| S1-2 | 12 | Negative | 57cm | 10YR 3/2, 18cm 10YR 4/2, 31cm 10YR 4/3, 57cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam; silt clay loam; clay loam | 11/17/2010 | MG, EE, JD, LR | 15m E of ST11 |
| S1-2 | 13 | Negative | 35cm | 10YR 3/2, 21cm 10YR 4/3, 35cm | Very Dark Grayish Brown, Brown | silt loam | 11/17/2010 | MG, EE, JD, LR | 15m E of ST12 |
| S1-2 | 14 | Positive | 38cm | 10YR 3/2, 17cm 10YR 4/3 mottled with 10YR 5/3, 38cm | Very Dark Grayish Brown, Brown | silt loam; silt sand loam with gravel and cobbles | 11/17/2010 | MG, EE, JD, LR | 1 small glass frag; 15m E of ST13 |
| S1-3 | 1 | Negative | 48cm | 10YR 3/2, 19cm 10YR 4/2, 29cm 10YR 4/3, 48cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with heavy gravel and cobbles | 11/17/2010 | MG, EE, JD, LR | ~10m W of Fence |
| S1-3 | 2 | Negative | 25cm | 10YR 3/2, 10cm 10YR 4/3, 25cm | Very Dark Grayish Brown, Brown | silt loam with cobbles at base of test | 11/17/2010 | MG, EE, JD, LR | 15m W of ST1 |
| S1-3 | 3 | Negative | 50cm | 10YR 3/2, 33cm 10YR 4/2, 39cm 10YR 4/3, 50cm | Very Dark Grayish Brown, Dark Grayish Brown, Brown | silt loam with cobbles at base of test and gravel throughout | 11/17/2010 | MG, EE, JD, LR | 15m W of ST2 |
| S1-3 | 4 | Negative | 41cm | 10YR 3/2, 28cm 10YR 4/3, 41cm | Very Dark Grayish Brown, Brown | silt loam/clay loam | 11/17/2010 | MG, EE, JD, LR | 15m W of ST3 |

Appendix C: Geomorphological Model

**GEOMORPHOLOGICAL MODEL FOR LOCATING AREAS WITH
POTENTIAL FOR DEEPLY BURIED ARCHAEOLOGICAL DEPOSITS
ALONG THE CENTER TO GRAND FORKS 345 KV TRANSMISSION
LINE CORRIDOR IN NORTH DAKOTA.**

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INTRODUCTION

Geomorphological modeling of the proposed Center to Grand Forks Transmission Line corridor is focused on the identification and mapping of landforms and/or deposits that may have potential to contain deeply buried (>0.5 m below the modern surface) archaeological deposits. Potential is a qualitative measure of the likelihood that a particular geologic environment will contain archaeological deposits in primary context. During the assessment, archaeological variables (settlement and subsistence patterns for example) are not considered. Rather, three major geomorphic criteria are used when assigning a level of potential: (1) age of the deposits, (2) depositional environment, and (3) post-depositional modifications (Hudak and Hajic 2002). Human occupation within the project area occurred from the Late Pleistocene through Holocene (<14,000 ¹⁴C yrs BP). Consequently, sediments deposited during this time span are considered as having chronological potential. Depositional environments most conducive to burying and preserving the primary context of the archaeological assemblage are eolian (dunes, sand sheets, loess sheets), fluvial vertical accretion (floodplains, terraces, alluvial fans), near shore lacustrine, sheet wash colluvium, and mass-wasting off slopes. Post depositional modifications that may disturb the context of the archaeological deposits are pedogenic processes such as bioturbation and shrink-swell in clayey soils, and historic anthropogenic activities such as mining, agriculture, and various construction activities.

The three levels of potential and the criteria for their selection are listed below (modified from Hudak and Hajic 2002, Monaghan et al. 2006, Mayer and McFaul 2008)

High Potential: depositional style yields stratigraphic sequences that are conducive to preserving buried archaeological deposits in primary contexts and with the potential for separation of some of the archaeological components in stacked paleosols or in accretionary deposits with relatively high sedimentation rates.

Moderate Potential: (1) depositional style yields stratigraphic sequences that are conducive to preserving buried archaeological deposits but with possible physical modifications to the primary cultural context or; (2) landforms that are likely to have potential for buried archaeological deposits but the stratigraphic contexts of these landforms is unknown or geographically variable.

Low Potential: deposits that are too old or too thin to contain buried archaeological deposits in primary context or deposits that accumulated in high-

energy depositional environments, fluvial channels for example, where any contained archaeological deposits are not in primary context.

PREVIOUS RESEARCH

Previous research covers investigations of geologic environments where archaeological deposits may be preserved. In North Dakota most of the deposits of Late Wisconsinan and Holocene age are classified as the Oahe Formation (Clayton et al. 1980). The one exception pointed out by Clayton et al (1980) and relevant here are the early Holocene Lake Agassiz beach deposits that are, because of their grain-size and lack of organics, a part of the Coleharbor Group which underlies the Oahe Formation. The Oahe Formation includes sediment deposited in eolian, fluvial, and lacustrine/paludal depositional environments. The Oahe Formation is subdivided into four members (oldest to youngest): (1) Mallard Island, (2) Aggie Brown, (3) Pick City, and (4) Riverdale (Clayton et al 1980, Clayton and Moran 1976). The Mallard Island Member is Late Wisconsinan in age and tends to occur in areas not glaciated during the Late Wisconsinan and in lacustrine environments (Clayton et al 1976 and 1980). The Aggie Brown Member is Late Wisconsinan through middle Holocene in age and is often marked by the distinctive Leonard Paleosol in eolian depositional environments. The Pick City Member is middle Holocene in age and the Riverdale Member is late Holocene in age (Clayton et al 1980). The Riverdale Member contains the Thompson paleosol in its lower part. Characteristics of the Oahe Formation vary in the different depositional settings in which it occurs with reference to presence and strength of development of paleosols, texture, and fossil content.

Eolian Environments

The eolian deposits of the Oahe Formation consist of relatively well-sorted sand in dunes and sand sheet, and silt (loess) that forms a blanket-type deposit on uplands and high terraces (Clayton et al. 1976). The Oahe Formation is most complete in eolian depositional settings where thick sequences of loess occur. Thick loess sequences are not ubiquitous but are preserved in landscape positions where slopes are less than about 5° (Clayton et al 1976) and on the lee side of ridges (southeast, east and south sides) and in swales and lows on uplands. In general the upland eolian deposits are thickest (1-2 m) along Missouri River valley (and to the west outside of the project corridor) and thin to the east where they are 0.2 to 1 meter thick (see map in Clayton et al. 1976). Dunes occur where there is a sand source especially on outwash plains and in spillways/meltwater stream valleys.

Lacustrine Environments

The Oahe Formation has been documented in lakes, ponds and sloughs especially in central and eastern North Dakota (Clayton et al 1980, Bickley and Clayton 1972). The members above the Mallard Island Member are mostly silt and clay textured, stratified lacustrine deposits that often contain fossils. Water levels in these small basins certainly fluctuated with broad climatic shifts and wet and dry period on a century to decadal scale (Last 1984, Laird et al. 1996, Yansa 1998) causing the shorelines' positions to fluctuate up and down (mini- regressions and transgressions).

Fluvial

River and alluvial fan sediments in the Oahe Formation are stratified channel and overbank deposits that contain weakly developed paleosols (Clayton et al 1980). Most of the exposed river sediment is a part of the Riverdale Member (Clayton et al 1980, Running 1996).

Geoarchaeology

The Oahe Formation is the stratigraphic framework for understanding context where buried archaeological sites may and do occur. A thorough review of geoarchaeological research in North Dakota as well as the historic context of that research is presented by Artz (1995, 2000) Archaeological deposits have been documented in fluvial and eolian members of the Oahe Formation. Geologic contexts of many of these sites are summarized by Artz (1995) with details in the archaeological literature.

METHODS

Four data sets are used to determine the level of potential for landforms in the study area: (1) extant geological and geoarchaeological publications and maps, (2) contour maps (1:24,000 scale), (3) NRCS soil maps on Web Soil Survey (USDA nd), and (4) aerial photographs.

Data sources have some limitations when applied to locating buried archaeological deposits and especially when trying to assess the potential conditions of the archaeological record at a particular locality. Surficial geology map units are small-scale making them limited at the scale of archaeological phenomena but do provide a broad landscape context for understanding landforms and deposits. Soil maps are larger scale but still too small scale to capture detail in many of the depositional settings where buried archaeological sites may occur. Soil mapping is based on the idea of a type soil (soil series) that is tied to a landscape segment and parent

material defined at the type section. The soil is then mapped by essentially extrapolating to similar landscape segments over a large area with minimal field verification (Soil Survey Staff 1951, see Holliday 2004, p. 57 for limitations of soil surveys for soil-stratigraphic studies). However, soil maps, especially when used with topographic maps, are a widespread and relatively accurate proxy for determining depositional environments that is critical in predicting the potential for buried archaeological deposits.

Landforms and deposits that have potential to contain buried archaeological deposits are not all equally “visible” using the above non-field techniques of identification. Landforms with high visibility have distinctive well-defined morphology and soil types, and therefore can be plotted relatively accurately using maps and aerial photographs. These include river valley bottoms and associated macro-landforms (terraces and channel belts for example), dune fields, alluvial fans, and colluvial slopes.

Landforms with moderate visibility have poorly defined morphology with multiple soil series and/or are too small to be captured in the soil mapping and therefore their boundaries will be gradational because the geologic phenomena is gradational or because the topographic-soils-aerial photo data resolution is too low. These include isolated low dunes, vertical accretion tributary alluvium, some meso-scale alluvial landforms on low terraces and floodplains. Field observations and probably subsurface investigation would be necessary to more accurately delineate the landform boundaries at an archaeological scale of investigation.

Landforms with low visibility have almost no morphological expression and are not visible on soil maps due to their generic parent material or small size. The existence of these landforms/deposits has been noted by other researchers based on field investigations and may or may not be geographically extensive. These are the loess sheets and sand sheets.

The first step in the process of mapping the potential for buried archaeological deposits is to examine the extant literature and determine (1) the context of known buried archaeological deposits, and, where possible, (2) the nature and location of Late Pleistocene and Holocene landforms. The second step uses soil maps/aerial photos and 1:24,000 scale topographic maps to determine where along the corridor landforms with potential for buried archaeological sites are located. This is an iterative process that involved finding landforms on topographic maps, such

as stream valleys or paleoshorelines, checking the soil types in those areas, then delineating the portion of the landscape where potential for deeply buried sites occurs.

Each landform will be assigned a level of potential for the presence of buried archaeological sites using the context of known buried sites and reconstructions from the literature of Holocene and late Pleistocene depositional environments and stratigraphic sequences.

The third step is to plot localities with high and moderate potential for buried archaeological deposits within the 1000 ft wide study corridor on 1:24,000 topographic maps. Landforms are determined by morphology as expressed on the topographic maps and by the distribution of soil series associated with those landforms and are listed in Table 1. Tonal changes on aerial photos will also be used to aid in the placement of landform boundaries.

RESULTS

The proposed transmission line corridor crosses North Dakota west to east from the older glaciated terrain of the Missouri Plateau near Center, across the Missouri River valley, then across the Late Wisconsinan glacial deposits on the Missouri Coteau and in the lowlands to the east, and then across the abandoned basin of Lake Agassiz to Grand Forks. Due to differences in age and the dominant geologic processes the landscapes these different physiographic regions are very different.

Localities with high, moderate, and moderate to low potential for deeply buried archaeological deposits are plotted on the 1:24,000 scale maps provided by the client (see Appendix B). These potentials are also shown in table form in Appendix A. Low potential localities were eliminated during the first pass through the data.

Eolian Landforms and Depositional Environments

Three eolian landforms occur in the project corridor: (1) loess blankets, (2) dunes, and (3) sand sheets. Loess blankets and sand sheets have very subtle morphological expression making them difficult to delineate on 1:24,000 topographic maps. Boundaries must be estimated from geologic maps and soil maps. Loess occurs in varying thicknesses along the entire corridor due to differential preservation. As stated earlier the thicker loess occurs near the Missouri River valley on slopes of less than 5° and on the lees side of ridges and in saddles and swales in

uplands. Well-developed paleosols occur in the thicker sequences indicating prolonged periods of geomorphic stability. Paleosols have high potential for buried archaeological deposits. In the thinner loess deposits paleosols soils may be welded with the surface soils creating a thick dark upper solum that also may contain buried archaeological deposits.

Dunes have a distinctive morphological expression especially if they occur in dune fields. Sand sheets do not have a distinct morphology but can often be detected by the soil type present. Geomorphic stability of sandy deposits is dependent on a number of geomorphic variables that are often tied to climate and land-use through their effects on vegetative cover.

Fluvial Landforms and Depositional Environments

Fluvial landforms are channel belts, floodplains, alluvial terraces, meltwater stream terraces and alluvial fans. In the lower order streams channel belts, floodplains, and low terraces cannot be separated using the data at hand so are referred to as valley bottoms. These landforms can likely be differentiated in the field. Small alluvial fans also cannot necessarily be delineated with the data at hand but they are assumed (for the purpose of this report) to be present at the mouths of tributary valleys along valley margins. These areas should be deep tested. Larger fans are visible on the 1:24,000 scale maps and do contain buried sites in fluvial and other depositional contexts (Running 1996).

Lacustrine Landforms and Depositional Environments

Two lacustrine geomorphic settings with potential for deeply buried archaeological deposits are present within the transmission line corridor: (1) shoreline zones around small lakes, ponds, and sloughs of glacial origin, and (2) shoreline complexes formed in proglacial Lake Agassiz. Small inland water bodies are resource loci that are utilized by human populations. Water levels in these lakes have fluctuated over the time span of the Holocene creating a shoreline zone where transgressions and regressions have occurred. Archaeological sites in the shoreline zone associated with low water can be buried and preserved during periods of high water. Intensive review of paleoenvironmental studies of lakes in the northern plains would likely provide data on the width of the active shoreline zone in different types of lakes.

Lake Agassiz was established in the southern end of the basin during the Cass and Lockhart Phases between 11,600 and 11,000 BP at which time its outlet was to the south through River Warren (Minnesota River valley) (Teller 1985). Beaches crossed by the transmission line

corridor formed during this time period. During the Moorehead Phase (11,000 and 9900 BP) the retreat of the glacial ice opened outlets to the east causing water levels drop precipitously exposing the former lake bottom to subaerial processes including soil formation and possibly human settlement. A re-advance of the glacier during the Emerson Phase (9900-9500 BP) cause water levels to rise in the southern part of the basin and the outlet again became the River Warren. During this time the lower beaches crossed by the transmission line corridor were formed. Archaeological deposits could be buried at these shoreline locations by nearshore lacustrine processes when Lake Agassiz was present or after the shorelines were abandoned by eolian or fluvial processes.

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Appendix A

Deep Test Locality Soil and Geomorphic Data

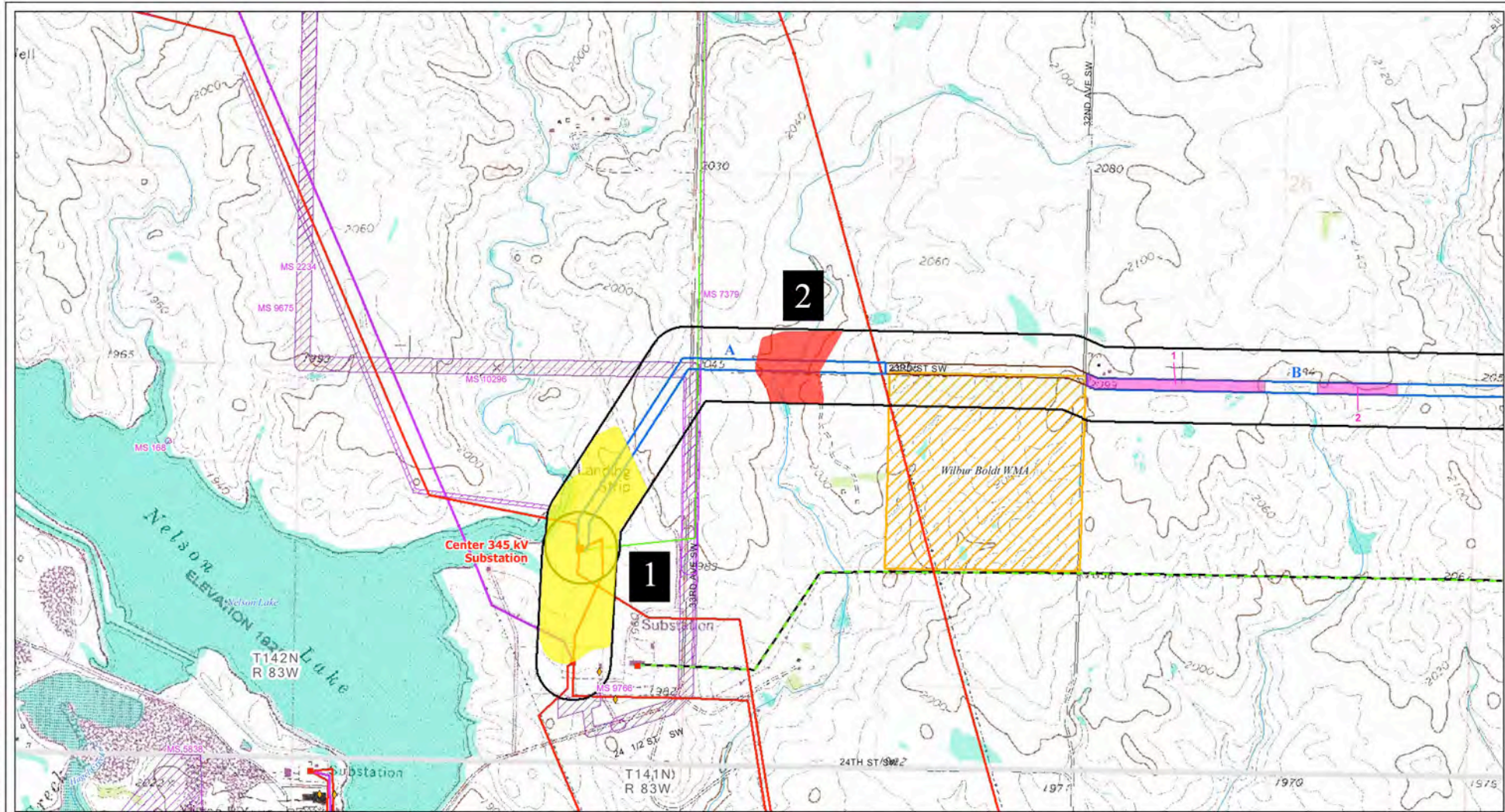
| Locality # | Locality Name | HDR Page # | Landform | Soil Series | Deposits | Geologic Potential |
|------------|--------------------------------|------------|---|-----------------------------------|---------------------------------|--------------------|
| 1 | Nelson Lake | 1 | terace & alluvial fans | Arnegard, Williams | alluvium & till | moderate |
| 2 | Intermittent Stream 1 | 1 | valley bottom | Belfield, Daglum | allivium | moderate - low |
| 3 | Missouri River Trib 1 | 4 | alluvial fans/valley margin & valley bottom | Straw, Arnegard | alluvium | moderate |
| 4 | Sherk Creek | 4 & 5 | valley bottom & alluvial fans | Regan, Straw | alluvium | high |
| 5 | Missouri River Trib 2 | 4 | valley bottom, alluvial fans, terrace | Lehr, Straw, Arnegard | alluvium | high |
| 6 | Missouri River N | 5 | channel belt, floodplain & terraces | Havrelon, Mandan | alluvium | high |
| 7 | Missouri River S | 5 | alluvial fan, channel belt, floodplain & terraces | Havrelon, Harriet | alluvium | high |
| 8 | Missouri River East Uplands | 6,7 & 8 | valley bottoms & uplands with < 5° slopes | Temvik, Linton, Mandan and others | loess & alluvial | moderate |
| 9 | Intermittent Stream 2 | 7 | valley bottom & alluvial fan | Temvik, Arnegard | alluvium | moderate |
| 10 | Yanktonai Lake | 9 | valley bottom, high terrace and upland | Temvik, Harriet, Rhodes Complex | alluvium & loess | moderate |
| 11 | Yanktonai Creek | 9 | valley bottom & high terrace | Harriet | alluvial & loess | moderate |
| 12 | Grass Lake Inlet | 13 | valley bottom | Heil, Arnegard | alluvial | moderate |
| 13 | Painted Woods Creek | 14 & 15 | valley bottom | Harriet, Grail, Arnegard | eoilan & alluvial | moderate |
| 14 | ephemeral stream/wetland | 26 | lake edge & alluvail fan | Southham | lacustrine/colluvial & alluvial | moderate |
| 15 | Mertz Slough Shoreline & Inlet | 32 | lake edge & valley bottom | Parnell | lacustrine & alluvial | moderate |
| 16 | James River 1 | 38 | valley bottom, dunes & high terraces | Lowe, Egeland, Embden, Arvilla | alluvial & eolian | high |
| 17 | Alluvial Fan | 40 | alluvial fan | Emrick, Larson | alluvium | moderate |
| 18 | Rosefield Slough 1 | 48 | valley bottom | Lowe | alluvial | moderate-low |
| 19 | Rosefield Slough 2 | 48 | valley bottom & margin (dammed lake) | Lowe & Hecia | (dammed lake) alluvial & eolian | moderate - low |
| 20 | Rocky Run 1 | 49 | valley bottom | Lowe | alluvial | moderate to low |

| | | | | | | |
|----|-------------------------|---------|--|--|------------------------------|-----------------|
| 21 | Rocky Run 2 | 50 | valley bottom | Lowe | alluvial | moderate to low |
| 22 | Rocky Run 3 | 50 | valley bottom | Lowe | alluvial | moderate to low |
| 23 | Trib James River | 52 | valley bottom | Lowe | alluvial | moderate |
| 24 | James River 2 | 52 | channel belt, floodplain terrace, alluvial fan | Ludden, La Prairie | alluvium | high |
| 25 | Intermittent Stream3 | 55 | valley bottom | Lowe | alluvial | moderate to low |
| 26 | Intermittent Stream 4 | 56 | valley bottom & dunes ? | Lowe, Hecia, Towner | alluvial & eolian | moderate |
| 27 | Spillway Wetland | 57 | valley bottom/lake | Southham | alluvial & lacustrine | moderate |
| 28 | Baldhill Ceek | 64 | valley bottom | Lowe | alluvial | moderate to low |
| 29 | Spillway Wetland | 66 | abandoned lake & alluvial fans? | Southham | alluvial & lacustrine | moderate |
| 30 | Lake Norway | 67 | lake/shorelines | NA | lacustrine | moderate to low |
| 31 | Trib Sheyenne River | 70 | high terrace & valley bottom | Walsh, Swenoda, Barnes, Embden, Dicky | alluvial & eolian | moderate |
| 32 | Sheyenne River S | 70 | high terrace, floodplain, channel belt & alluvail fans | LaDelle, Ludden, Walsh | alluvial | high |
| 33 | Sheyenne River N | 71 | high terrace, floodplain, channel belt | LaDelle, Ryan, Ludden | alluvial | high |
| 34 | Pickeral Lake Creek | 72 | valley bottom | Lowe | alluvial | moderate to low |
| 35 | Goose Creek | 80 | valley bottom | Lowe | alluvial | moderate to low |
| 36 | Spring Creek 1 | 82 | valley bottom | Lowe | alluvial | moderate to low |
| 37 | Spring Creek 2 | 81 | valley bottom | Lowe | alluvial | moderate to low |
| 38 | Lake Aggassiz Shoreline | 83 & 84 | paleoshoreline | Antler, Renshaw, Divide, Colvin | nearshore lacustrine, eolian | moderate |
| 39 | Goose River | 84 | valley bottom | LaDella, Zell | alluvial | high |
| 40 | Little Goose River | 84 | valley bottom | LaDella, Lamoure | alluvial | high |
| 41 | L. Agassiz shoreline | 87 | paleoshoreline | Wyndmere, Hecia, Maddlock, Bearden, Antler, Renshaw, Divide, Covin | nearshore lacustrine, eolian | moderate |

| | | | | | | |
|----|---|----|--------------------------------|--|--|----------|
| 42 | L. Agassiz Shoreline N | 88 | paleoshoreline | Hecia, Maddock, Hamar, Marysland, Arvilla, Tiffany | nearshore lacustrine, eolian | moderte |
| 43 | L. Agassiz Shoreline S | 88 | paleoshoreline | Hecia, Maddock, Hamar, Marysland, Arvilla, Tiffany | nearshore lacustrine, eolian | moderate |
| 44 | EnglishCouleer/Lake Agassiz Shoreline Complex | 89 | paleoshoreline & valley bottom | Towner, Marysland, Arvilla, Antler, Velva | alluvial, eolian and near shore lacustrine | high |
| 45 | L. Agassiz Shoreline/English Coulee | 90 | valley bottom & paleoshorelne | Arvilla, Antler, Rockwell, Gilby, Sioux | alluvial and near shore lacustrine | high |
| 46 | L. Agassiz Shoreline/English Coulee trib | 90 | valley bottom & paleoshorelne | Arvilla, Antler, Rauville | alluvial and near shore lacustrine | moderate |
| 47 | Lake Agassiz Shoreline | 91 | paleoshoreline | Arvilla, Embden, Antler | near shore lacustrine | |
| 48 | English Coulee Trib | 92 | valley bottom & upland margin | Ojata, Zell-La Delle, Renshaw | alluvial | moderate |
| 49 | Intermittent stream/paleochannel | 94 | valley bottom & upland margin | Bearden, Lallie | alluvial | moderate |
| 50 | English Coulee Ditch | 95 | valley bottom & upland margin | Bearden, Ojata | alluvial | moderate |

Appendix B

Location of Deep Test Localities on 1:24,000 Topographic Maps

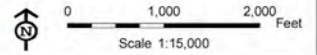


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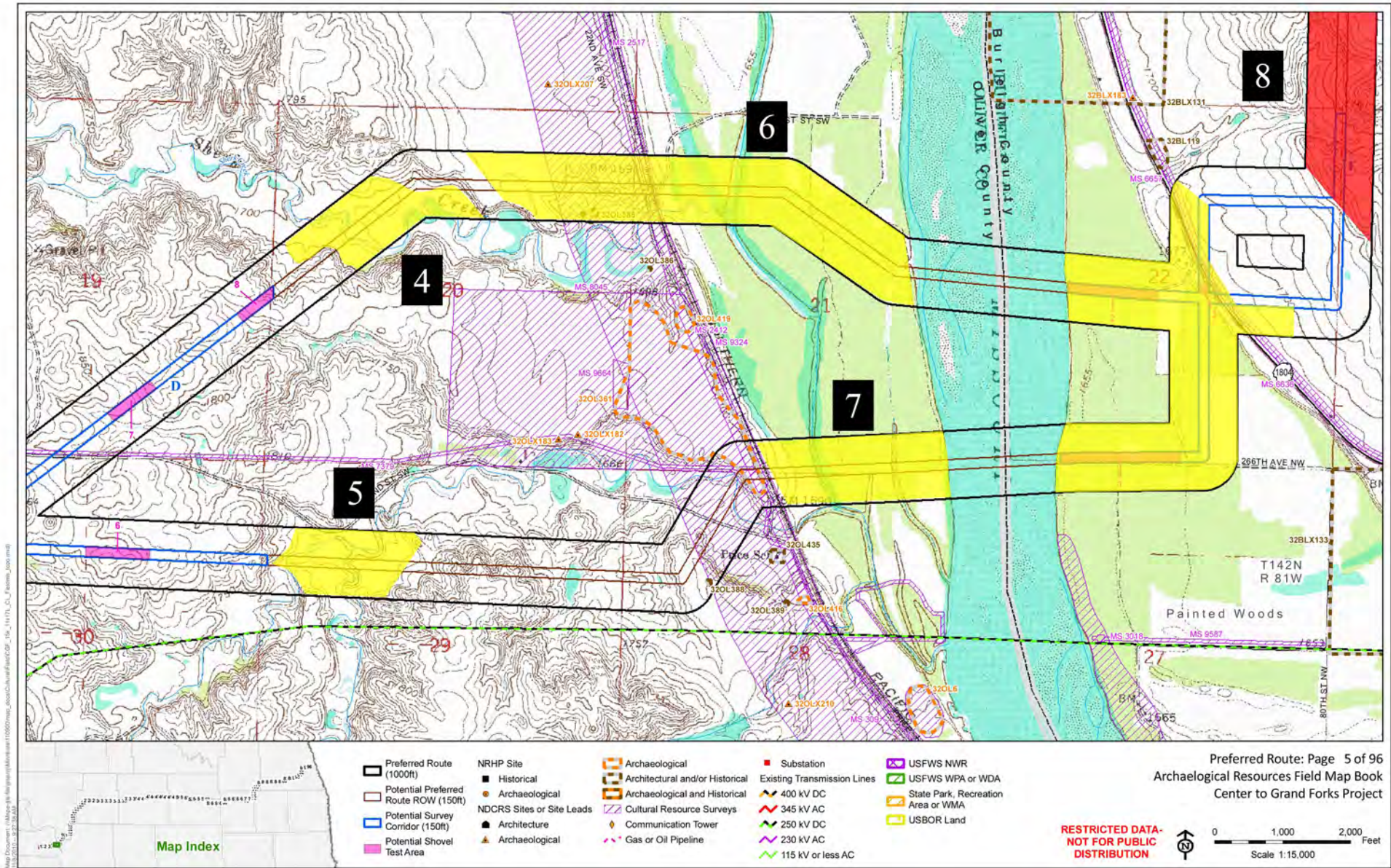
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Preferred Route: Page 1 of 96
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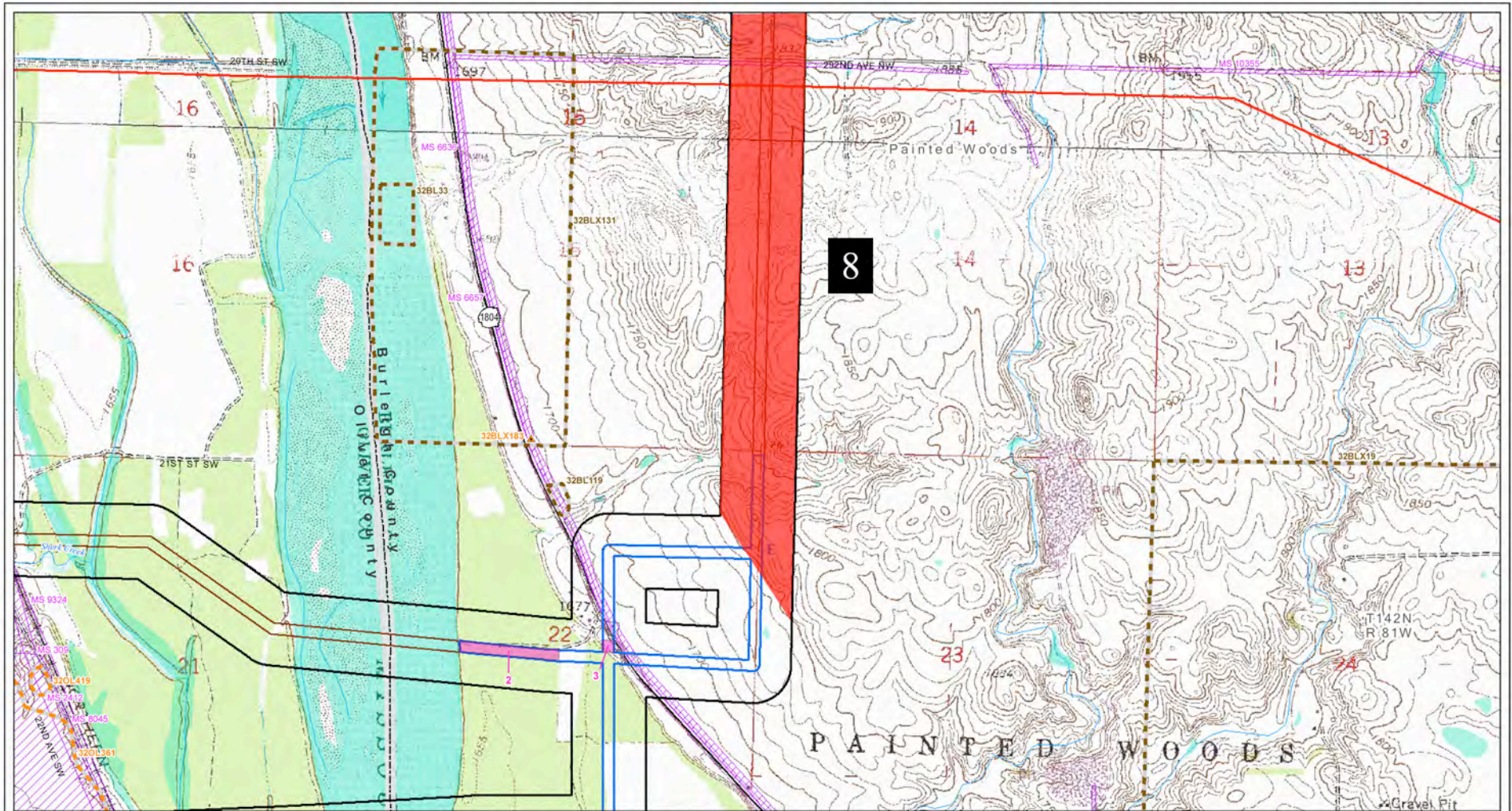
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- High Geologic Potential
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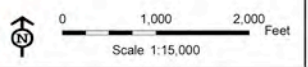
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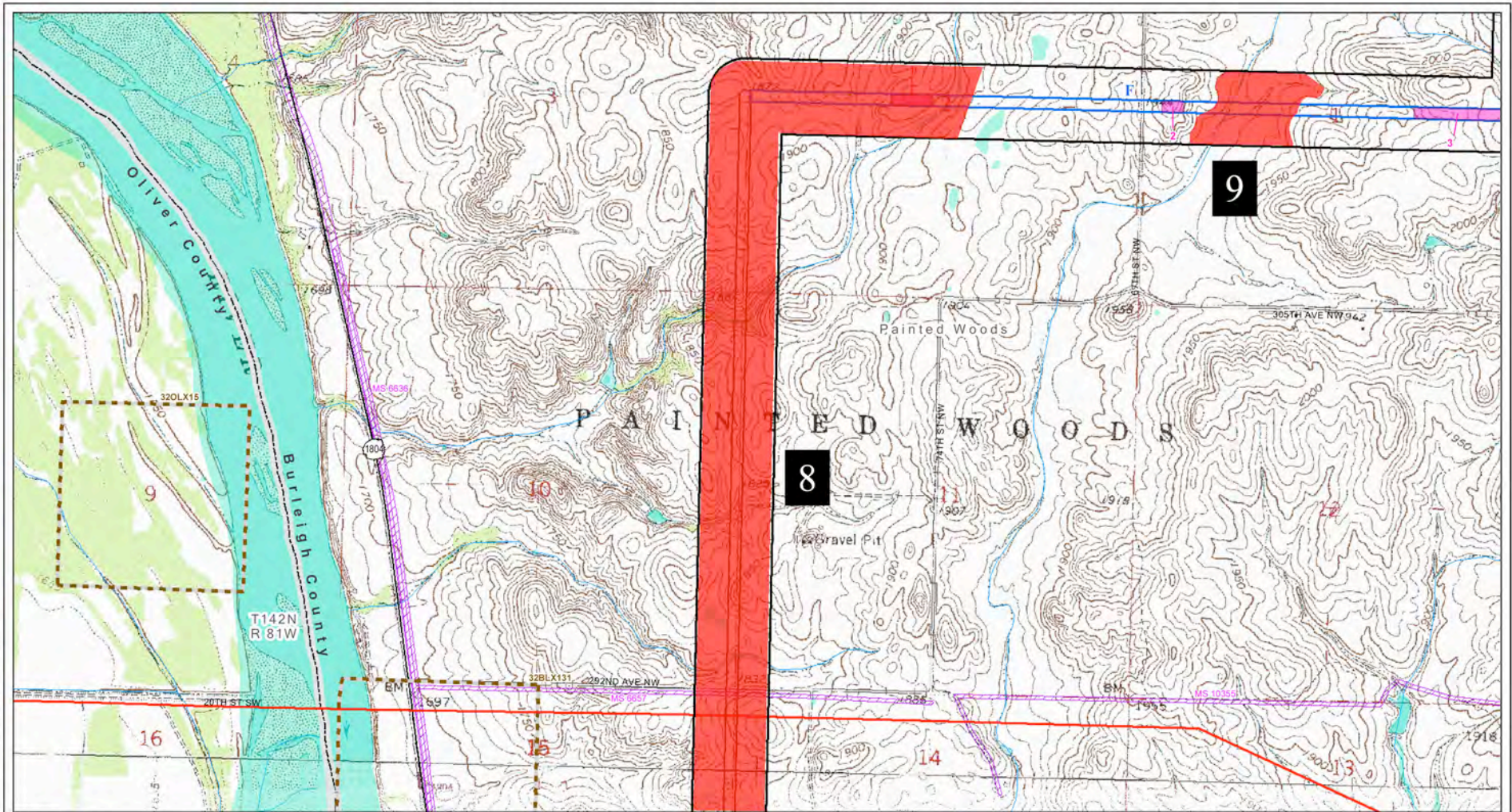
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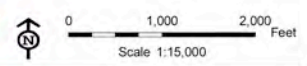
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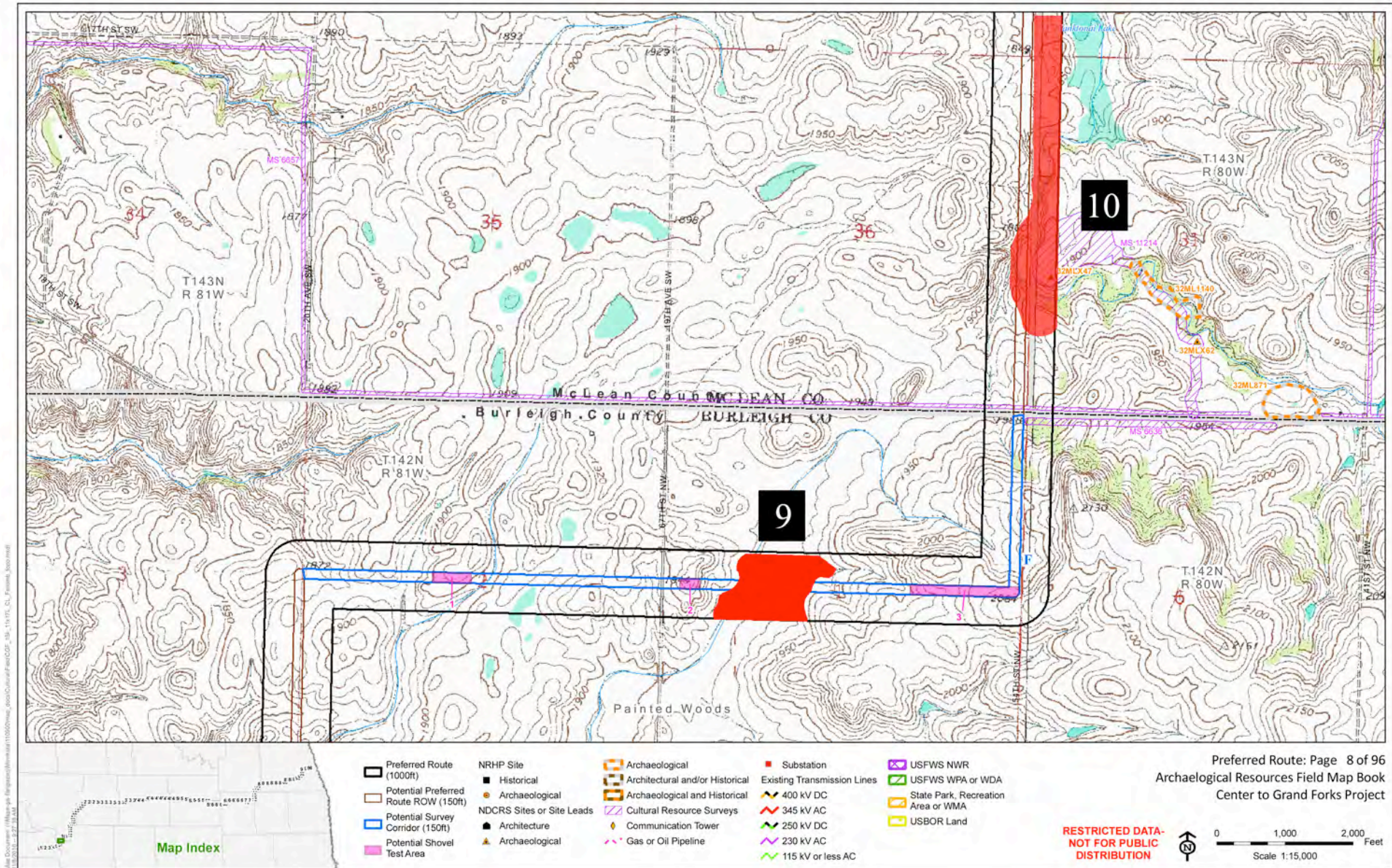
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Archaeological Resources Field Map Book
Center to Grand Forks Project

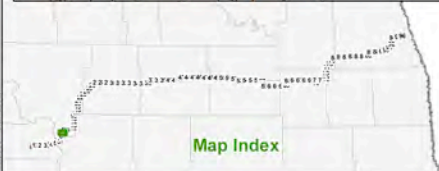
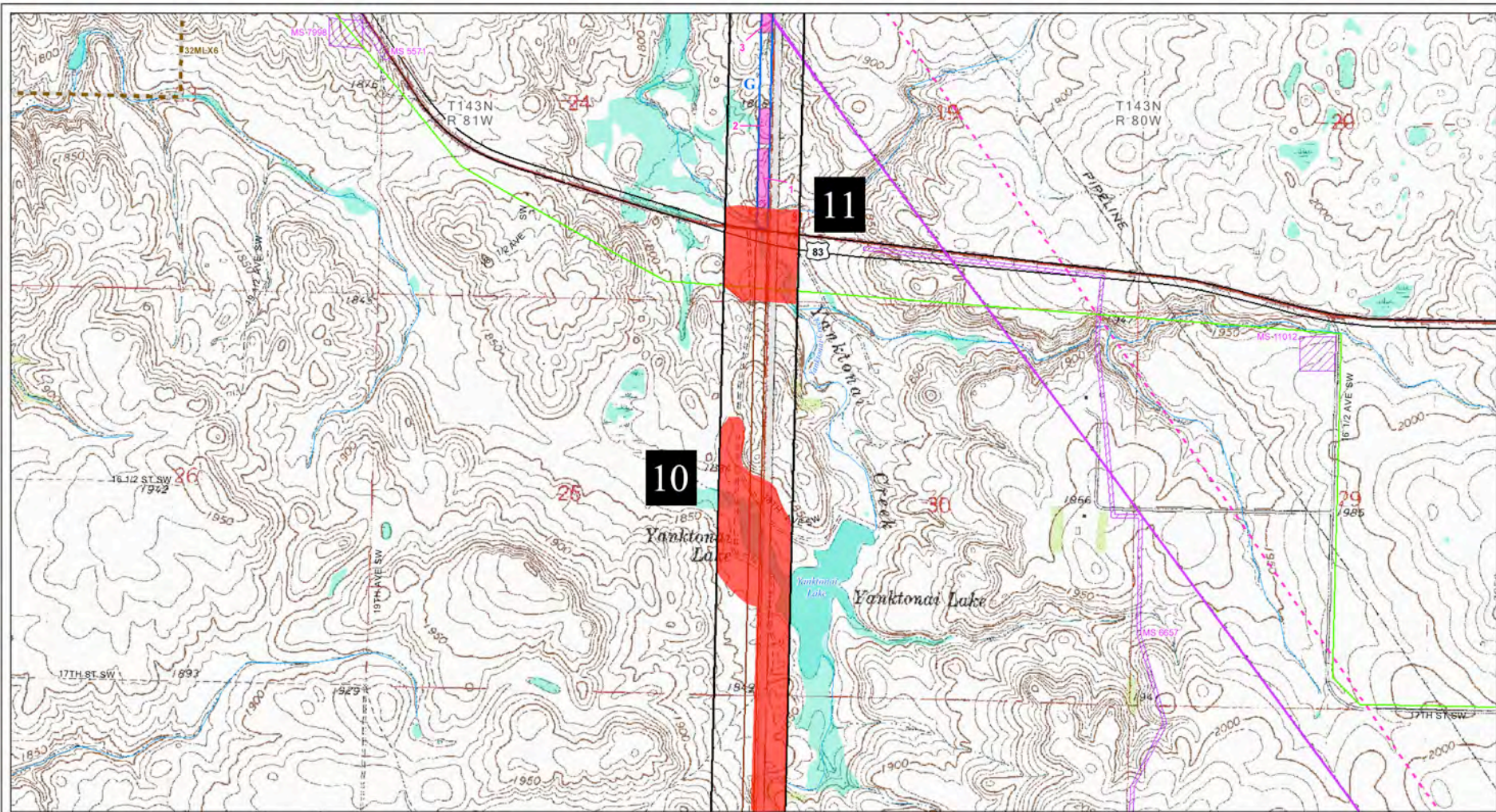
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- High Geologic Potential
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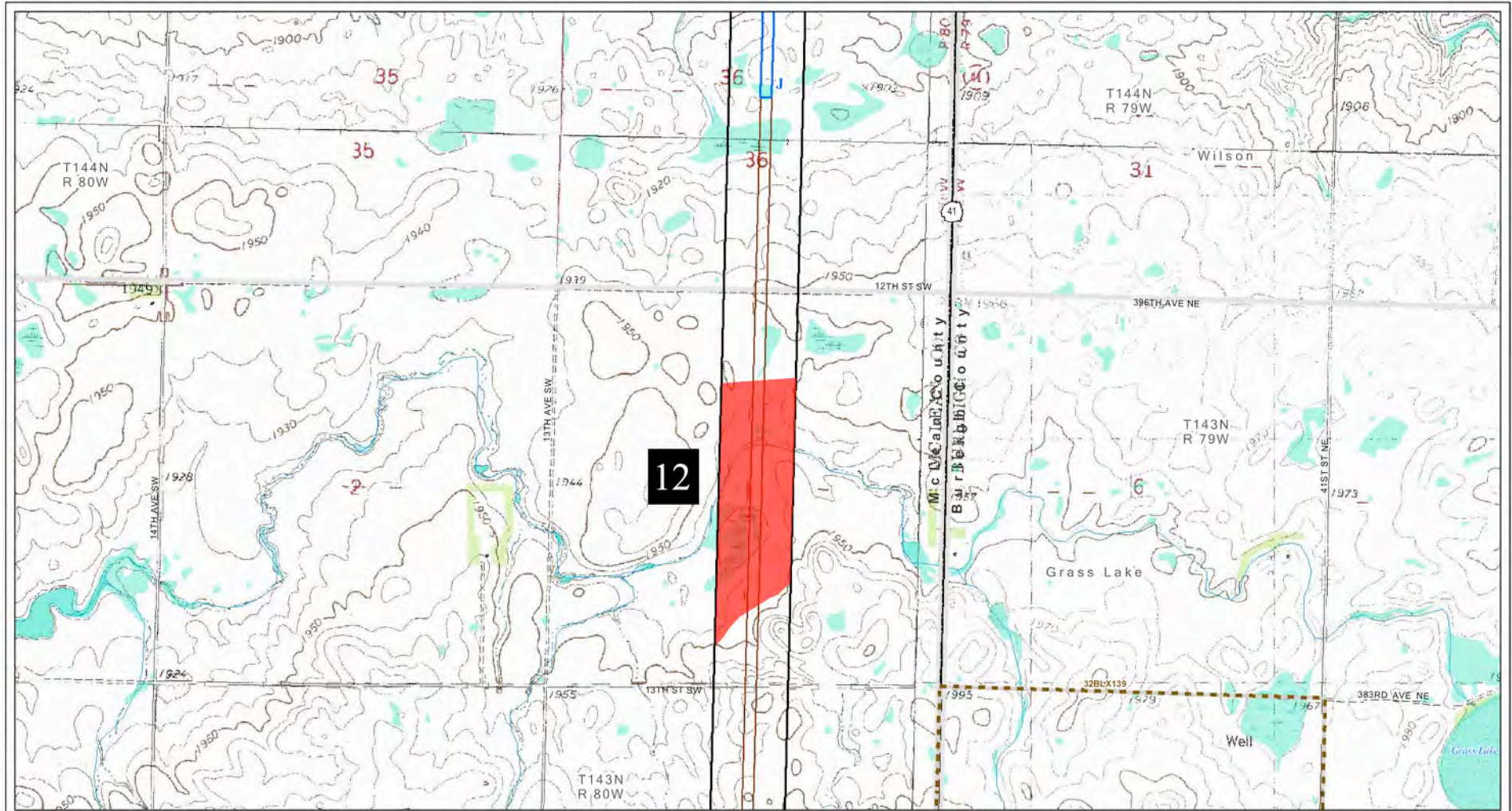
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| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC | USBOR Land |
| | Architecture | Communication Tower | 250 kV DC | |
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Scale 1:15,000

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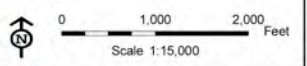
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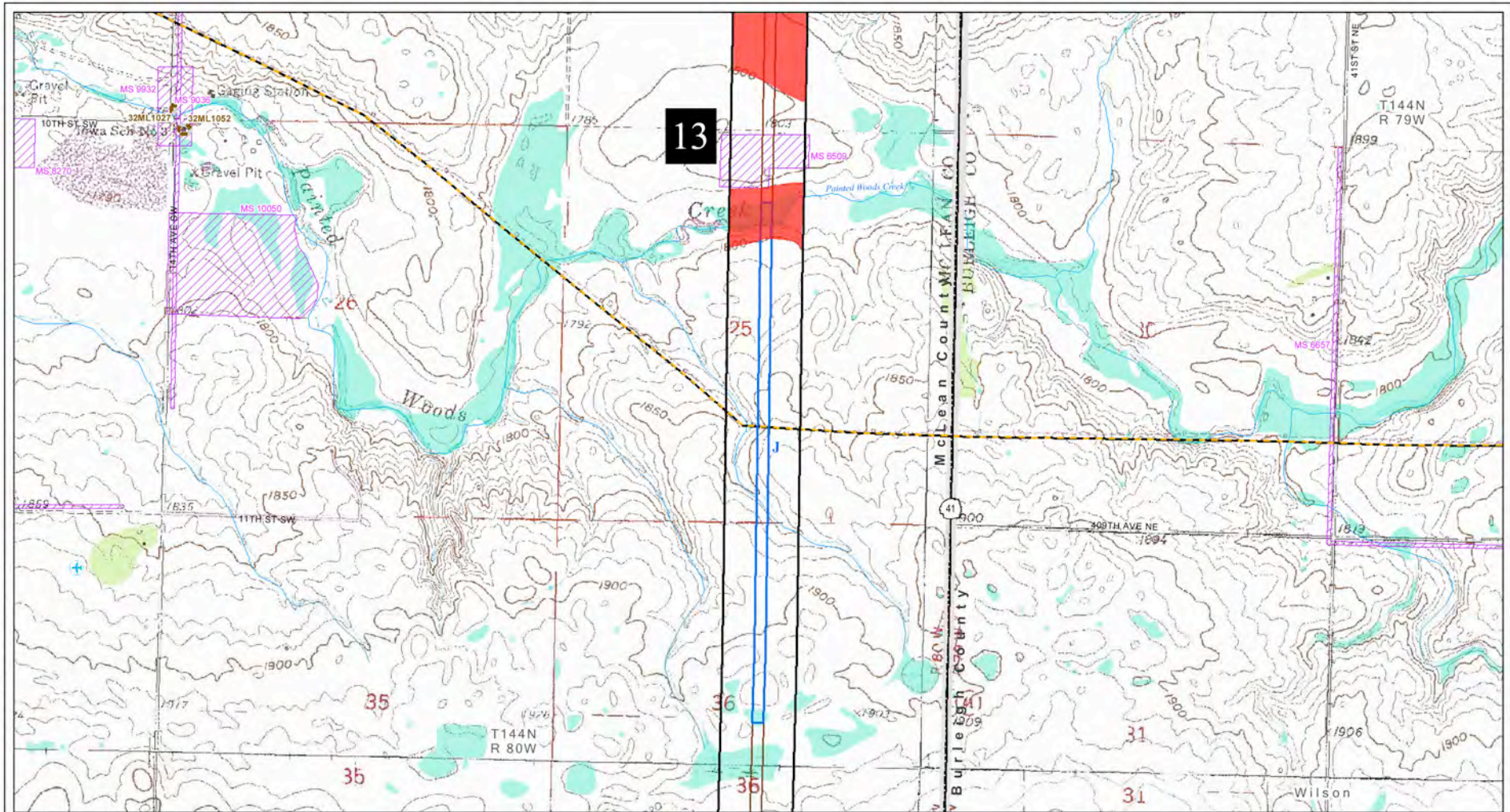
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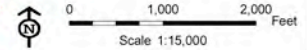
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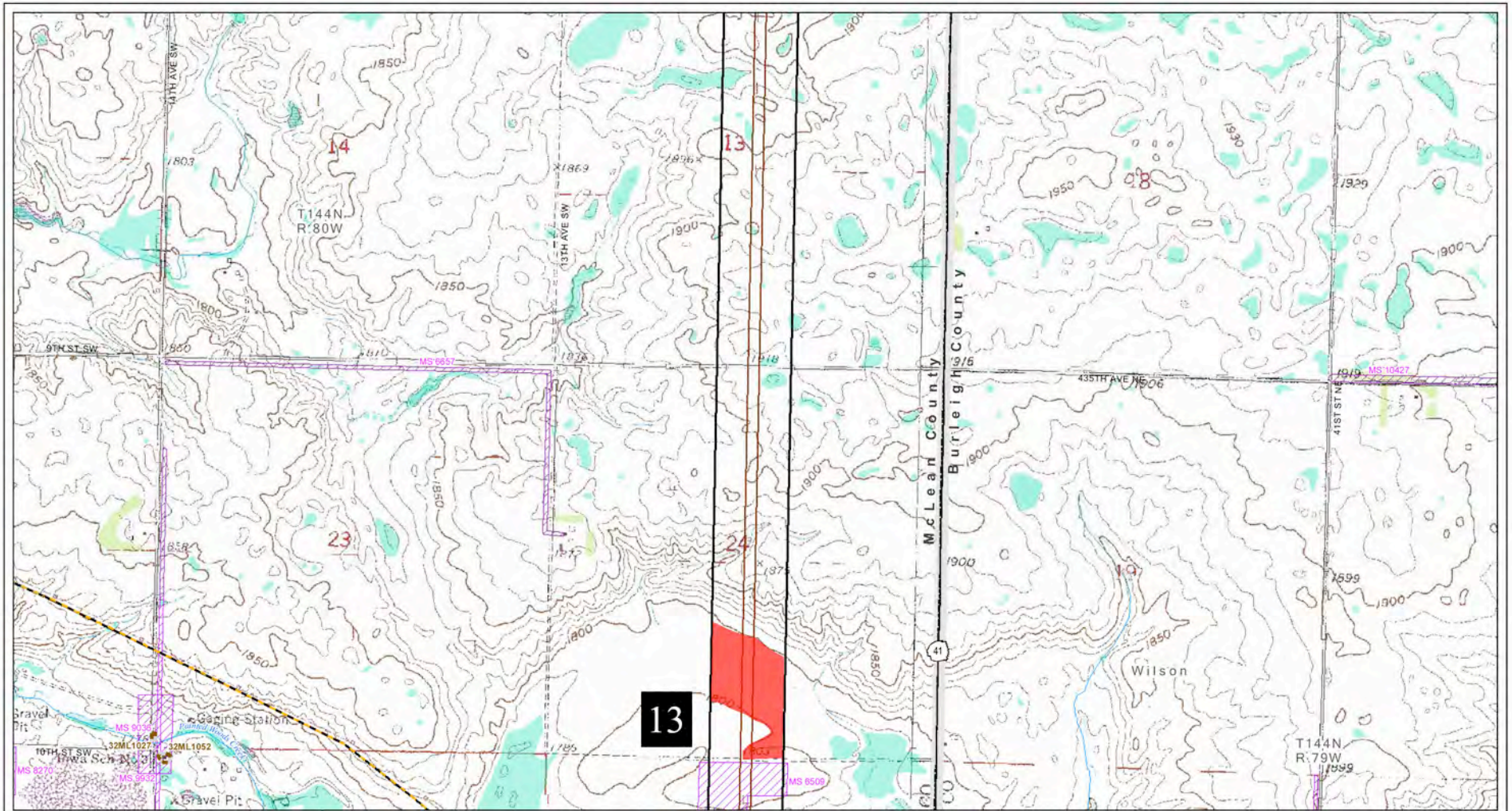
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Preferred Route: Page 14 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project

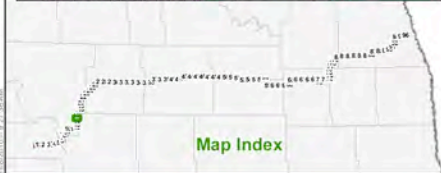
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- Moderate - Low Geologic Potential



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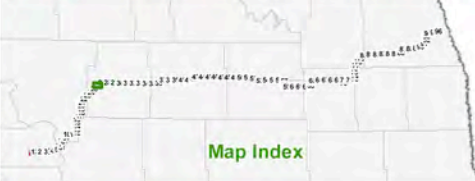
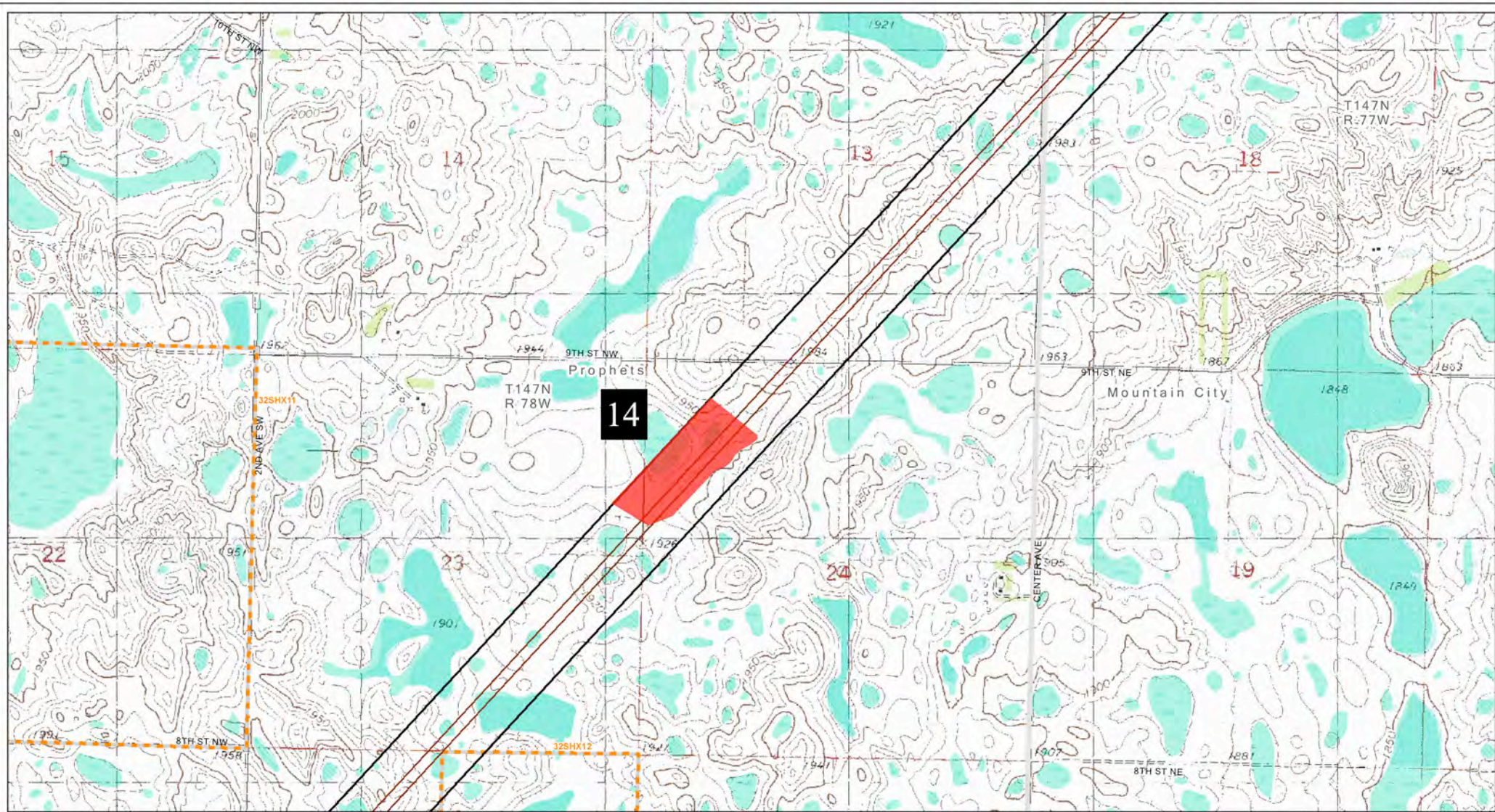
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| Preferred Route (1000ft) | NRHP Site | Archaeological | Substation | USFWS NWR |
| Potential Preferred Route ROW (150ft) | Historical | Architectural and/or Historical | Existing Transmission Lines | USFWS WPA or WDA |
| Potential Survey Corridor (150ft) | Archaeological | Archaeological and Historical | 400 kV DC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC | USBOR Land |
| | Architecture | Communication Tower | 250 kV DC | |
| | Archaeological | Gas or Oil Pipeline | 230 kV AC | |
| | | | 115 kV or less AC | |

Preferred Route: Page 15 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project

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Scale 1:15,000

- High Geologic Potential
- Moderate Geologic Potential
- Moderate - Low Geologic Potential



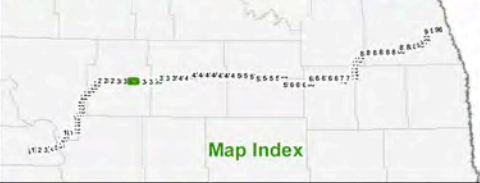
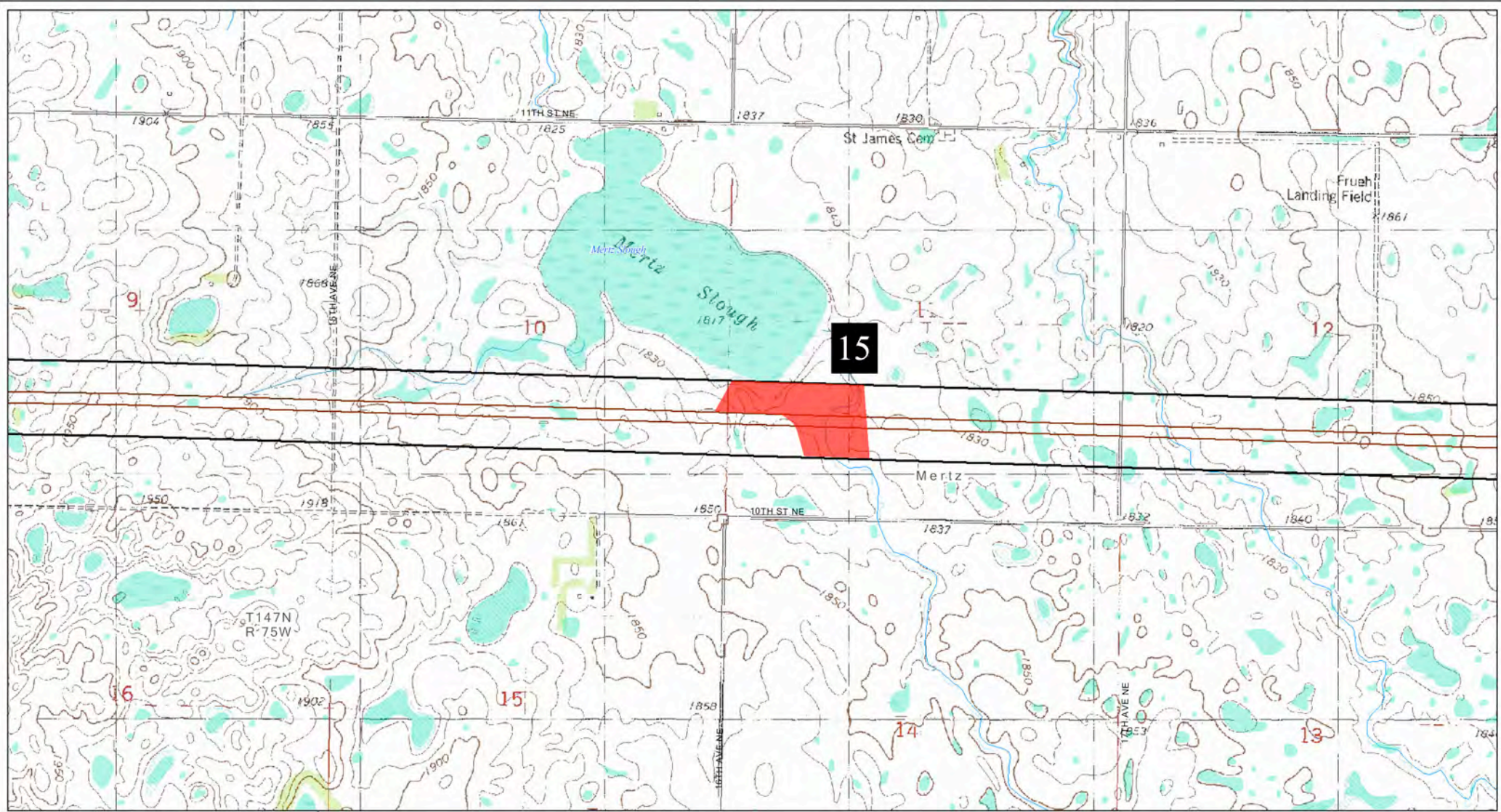
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| Preferred Route (1000ft) | NRHP Site | Archaeological | Substation | USFWS NWR |
| Potential Preferred Route ROW (150ft) | Historical | Architectural and/or Historical | Existing Transmission Lines | USFWS WPA or WDA |
| Potential Survey Corridor (150ft) | Archaeological | Archaeological and Historical | 400 kV DC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC | USBOR Land |
| | Architecture | Communication Tower | 250 kV DC | |
| | Archaeological | Gas or Oil Pipeline | 230 kV AC | |
| | | | 115 kV or less AC | |

Preferred Route: Page 26 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project

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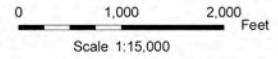
- High Geologic Potential
- Moderate Geologic Potential
- Moderate - Low Geologic Potential



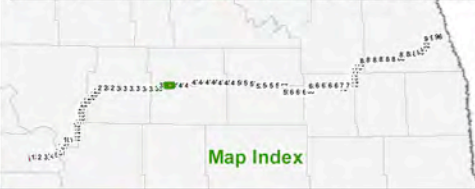
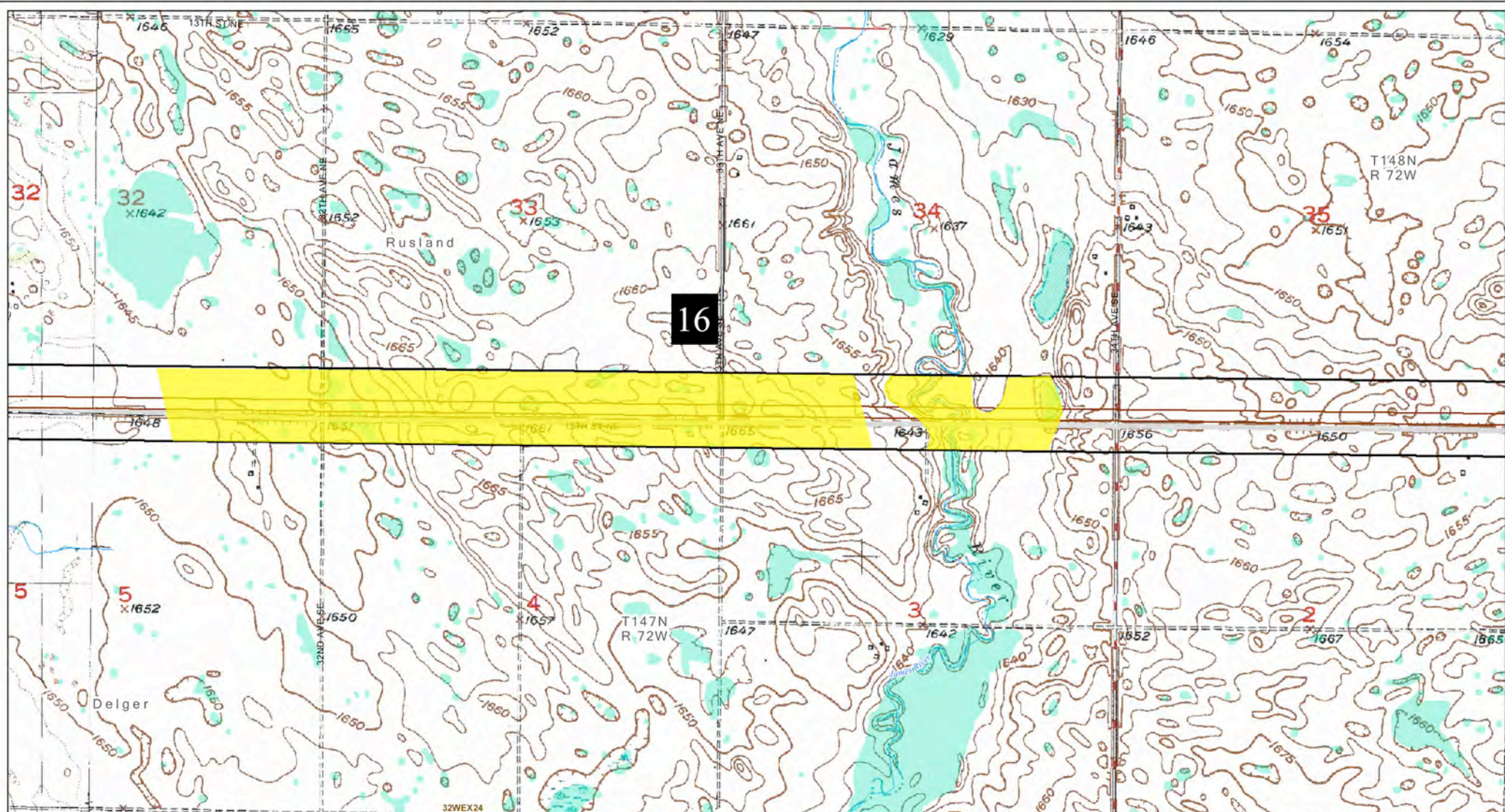
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| Preferred Route (1000ft) | NRHP Site | Archaeological | Substation | USFWS NWR |
| Potential Preferred Route ROW (150ft) | Historical | Architectural and/or Historical | Existing Transmission Lines | USFWS WPA or WDA |
| Potential Survey Corridor (150ft) | Archaeological | Archaeological and Historical | 400 kV DC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC | USBOR Land |
| | Architecture | Communication Tower | 250 kV DC | |
| | Archaeological | Gas or Oil Pipeline | 230 kV AC | |
| | | | 115 kV or less AC | |

Preferred Route: Page 32 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project

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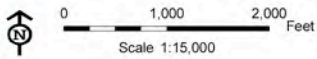
- High Geologic Potential
- Moderate Geologic Potential
- Moderate - Low Geologic Potential



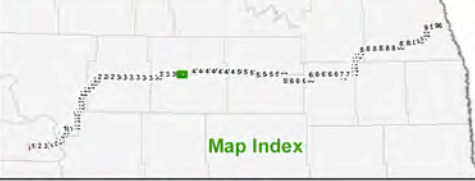
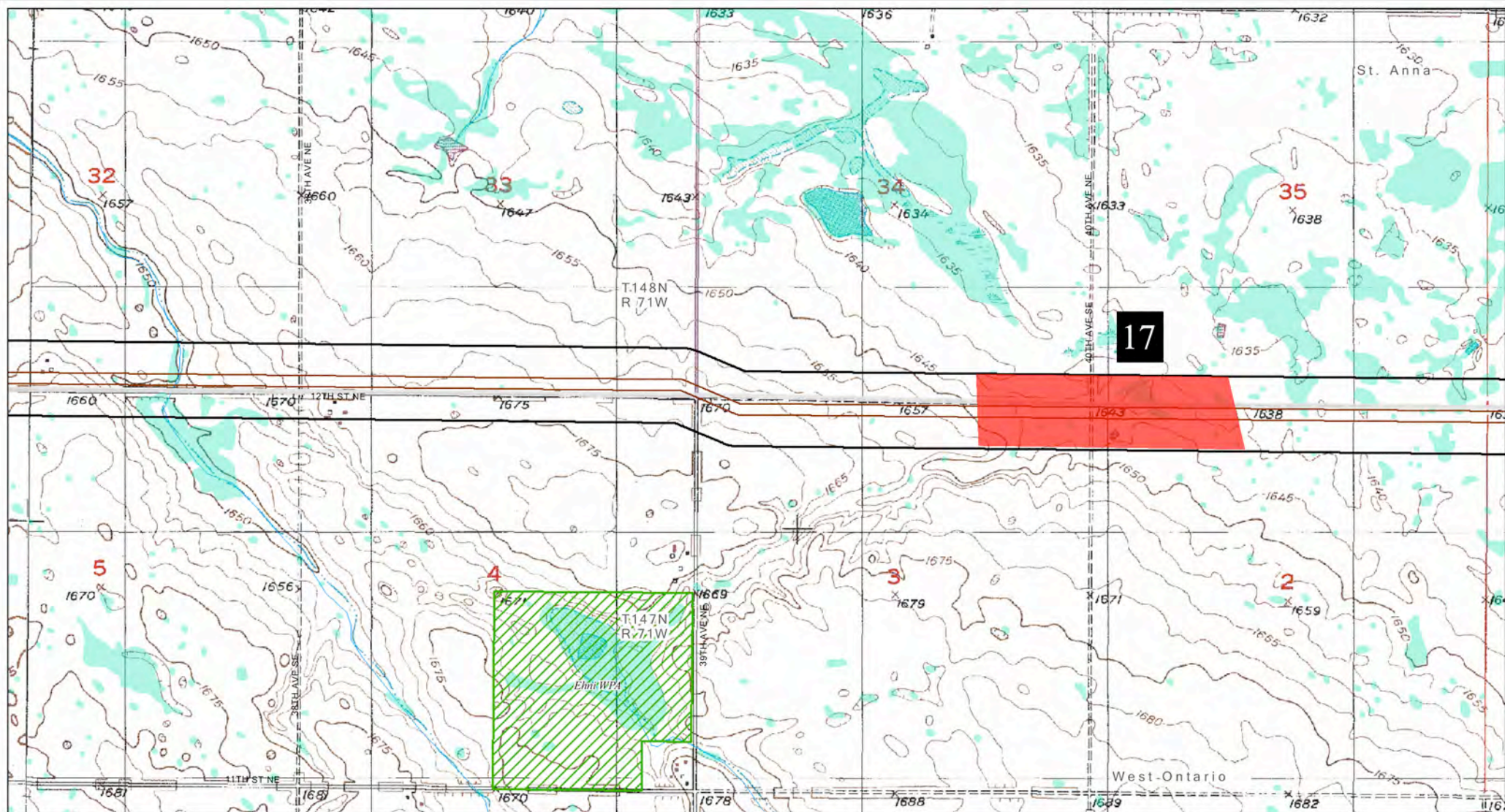
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| Potential Preferred Route ROW (150ft) | Historical | Architectural and/or Historical | Existing Transmission Lines | USFWS WPA or WDA |
| Potential Survey Corridor (150ft) | Archaeological | Archaeological and Historical | 400 kV DC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC | USBOR Land |
| | Architecture | Communication Tower | 250 kV DC | |
| | Archaeological | Gas or Oil Pipeline | 230 kV AC | |
| | | | 115 kV or less AC | |

Preferred Route: Page 38 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project

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- High Geologic Potential
- Moderate Geologic Potential
- Moderate - Low Geologic Potential



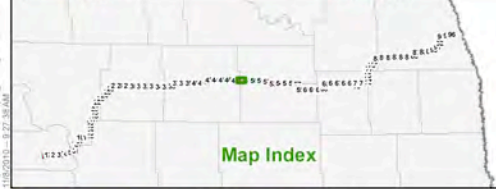
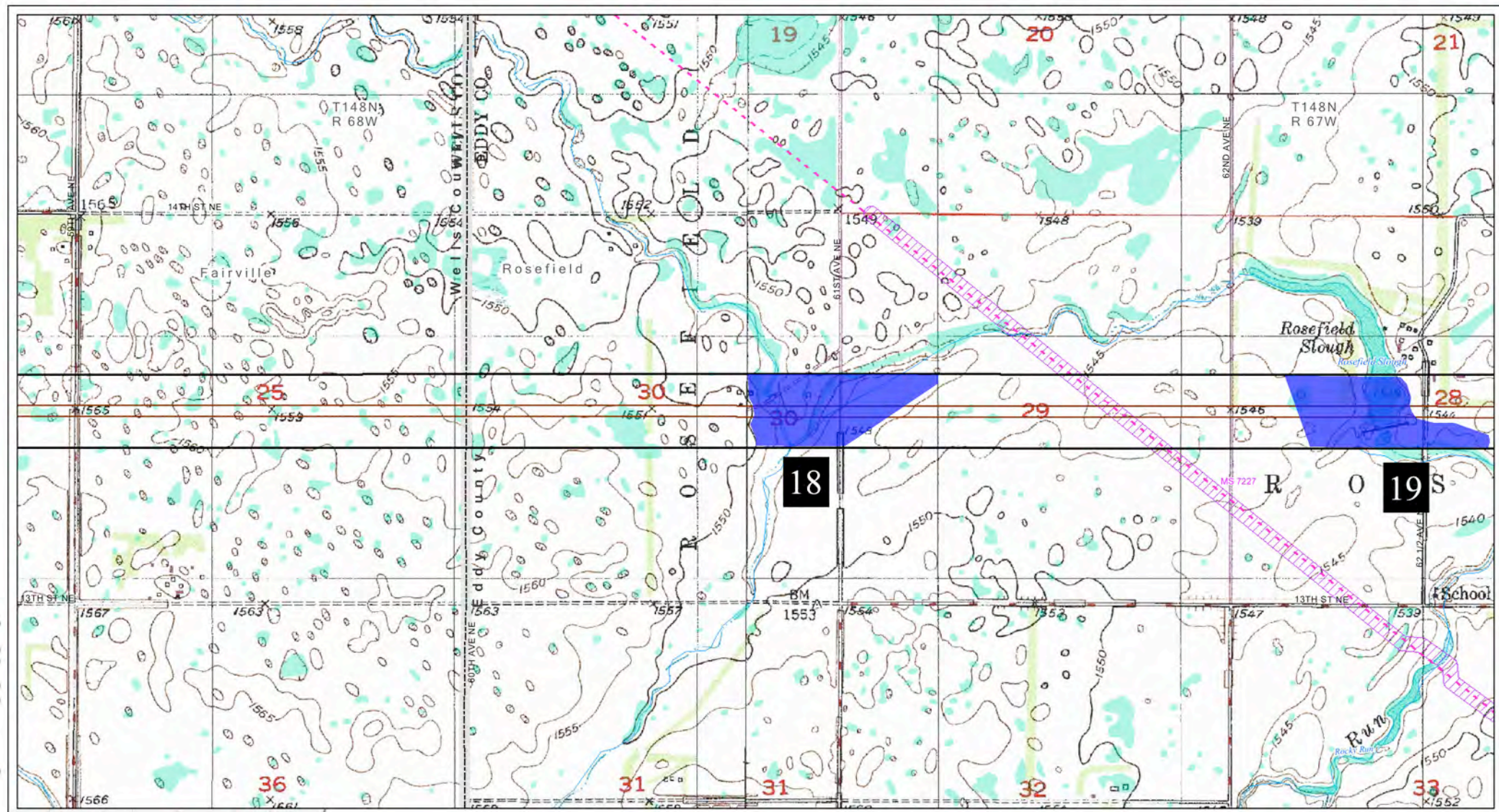
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| Potential Preferred Route ROW (150ft) | Historical | Architectural and/or Historical | Existing Transmission Lines | USFWS WPA or WDA |
| Potential Survey Corridor (150ft) | Archaeological | Archaeological and Historical | 400 kV DC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC | USBOR Land |
| | Architecture | Communication Tower | 250 kV DC | |
| | Archaeological | Gas or Oil Pipeline | 230 kV AC | |
| | | | 115 kV or less AC | |

Preferred Route: Page 40 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project

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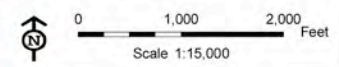
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- Moderate Geologic Potential
- Moderate - Low Geologic Potential



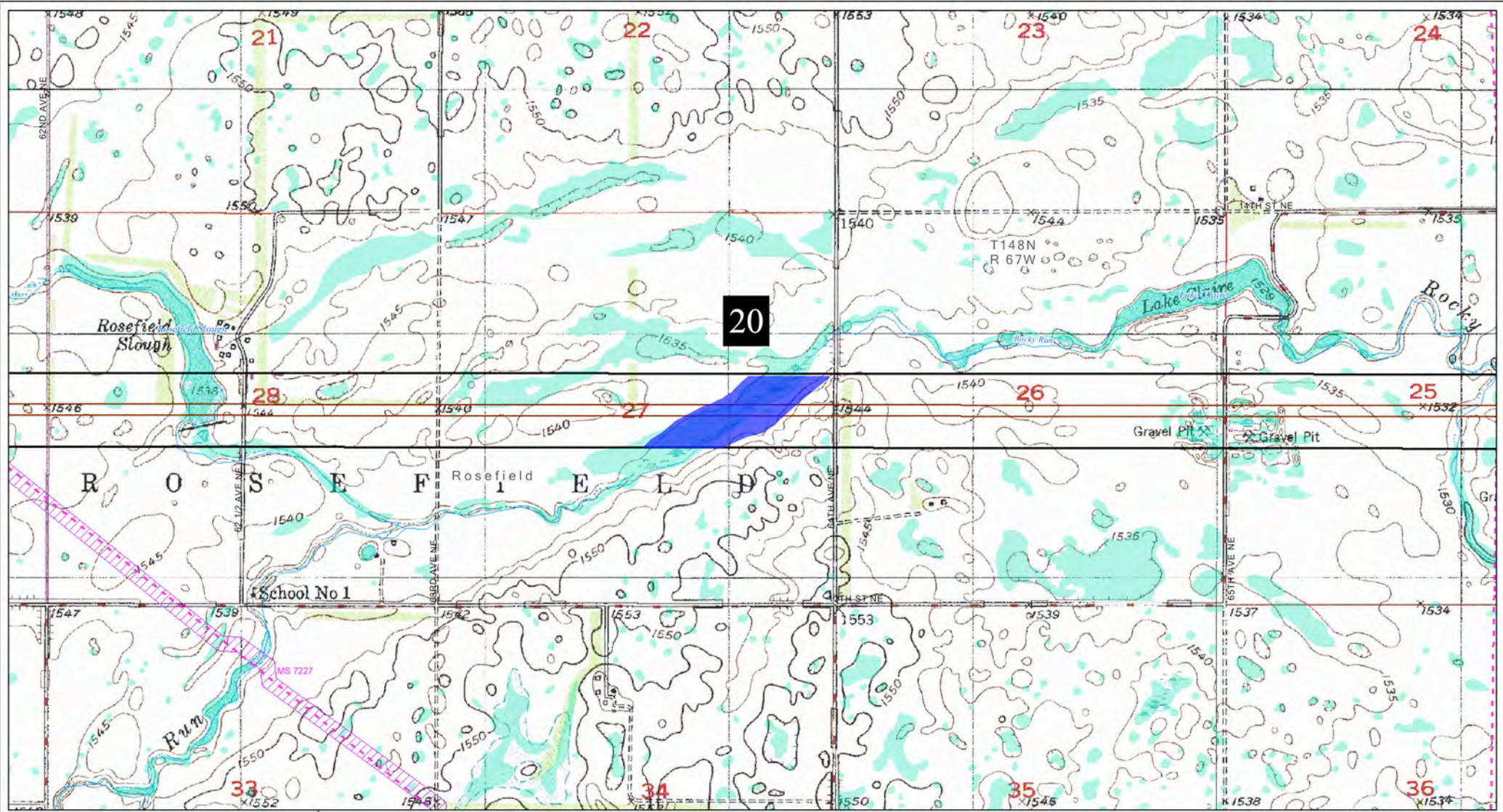
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| Potential Preferred Route ROW (150ft) | Historical | Architectural and/or Historical | Existing Transmission Lines |
| Potential Survey Corridor (150ft) | Archaeological | Archaeological and Historical | 400 kV DC |
| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC |
| | Architecture | Communication Towers | 250 kV DC |
| | Archaeological | Gas or Oil Pipeline | 230 kV AC |
| | | | 115 kV or less AC |
| | | | USFWS NWR |
| | | | USFWS WPA or WDA |
| | | | State Park, Recreation Area or WMA |
| | | | USBOR Land |

Preferred Route: Page 48 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project

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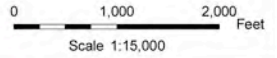
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- Moderate Geologic Potential
- Moderate - Low Geologic Potential



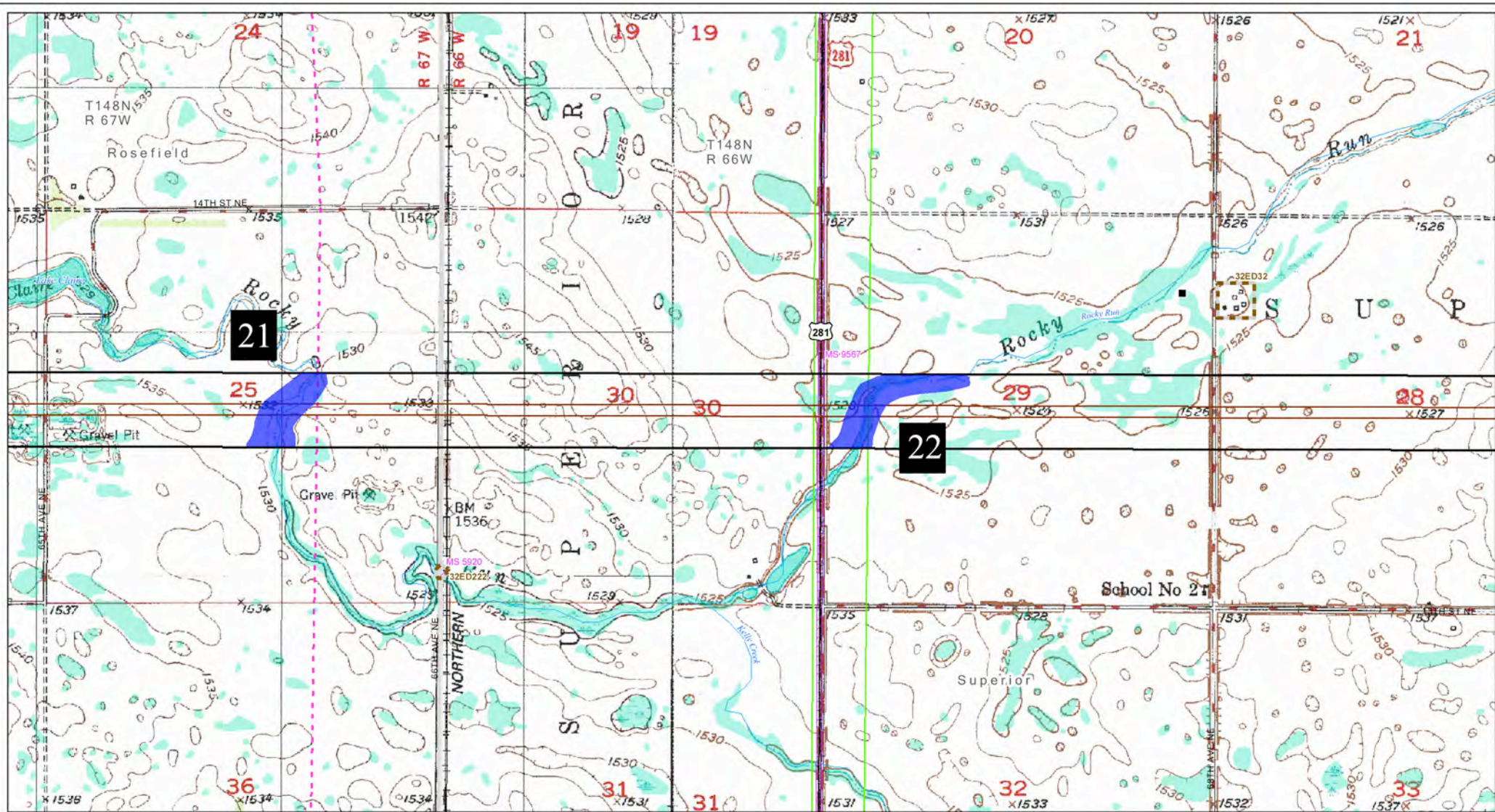
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| Potential Survey Corridor (150ft) | Archaeological | Archaeological and Historical | 400 KV DC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 KV AC | USBOR Land |
| | Architecture | Communication Tower | 250 KV DC | |
| | Archaeological | Gas or Oil Pipeline | 230 KV AC | |
| | | | 115 kV or less AC | |

Preferred Route: Page 49 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project

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- High Geologic Potential
- Moderate Geologic Potential
- Moderate - Low Geologic Potential



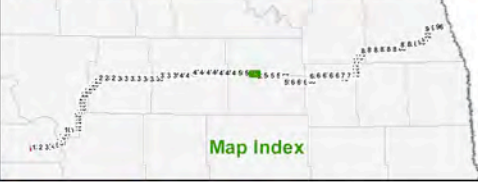
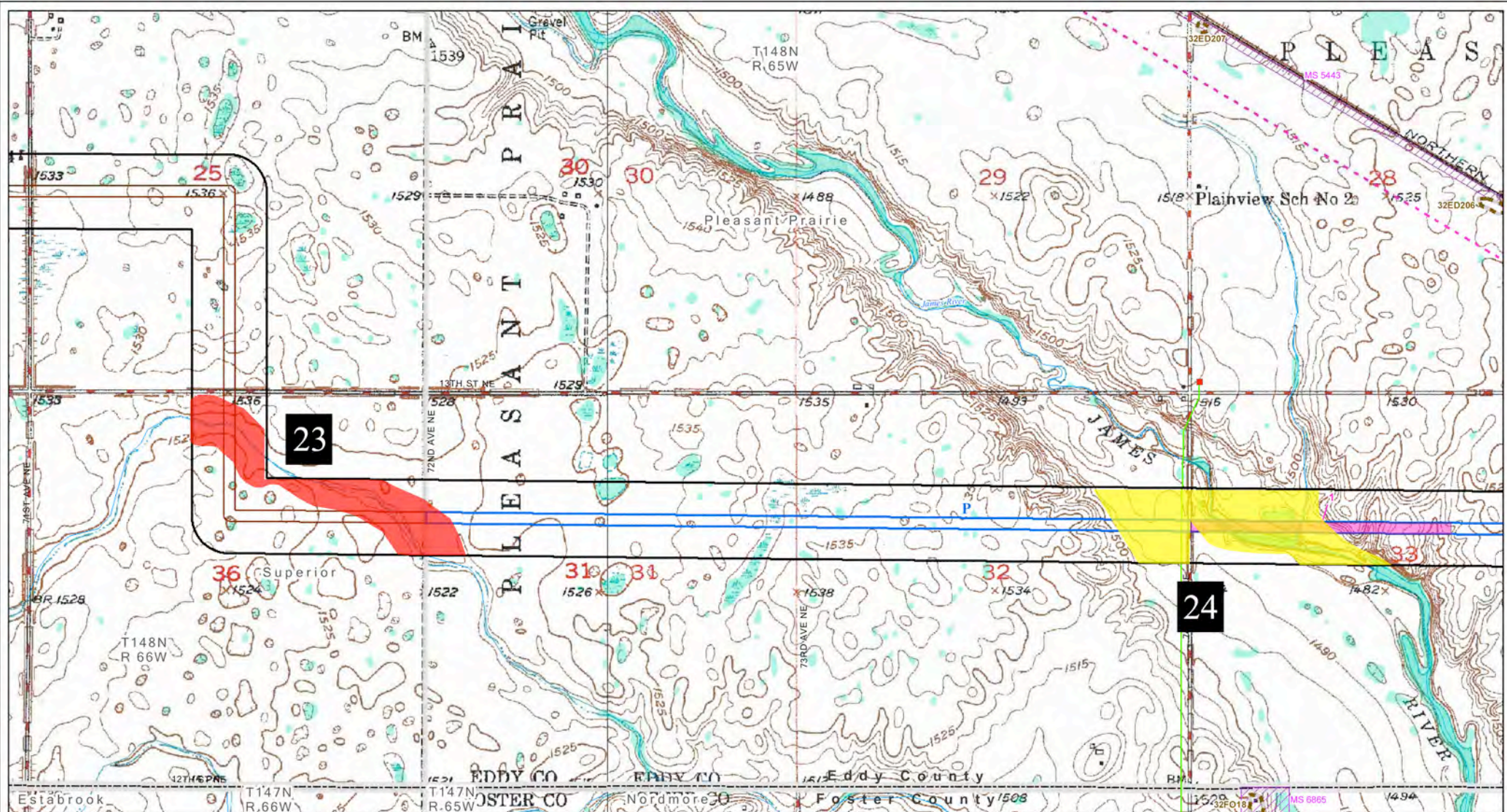
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| Potential Preferred Route ROW (150ft) | Historical | Architectural and/or Historical | Existing Transmission Lines | USFWS WPA or WDA |
| Potential Survey Corridor (150ft) | Archaeological | Archaeological and Historical | 400 kV DC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC | USBOR Land |
| | Architecture | Communication Tower | 250 kV DC | |
| | Archaeological | Gas or Oil Pipeline | 230 kV AC | |
| | | | 115 kV or less AC | |

Preferred Route: Page 50 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project

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 Scale 1:15,000

- High Geologic Potential
- Moderate Geologic Potential
- Moderate - Low Geologic Potential



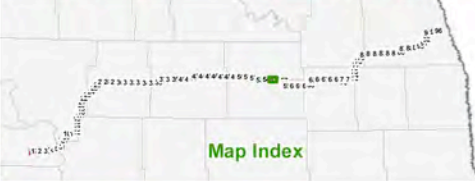
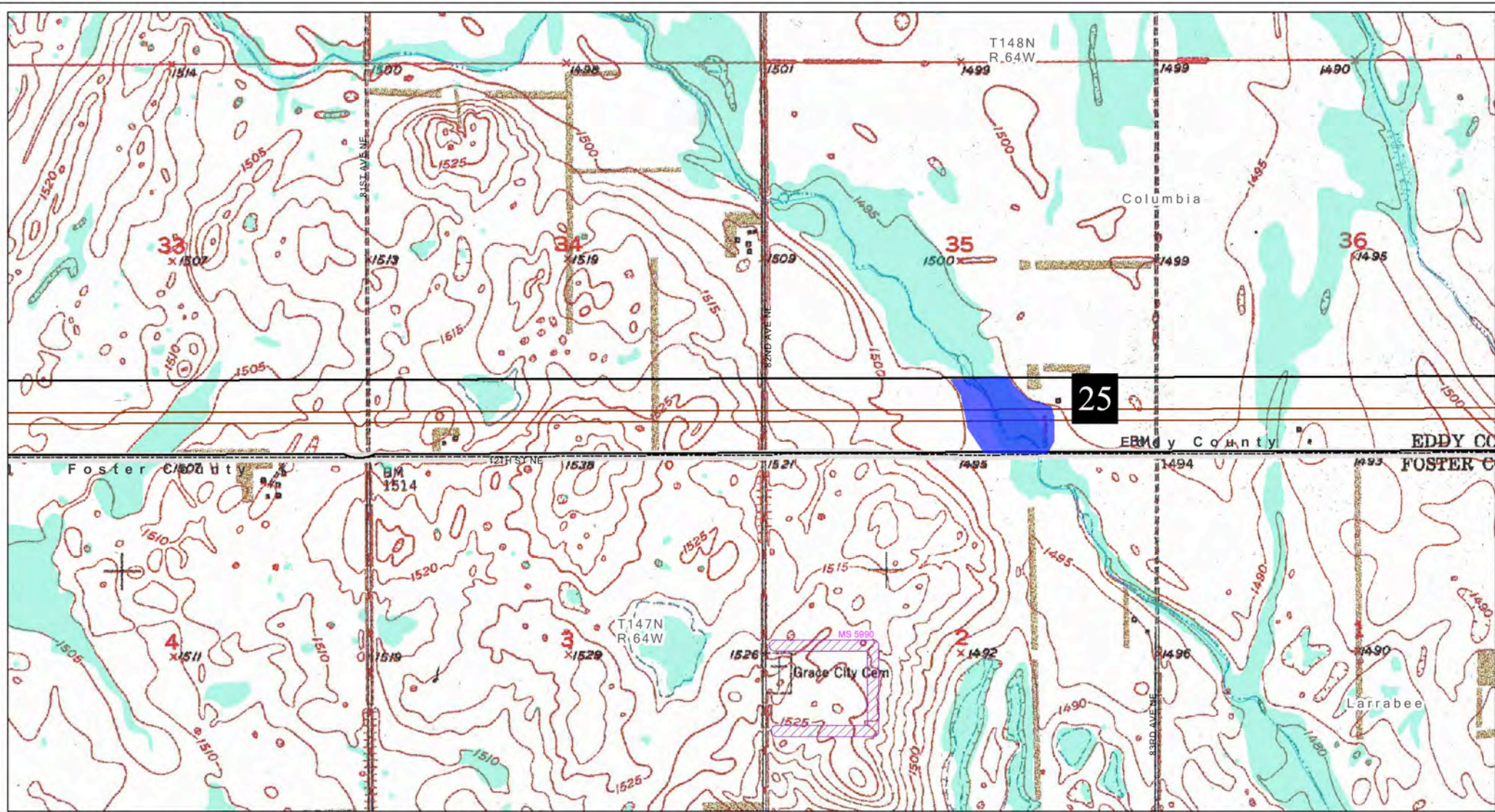
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| Potential Preferred Route ROW (150ft) | Historical | Architectural and/or Historical | Existing Transmission Lines | USFWS WPA or WDA |
| Potential Survey Corridor (150ft) | Archaeological | Archaeological and Historical | 400 kV DC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC | USBOR Land |
| | Architecture | Communication Tower | 250 kV DC | |
| | Archaeological | Gas or Oil Pipeline | 230 kV AC | |
| | | | 115 kV or less AC | |

Preferred Route: Page 52 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project

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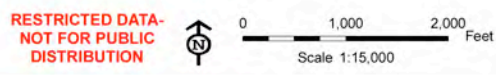
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 Scale 1:15,000

- High Geologic Potential
- Moderate Geologic Potential
- Moderate - Low Geologic Potential

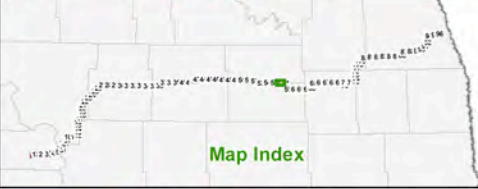
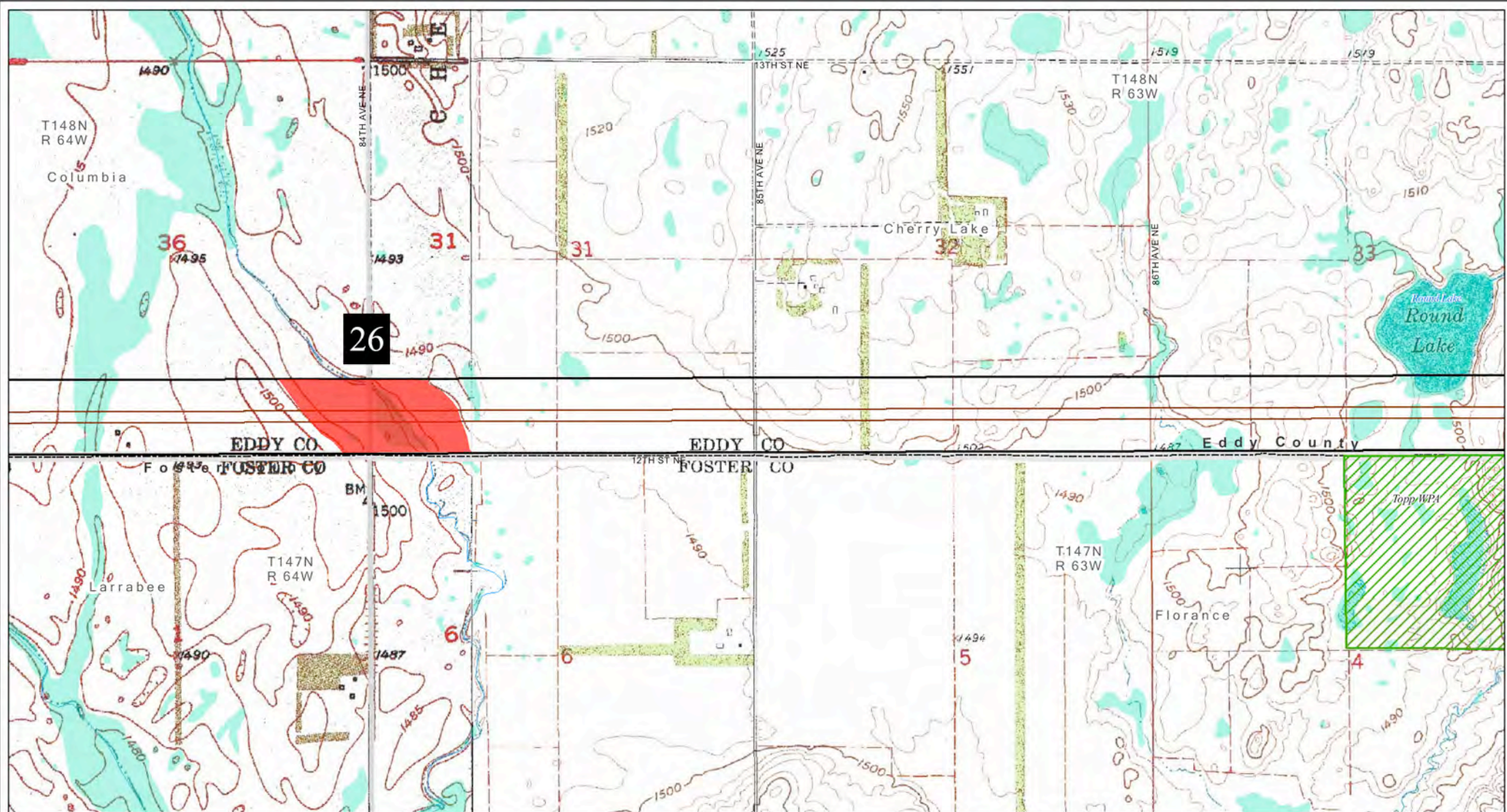


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|---------------------------------------|---------------------------|---------------------------------|-----------------------------|------------------------------------|
| Preferred Route (1000ft) | NRHP Site | Archaeological | Substation | USFWS NWR |
| Potential Preferred Route ROW (150ft) | Historical | Architectural and/or Historical | Existing Transmission Lines | USFWS WPA or WDA |
| Potential Survey Corridor (150ft) | Archaeological | Archaeological and Historical | 400 kV DC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC | USBOR Land |
| | Architecture | Communication Tower | 250 kV DC | |
| | Archaeological | Gas or Oil Pipeline | 230 kV AC | |
| | | | 115 kV or less AC | |

Preferred Route: Page 55 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project



- High Geologic Potential
- Moderate Geologic Potential
- Moderate - Low Geologic Potential



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|---------------------------------------|---------------------------|---------------------------------|-----------------------------|------------------------------------|
| Preferred Route (1000ft) | NRHP Site | Archaeological | Substation | USFWS NWR |
| Potential Preferred Route ROW (150ft) | Archaeological | Architectural and/or Historical | Existing Transmission Lines | USFWS WPA or WDA |
| Potential Survey Corridor (150ft) | NDCRS Sites or Site Leads | Archaeological and Historical | 345 kV AC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | Architecture | Cultural Resource Surveys | 250 kV DC | USBOR Land |
| | Archaeological | Communication Tower | 230 kV AC | |
| | | Gas or Oil Pipeline | 115 kV or less AC | |

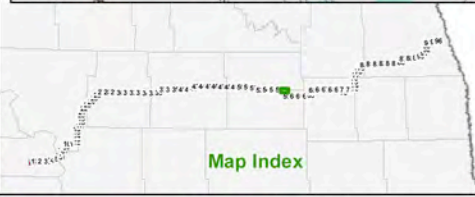
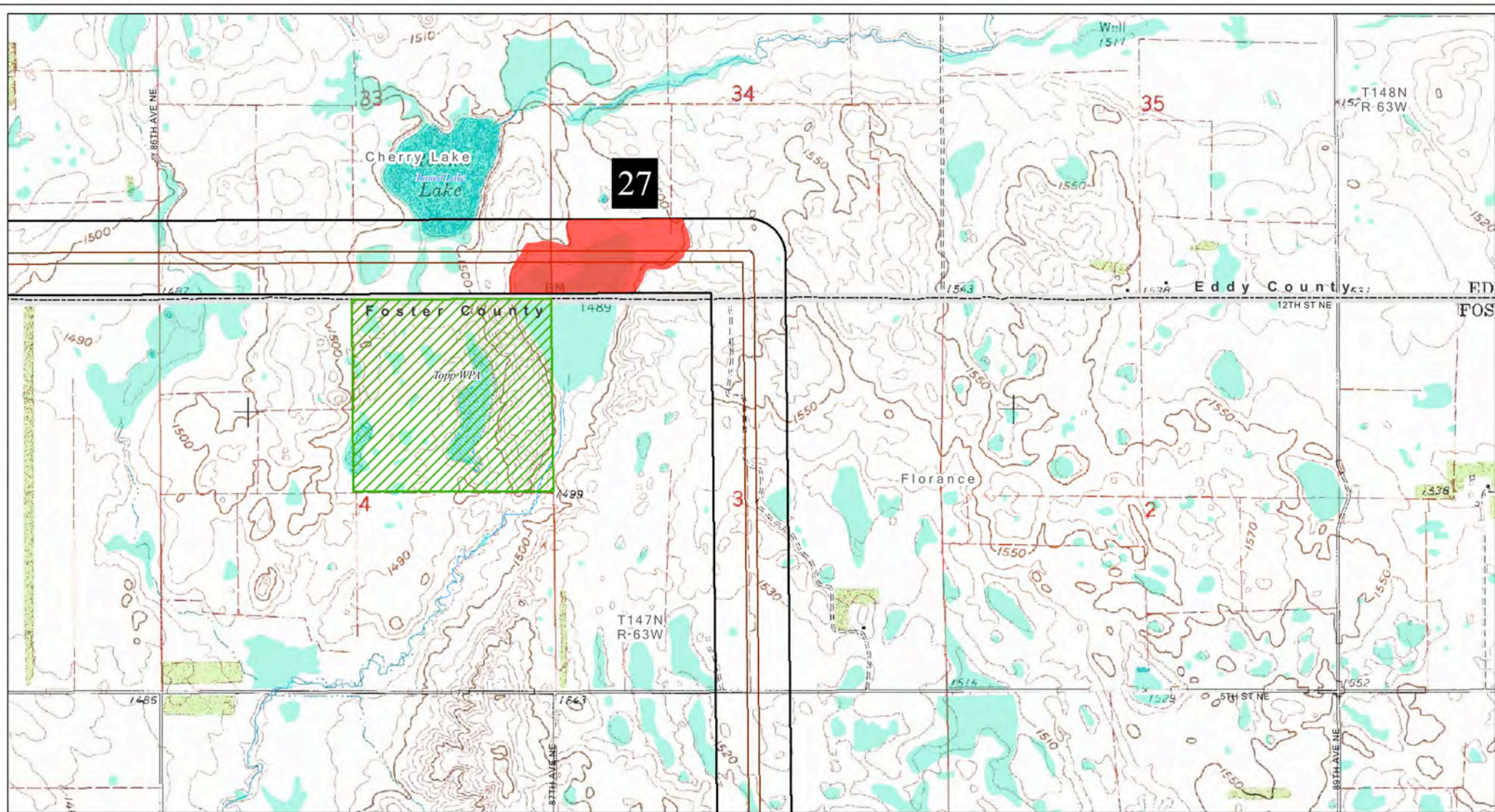
Preferred Route: Page 56 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project

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Scale 1:15,000

0 1,000 2,000 Feet

- High Geologic Potential
- Moderate Geologic Potential
- Moderate - Low Geologic Potential



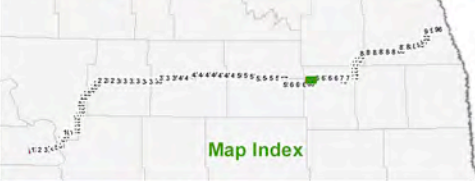
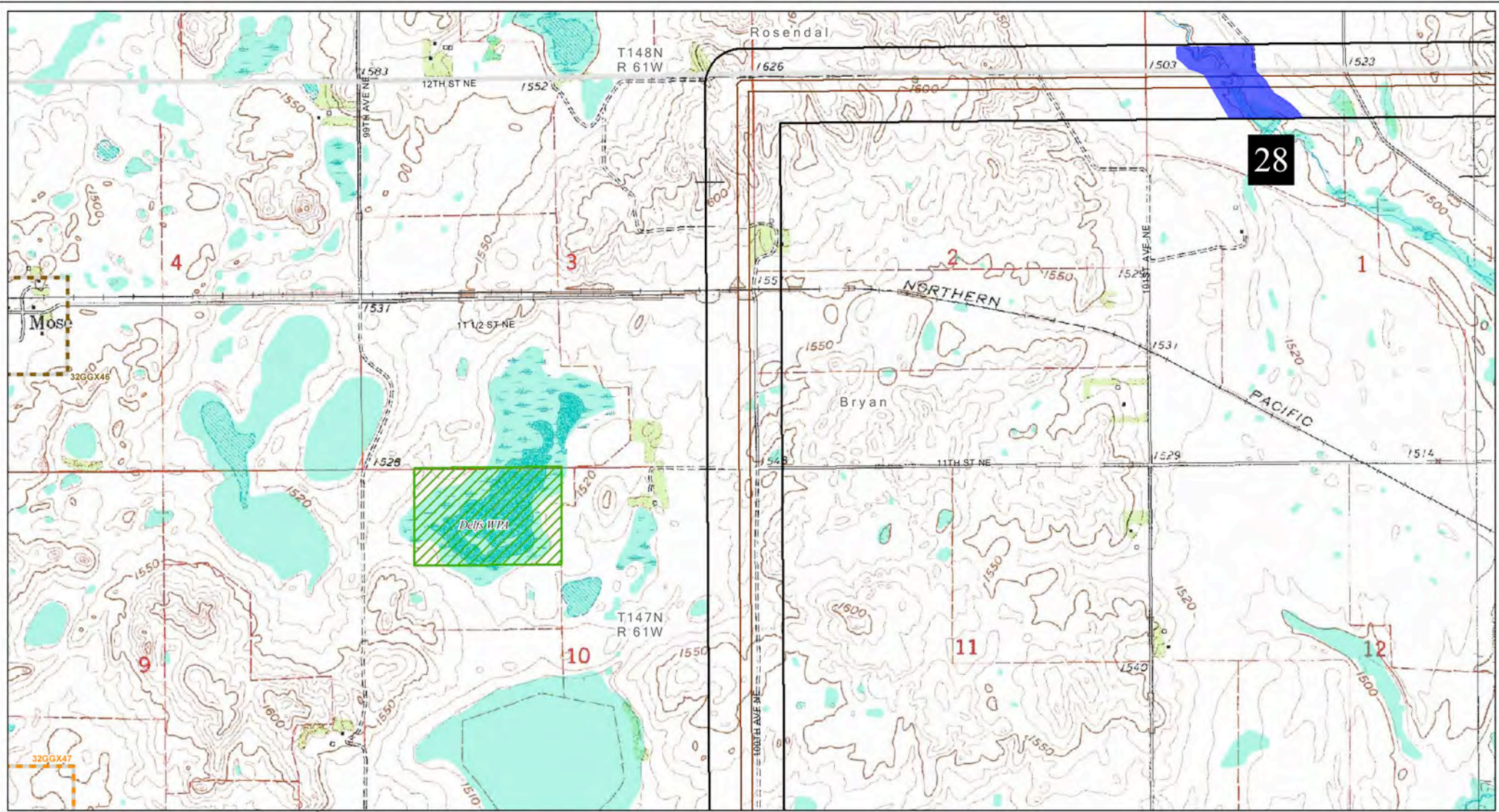
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| Potential Preferred Route ROW (150ft) | Historical | Architectural and/or Historical | Existing Transmission Lines | USFWS WPA or WDA |
| Potential Survey Corridor (150ft) | Archaeological | Archaeological and Historical | 400 kV DC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC | USBOR Land |
| | Architecture | Communication Tower | 250 kV DC | |
| | Archaeological | Gas or Oil Pipeline | 230 kV AC | |
| | | | 115 kV or less AC | |

Preferred Route: Page 57 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project

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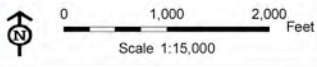
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- Moderate Geologic Potential
- Moderate - Low Geologic Potential



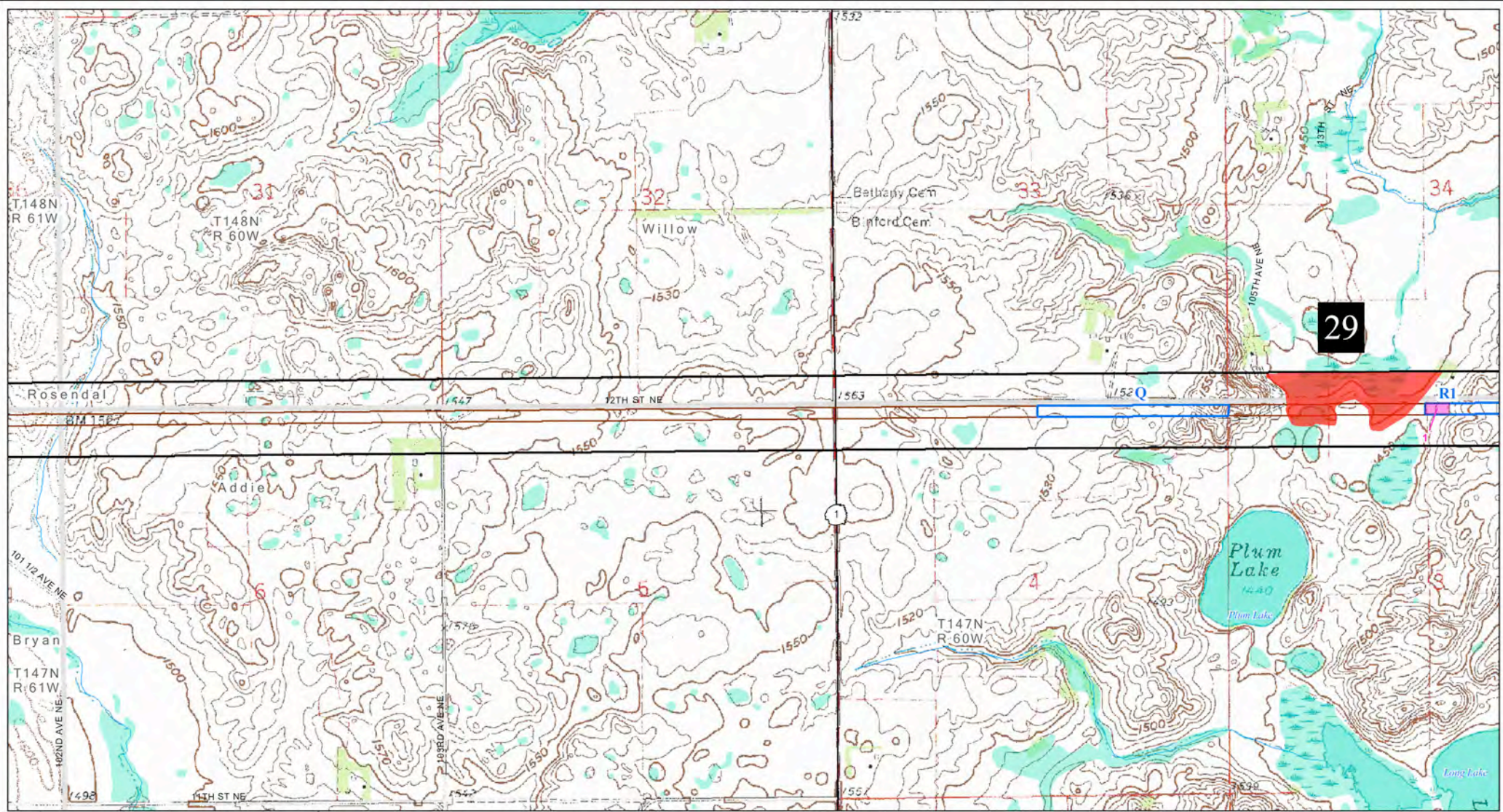
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| Potential Survey Corridor (150ft) | NDCRS Sites or Site Leads | Archaeological and Historical | 345 kV AC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | Architecture | Cultural Resource Surveys | 250 kV DC | USBOR Land |
| | Archaeological | Communication Tower | 230 kV AC | |
| | | Gas or Oil Pipeline | 115 kV or less AC | |

Preferred Route: Page 64 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project

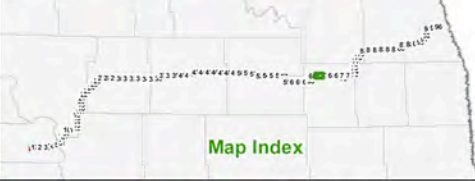
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- High Geologic Potential
- Moderate Geologic Potential
- Moderate - Low Geologic Potential



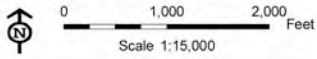
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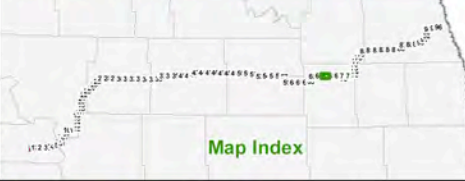
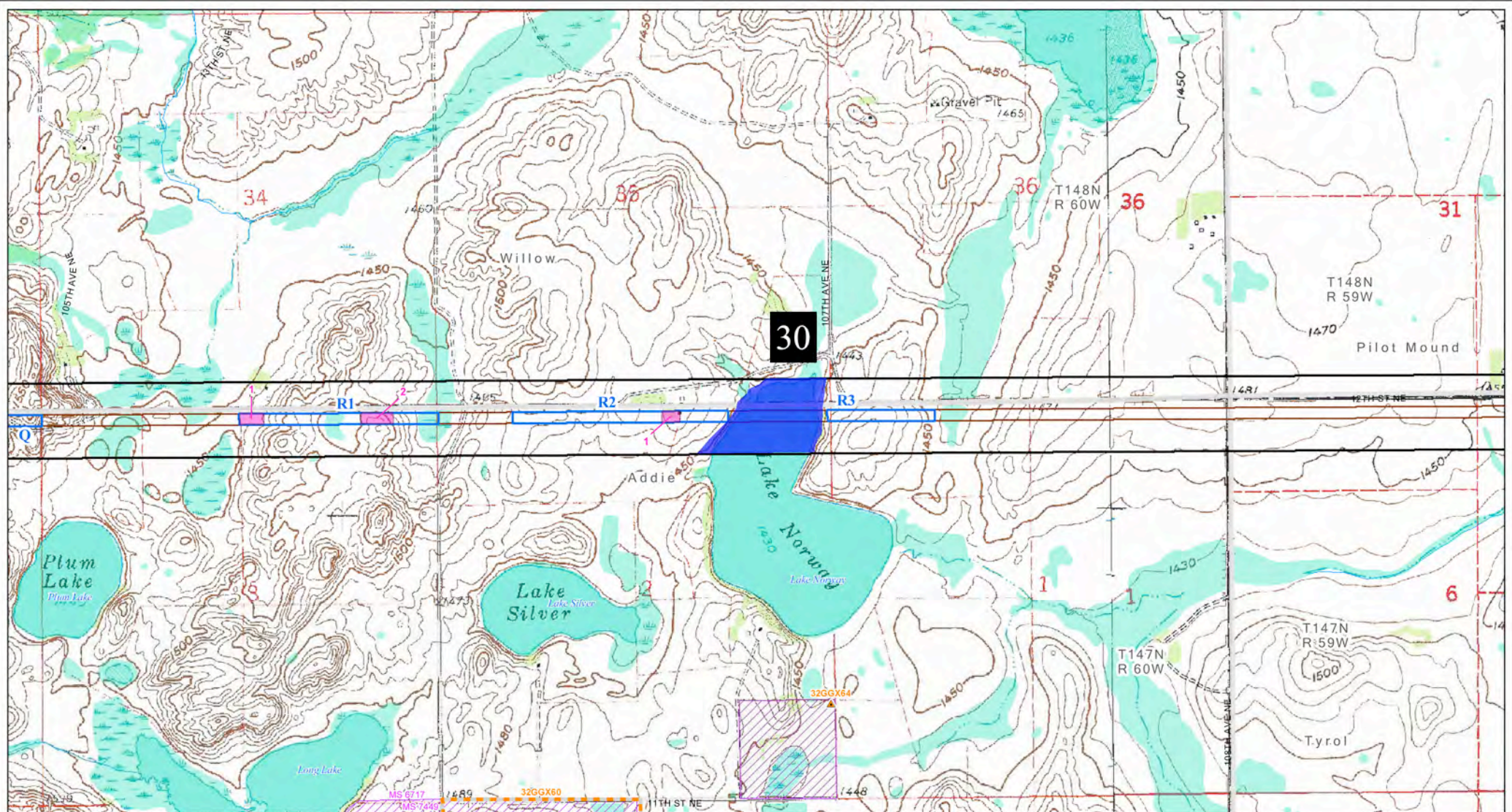
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|---------------------------------------|---------------------------|---------------------------------|-----------------------------|------------------------------------|
| Preferred Route (1000ft) | NRHP Site | Archaeological | Substation | USFWS NWR |
| Potential Preferred Route ROW (150ft) | Historical | Architectural and/or Historical | Existing Transmission Lines | USFWS WPA or WDA |
| Potential Survey Corridor (150ft) | Archaeological | Archaeological and Historical | 400 kV DC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC | USBOR Land |
| | Architecture | Communication Tower | 250 kV DC | |
| | Archaeological | Gas or Oil Pipeline | 230 kV AC | |
| | | | 115 kV or less AC | |

Preferred Route: Page 66 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project

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- High Geologic Potential
- Moderate Geologic Potential
- Moderate - Low Geologic Potential

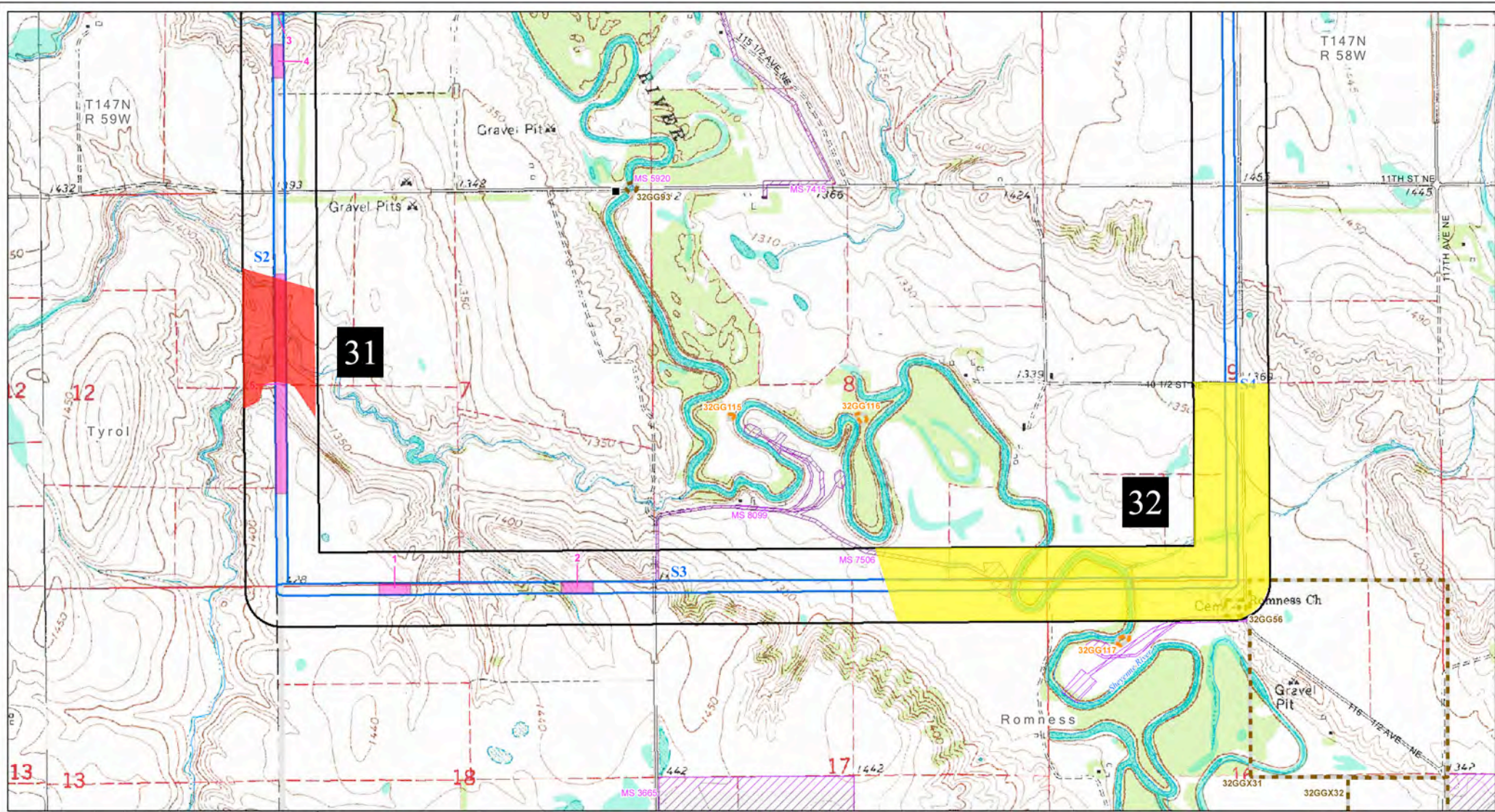


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| Preferred Route (1000ft) | NRHP Site | Archaeological | Substation | USFWS NWR |
| Potential Preferred Route ROW (150ft) | Historical | Architectural and/or Historical | Existing Transmission Lines | USFWS WPA or WDA |
| Potential Survey Corridor (150ft) | Archaeological | Archaeological and Historical | 400 kV DC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC | USBOR Land |
| | Architecture | Communication Tower | 250 kV DC | |
| | Archaeological | Gas or Oil Pipeline | 230 kV AC | |
| | | | 115 kV or less AC | |

Preferred Route: Page 67 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project



- High Geologic Potential
- Moderate Geologic Potential
- Moderate - Low Geologic Potential



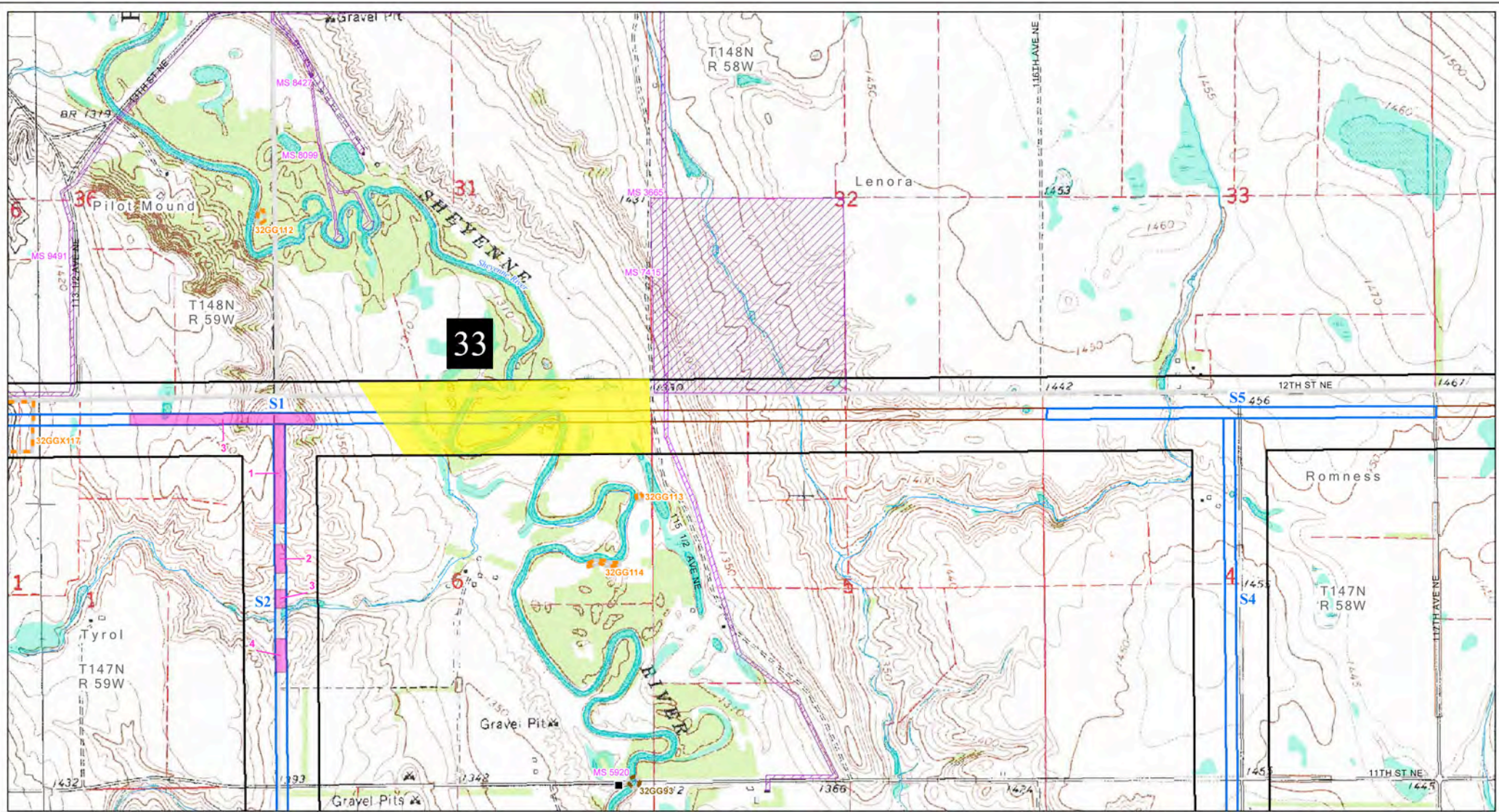
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| Potential Preferred Route ROW (150ft) | Historical | Architectural and/or Historical | Existing Transmission Lines | USFWS WPA or WDA |
| Potential Survey Corridor (150ft) | Archaeological | Archaeological and Historical | 400 kV DC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC | USBOR Land |
| | Architecture | Communication Tower | 250 kV DC | |
| | Archaeological | Gas or Oil Pipeline | 230 kV AC | |
| | | | 115 kV or less AC | |

Preferred Route: Page 70 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project

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Scale 1:15,000

- High Geologic Potential
- Moderate Geologic Potential
- Moderate - Low Geologic Potential



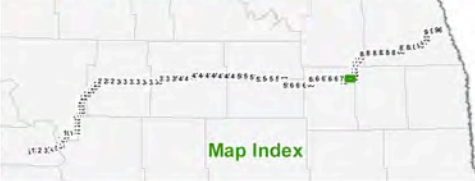
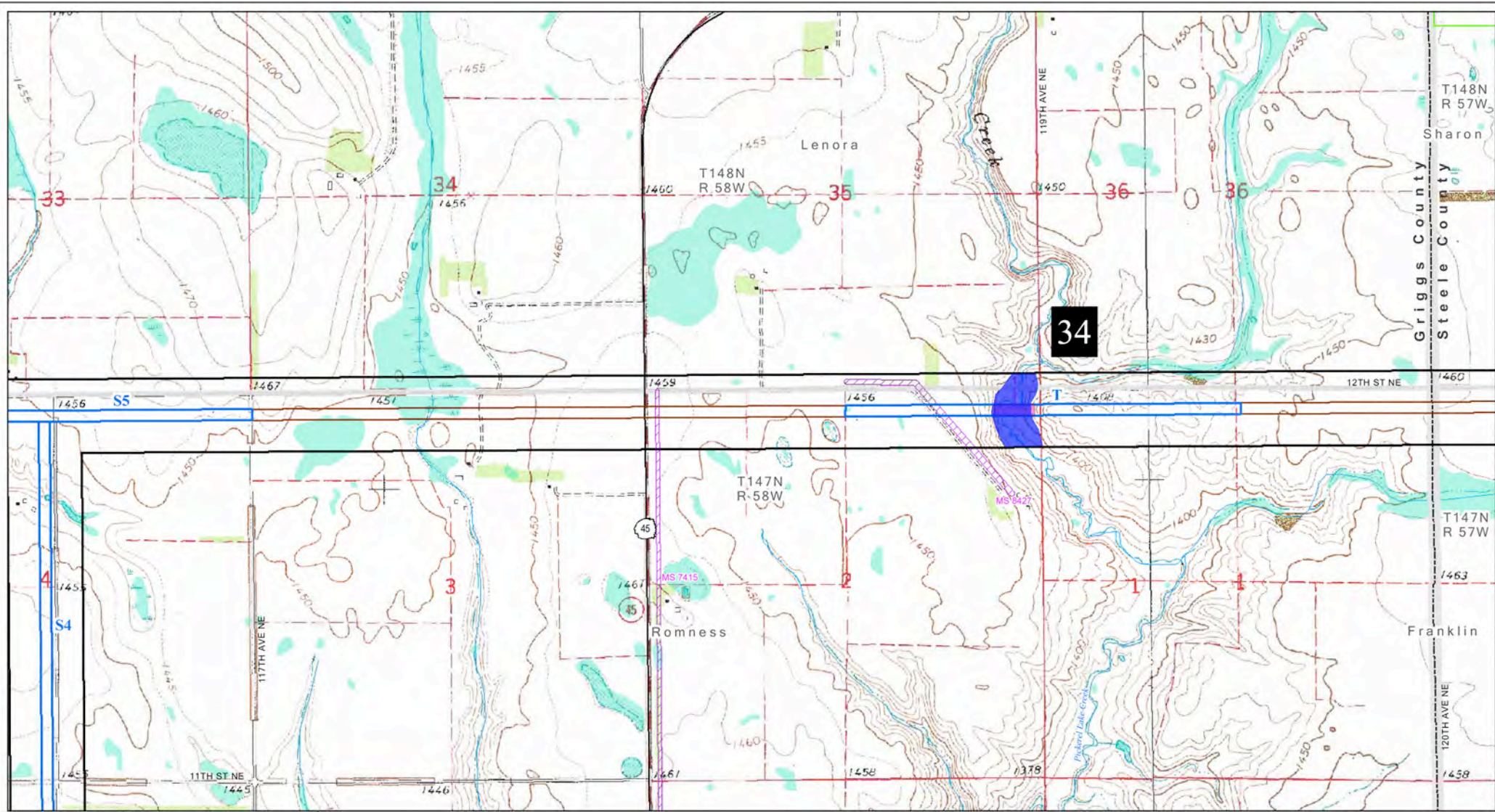
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| Potential Preferred Route ROW (150ft) | Archaeological | Archaeological and/or Historical | Existing Transmission Lines | USFWS WPA or WDA |
| Potential Survey Corridor (150ft) | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC | State Park, Recreation |
| Potential Shovel Test Area | Archaeological | Communication Tower | 250 kV DC | Area of WMA |
| | | Gas or Oil Pipeline | 230 kV AC | USBOR Land |
| | | | 115 kV or less AC | |

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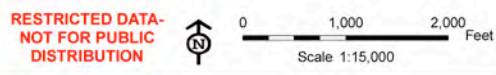
Preferred Route: Page 71 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project

- High Geologic Potential
- Moderate Geologic Potential
- Moderate - Low Geologic Potential



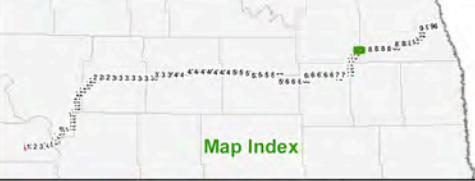
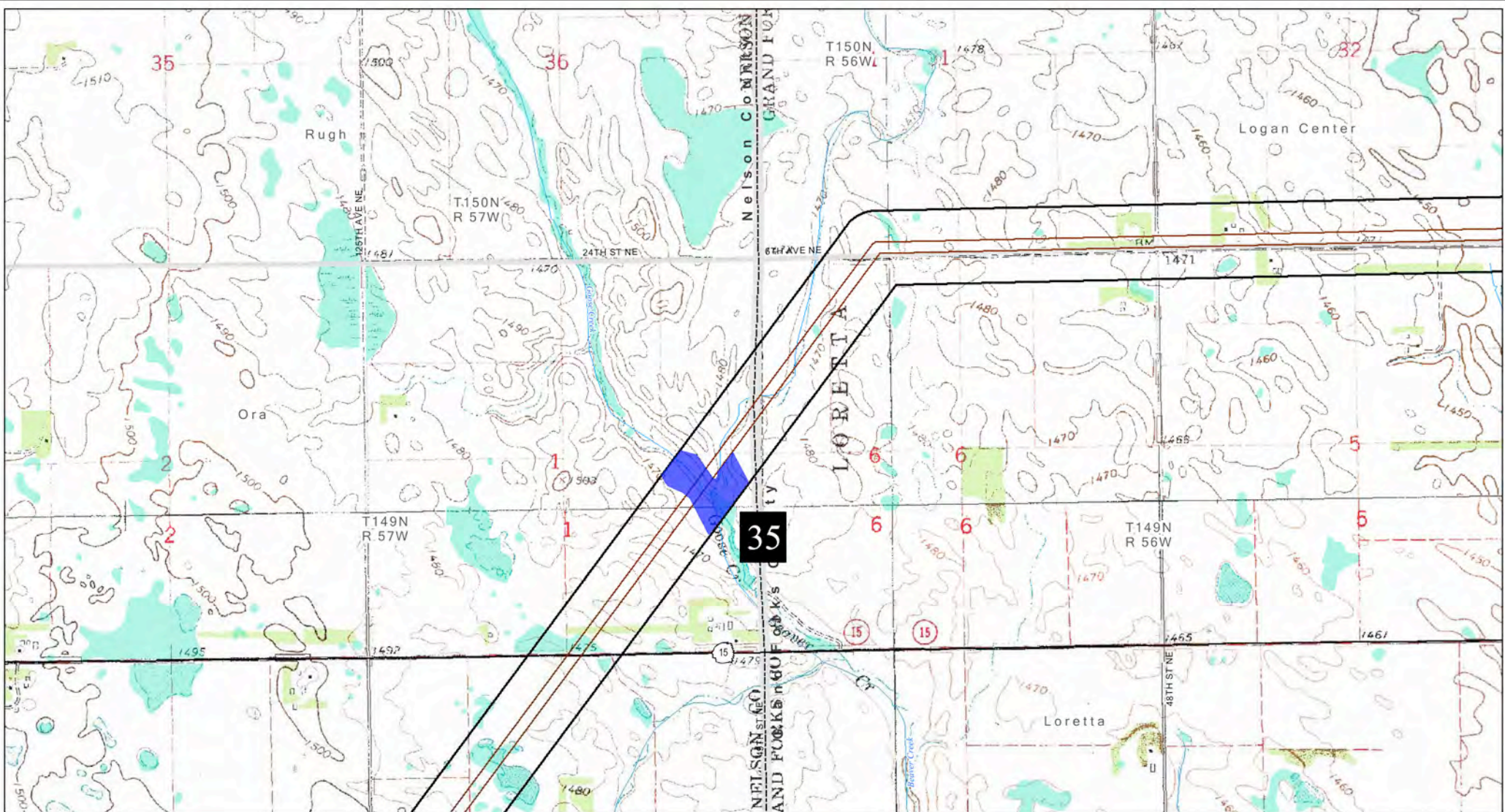
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| Potential Preferred Route ROW (150ft) | Historical | Architectural and/or Historical | Existing Transmission Lines | USFWS WPA or WDA |
| Potential Survey Corridor (150ft) | Archaeological | Archaeological and Historical | 400 kV DC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC | USBOR Land |
| | Architecture | Communication Tower | 250 kV DC | |
| | Archaeological | Gas or Oil Pipeline | 230 kV AC | |
| | | | 115 kV or less AC | |

Preferred Route: Page 72 of 96
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- High Geologic Potential
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- Moderate - Low Geologic Potential



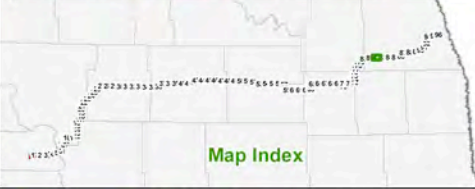
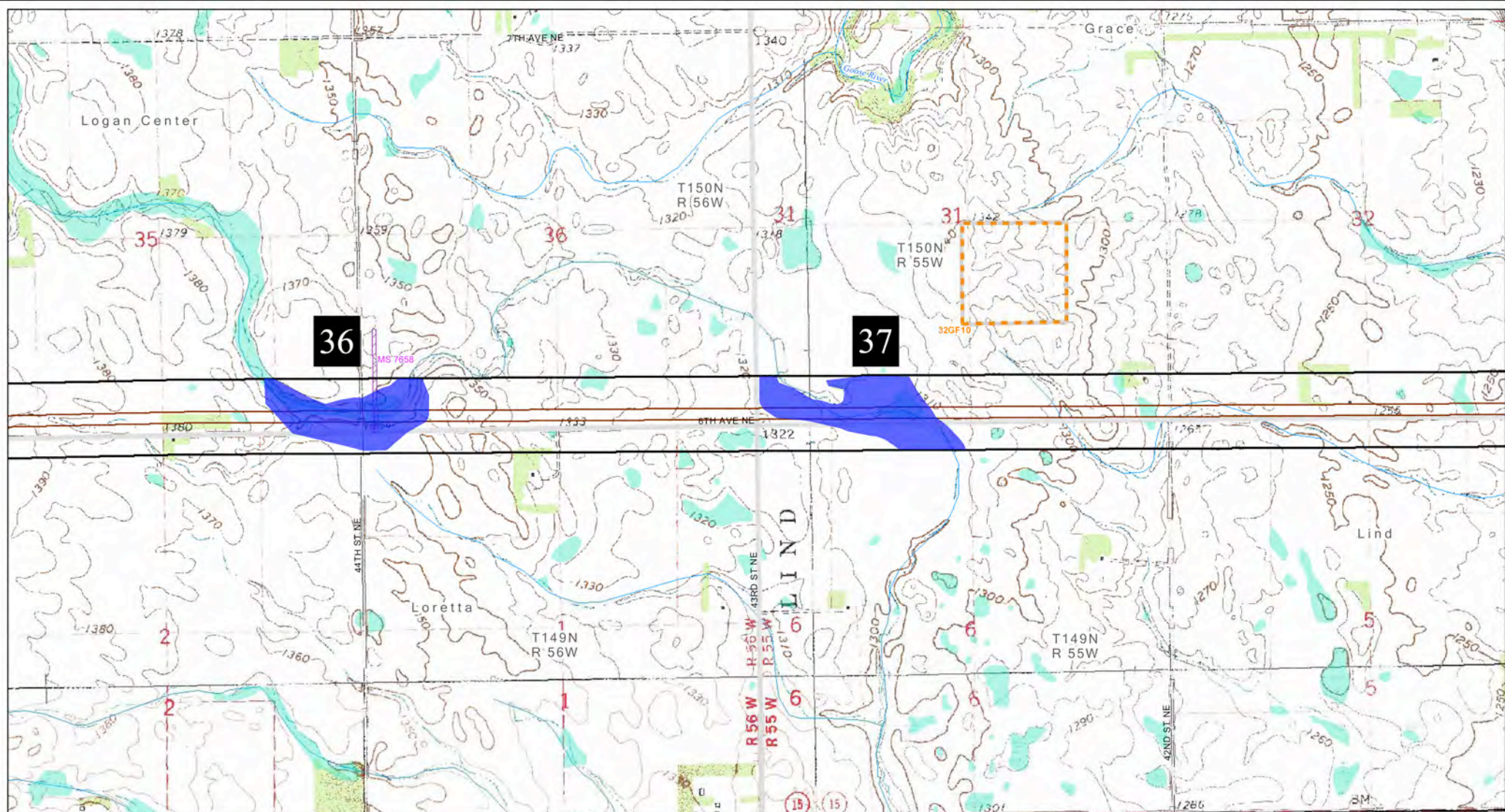
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| | | | 115 kV or less AC | |

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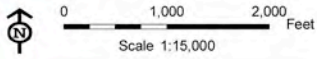
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- Moderate Geologic Potential
- Moderate - Low Geologic Potential



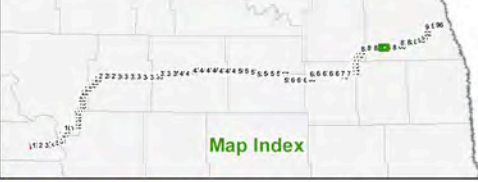
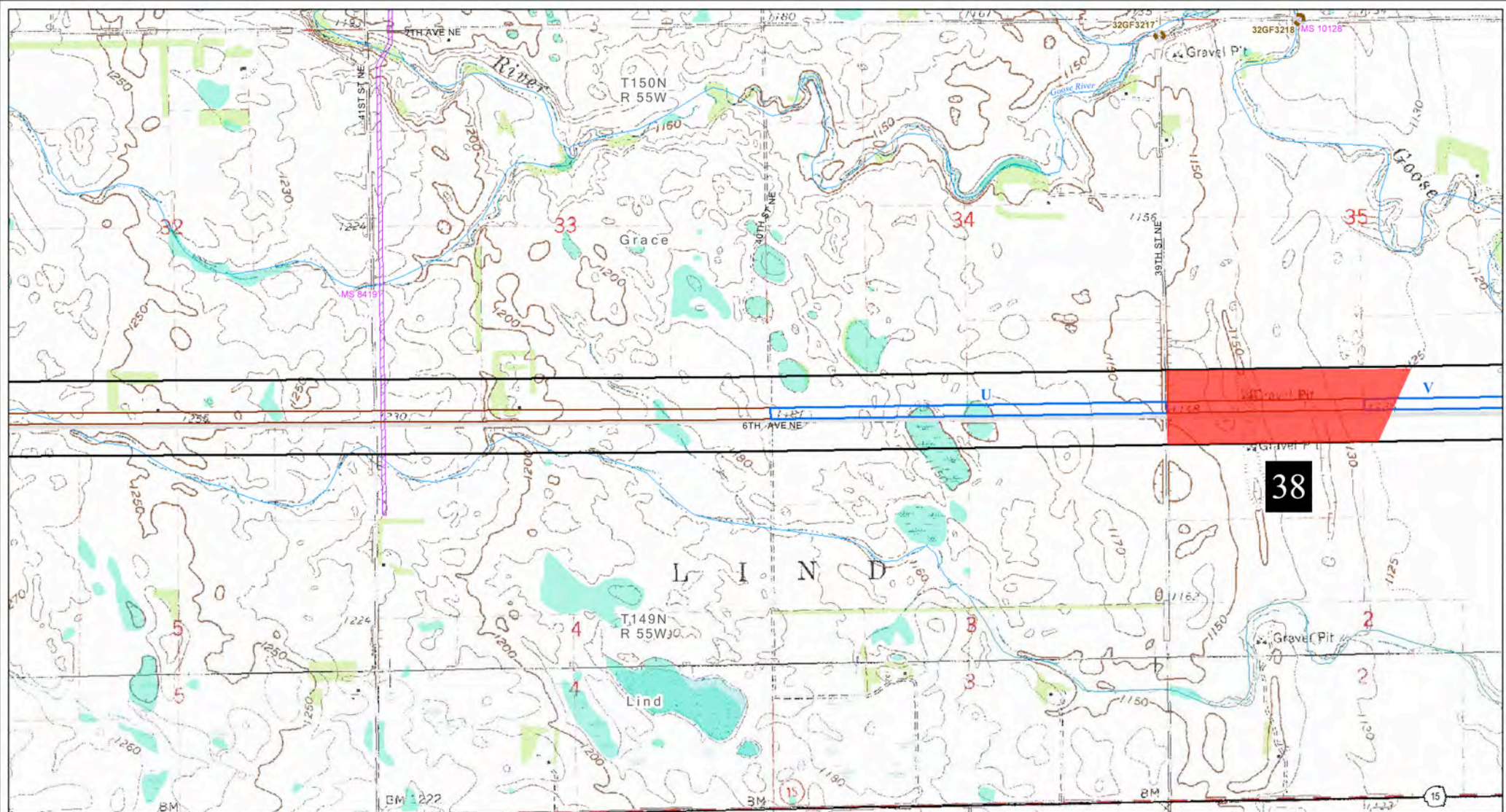
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| | Archaeological | Gas or Oil Pipeline | 230 kV AC | |
| | | | 115 kV or less AC | |

Preferred Route: Page 82 of 96
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- Moderate - Low Geologic Potential



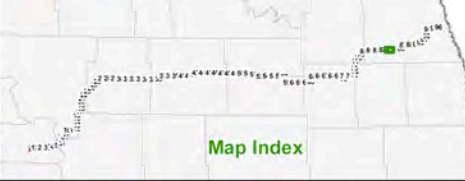
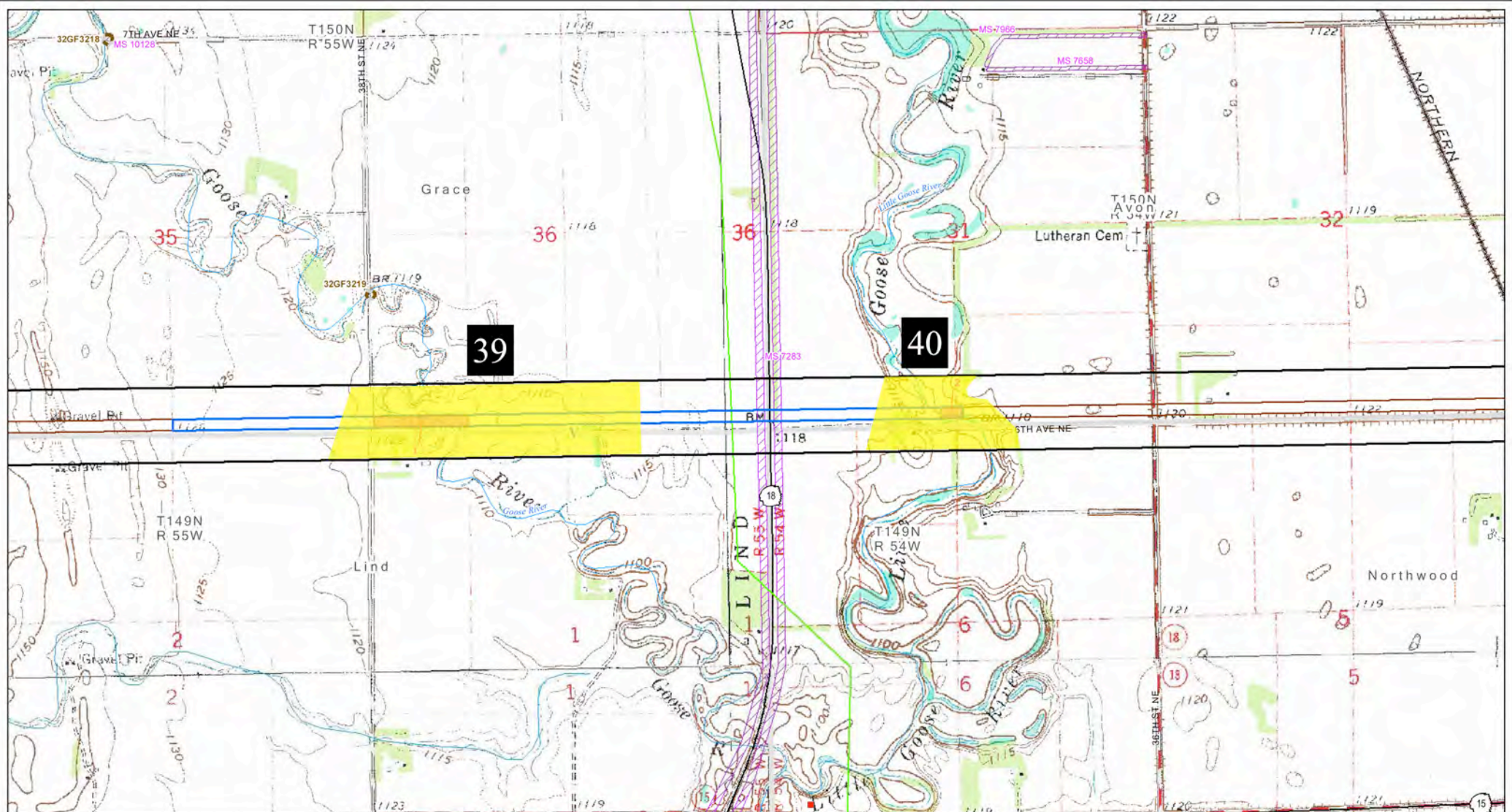
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| Potential Shovel Test Area | Architecture | Cultural Resource Surveys | 345 kV AC | USBOR Land |
| | Archaeological | Communication Tower | 250 kV DC | |
| | | Gas or Oil Pipeline | 230 kV AC | |
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Preferred Route: Page 83 of 96
Archaeological Resources Field Map Book
Center to Grand Forks Project

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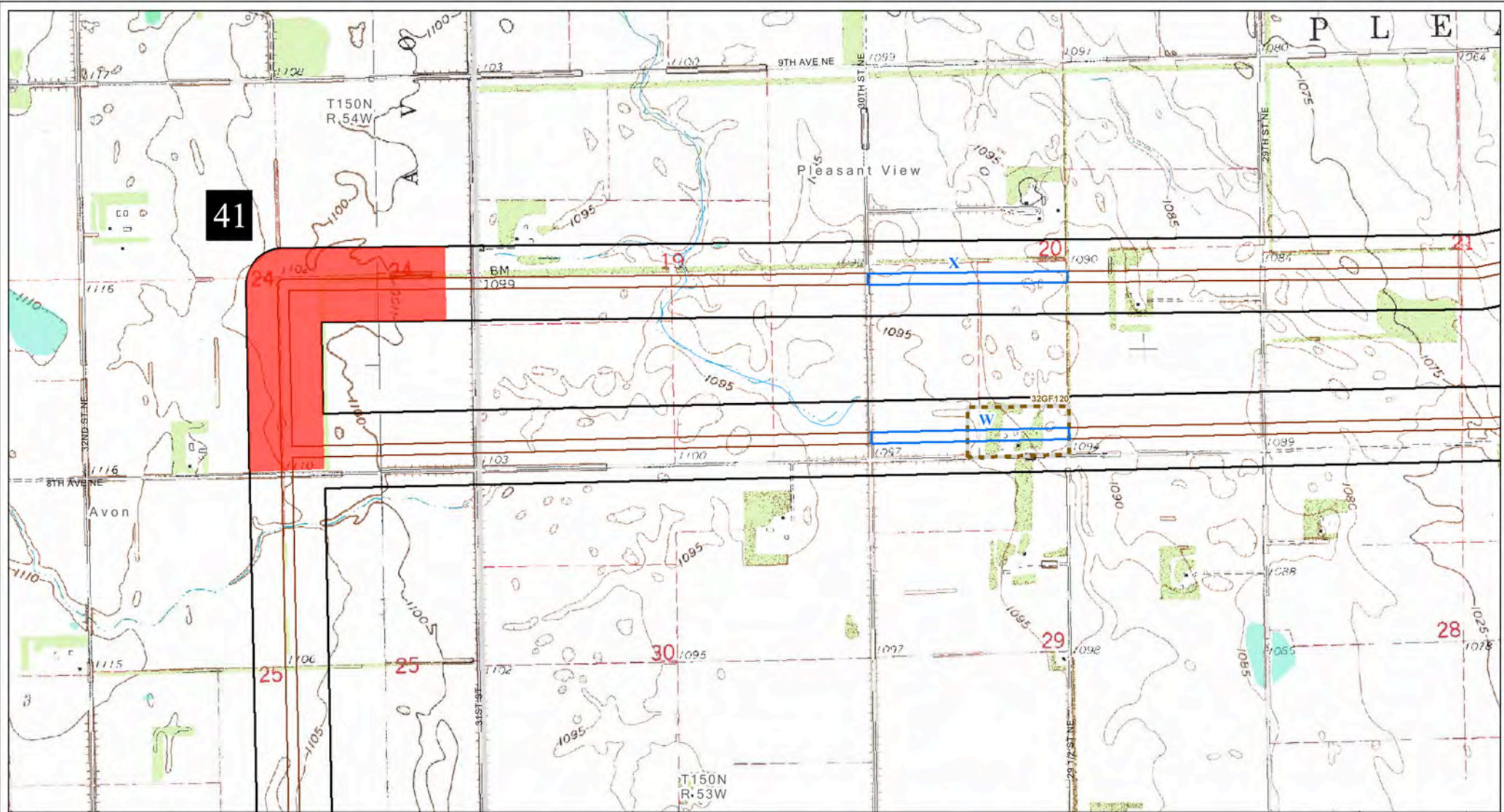
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Preferred Route: Page 84 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project



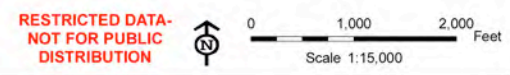
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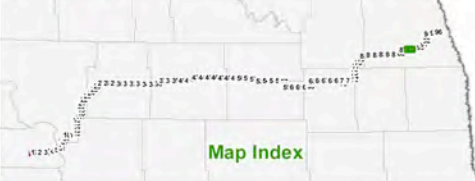
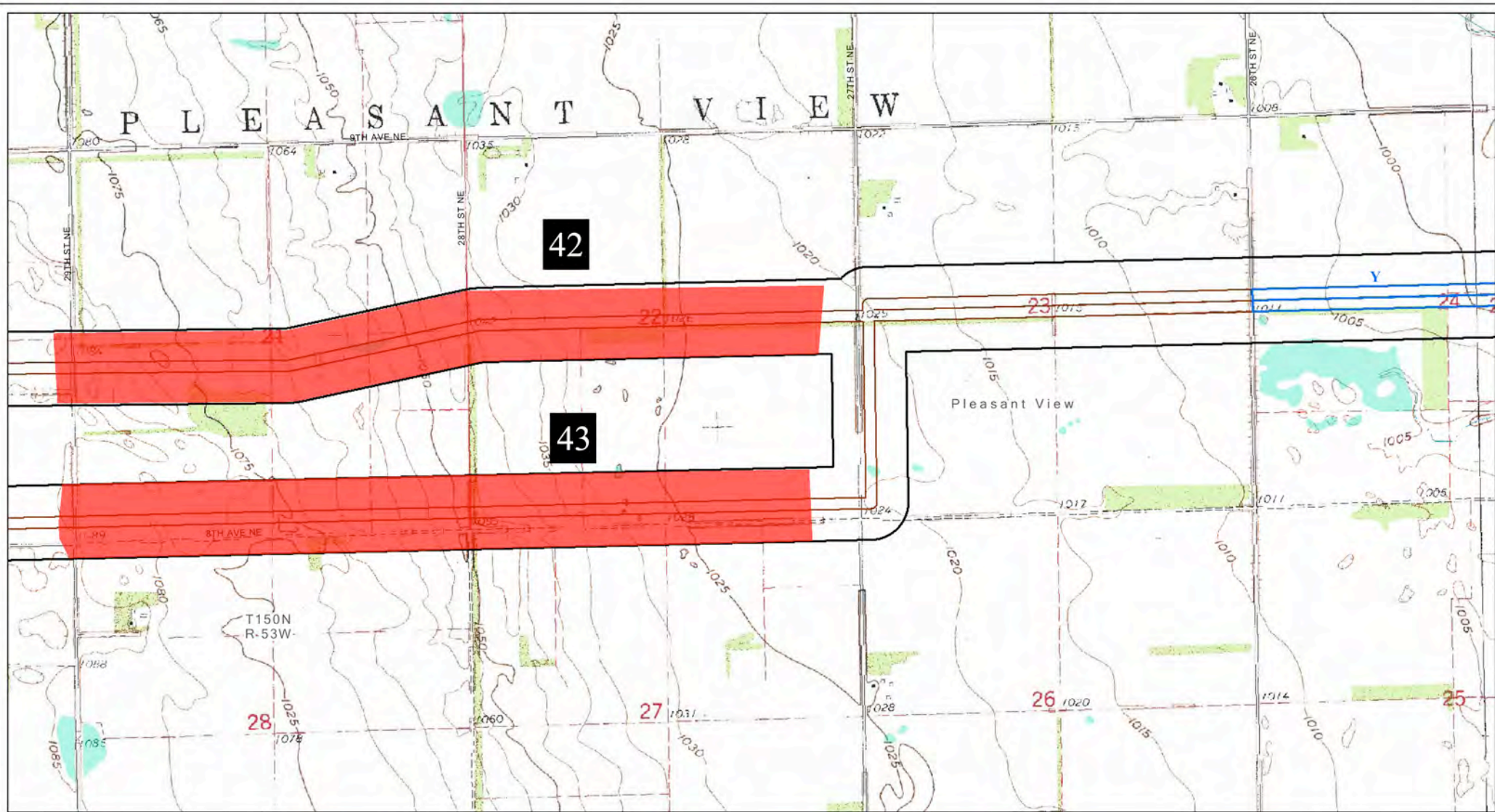
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Preferred Route: Page 87 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project



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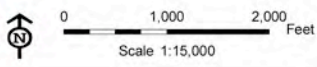
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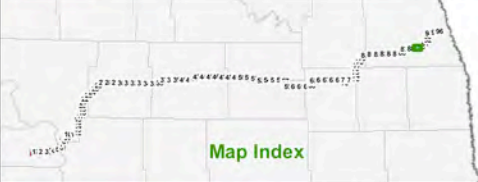
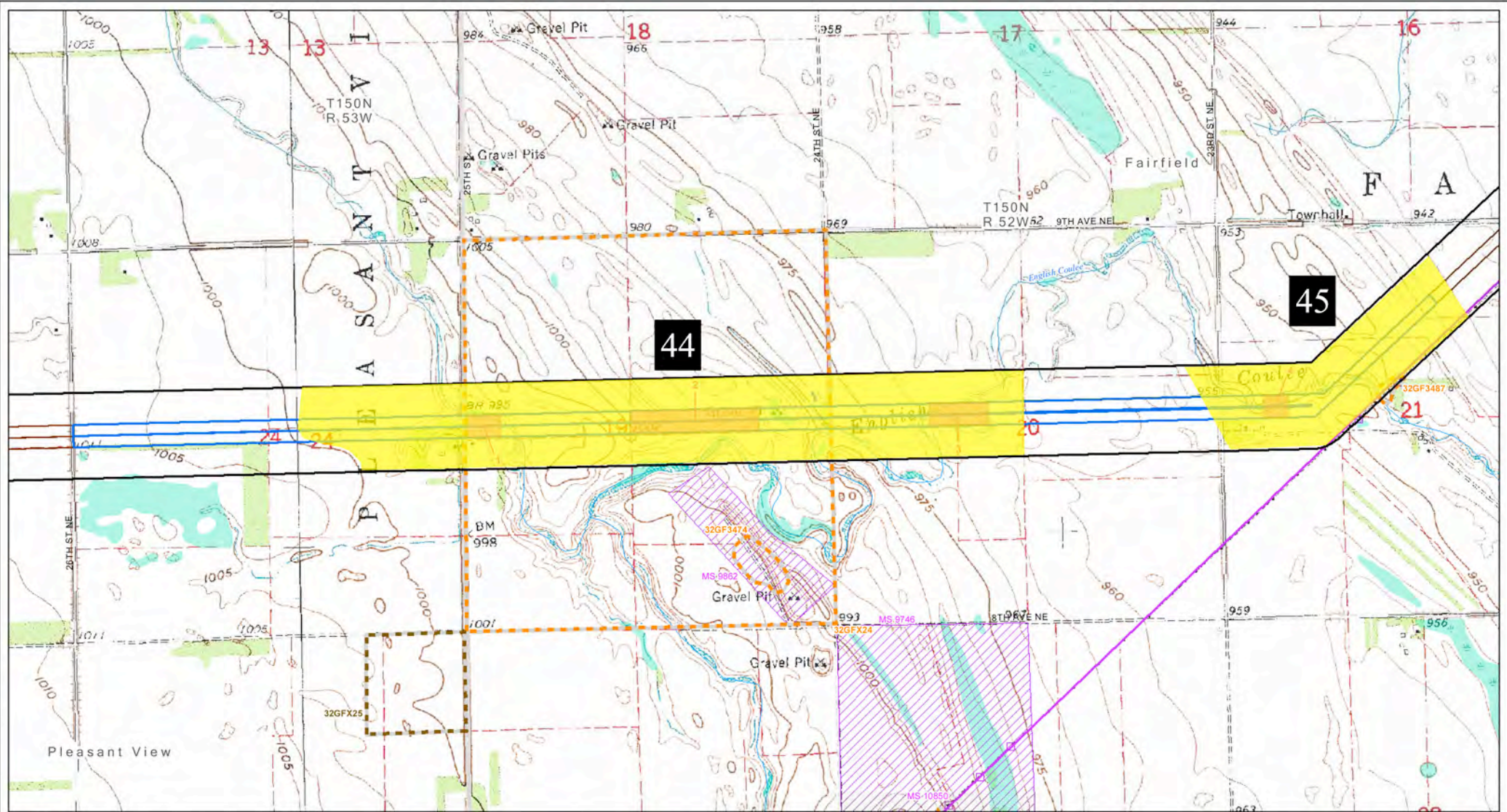
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| | | | 115 kV or less AC | |

Preferred Route: Page 88 of 96
 Archaeological Resources Field Map Book
 Center to Grand Forks Project

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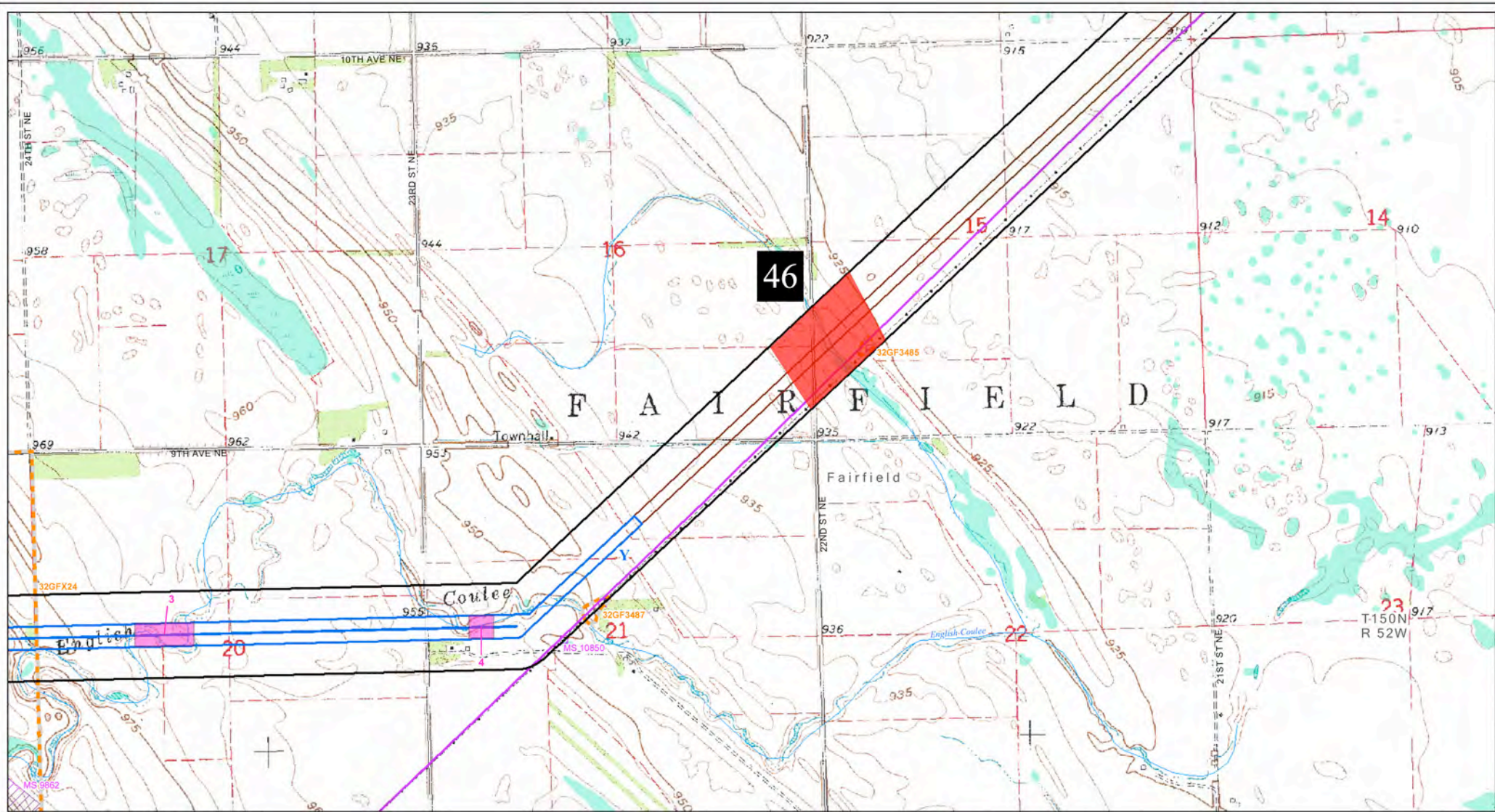
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Preferred Route: Page 89 of 96
 Archaeological Resources Field Map Book
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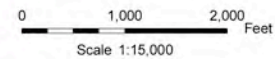
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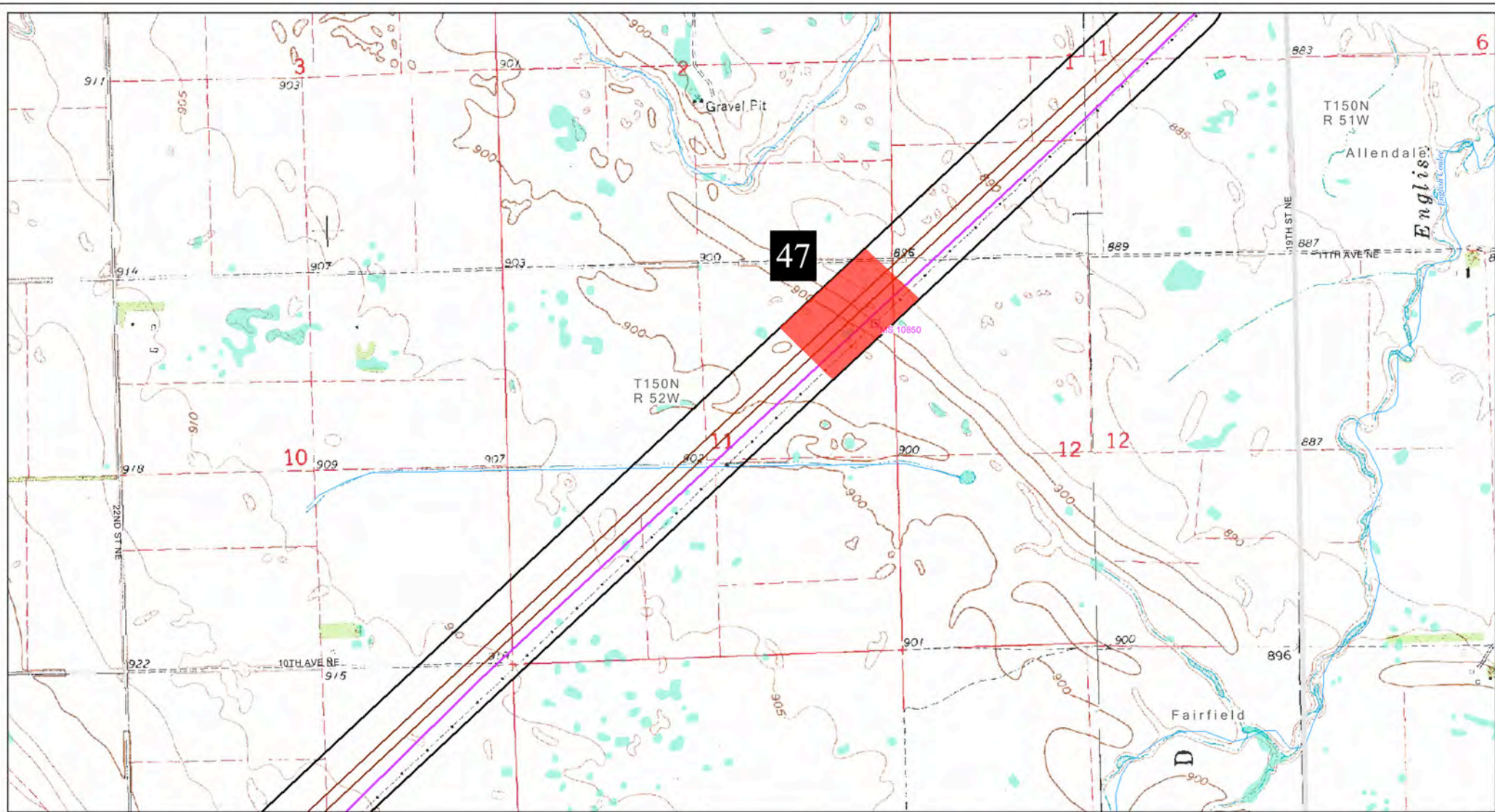
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 Archaeological Resources Field Map Book
 Center to Grand Forks Project

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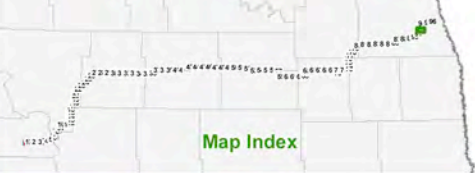
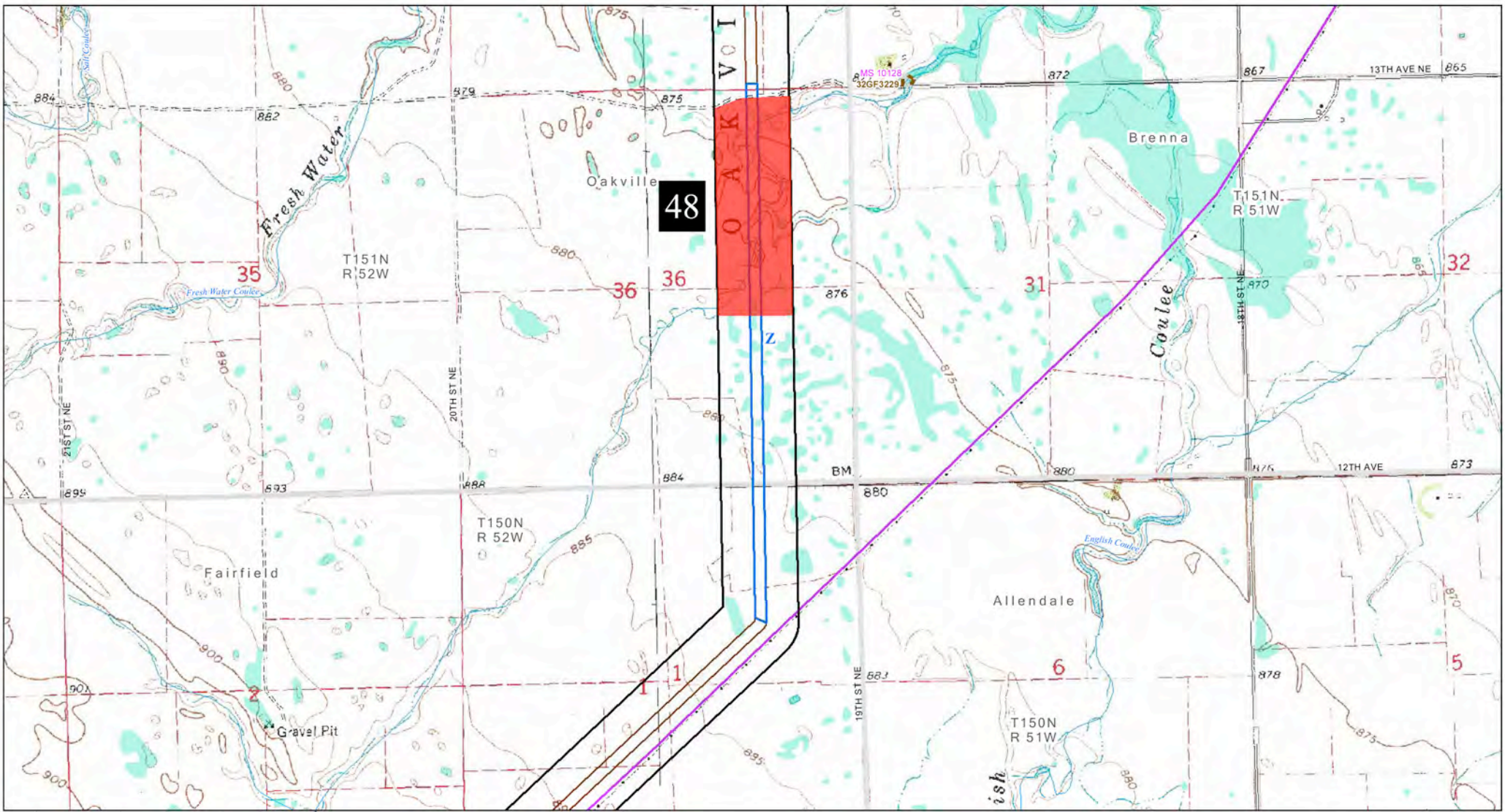
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Preferred Route: Page 91 of 96
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 Center to Grand Forks Project

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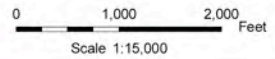
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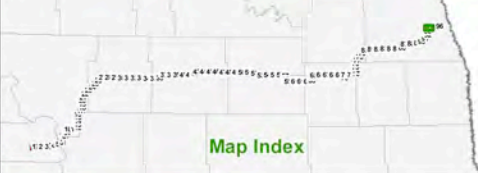
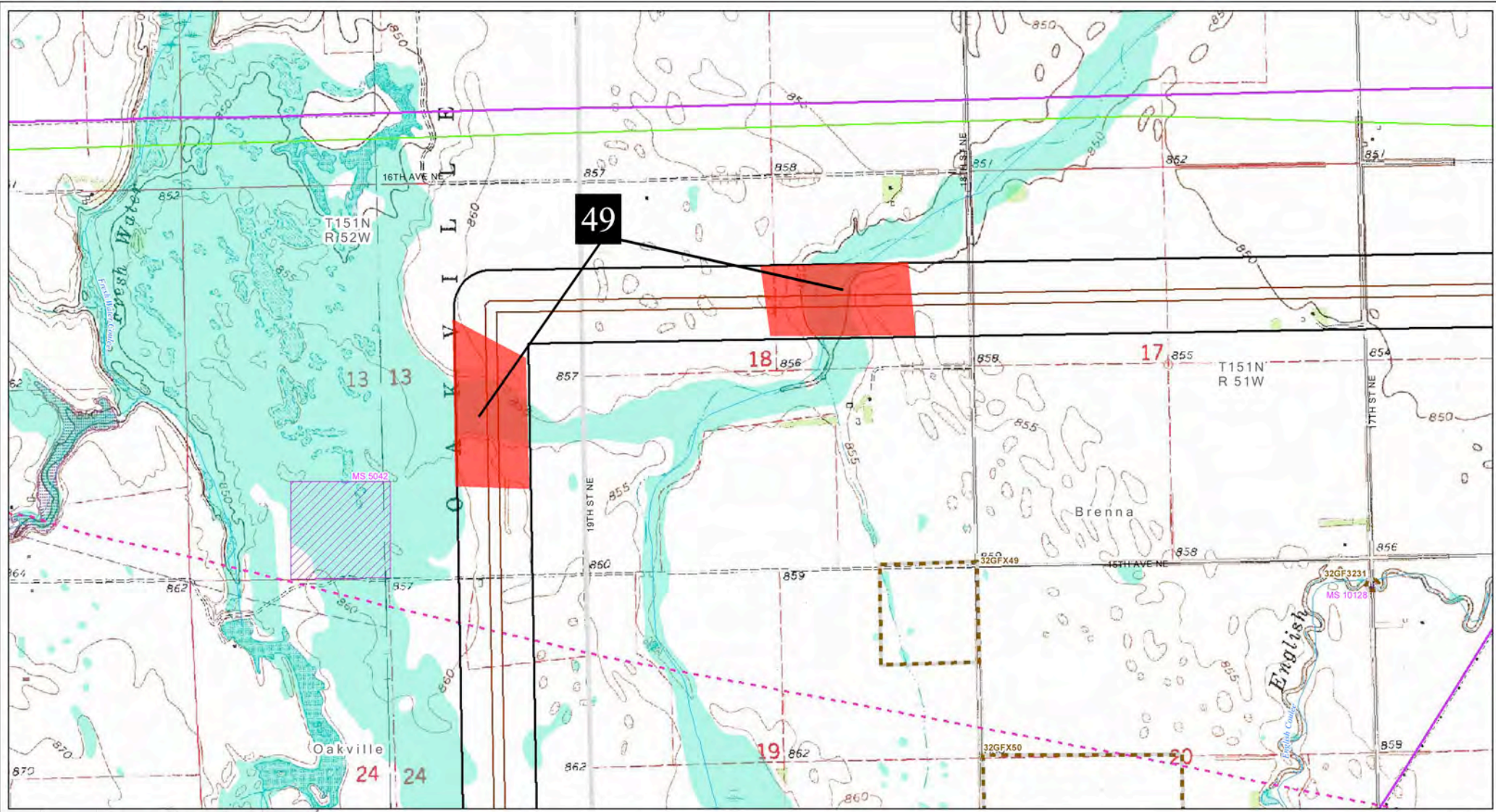
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| | Archaeological | Gas or Oil Pipeline | 230 kV AC | |
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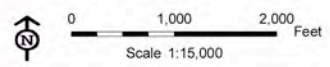
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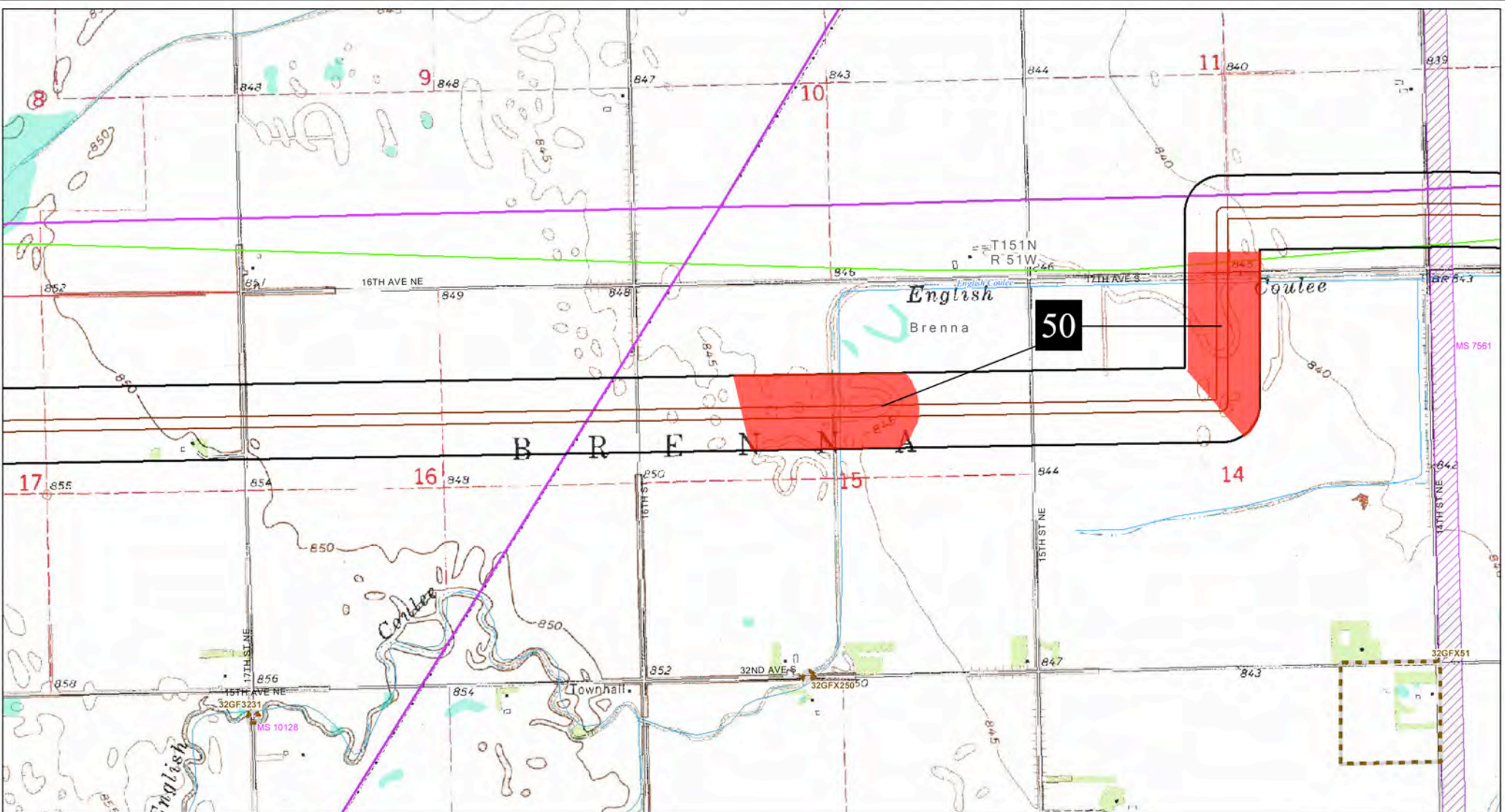
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| Potential Survey Corridor (150ft) | Archaeological | Archaeological and Historical | 400 kV DC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC | USBOR Land |
| | Architecture | Communication Tower | 250 kV DC | |
| | Archaeological | Gas or Oil Pipeline | 230 kV AC | |
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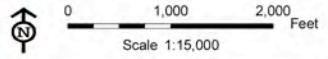
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| Potential Preferred Route ROW (150ft) | Historical | Architectural and/or Historical | Existing Transmission Lines | USFWS WPA or WDA |
| Potential Survey Corridor (150R) | Archaeological | Archaeological and Historical | 400 kV DC | State Park, Recreation Area or WMA |
| Potential Shovel Test Area | NDCRS Sites or Site Leads | Cultural Resource Surveys | 345 kV AC | USBOR Land |
| | Architecture | Communication Tower | 250 kV DC | |
| | Archaeological | Gas or Oil Pipeline | 230 kV AC | |
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- Moderate - Low Geologic Potential

Appendix D: Initial Predictive Model

Initial Center to Grand Forks Archaeological Predictive Model

Prepared by
Marcus P. Grant

Introduction

The term “predictive” modeling is somewhat misleading in an archaeological context and seems to promise more than it delivers. No method has been developed to predict with absolute certainty whether an archaeological site will be present at a specific point on the landscape. It is possible, however, to classify parts of a landscape by the relative probability of finding a certain density of sites within a discrete area. “Probability” modeling is probably a more humble and accurate term for this process.

How accurate is probability modeling? The accuracy of a model depends on the quality and quantity of the data used to construct the model, the specific methods of prediction (or classification) used, and the researcher’s level of expertise. The adage “garbage in, garbage out” certainly applies to probability modeling. Alternatively, “reliable data in, reliable data out” is equally applicable. More importantly, a well constructed model will not just provide probability estimates but also upper and lower bounds of expected errors associated with those estimates. The model is not the landscape; it is a reasoned approximation. A reliable model knows its limits and states them.

This project’s predictive model is based on geographic information about the project area that is provided by multiple sources, such as the US Geological Survey, Department of the Interior, Department of Agriculture, and North Dakota State Historic Preservation Office. Some basic landscape data, such as surface slope, directional exposure, and distance to nearest stream or river, are derived from these larger data sets by Geographic Information System (GIS) analysts at HDR.

Information such as surface slope, soil type, vegetation cover, distance to water, etc., are examined in relation to known sites and areas of high and low site density are identified by statistical analysis. The significant variables are combined in a multivariate procedure called logistic regression, which generates probabilities of site occurrences for (in this case) various combinations of soil types and vegetation covers. These scores are grouped into high, medium, and low probability zones and a color coded map is generated.

The model for this project correctly classifies 81% of known sites, which account for 12% of the landscape examined by the model. If we were guessing site locations by throwing darts at a map, we would probably get it right about 12 times out of 100. Using the model, we can expect to guess site probability correctly about 81 times out of a hundred, so the model is about 5.75 times (given by $.81/[(.81-.12)]$) more accurate than throwing darts (but less fun).

Predictive models identify regions of site likelihood, not specific points where sites will or will not occur. In effective predictive models site densities are usually about 3 to 5 times greater in high probability zones than low probability zones and medium probability zones yield about double the site density of low probability zones. Low probability zones are not necessarily devoid of sites but require significantly greater survey coverage than a higher probability zone to discover a similar number of sites.

Since the odds of encountering a site in a low probability zone are significantly less than a high or medium zone, the low probability zone defines the areas where ground disturbances are least likely to impact archaeological sites. Hence, the predictive model is a risk assessment tool for proponents who

wish to minimize the chances of encountering historic properties (“aim low”) and a prospection tool for archaeologist seeking the largest site sample at minimum expense (“aim high”).

Model Construction

Data were extracted from GIS coverage for 183 archaeological sites and 5,000 randomly generated points (RGPs) within the proposed corridor boundaries. The minimum distance between RGPs was 30 m. Archaeological sites and RGPs did not coincide spatially. Differences between the two data sets were assessed in relation to three continuous independent variables (slope, distance to water, and elevation) and two categorical independent variables (land use cover and soil type). Archaeological sites and RGPs differed significantly in relation to distance to water ($t [2,349] = 10.191, p < 0.001$), soil type ($X^2 [1] = 818.882, p < 0.001; \phi = 0.590$), and land use cover ($X^2 [1] = 321.409, p < 0.001; \phi = 0.370$). Soil type contained over 140 categories and land use cover contained 26 categories.

The strongest relationships between the independent variables and the target groups were obtained by collapsing the multiple elements of the categorical independent variables to two or three vectors. Soil type was dichotomized by those soils that intersected 5% or fewer archaeological sites as a proportion of all sampled points and polygons (coded as Vector 0) and those that intersected more than 5% archaeological sites as a proportion of all sampled points or polygons (coded as Vector 1). Results are summarized in Table 1. Categories not listed in this table are treated as missing data due to inadequate sample sizes.

Land use cover was similarly reduced to three vectors (a two-vector coding resulted in high standard errors for the variable’s regression coefficient but the three-vector scheme behaved robustly in a regression equation). The criteria for coding land use was based on equal division of potential proportions of archaeological occurrences sampled ranging from 0 to 1: $<0.33 = -1, \geq 0.33 < 0.66 = 0, \geq 0.66 = 1$. Results are summarized in Table 2. Categories not listed in this table are treated as missing data due to inadequate sample sizes.

Table 1. Summary of Soil Type Vectors.

| Soil Type | Vector |
|---|---------------|
| No name given | 0 |
| Amegard loam | 1 |
| Antler silt loam | 0 |
| Antler silty clay loam, saline | 0 |
| Antler-Mustinka silt loams, 0 to 2 percent slopes | 0 |
| Arveson loam | 0 |
| Arvilla sandy loam | 0 |
| Balaton-Wyard loams, 0 to 6 percent slopes | 0 |
| Barnes loam, rolling | 1 |
| Barnes-Buse loams | 0 |
| Barnes-Buse-Langhei loams | 0 |
| Barnes-Cresbard loams, 0 to 6 percent slopes | 0 |
| Barnes-Svea loams | 0 |
| Bearden and Glyndon silt loams | 0 |
| Bearden silty clay loam | 0 |

Center to Grand Forks Transmission Line
Class III Intensive Archaeological Resources Inventory

| Soil Type | Vector |
|--|--------|
| Bearden-Kindred silty clay loams, 0 to 2 percent slopes | 0 |
| Bearden-Overly silty clay loams | 0 |
| Bearden-Perella silty clay loams | 0 |
| Bearden-Perella silty clays | 0 |
| Binford-Coe complex, 0 to 6 percent slopes | 0 |
| Borup silt loam | 0 |
| Bowbells-Williams loams, 3 to 6 percent slopes | 0 |
| Brantford loam, 0 to 2 percent slopes | 0 |
| Buse-Barnes loams, 9 to 15 percent slopes | 1 |
| Buse-Barnes-Darnen loams | 0 |
| Cabba-Werner complex | 1 |
| Coe-Binford complex, 6 to 9 percent slopes | 0 |
| Coe-Binford sandy loams, 9 to 25 percent slopes | 0 |
| Cohagen-Rock outcrop complex, 15 to 50 percent slopes | 1 |
| Cohagen-Vebar fine sandy loams, 6 to 35 percent slopes | 1 |
| Colvin silt loam, 0 to 1 percent slopes | 0 |
| Colvin-arveson, loamy substratum, complex, saline, 0 to 1 percent slopes | 0 |
| Cresbard-Cavour loams, 0 to 3 percent slopes | 0 |
| Dickey-Buse-Embden complex | 1 |
| Dickey-Esmond-Embden complex | 1 |
| Divide loam | 0 |
| Edgeley loam | 0 |
| Edgeley-Kloten-Buse loams | 1 |
| Egeland-Embden fine sandy loams | 0 |
| Embden fine sandy loam | 0 |
| Embden-Egeland fine sandy loams | 0 |
| Embden-Heimdal complex | 0 |
| Emrick-Cathay loams | 0 |
| Emrick-Larson loams | 0 |
| Esmond-Heimdal loams | 1 |
| Esmond-Heimdal-Darnen loams | 1 |
| Fargo silty clay | 0 |
| Fargo-Hegne silty clays | 0 |
| Ferney loam, 0 to 3 percent slopes | 0 |
| Ferney-Cavour loams, 0 to 3 percent slopes | 0 |
| Forman clay loam, undulating | 0 |
| Fram-Tonka complex, 0 to 3 percent slopes | 0 |
| Fram-Tonka-Parnell complex, 0 to 3 percent slopes | 0 |
| Fram-Wyard loams, 0 to 3 percent slopes | 0 |

Center to Grand Forks Transmission Line
 Class III Intensive Archaeological Resources Inventory

| Soil Type | Vector |
|--|---------------|
| Galchutt-Fargo complex | 0 |
| Gardena loam, 0 to 2 percent slopes | 0 |
| Gardena silt loam | 0 |
| Gilby loam | 0 |
| Gilby-Mustinka complex, 0 to 2 percent slopes | 0 |
| Glyndon silt loam | 0 |
| Glyndon-Tiffany loams | 0 |
| Glyndon-Tiffany silt loams | 0 |
| Grassna silt loam, 0 to 2 percent slopes | 1 |
| Grassna silt loam, 2 to 6 percent slopes | 0 |
| Hamar sandy loam | 1 |
| Hamerly-Tonka clay loams | 0 |
| Hamerly-Tonka clay loams, saline | 0 |
| Hamerly-Tonka complex, 0 to 3 percent slopes | 0 |
| Hamerly-Tonka-Parnell complex, 0 to 3 percent slopes | 0 |
| Hamerly-Wyard loams, 0 to 3 percent slopes | 0 |
| Harriet silt loam | 1 |
| Havrelon loam, 0 to 2 percent slopes | 1 |
| Havrelon silty clay loam, 0 to 2 percent slopes | 1 |
| Hecla fine sandy loam | 0 |
| Hecla loamy fine sand, 0 to 2 percent slopes | 0 |
| Hecla-Maddock fine sandy loams, 2 to 6 percent slopes | 0 |
| Heimdal-Emrick loams | 0 |
| Heimdal-Esmond loams | 0 |
| Heimdal-Esmond-Sisseton loams | 1 |
| La Prairie loam | 1 |
| LaDelle silt loam, 0 to 2 percent slopes, occasionally flooded | 0 |
| LaDelle silty clay loam | 1 |
| Lankin loam | 0 |
| Larson-Cathay loams, 0 to 3 percent slopes | 0 |
| Larson-Uranda complex, 0 to 3 percent slopes | 0 |
| Lohnes-Claire loamy coarse sands, 0 to 6 percent slopes | 0 |
| Lowe loam | 0 |
| Maddock-Hecla loamy fine sands | 0 |
| Mandan silt loam | 1 |
| Marysland loam | 1 |
| Max loam, 3 to 6 percent slopes | 0 |
| Max-Zahl loams | 0 |
| Minnewaukan-Banks-Riverwash complex, 0 to 2 percent slopes | 1 |

Center to Grand Forks Transmission Line
Class III Intensive Archaeological Resources Inventory

| Soil Type | Vector |
|--|---------------|
| Nutley silty clay | 0 |
| Ojata silty clay loam | 0 |
| Overly silty clay loam | 0 |
| Parnell silty clay loam | 0 |
| Parnell-Vallers complex, 0 to 1 percent slopes | 0 |
| Renshaw loam, 0 to 2 percent slopes | 0 |
| Renshaw loam, 0 to 6 percent slopes | 0 |
| Renshaw-Sioux complex | 0 |
| Ruso-Manning coarse sandy loams, 2 to 6 percent slopes | 0 |
| Sen and Amor loams, 3 to 6 percent slopes | 0 |
| Sen and Amor loams, 6 to 9 percent slopes | 1 |
| Sen-Werner loams, 3 to 9 percent slopes | 1 |
| Sioux loam, 1 to 15 percent slopes | 1 |
| Sioux-Arvilla complex | 0 |
| Southam silty clay loam, 0 to 1 percent slopes | 0 |
| Stirum-arveson saline, fine sandy loams, 0 to 1 percent slopes | 0 |
| Straw loam, channeled, 0 to 2 percent slopes | 1 |
| Straw soils, channeled, 0 to 2 percent slopes | 1 |
| Svea loam, 0 to 3 percent slopes | 0 |
| Svea-Barnes loams, 0 to 3 percent slopes | 0 |
| Svea-Buse-Tonka complex | 0 |
| Svea-Cresbard loams | 0 |
| Swenoda fine sandy loam | 0 |
| Swenoda-Barnes complex, 3 to 6 percent slopes | 0 |
| Swenoda-Barnes fine sandy loams, 0 to 3 percent slopes | 0 |
| Temvik silt loam | 0 |
| Temvik-Williams silt loams | 1 |
| Tiffany loam | 0 |
| Tonka silt loam, 0 to 1 percent slopes | 0 |
| Towner loamy fine sand, 0 to 3 percent slopes | 0 |
| Towner-Barnes complex, 3 to 6 percent slopes | 0 |
| Uranda-Larson loams, 0 to 3 percent slopes | 0 |
| Vallers loam | 0 |
| Vallers saline-Manfred complex, 0 to 1 percent slopes | 0 |
| Vallers saline-Parnell complex, 0 to 1 percent slopes | 0 |
| Vallers-Hamerly loams, saline, 0 to 3 percent slopes | 0 |
| Wabek loam, gravelly, 6 to 35 percent slopes | 1 |
| Wabek sandy loam | 0 |
| Wabek soils | 0 |

| Soil Type | Vector |
|---|---------------|
| Walsh silty clay loam | 0 |
| Walum sandy loam, 0 to 2 percent slopes | 0 |
| Williams loam | 1 |
| Williams-Bowbells loams | 0 |
| Williams-Zahl loams | 0 |
| Wyndmere fine sandy loam | 0 |
| Wyndmere loam | 0 |
| Wyndmere sandy loam | 0 |
| Wyndmere-Tiffany complex, silty substratum | 0 |
| Wyndmere-Tiffany fine sandy loams | 0 |
| Zahl-Cabba complex, 15 to 35 percent slopes | 1 |
| Zahl-Max loams, 9 to 35 percent slopes | 0 |
| Zahl-Williams loams | 1 |
| Zahl-Williams-Parnell complex, 0 to 35 percent slopes | 0 |
| Zell-Overly silt loams | 1 |

Table 2. Summary of Land Use Vectors.

| Category | Vector |
|---|---------------|
| Cropland | -1 |
| Prairie – bluestem-needlegrass-wheatgrass | -1 |
| Prairie – little bluestem | 0 |
| Prairie – mesic tall and mixed grass | 1 |
| Prairie – needlegrass prairie | 0 |
| Prairie – saline | 0 |
| Prairie – sand | 1 |
| Prairie – wet-mesic tall grass | -1 |
| Prairie – wheatgrass prairie | 0 |
| Shrubland – upland deciduous | 0 |
| Wetland – lacustrine | -1 |
| Wetland – palustrine seasonal | -1 |
| Wetland – palustrine semipermanent | -1 |
| Wetland – palustrine permanent | -1 |
| Wetland – riverine | 0 |
| Wetland – water | -1 |
| Woodland – burr oak | 1 |
| Woodland – deciduous | 1 |
| Woodland – floodplain | 1 |
| Woodland – green ash | 1 |

Distance to water behaved more robustly as a predictor when coded for all distances equal to or less than 200 m (Vector 1) and all distances greater than 200 m (Vector 0). Although the range of this variable was from 0 to 3,493 m in the combined sample of RGPs and archaeological sites, the modal distance to water for archaeological sites was 200 m, and 50% of all sampled points and polygons that intersect archaeological sites were less than 200 m from water. Dichotomizing the variable removed the effects of outlying scores in the distribution's long tail.

A predictive equation was constructed using binary logistic regression (BLR) with the three independent variables described above as covariates and RGPs and archaeological sites as the response variables. In the regression equation, a point or polygon intersecting an archaeological site was coded as 1 and a point or polygon intersecting an RGP was coded as 0.

The resulting BLR equation accounted for approximately 49% of the total sample variance ($R^2 = 0.493$) and correctly classified 82% of RGPs and 84% of archaeological sites for an overall correct classification proportion of 83%. Prior probabilities indicated about a 90% chance of randomly selecting an RGP from the sample area and a 10% chance of randomly selecting an archaeological site. Hence, the model is better at identifying potential site locations than identifying areas that are unlikely to contain archaeological sites. This bias toward site identification ensures liberal delineation of high probability zones and conservative delineation of lower probability zones. The equation is:

$$\lambda = -2.811 + (0.615 \text{ Land cover vector}) + (2.891 \text{ Soil type vector}) + (0.800 \text{ distance to water vector}).$$

The resulting value of lambda is converted to a probability of archaeological occurrence (P) by the formula:

$$P = e^\lambda / (1 + e^\lambda),$$

where e is the base natural logarithm, approximately 2.718.

Since two dichotomized variables and one trichotomized variable were used as predictors, any point or polygon in the project GIS coverage can be assigned one of 12 discrete probability scores, ranging from 0.03 to 0.82, for the occurrence of an archaeological site. Scores are grouped by generalized probability zones as follows: Low: $P < 0.12$; Moderate: $P \geq 0.12 < 0.40$; High: $P \geq 0.40$.

Evaluation

As noted above, the model is able to account for just under half of the total sample variance and exhibits a correct site classification rate of 85% based on known site locations. Without the model, approximately 90% of sites are likely to be miss-classified as RGPs and approximately 10% of RGPs are likely to be miss-classified as sites, based on the sample's prior probabilities. Obtained miss-classification rates with the model are 19% for sites and 18% for RGPs.

Based on these proportions the model robustly improves the correct prediction rate of archaeological occurrences but negatively impacts the correct prediction of non-site locations. All models are biased in favor of more robust site classifications or more robust non-site classifications. A bias toward robust site classification is benign and ensures conservative delineation of low probability zones whereas a bias toward robust non-site classification and less efficient site classification could negatively impact the resource by frequently miss-classifying sites as non-sites.

The model's components are summarized in Table 3. Portions of this table that are germane to evaluating the model are the Standard Error of β scores, which are small, the significance of the Wald scores, which indicate less than one chance in 1,000 of obtaining the same results without a variable's inclusion in the model, and e^{β} . This final score is the log odds ratio of obtaining a score of 1 (site) rather than 0 (RGP) given a one-unit change in the predictor variable's value. A score of 0 indicates even odds or no change in the outcome associated with a unit change in the independent variable. The current model uses predictors that yield small standard errors, do not reflect chance outcomes, and contribute substantively to the correct classification rates.

Appendix E: Final Predictive Model

FINAL CENTER TO GRAND FORKS ARCHAEOLOGICAL PREDICTIVE MODEL

March 2011



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INTRODUCTION

Predictive modeling in archaeology mirrors principles and methods used in other disciplines that are interested in predicting the likelihood of certain events in a broad population from a representative sample. Methods and theories relevant to archaeological predictive models occur in such diverse contexts as radiology, psychology, epidemiology, and financial risk analysis. All of these disciplines, which arguably deal in events of greater practical consequence than the prediction of archaeological sites, are bound by similar methodologies in generating and assessing prediction models. As with other disciplines that predict presence or absence of an event, archaeological site prediction is binary (positive or negative) and has two states: true or false. Hence each model produces four scores that require evaluation.

A true positive or hit is the correct prediction of a site where one is present. A true negative is the correct prediction of cultural sterility where no site occurs. A false positive or false alarm is the prediction of a site where none is found; a false negative or miss is the prediction of cultural sterility where a site is present. These four outcomes determine several metrics important in assessing and using predictive models. The current model relies on seven measures of performance that are commonly used in elementary signal detection theory and mathematical statistics. These metrics are summarized in Table 1.

Table 1. Summary of Metrics Used in Evaluating Predictive Model Performance.

| Metric | Calculation | Practical Significance |
|---|--|---|
| True Positive Rate (TPR); Sensitivity; Precision; Power; $1-\beta$ | True Positives/(True Positives + False Negatives) | The model's ability to correctly predict site occurrences; inversely related to the rate of misses (false negatives). |
| True Negative Rate (TNR); Specificity; $1-\alpha$ | True Negatives/(False Positives + True Negatives) | The model's ability to discriminate non-site locations; inversely related to the rate of false alarms (false positives). |
| False Positive Rate (FPR); Type I Error; α | False Positives/(False Positives + True Negatives) | The rate at which the model incorrectly predicts site occurrences (false alarms). |
| False Negative Rate (FNR); Type II Error; β | False Negatives/(False Negatives + True Positives) | The rate at which the model incorrectly predicts non-sites (misses) |
| Accuracy (ACC) | Correct Classifications/All Classifications | The proportion of correct classifications to the sum of correct and incorrect classifications; the model's ability to "hit the target." |
| Odds Ratio (OR); | $(TPR * TNR)/(FPR * FNR)$ | The odds of correctly classifying a point given the information used in the model; the larger the OR, the stronger the effect of the independent variables. |
| Area Under the Curve (AUC) | Sensitivity/1-Specificity; Trapezoidal Method | Areas in excess of 0.50 indicate performance better than chance; the closer to 1.0, the more powerful the model. |

In using these metrics, minimum standards were established for the final Center to Grand Forks predictive model on seven criteria. Two assumptions underlie these standards: (1) false negatives, which equate with potentially missed sites, are more detrimental than false positives, which equate with incorrect predictions of site presence; and (2) the true positive rate, which is the percentage of sites correctly predicted, is more important than the true negative rate, which is the percentage of non-site correctly predicted.

Additionally, criteria are dependent one another due to 1:1 relationships or very strong linear correlations. The maximum tolerable False Negative Rate (FNR), for instance, dictates that the minimum acceptable True Positive Rate (TPR) is $1-FNR$. Consequently, setting the maximum FNR too conservatively can

result in an unrealistically high TPR criterion. The True Negative Rate (TNR) shares this same relationship with the False Positive Rate (FPR). The FPR and Accuracy are similarly constrained due to a robust linear correlation, as are Area under the Curve (AUC) and the Odds Ratio (OR). Predictive models using various combinations of independent variables, including single predictor variables, are assessed on each of the seven criteria in Table 2 on a pass/fail basis. A model must pass all seven criteria to qualify for as a working model. The goal of this project was to develop a model that achieved the highest *reliable* TPR and TNR rates while keeping FPR and FNR rates as low as possible.

Table 2. Minimum Standards for the Center to Grand Forks Predictive Model.

| Metric | Minimum | Maximum | Caveat(s) |
|---------------|----------------|----------------|--|
| TPR | 0.70 | N/A | Constrained by maximum FNR |
| TNR | 0.65 | N/A | Constrained by maximum FPR |
| FPR | N/A | 0.35 | More conservative value could inflate TNR to an unrealistic level. |
| FNR | N/A | 0.30 | More conservative value could inflate TPR to an unrealistic level. |
| ACC | 0.65 | N/A | Constrained by maximum FPR |
| AUC | 0.65 | N/A | Lower bound of the 95 CI is not less than 0.55. More stringent value could inflate criterion OR to an unrealistic level. |
| OR | 3.50 | N/A | Relative standard error of <i>B</i> in regression equation does not exceed 25%; the lower bound of the 95% CI of the OR is not less than 1.50. |

METHODS

Within the various cultural resources survey areas depicted on the project GIS coverage, 5,000 random points were generated by ArcGIS 9.3, ESRI outside recorded site boundaries. These points represented landscape attributes in confirmed culturally sterile locations. Among the 5,000 random points initially generated, 1,208 lacked information in the project GIS coverage on two or more attributes. These points were deleted leaving an effective sample of 3,792 culturally sterile points. The center points of recorded prehistoric archaeological sites ($n = 257$) comprised the initial site sample. Of these, six sites (32MS410, 32MS496, 32BL122, 32WE5, 32SH351, and 32GG63) lacked information on two or more attributes in the project GIS coverage and were deleted from the data leaving an effective sample of 251 sites.

The 251 screened sites and 3,792 screened random points were combined into a single file of 4,043 records. A field named Status identified each record as a site (Status = 1) or non-site (Status = 0). In addition to the Status field, each record contained a unique identifier (Point_No) and scores on four environmental variables: elevation in meters (Elevation) slope in degrees (Slope), distance to nearest drainage in meters (Water), and named soil type (Soil). Each environmental variable was examined individually and assessed for normality, outlying cases, and missing data. Descriptive statistics and frequency histograms were generated for sites and non-sites on the four environmental variables. Differences between sites and non-sites in relation to Elevation, Slope, and Water were assessed by independent samples *t*-Tests or Mann-Whitney U Test as appropriate based on the shapes of the distributions. Soil was coded numerically to represent a three-part linear contrast (-1, 0, 1) as described later. Differences between sites and non-sites in relation to Effect Coded Soil (ECS) were assessed by Chi-square analysis and nominal associations. Other variables were also eventually coded to form binary outcomes or three-part linear distributions, as discussed below.

Binomial logistic regression (BLR) was chosen as the procedure for building prediction equations. The efficacy of each environmental variable as the sole predictor of Status was assessed by a simple BLR model with 0.06 (the proportion of sites to random points) as the cut point for random classifications. The models were run using SPSS version 17.0 with the Regression Models module. Predicted probabilities generated Receiver Operating Characteristic (ROC) curves to both visually and statistically compare each predictor's performance. Originally designed to test how well a human subject or electronic device could discriminate a meaningful signal from background noise, the ROC curve plots sensitivity on 1-specificity. Points that fall on the graph's diagonal or *reference line* (sometimes called the *line of no discrimination*) indicate chance results. A perfect model would obtain $AUC = 1$. Scores less than 0.50 indicate a model's outcomes are contrary to its intended purpose.

Finally, the data were subjected to cross-validation of the overall results. A sample of 125 sites was randomly drawn from the 251 sites in the overall sample (site sample A). This file was merged with a random sample of 500 non-site points (random point sample A to form Group AA) and subjected to the same modeling process described above for the entire sample. This process was repeated a second time creating Group BB. Site and non-site sub samples were then crossed to create Groups AB and BA. The model's overall reliability was assessed as the degree of consistency among the overall sample and the cross-validated random samples. The final predictive model relies on the most efficient combination of variables that significantly differentiate site from non-site locations. A detailed discussion of raw and coded independent variables is included in Appendix I.

PREDICTIVE MODEL CONSTRUCTION

Figure 1 shows ROC curves for each of the variables summarized above entered individually as independent variables in a BLR model with Status as the dependent variable. All variables provide estimated probabilities that deviate significantly from random outcomes. ECS is the most powerful predictor with AUC = 0.732. Water is the weakest predictor with AUC = 0.597. The lower bound of the 95% CI of the AUC for Water = 0.560, which meets the minimum criterion for inclusion in the model.

Although all variables were statistically significant as predictors, none passed all seven critical measures. ECS as a single prediction variable failed to achieve a 65 percent true positive rate although all other measures were within bounds.

Various coding strategies were tried for Water, Elevation, and Slope in an effort to improve their performance in a predictive equation by collapsing cells with few or no sites or random points into a single category and coding for maximum distinction of those cells with high site proportions. Water could not be improved. However, Elevation improved significantly as a predictor by coding each recorded value as -1, 0, or 1, using the same criteria described above to code soil categories. The coded variable

placed 221 sites (88 percent) in category 1, 21 (eight percent) in category 0, and nine (four percent) in Category -1. Slope also improved markedly when coded for a binary contrast with slopes of 2-10 degrees, within which 60 percent of sites occurred, coded as 1 and all other values coded as 0.

Combinations of raw and coded variables were entered into a logistic regression model and assessed against the seven critical criteria defined above. Results are summarized in Table 3. Only two of nine models (Nos. 8 and 9) passed all seven criteria. Although models 3, 5, and 7 achieved higher true positive rates, those models exhibited low accuracy scores, which suggested they may not generalize well to the larger study area outside current cultural resource survey boundaries. Model 9 exhibited slightly higher scores on most criteria than Model 8. However, the model was suspect because the inclusion of Water, which was responsible for the apparent improvement, made no measurable contribution to the regression equation, with an associated logistic correlation coefficient of 0.00 and an odds ratio of 1.0 (no measurable effect). This suggested Water suppressed a small amount of error variance in one or more variables but because it made no measurable contribution to the prediction equation was unlikely to behave consistently if the model was generalized to new areas. Model 8 was chosen as the most reliable model that satisfied all criteria.

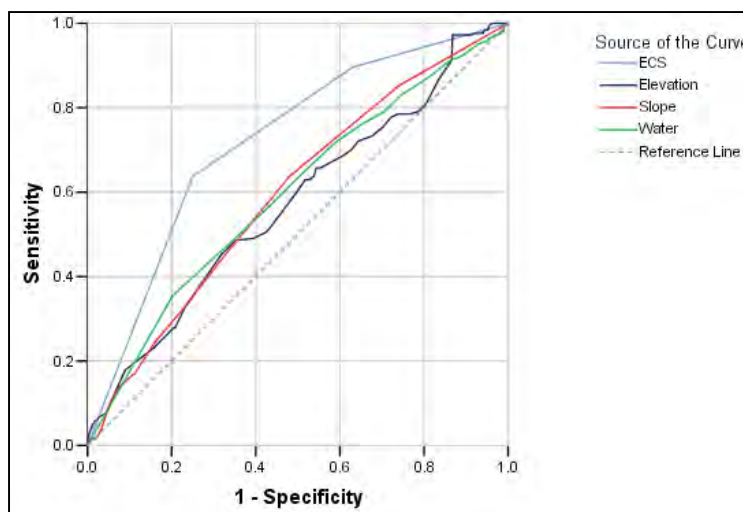


Figure 1. ROC Curves for Obtained Probabilities Generated by Each Independent Variable Entered Singly into a Logistic Regression Model as the Predictor of Status.

Table 3. Critical Criteria Scores for Nine Predictive Models. Bolded Text Indicates Failed Scores (Outside Project Tolerances).

| Model No. | Variables Entered | TPR | TNR | FPR | FNR | ACC | OR | AUC |
|-----------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|
| 1 | Slope | 0.45 | 0.70 | 0.309 | 0.55 | 0.681 | 1.873 | 0.615 |
| 2 | Slope, Water | 0.669 | 0.506 | 0.494 | 0.331 | 0.516 | 2.076 | 0.613 |
| 3 | Slope, Water, ECE | 0.813 | 0.464 | 0.536 | 0.187 | 0.485 | 3.751 | 0.672 |
| 4 | Slope, Water, ECE, ECS | 0.797 | 0.625 | 0.375 | 0.203 | 0.635 | 6.528 | 0.760 |
| 5 | ECE, ECS, Slope | 0.833 | 0.557 | 0.443 | 0.167 | 0.574 | 6.255 | 0.753 |
| 6 | ECE, ECS, Water | 0.797 | 0.606 | 0.394 | 0.203 | 0.618 | 6.025 | 0.759 |
| 7 | ECE, ECS | 0.833 | 0.557 | 0.443 | 0.167 | 0.574 | 6.256 | 0.744 |
| 8 | ECE, ECS, Binary Slope | 0.749 | 0.681 | 0.319 | 0.251 | 0.686 | 6.383 | 0.773 |
| 9 | ECE, ECS, Binary Slope, Water | 0.761 | 0.683 | 0.317 | 0.239 | 0.687 | 6.830 | 0.768 |

Figure 2 illustrates ROC curves for ECS as a sole predictor of status and Model 8. The additional variables in Model 8 increase the total AUC by only about four percent, but more importantly, increase the TPR by slightly more than 11 percent and reduce the FNR commensurately.

Cross Validation

Results of cross validations of sub models are summarized in Table 4. The cross-validated sub models exhibited consistency in the TPR, which is synonymous with precision and sensitivity, but fluctuated considerably in regard to the TNR, which is synonymous with specificity. The fluctuations are associated with Site Sample A and occur regardless of the random point sample with which it is paired. This may simply reflect the fact that it is easier to capture natural environmental variability in a sub sample than to capture all the variability in site locations. Each of the sub models meets minimum criteria on all metrics except Accuracy on Model AB. Overall mean scores of the four sub models on all metrics are extremely similar to Model 8 scores. Overall, the model appears stable and likely to stay within specified tolerances when generalized to broader study areas.

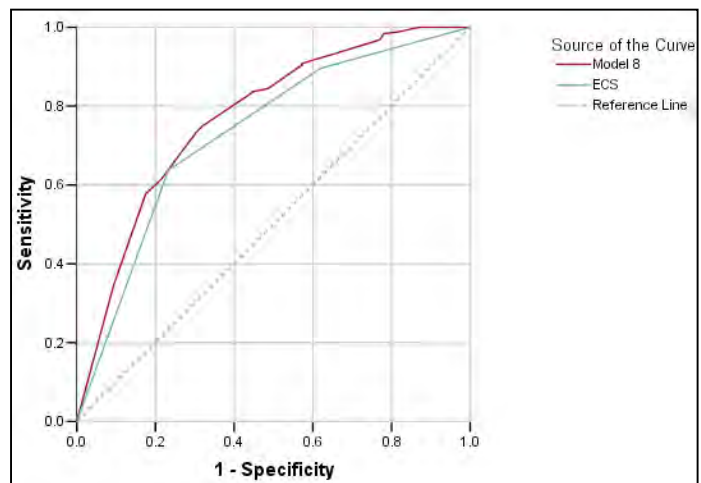


Figure 9. ROC Curves for ECS and Model No. 8.

Table 4. Results of Sub Model Cross Validation.

| Sub Model | TPR | TNR | FPR | FNR | ACC | OR | AUC |
|-----------|-------|-------|-------|-------|-------|------|-------|
| AA | 0.744 | 0.632 | 0.368 | 0.256 | 0.654 | 4.99 | 0.758 |
| BB | 0.744 | 0.706 | 0.294 | 0.256 | 0.714 | 6.98 | 0.784 |
| AB | 0.744 | 0.600 | 0.400 | 0.256 | 0.626 | 4.29 | 0.740 |
| BA | 0.744 | 0.760 | 0.240 | 0.256 | 0.768 | 9.20 | 0.803 |
| Mean | 0.744 | 0.675 | 0.325 | 0.256 | 0.691 | 6.37 | 0.771 |

Discussion

The current predictive model uses two predictor variables (Soil and Elevation) coded for three contrasts and one predictor variable (Slope) coded for two contrasts. This model partitions the landscape into 18 discrete units representing probabilities of prehistoric archaeological site presence. The obtained probabilities range from 0.06 to 0.78 for a range of 0.72. This is divided into three probability zones of approximately equal range: (1) Low – 0.06-0.30, (2) Moderate - 0.31–0.55 and (3) High – ≥ 0.56 . These divisions are likely to be correct in about 71 percent of cases ($(\text{TPR} + \text{TNR})/2$), based on the current sample of archeological sites.

The expected correct classification rate based on chance alone is 0.06. The obtained correct site classification rate is approximately 75 percent ($\text{Obtained Rate}/[1-\text{Expected Rate}]$) better than guessing based on known site densities alone. Although the model is robust, it is neither perfect nor literal. The best use of a probabilistic model is ensuring that project planning minimizes the likelihood of impacting cultural resources (avoiding development in high probability zones) and maximizes the likelihood of avoiding cultural resources (concentrating development in low probability zones).

APPENDIX I: DETAILED SUMMARY OF INDEPENDENT VARIABLES

Soil Type

Since over 190 soil types were present in the project area, and most contained few random points or sites, this variable was reduced to three effect coded categories in the following manner. The combined sample of sites and random points ($n = 4,043$) was cross-tabulated by Status and Soil. All Soil categories containing less than 0.005 of the total sample (fewer than 20 sites and/or random points) were coded 0; these were assumed to have no predictive utility due to underrepresentation in the sample. All Soil categories containing at least 20 cases with proportionally more sites than random points were coded 1; these categories were more likely to be associated with sites than other categories. All Soil categories containing at least 20 cases with proportionally more random points than sites were coded -1; these were more likely to be associated with culturally sterile areas.

The resulting Effect Coded Soils sequence placed approximately 64 percent of sites ($n = 160$) and 23 percent of random points ($n = 882$) in category 1, which represented 25.80 percent of all cases. Category -1, which contained 36.30 percent of all cases, contained 38 percent of random points ($n = 1,441$) and approximately 10 percent of sites ($n = 26$). The balance of cases (39 percent of random points and approximately 26 percent of sites) was assigned to category 0, which comprised 37.90 percent of all cases. The distribution of sites by coded soil category is illustrated in Figure 1. The resulting proportions of sites by ECS may be considered obtained probabilities that divide the project area into high, moderate, and low site sensitivity areas on the basis of soil type alone. Coded soil categories are listed in Appendix I.

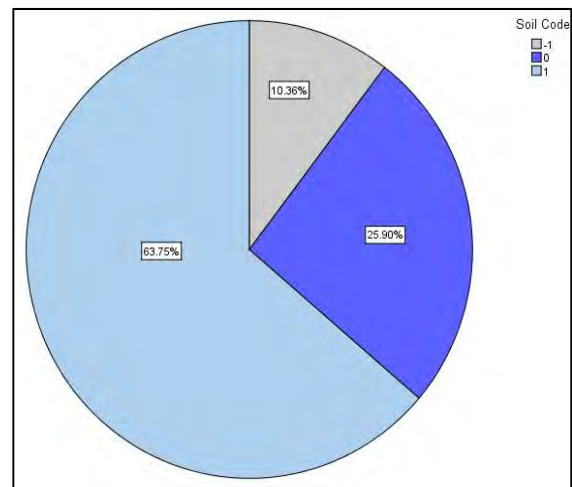


Figure I-1. Proportional Distribution of All Prehistoric Archaeological Sites by Coded Soil Type.

Chi-square analysis of the resulting frequencies of sites and non-sites by ECS indicated a statistically significant association between ECS and Status ($\chi^2 [2] = 209.58, P < 0.0001$; minimum expected count = 64.69). The nominal association between rows and columns in the 3 x 2 contingency table was moderately strong and statistically significant ($V = 0.228, P < 0.0001$).

Elevation

Recorded sites within the project area range in elevation from 280 to 680 m above mean sea level, with an average elevation of 517 m \pm 92 m. The distribution of sites by elevation is uneven. Within the 400 m range in which sites are recorded, two distinct clusters occur between 390 and 460 m and more prominently between approximately 560 and 620 m (Figure 2).

Random point elevations range from 250 to 670 m above mean sea level with an average of 489 m \pm 100 m. The distribution is multimodal with at least eight peaks of varying magnitude (Figure 3).

The difference in mean elevation between the two groups is statistically significant (t [3,773] = -4.399, $P < 0.0001$, variances equal per Levene's Test). The lower bound of the 95% confidence interval of the mean elevation of sites is 506.03 m whereas the upper bound of the 95% confidence interval of the mean elevation of non-sites is 492.19 m. The difference may seem small, (about 14 m) but it indicates the population parameters for the two samples are distinct and do not overlap. Prehistoric archaeological sites occur above approximately 500 m elevation more frequently than would occur if their placement simply reflected the natural attributes of the landscape.

Slope

Sites within the project area occur on slopes ranging from 0 to 16 degrees with a mean occurrence of approximately 3 \pm 3 degrees. The distribution is right skewed; 75 percent of sites occur on slope of 4 degrees or less and 98 percent of sites occur on slopes of 10 degrees or less (Figure 4). Non-site points occur on slopes ranging from 0 to 22 degrees with a mean of 2 \pm 3 degrees. This distribution is also right skewed; 75 percent of points are recorded on slopes of three degrees or less and 98 percent occur on slope equal to or less than 10 degrees. Less than one percent of points ($n = 5$) exceed 16 degrees (Figure 5).

The extreme skew in these distributions is such that comparison of mean scores would not be informative. The non-parametric Mann-Whitney U Test and Kolmogorov-Smirnov Two-sample Test, however, both indicate significant differences in the two distributions (Mann-Whitney U = 366056, $Z = -6.273$, $P < 0.0001$; Kolmogorov-Smirnov $Z = 2.874$, $P < 0.0001$).

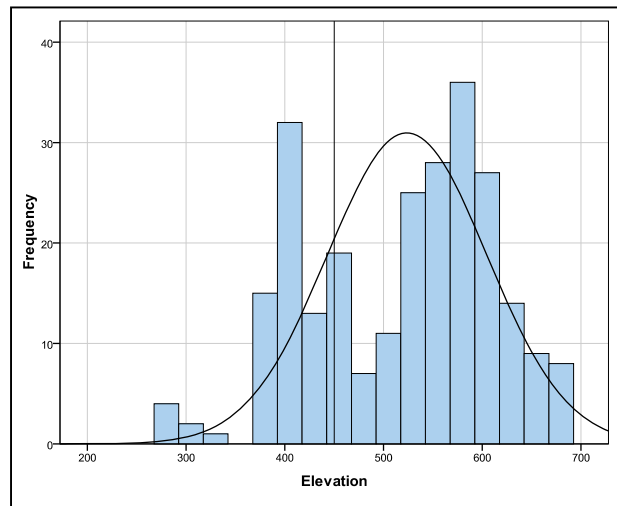


Figure I-2. Distribution of Sites by Elevation.

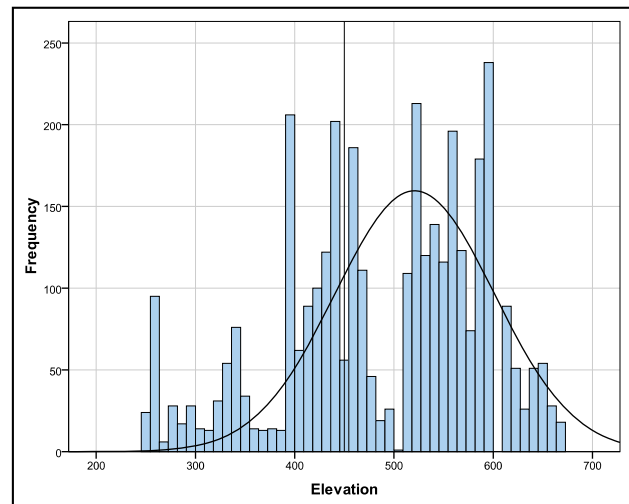


Figure I-3. Distribution of Random Points by Elevation.

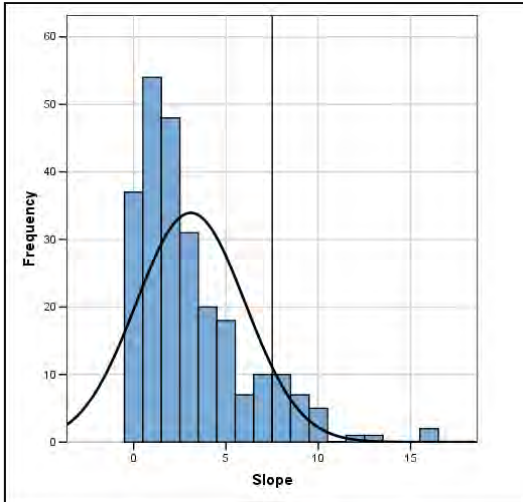


Figure I-4 Distribution of Sites by Slope.

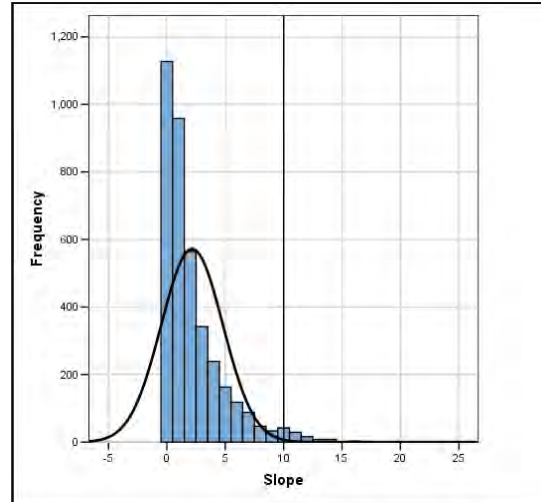


Figure I-5 Distribution of Random Points by Slope.

Water

Archaeological sites occur from 0 to 3,046 m from flowing surface water with a mean of 338 ± 430 m. The distribution of sites in relation to flowing surface water is right skewed: 75 percent of sites occur within 450 m of a flowing stream and 98 percent of sites occur within 1,710 m of a flowing stream (Figure 6). Random points are recorded between 0 and 3,406 m from flowing surface water with a mean of 453 ± 447 m (Figure 7).

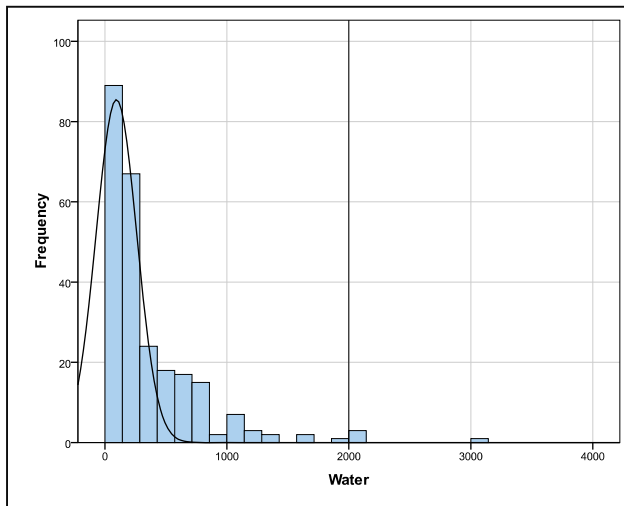


Figure I-6, Distribution of Sites by Water.

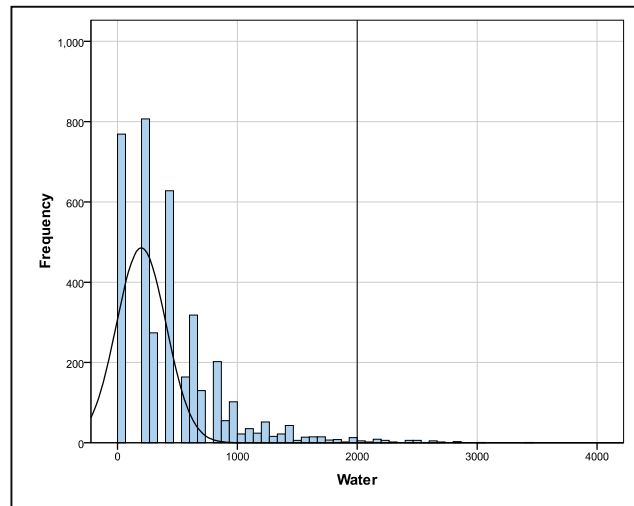
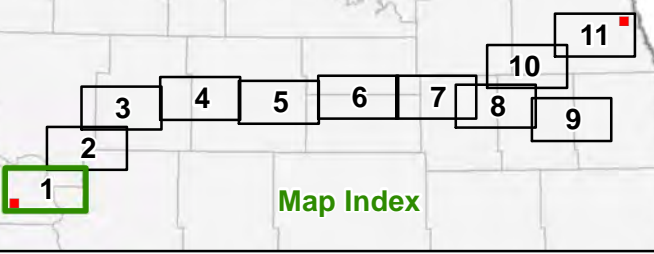
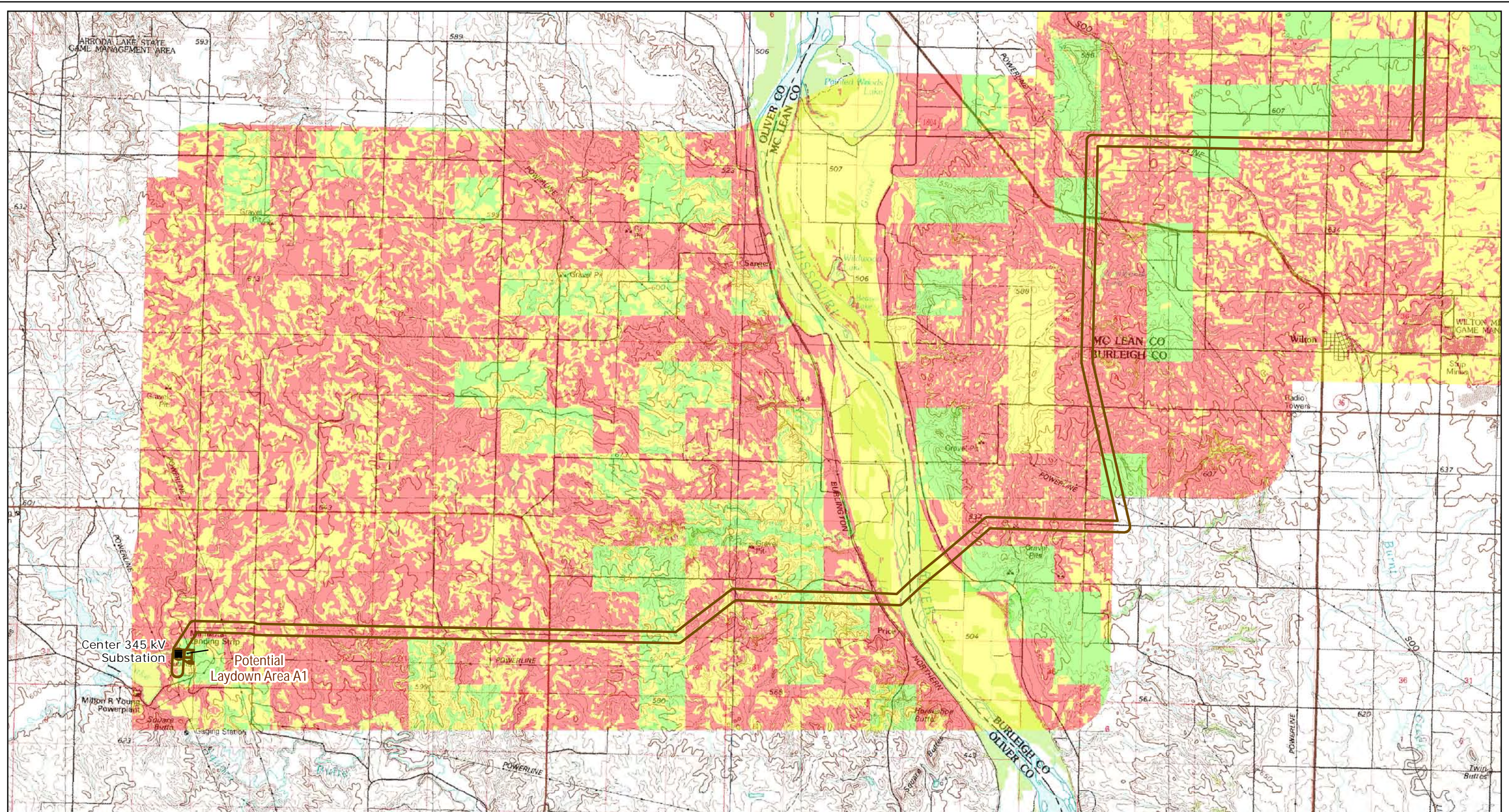


Figure I-7. Distribution of Random Points by Water.

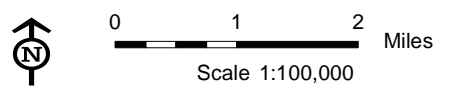
The extreme skew in these distributions is such that comparison of mean scores would not be informative. The non-parametric Mann-Whitney U Test and Kolmogorov-Smirnov Two-sample Test, however, both indicate significant differences in the two distributions (Mann-Whitney $U = 383559$, $Z = -5.211$, $P < 0.0001$; Kolmogorov-Smirnov $Z = 2.392$, $P < 0.0001$).

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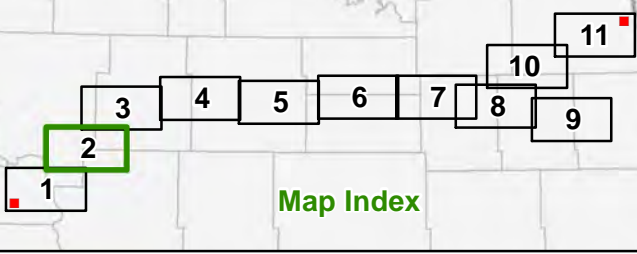
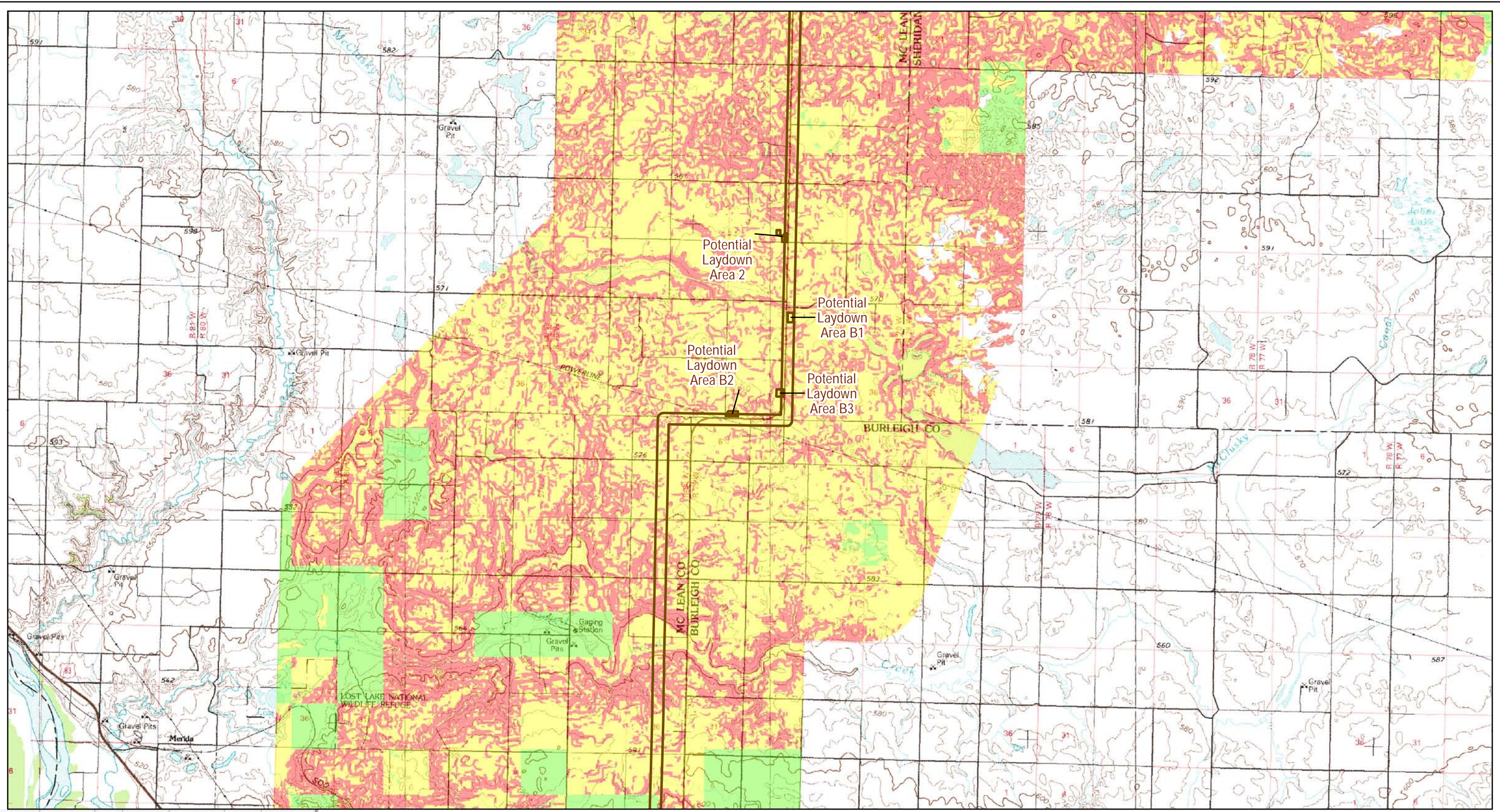


- Project APE
- High Probability
- Medium Probability
- Low Probability

Appendix E: Page 1 of 11
 Archaeological Resources Probability Model
 Center to Grand Forks Project
 Minnkota Power Cooperative, Inc.

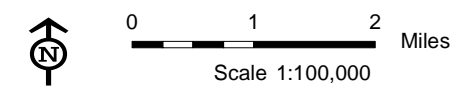


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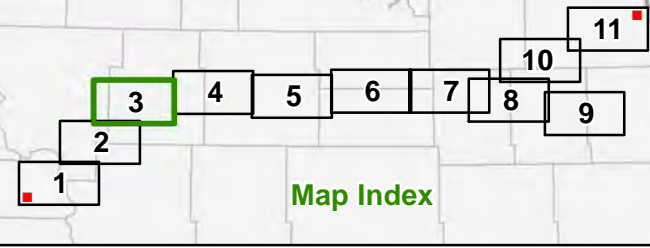
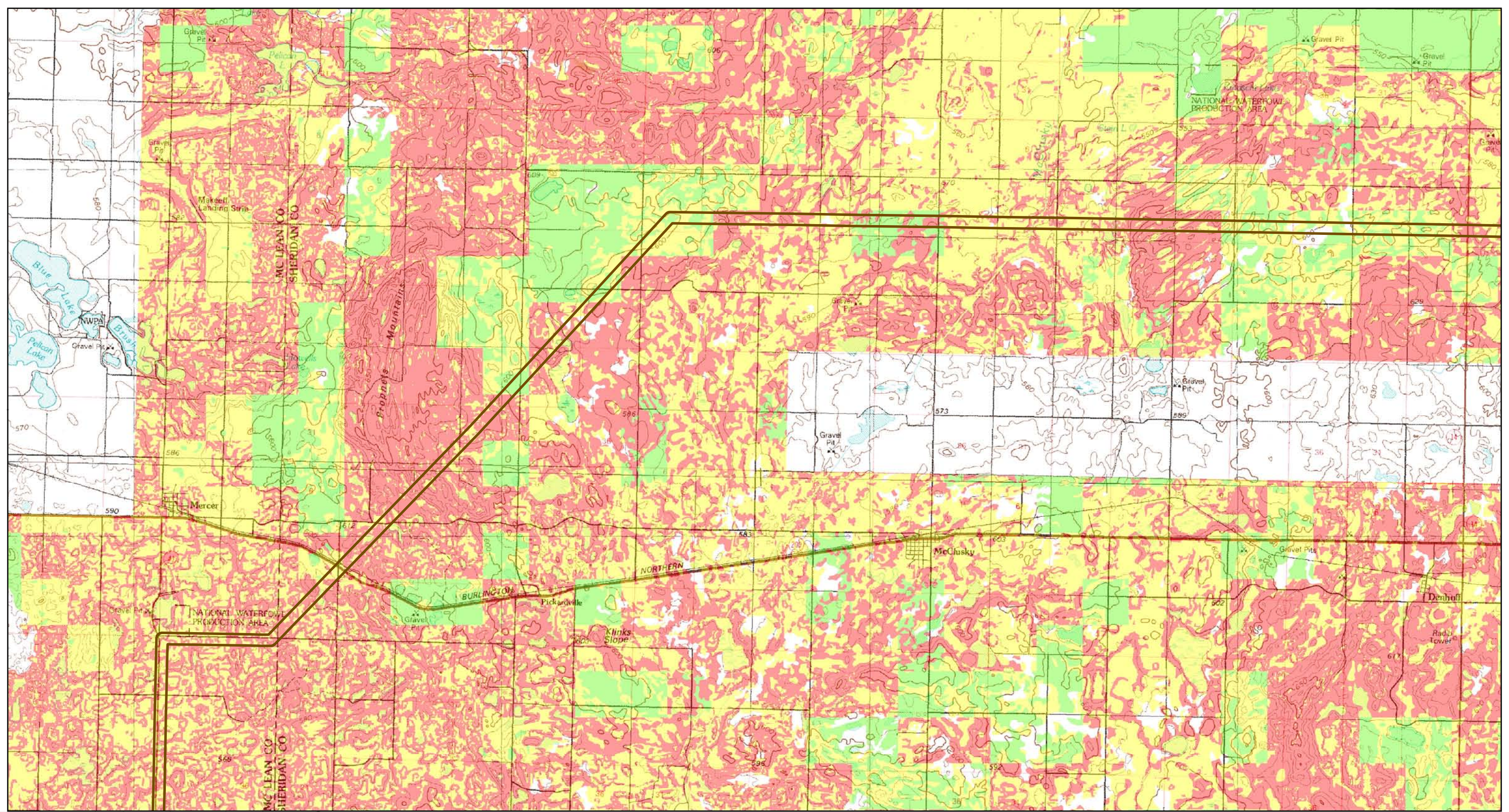






-  Project APE
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Appendix E: Page 2 of 11
Archaeological Resources Probability Model
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

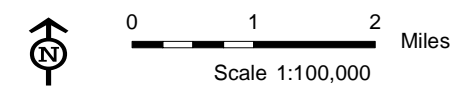


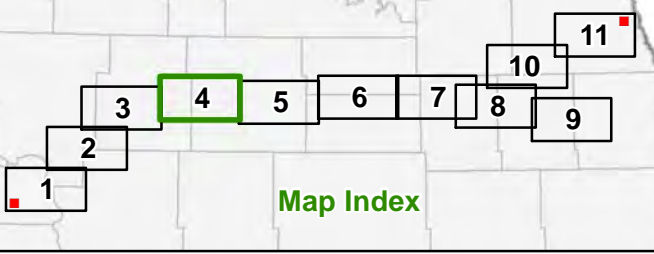
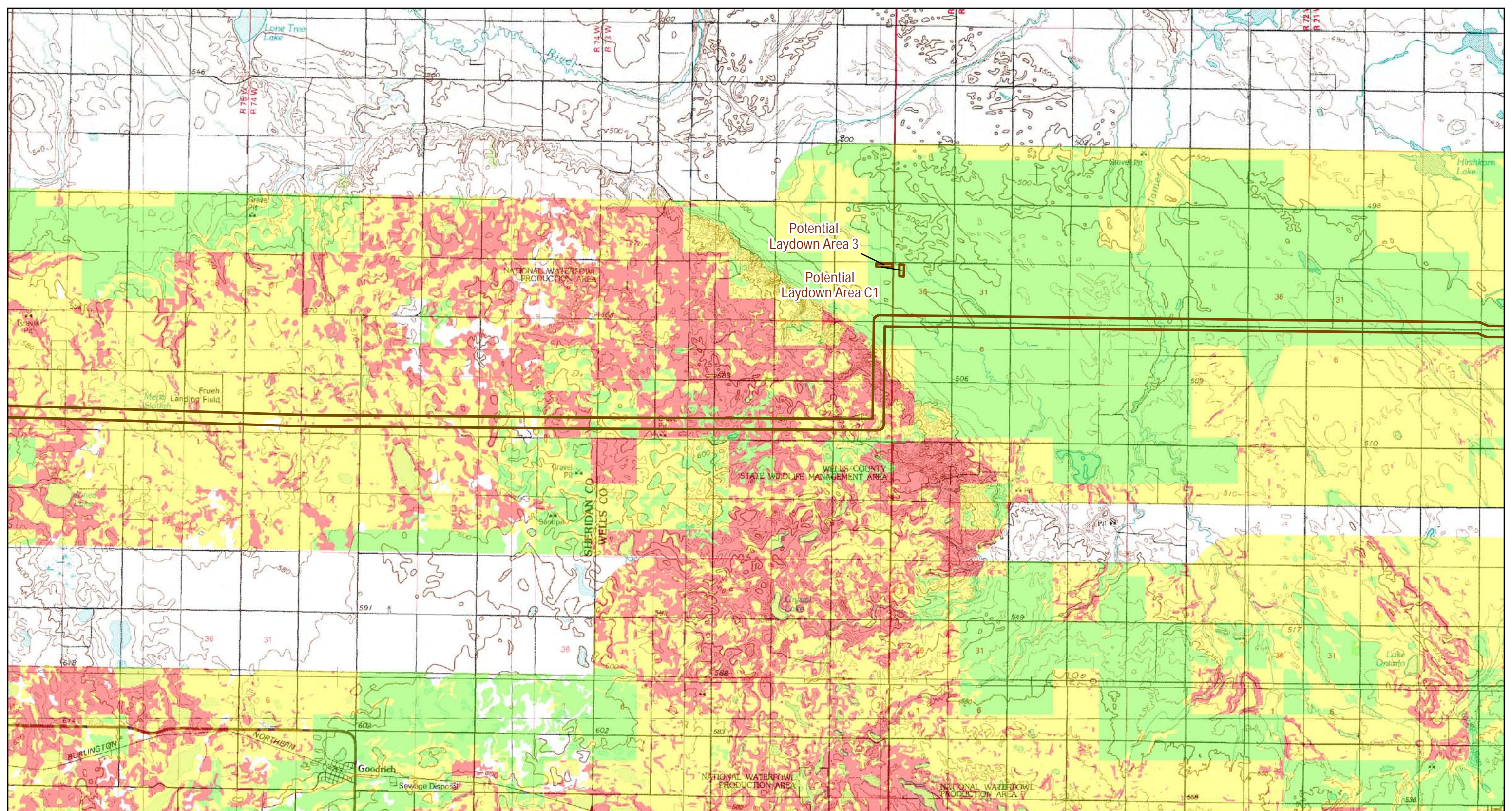
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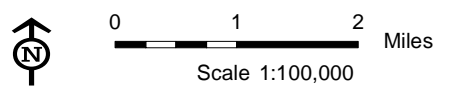
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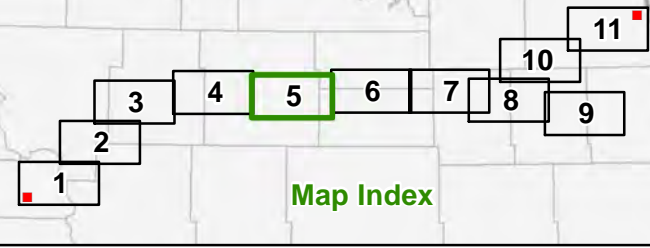
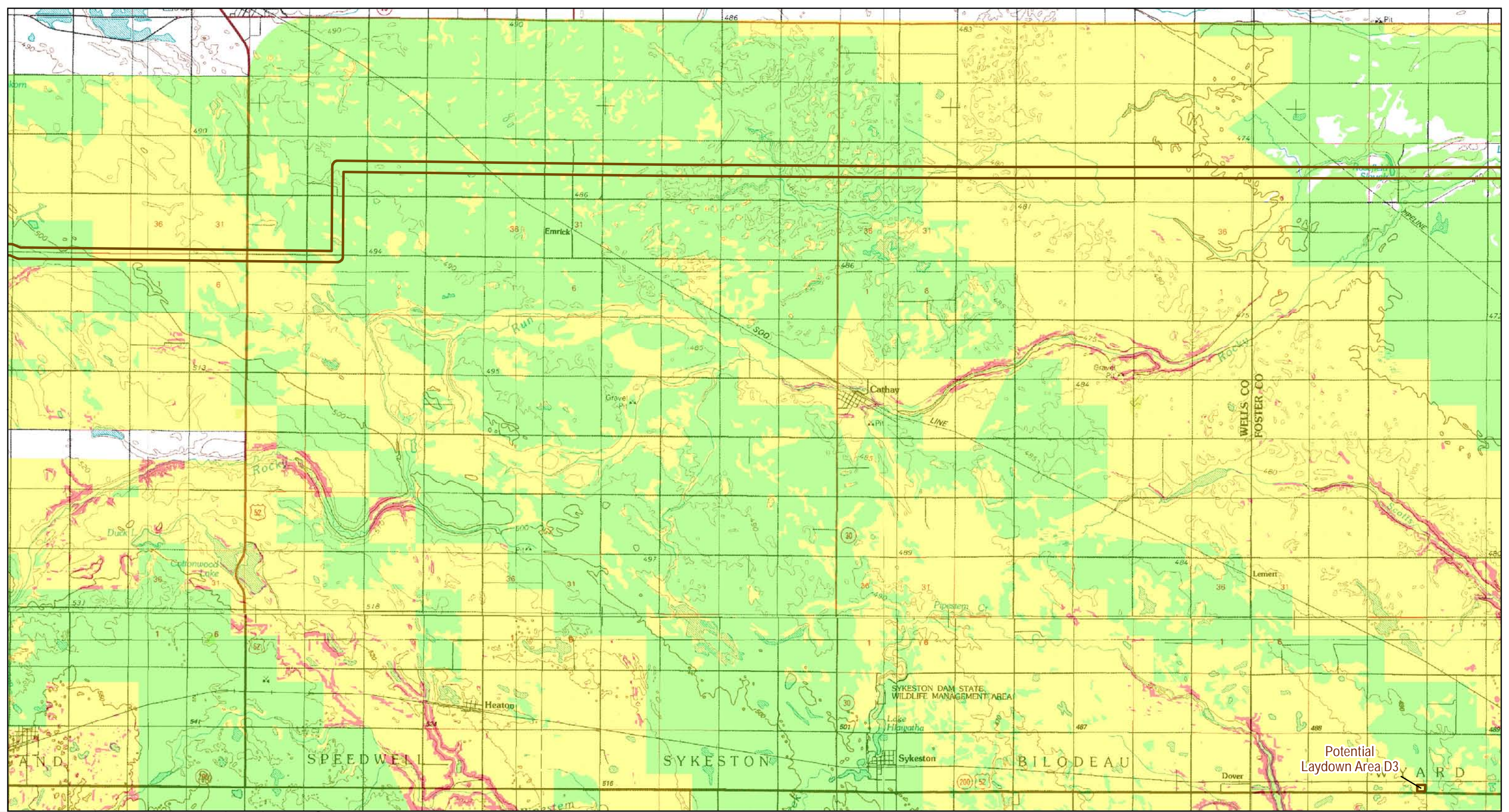
Appendix E: Page 3 of 11
 Archaeological Resources Probability Model
 Center to Grand Forks Project
 Minnkota Power Cooperative, Inc.



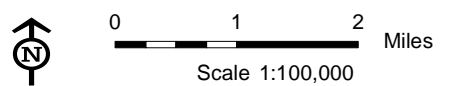


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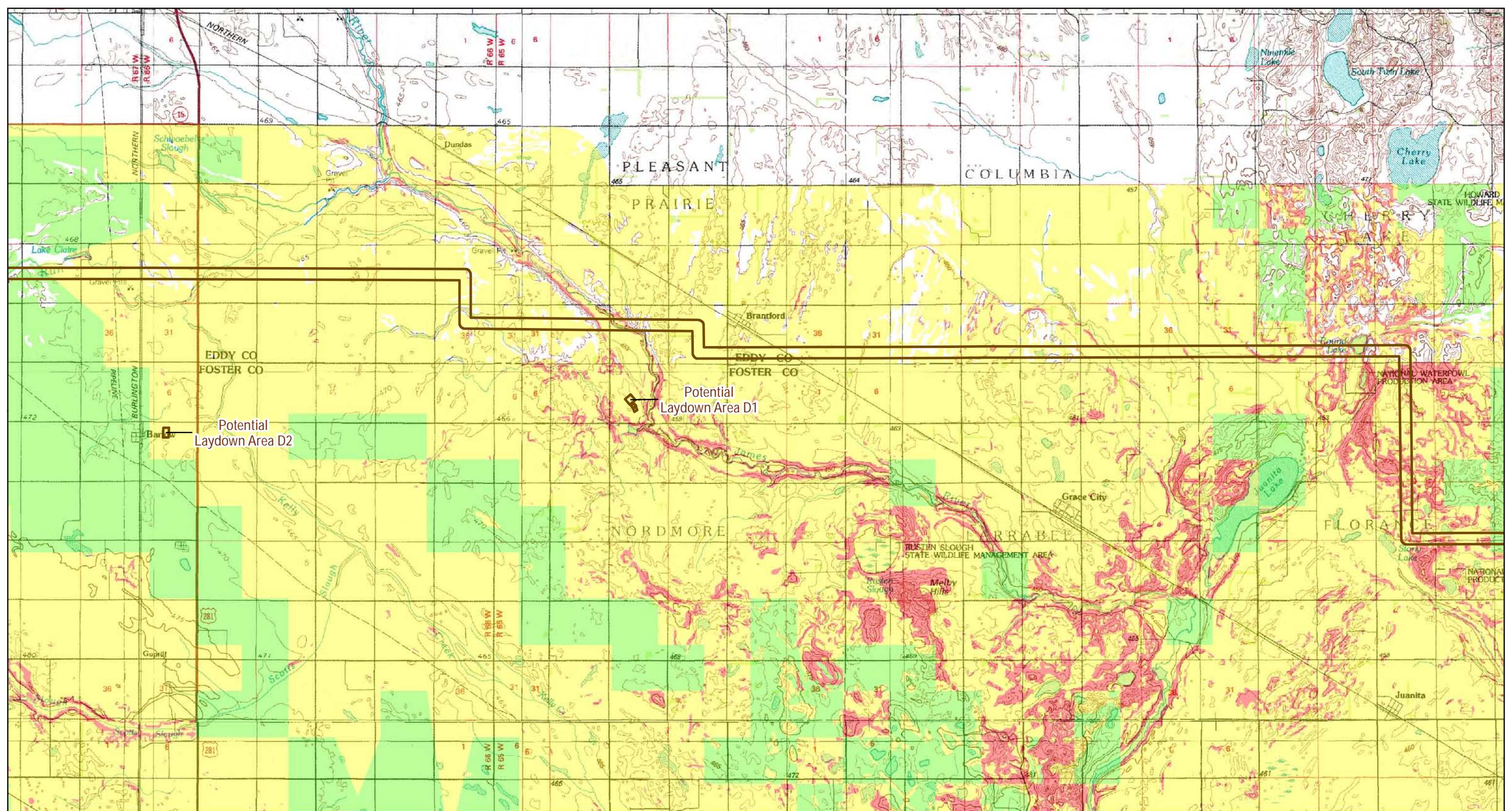




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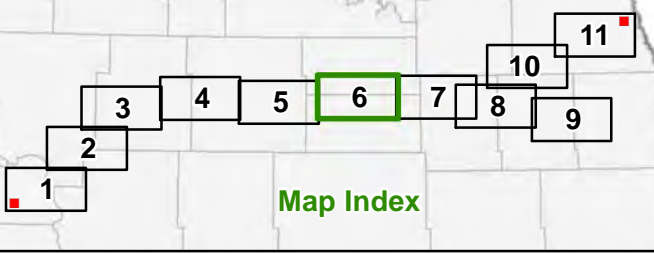


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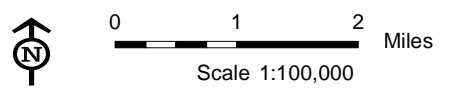
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Potential Laydown Area D1

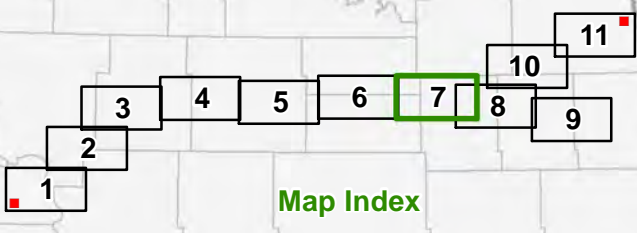
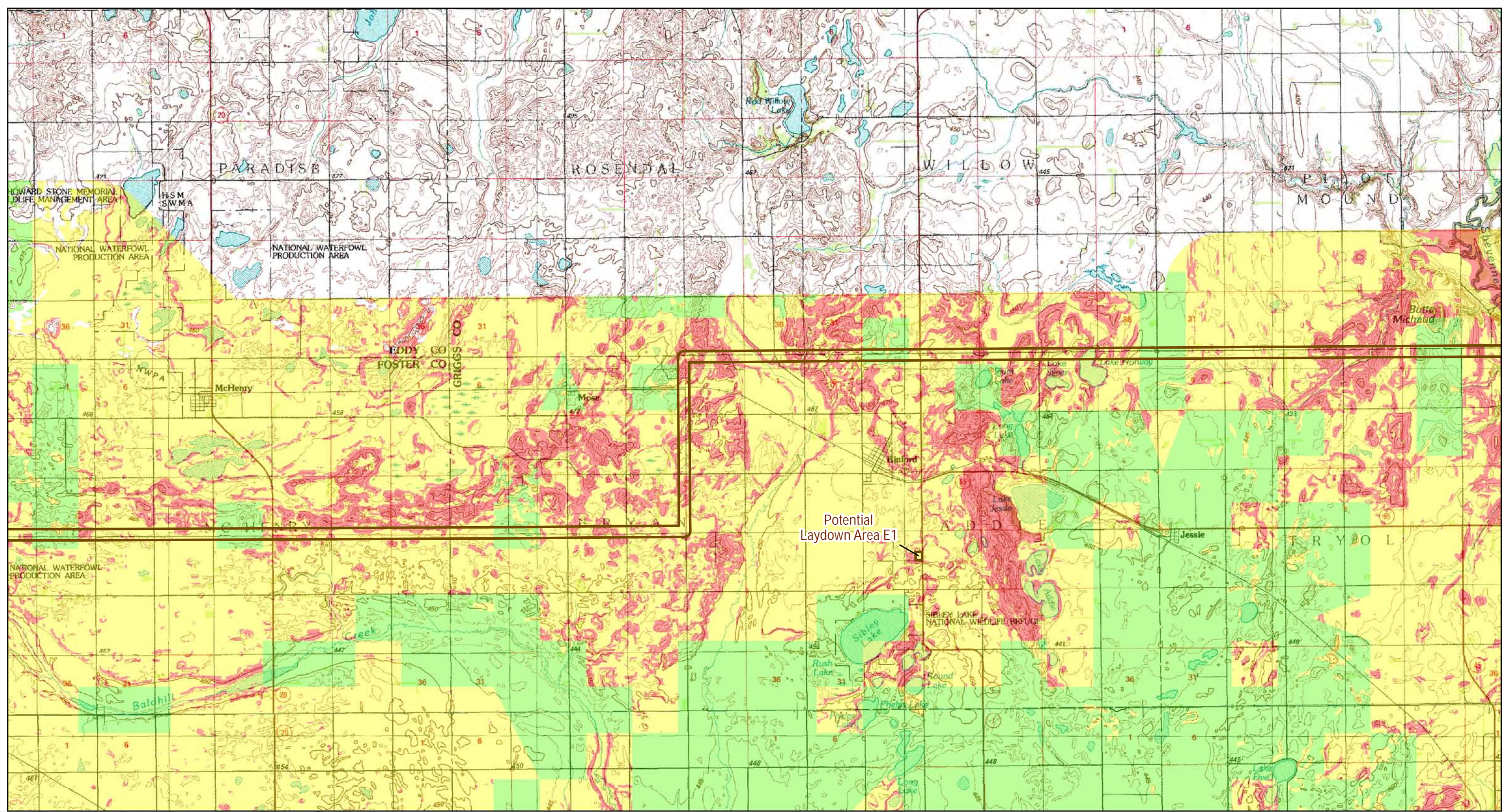


- Project APE
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Appendix E: Page 6 of 11
Archaeological Resources Probability Model
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

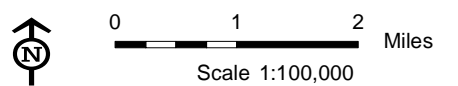


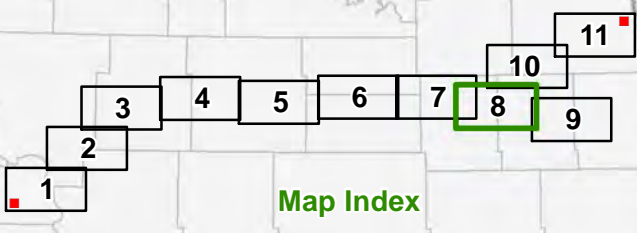
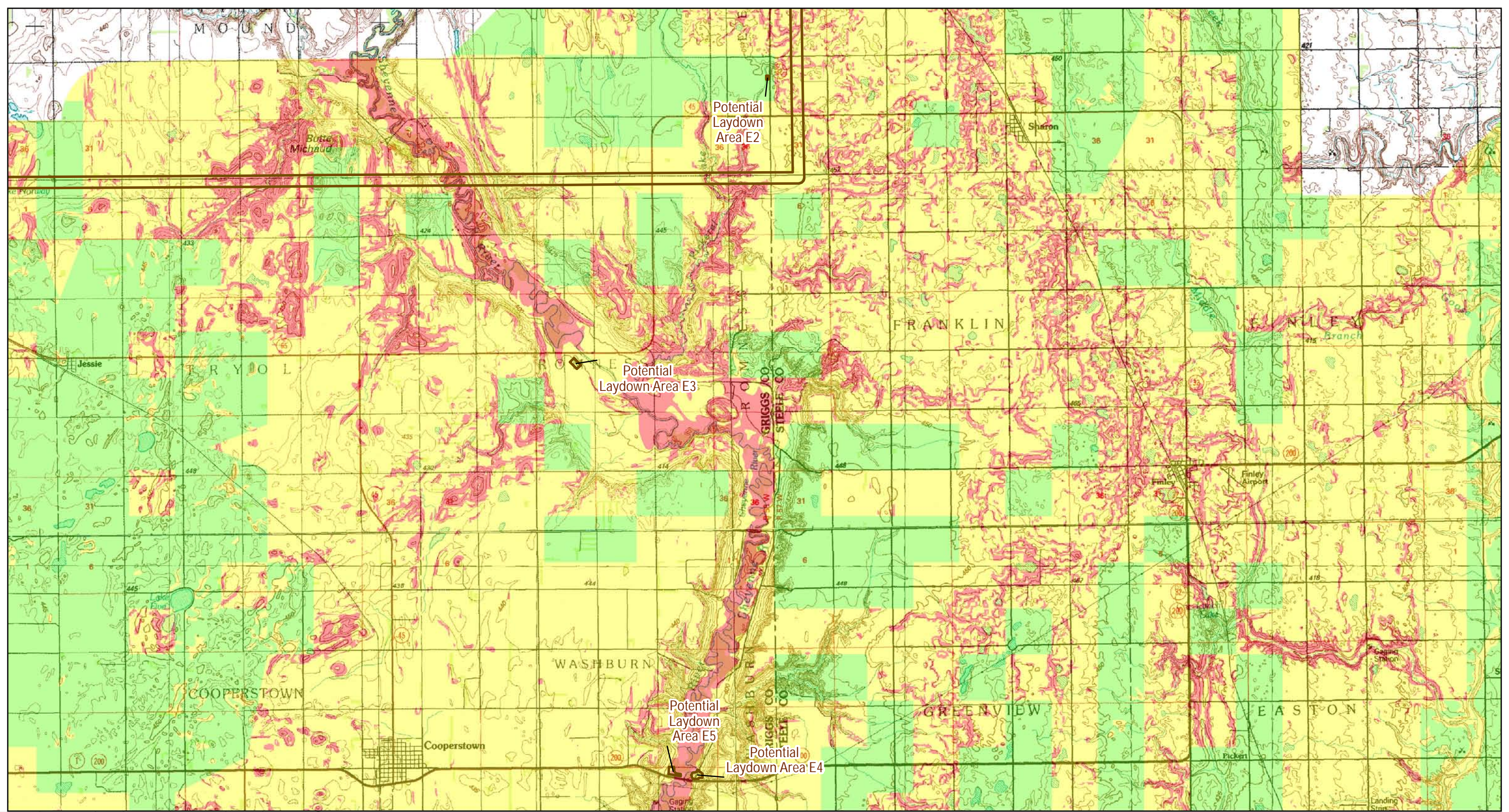
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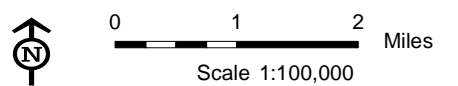
- Project APE
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Appendix E: Page 7 of 11
Archaeological Resources Probability Model
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

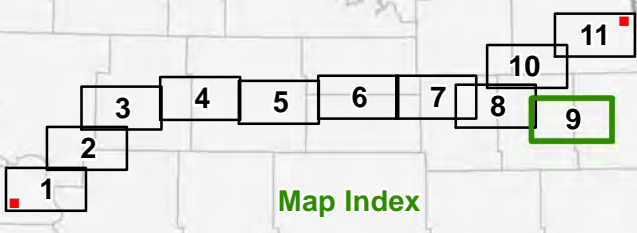
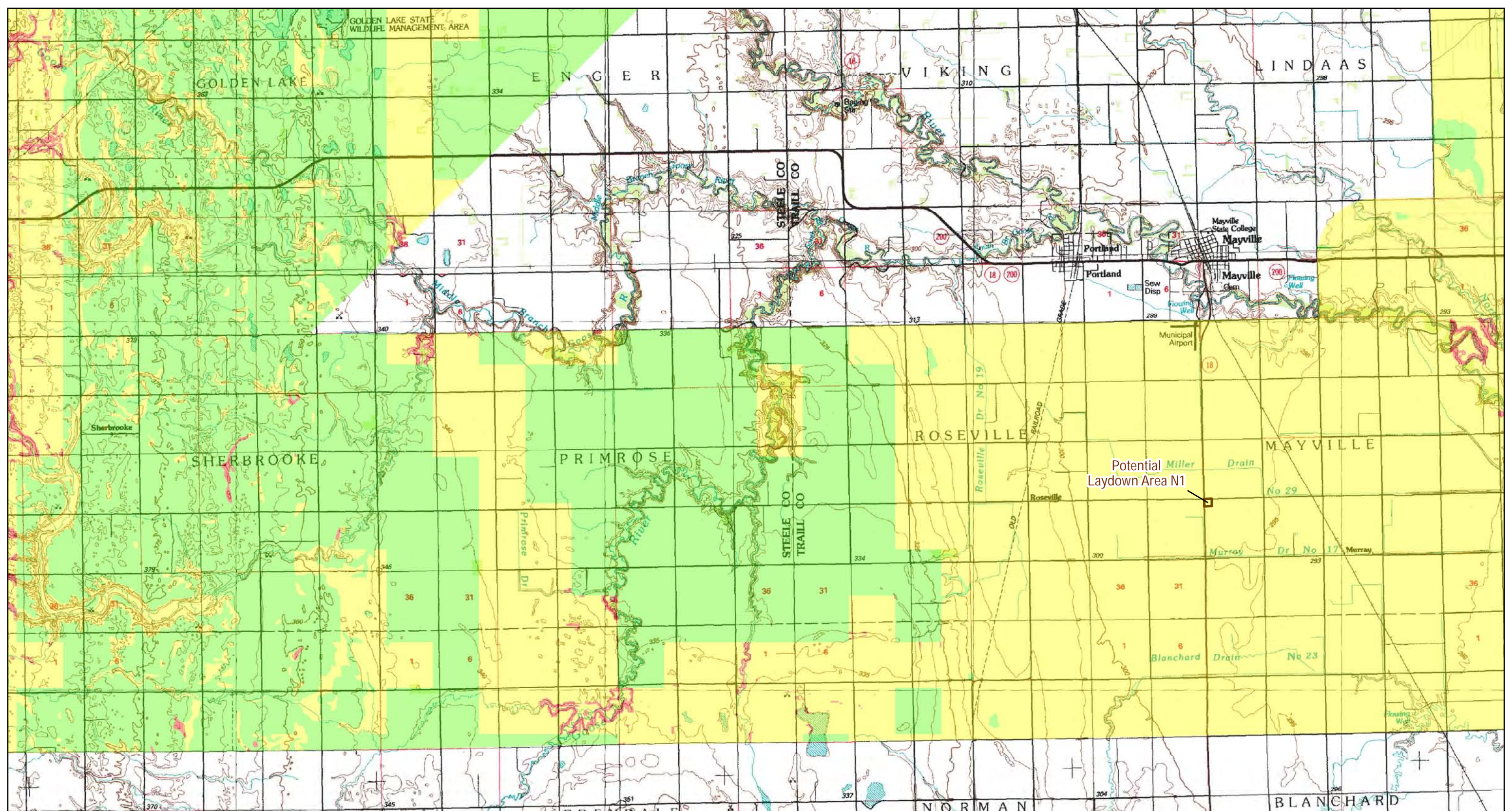




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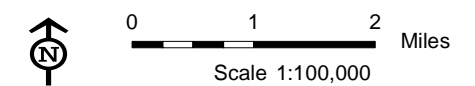


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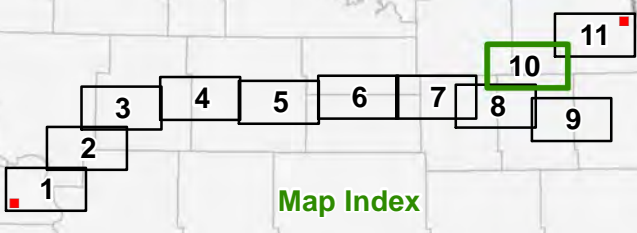
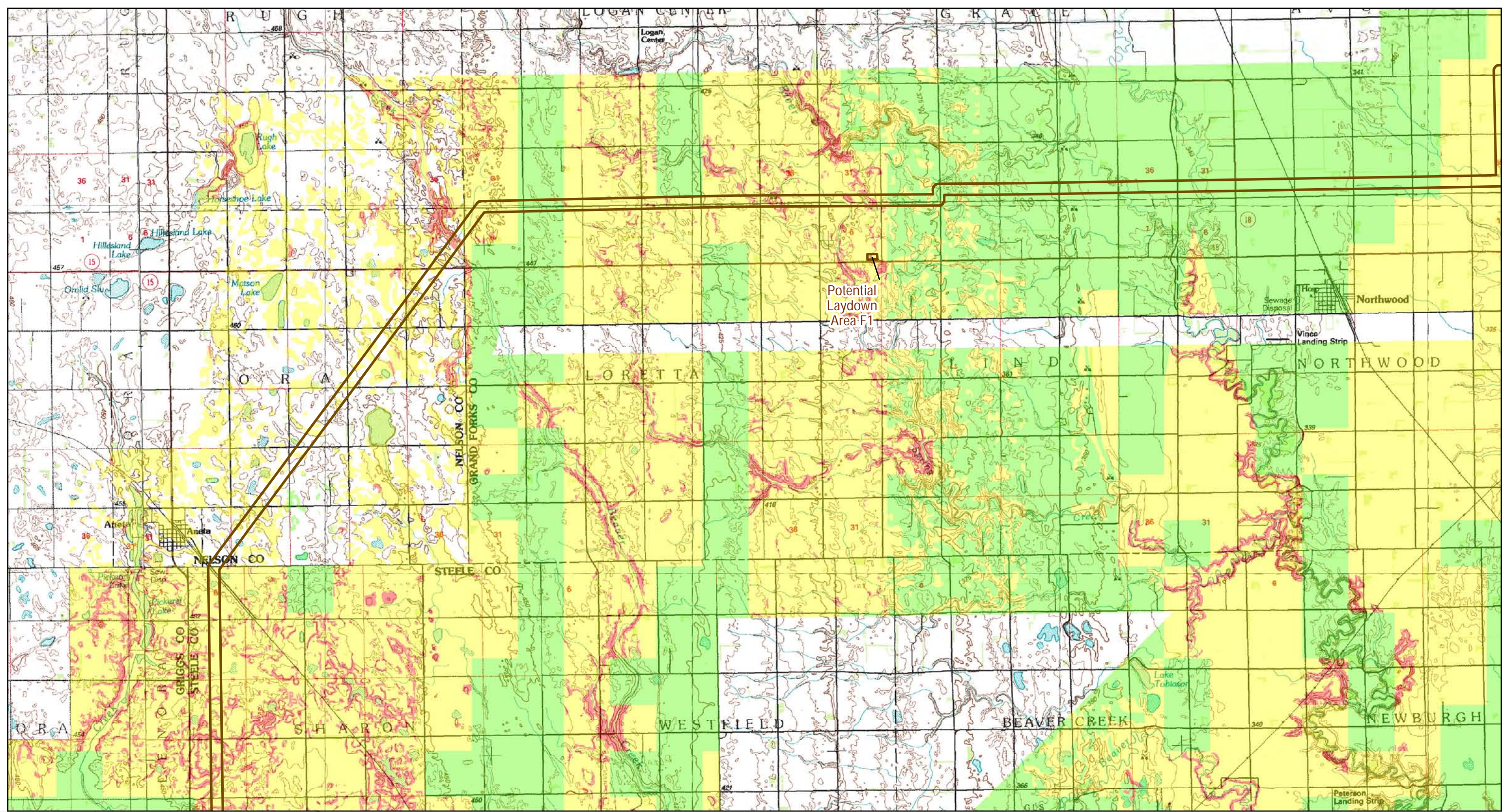


- Project APE
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- Low Probability

Appendix E: Page 9 of 11
Archaeological Resources Probability Model
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

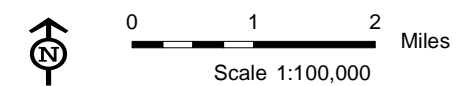


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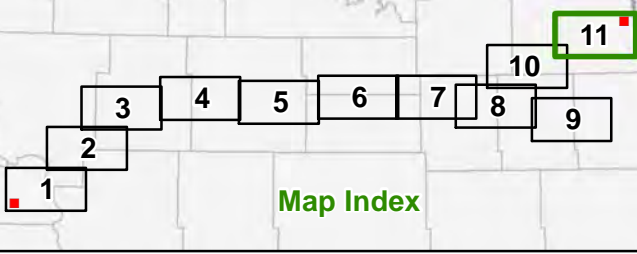
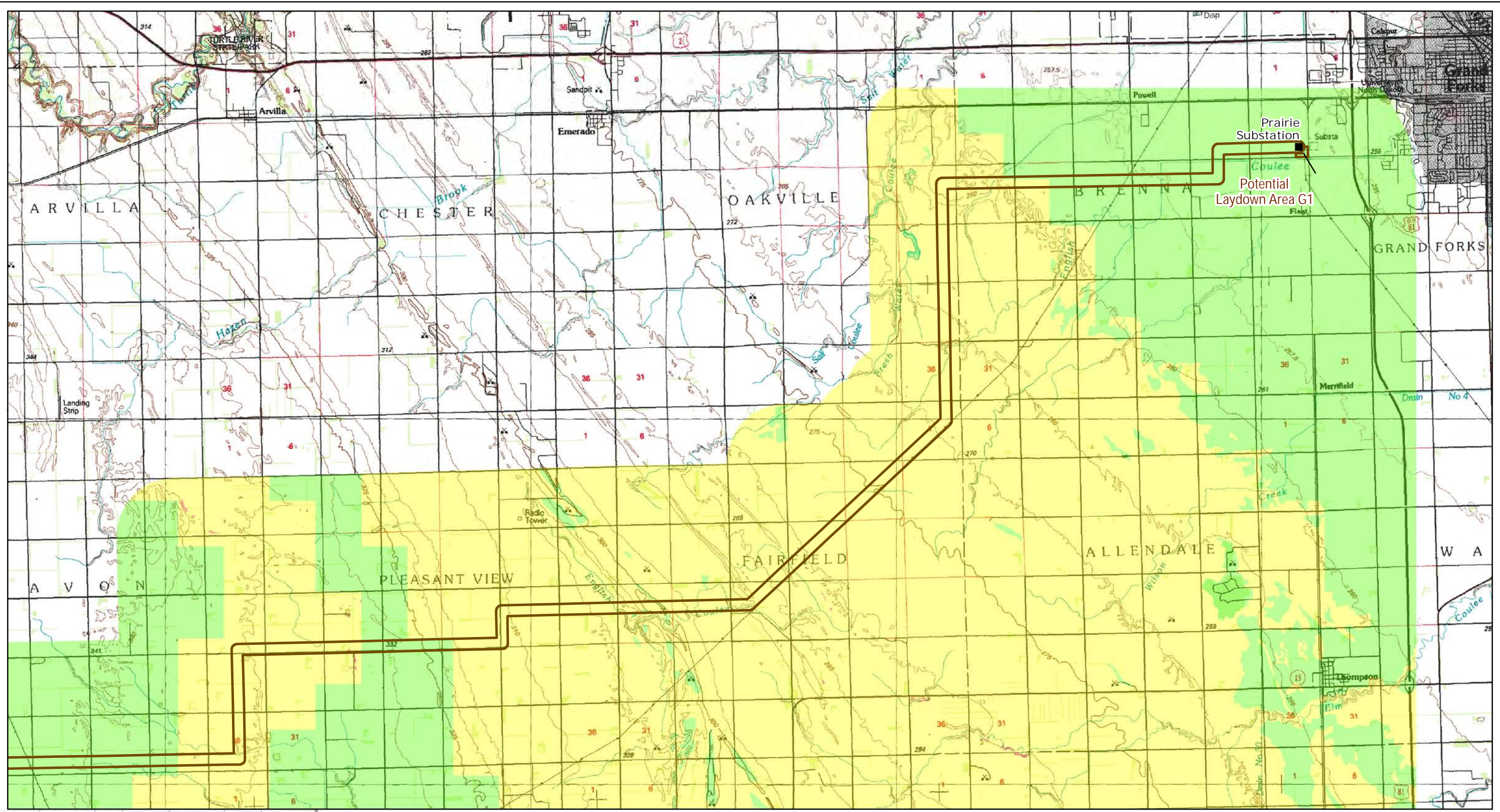


- Project APE
- High Probability
- Medium Probability
- Low Probability

Appendix E: Page 10 of 11
Archaeological Resources Probability Model
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

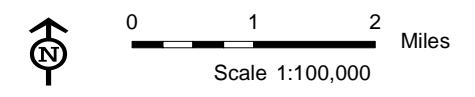


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- Project APE
- High Probability
- Medium Probability
- Low Probability

Appendix E: Page 11 of 11
Archaeological Resources Probability Model
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.





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HISTORICAL
SOCIETY
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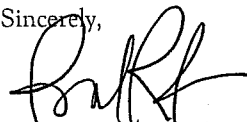
February 7, 2012
Mr. Mark S. Plank, Director
Engineering and Environmental Staff
Rural Development-Rural Utilities Service
United States Department of Agriculture
1400 Independence Avenue SW
Mail Stop 1571 Room 2244
Washington, DC 20250-1571

NDSHPO REF.: 10-0173b USDA-RUS/PSC Center to Grand Forks 345 kV Transmission
Line Project: Class III CRI Addendum Report

Dear Mr. Plank:

We have received and reviewed correspondence and documentation for: 10-0173b USDA-RUS/PSC Center to Grand Forks 345 kV Transmission Line Project: Class III CRI Addendum Report, "Class III Intensive Archaeological Resources Inventory Center to Grand Forks 345 kV Line, Supplemental Addendum 1," by Michael Justin and Erika Eigenberger (HDR, January 2012) and find it acceptable with SITS designations provided in future reports. We concur with "No Historic Properties Affected" and "No Significant Sites Affected" determinations provided the project is of the nature stated and that it takes in the location plotted in the report addendum and that unevaluated and eligible sites are avoided from impacts. Likewise, we concur with the report recommendations provided (Tables 2, 3, and 4, pp. 37-40) regarding Areas Remaining for (Inventory) Survey, Avoidance Areas, and National Register Status, respectively. In accordance with the executed Programmatic Agreement (PA), a phased approach to identification, evaluation, and mitigation is acceptable. Thank you for the opportunity to review the project, and we look forward to further consultation and to the review of (outstanding) project documentation on it. If you have questions please contact either Susan Quinnell at (701) 328-3576 or squinnell@nd.gov or Paul Picha at ppicha@nd.gov or (701) 328-3574.

Sincerely,


for Merlan E. Paaverud, Jr.
State Historic Preservation Officer (North Dakota)

and
Director, State Historical Society of North Dakota
c: Dennis Rankin, RUS, Washington, DC
c: Barry G. Williams, USFWS, Bismarck
c: Patrick Fahn, ND PSC, Bismarck
c: Michael Justin: HDR Engineering

Redacted

Class III Intensive Archaeological
Resources Inventory

Center to Grand Forks 345 kV Line
Supplemental Addendum 1

Minnkota Power Cooperative, Inc.

Prepared for
USDA
Rural Utilities Service

Prepared by
HDR Engineering, Inc.

Co-Principal Investigators:
Michael Justin, M.S., and Erika Eigenberger, M.A.

January 2012



Table of Contents

| | |
|---|----|
| Executive Summary..... | 1 |
| Introduction | 3 |
| The Area of Potential Effects | 3 |
| Physiography and Environmental Overview..... | 4 |
| Culture History..... | 4 |
| North Dakota Archaeological Study Units | 4 |
| Records Search and Literature Review | 4 |
| Research Design..... | 4 |
| Objectives | 4 |
| Methods..... | 4 |
| Predictive Model..... | 5 |
| Field Survey | 5 |
| Human Remains/Burials..... | 5 |
| Site Forms | 6 |
| Collection Policy..... | 6 |
| Results of Investigations | 7 |
| Summary | 7 |
| Survey Segment Coverage | 8 |
| Oliver County | 8 |
| McLean County | 12 |
| Sheridan County..... | 14 |
| Wells County | 17 |
| Wells County | 19 |
| Eddy County | 19 |
| Griggs County..... | 21 |
| Nelson County..... | 21 |
| Grand Forks County | 22 |
| Laydown Areas..... | 23 |
| Oliver County | 23 |
| Foster County..... | 23 |
| Grand Forks County | 23 |
| Fiber Optic Stations..... | 23 |
| McLean County | 24 |

| | |
|--------------------------------------|----|
| Wells County | 24 |
| Foster County | 24 |
| Grand Forks County | 24 |
| Identified Sites | 25 |
| Precontact Sites | 27 |
| Historic Sites..... | 35 |
| Areas Remaining for Survey..... | 37 |
| Areas of Avoidance | 40 |
| Conclusions and Recommendations..... | 41 |
| References | 42 |

List of Tables

| | |
|--|----|
| Table 1: Identified Sites..... | 26 |
| Table 2: Areas Remaining for Survey | 37 |
| Table 3: Areas of Avoidance..... | 40 |
| Table 4: National Register Status of Sites within ROW..... | 41 |

List of Photos

| | |
|--|----|
| Photo 1: Site CGF-A-1, View to Southwest | 27 |
| Photo 2: Site CGF-BB-1, View to East..... | 28 |
| Photo 3: Site 32OL642, View to Southwest | 30 |
| Photo 4: Site 32OL642, Ceramic Sherd, ST 004 | 30 |
| Photo 5: Site 32ML1237, View to Southwest | 34 |
| Photo 6: Site 32ML1237, KRF Drill, ST W5 N20..... | 34 |
| Photo 7: Site CGF-MM-1, View to West..... | 35 |

List of Appendices

- Appendix A – Figures (**Sensitive Location Information Removed**)
- Appendix B – Shovel Test Soil Profiles

Executive Summary

Minnkota Power Cooperative, Inc., (Minnkota) proposes to build an approximately 248-mile-long, 345 kilovolt (kV) Transmission Line (Project) from the Center 345 kV Substation, near Center, North Dakota, to the Prairie Substation, located just west of Grand Forks, North Dakota (Appendix A, Figure 1). The U.S. Department of Agriculture Rural Utilities Service (RUS) is considering a request for funding for the project. RUS has determined that the Project constitutes an undertaking which requires consultation under Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations (36 Code of Federal Regulations (CFR) Part 800).

In order to identify historic properties that might be affected, in October 2009, Minnkota and its consultant, HDR Engineering Inc (HDR), prepared a Macro-Corridor Study (MCS) for RUS that defined the project study area; a large macro-corridor that varied from 3 to 6 miles in width and traversed North Dakota from the Missouri River in the west to the Red River Valley in the east. From December 2009 to February 2010, HDR completed a Class I cultural resources inventory (literature search) for the proposed Project. In addition, several predictive models were developed to help identify areas within the corridor alternatives that might have a higher potential for containing archaeological resources. Separate models were developed, one for assessing the potential for deeply buried archaeological sites, and another for predicting the occurrence of pre-European contact surface or near-surface archaeological sites.

In the summer of 2011, HDR completed a Class III Intensive Archaeological Resources Inventory and prepared a report on the results of 80 linear miles (1,700 acres) of intensively surveyed corridor. The Class III inventory resulted in the identification of 25 previously unrecorded cultural resources including 17 precontact sites; CGF-B-1 (32OL641), CGF-C-1 (32OL642), CGF-D-1 (32OL643), CGF-DD-1 (32BLx287), CGF-DD8-1 (32BLx287), CGF-EE-1 (32MLx767), CGF-EE-2 (32MLx768), CGF-EE-2 (32ML1237), CGF-F-1 (32BL719), CGF-F-2 (32BL720), CGF-G-1 (32ML1238), CGF-G-2 (32ML1239), CGF-HH-1 (32ML1240), CGF-K-1 (32BLx288), CGF-L-1 (32SH268), CGF-N-1 (32SH270), CGF-N-2 (32SH271), seven historic sites; CGF-D-2 (32OL644), CGF-D-3 (32OL645), CGF-L-2 (32SH269), CGF-R1-1 (32GG179), CGF-R2-1 (32GG180), CGF-S2-1 (32GG181), CGF-Y-1 (32GF3552), and one multi-component site; CGF-EEE-1 (32GF3551). Of the 25 previously unrecorded sites, four are isolated finds and are considered not eligible for listing on the National Register of Historic Places (NRHP) (32BL720, 32BLx288, 32BLx287, and 32MLx767). The remaining 21 sites have not been evaluated for the NRHP and further work would be needed to determine their eligibility.

HDR recommended that all newly recorded sites be avoided during construction activities. If avoidance is not possible, HDR recommended that the sites be formally evaluated for their eligibility. Those that are eligible should be analyzed for adverse effects. If adverse effects are determined, appropriate strategies should be followed to mitigate those effects. Such strategies may include avoidance, data recovery, or other mitigation to be determined through consultation. Agreeing with the recommendations, the RUS submitted the report to the North Dakota State Historic Preservation Office, (NDSHPO). In a letter dated December 30, 2011, the NDSHPO concurred with RUS's "**No Historic Properties Affected**" and "**No Significant Sites Affected**" determinations. NDSHPO also concurred with the HDR's recommendations regarding Areas Remaining for (Inventory) Survey, Avoidance Areas, and National Register Status, respectively.

This supplemental addendum documents the results of additional historic site inventory that occurred between October 31st to November 7th, November 16th to 19th, and December 9th, 2011, and January 4th to 5th, 2012. In addition, this addendum provides survey recommendations to adjustments to the preferred route provided by Minnkota in January 2012. Since the submission of the Class III report,

Minnkota made changes to the proposed route based on landowner requests and on sensitive resource avoidance. New route alignments that shifted into high probability areas were inventoried for archaeological resources as were areas where access had been restricted by landowners. Areas were surveyed as they became available. Methods for inventory included pedestrian survey and subsurface testing when feasible.

The Class III Intensive Archaeological Resources Inventory Supplemental Addendum 1 resulted in the identification of three previously unrecorded precontact sites and one previously unrecorded historic site. Of the three previously unrecorded precontact sites, one is an isolated find and is considered not eligible for listing on the NRHP (CGF-MM-1). The remaining two precontact sites (CGF-A-1 and CGF-BB-1) have not been evaluated for the NRHP and further work would be needed to determine their eligibility. The one previously unrecorded historic site consists of an abandoned railroad bed (CGF-L-3). This site is considered potentially eligible and further work would be needed to determine eligibility.

In addition to the four previously unrecorded sites, three precontact sites identified during the Class III Inventory were revisited to further delineate site boundaries (32OL642, 32MLx768, and 32ML1237). These three sites have not been evaluated for the NRHP and further work would be needed to determine their eligibility.

HDR recommends all recorded sites within the ROW be avoided during construction activities. If avoidance is not possible, HDR recommends that the sites be formally evaluated to determine their eligibility status. Those found eligible should be reviewed for adverse effects. If adverse effects are identified, strategies should be developed by the appropriate parties (the applicant, RUS, SHPO, and other interested parties if necessary), to resolve those effects. Such strategies may include avoidance, data recovery, or other mitigation to be determined.

Introduction

Minnkota Power Cooperative, Inc., (Minnkota) proposes to build an approximately 248-mile-long 345-kilovolt (kV) Transmission Line (Project) from the Center 345 kV Substation, near Center, North Dakota, to the Prairie Substation, located just west of Grand Forks, North Dakota (Appendix A, Figure 1). The U.S. Department of Agriculture Rural Utilities Service (RUS) is considering a request for funding for the project. RUS has determined that the Project constitutes an undertaking which requires consultation under Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations (36 Code of Federal Regulations (CFR) Part 800). Section 106 requires federal agencies to consider the potential effects of undertakings within their jurisdictions on properties listed, or eligible for listing, on the National Register of Historic Places (NRHP). The project also requires consideration of cultural resources under Section 101(b) of the National Environmental Policy Act (NEPA). RUS must complete an environmental analysis and prepare an Environmental Assessment with scoping (EA) in accordance with its Environmental Policy and Procedures for Implementing the National Environmental Policy Act (7 CFR Part 1794) before the proposed Project can be considered for financing assistance. The draft EA was published in November 2010, prior to the completion of historic property identification studies; however, a Programmatic Agreement was created to address identification and treatment of historic properties to comply with Section 106 regulations.

The project will cross several major rivers and streams that fall under the jurisdiction of the U.S. Army Corps of Engineers. It will also cross easement lands under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS). These federal agencies have responsibilities under Section 106 of the National Historic Preservation Act, as amended, as well as other federal regulations. However, RUS has assumed the role of lead federal agency for the project, as it is considering funding the project. Numerous telephone conference calls and on-site meetings were held with federal agencies, regional American Indian tribes, and the State Historical Society of North Dakota (SHSND). These meetings and conversations resulted in a Programmatic Agreement among the consulting parties (RUS, SHSND, USFWS, Minnkota) that details the specific project concerns relating to historic property identification, possible adverse effects, and treatment.

The Area of Potential Effects

In a Programmatic Agreement for this project, RUS defines the Area of Potential Effects (APE) for archaeological resources as the 1,000-foot (ft) corridor chosen by Minnkota as the preferred route. This is the area within which a 150-ft right of way (ROW) will be obtained for line construction, and where ground-disturbing activities may occur. The 150-ft ROW will be negotiated with landowners and is subject to the approval of the North Dakota Public Services Commission. Pedestrian survey and subsurface testing was generally limited to the 150-ft ROW, with the understanding that it could shift within the 1,000-ft APE. Any shifts would be subject to review.

Also included in the APE are four fiber optic stations, two staging or laydown areas, areas included in substation expansion, access roads, and other areas where ancillary construction activities may alter the ground surface and therefore, may affect possible archaeological sites. This APE does not take into consideration effects to buildings, standing structures, or traditional cultural properties.

Physiography and Environmental Overview

For a complete description of the Physiography and Environmental Overview, please reference *the Class III Intensive Archaeological Resources Inventory Center to Grand Forks 345kV Line* report (Justin and Eigenberger 2011).

Culture History

For a complete description of regional Culture History, please reference *the Class III Intensive Archaeological Resources Inventory Center to Grand Forks 345kV Line* report (Justin and Eigenberger 2011).

North Dakota Archaeological Study Units

For a complete description of the North Dakota Archaeological Study Units within the project area, please reference *the Class III Intensive Archaeological Resources Inventory Center to Grand Forks 345kV Line* report (Justin and Eigenberger 2011).

Records Search and Literature Review

For a complete description of the Records Search and Literature Review, including previous site and surveys, please reference *the Class III Intensive Archaeological Resources Inventory Center to Grand Forks 345kV Line* report (Justin and Eigenberger 2011).

Research Design

Objectives

The objective of the Class III Inventory is to identify as many historic properties, as defined by the National Historic Preservation Act, as practicable within the project's APE. RUS, as lead federal agency, has approved a program to:

- Identify previously recorded sites and assess condition
- Identify new sites not previously recorded within the APE

All work was conducted in accordance with *Historic Preservation in North Dakota Volume II: A Statewide Comprehensive Plan* (SHSND 2003), *North Dakota SHPO Guidelines Manual for Cultural Resource Inventory Projects* (SHSND 2006), and The Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation [48 Federal Register 44716-44740] (National Park Service [NPS] 1983).

Methods

In order to meet the objective, multiple pathways to knowledge were followed. The previous Class I inventory provided useful information on where known sites were located, gave an indication of where previous investigations were concentrated, and which areas lacked systematic study. Because of the length of the proposed project, RUS suggested that for practical, logistical, and financial reasons, not all of the land areas needed intensive survey. RUS is of the opinion that the regulations require a good faith effort to identify historic properties, which does not equate with identifying every possible archaeological site on the landscape. RUS contends that previous years of archaeological research have given us a fairly good idea of where on the landscape important archeological sites may be

concentrated. Therefore, the following protocol was administered following consultation with SHSND, other federal agencies, and Native American tribal historic preservation offices. Following the literature search, probability modeling was done with the aim of focusing field work on areas most likely to contain significant resources. Then, intensive field work was completed to locate buried and near-surface archaeological and cultural sites, and to test the model.

Predictive Model

For a complete description of the Predictive Model, please reference Appendix E in the *Class III Intensive Archaeological Resources Inventory Center to Grand Forks 345kV Line* report (Justin and Eigenberger 2011).

Field Survey

As earlier stated, the APE for the project is the 1,000-ft corridor chosen by Minnkota as the preferred alignment. This is the area where ground-disturbing activities may occur and within which the 150-ft ROW will be negotiated that will become the final route of the transmission line. In a departure from previous survey methods, per Minnkota's request, methods covered by this addendum have been modified to include one additional transect outside the 150-ft survey corridor to cover a wider, 200-ft survey corridor.

Pedestrian survey employed transects spaced at no greater than 15 meter (m) intervals. When surface features or artifacts were identified, additional transects were surveyed at 5 or 10 m intervals, depending on the ground surface visibility. When found, cultural materials were recorded and photographed, and GPS coordinates were collected for future mapping. Pedestrian survey also identified additional areas where subsurface testing would be recommended. These areas were recorded and photographed, and GPS coordinates were collected and added to field maps.

Subsurface testing, or shovel testing, was used in high probability areas and where the ground surface was obscured by vegetation. Shovel tests were spaced at no greater than 15 m intervals and followed the center of the transmission line corridor, or the natural landform when appropriate, to properly test the area. Tests were excavated to a maximum depth of 100 cm, or until either a buried C horizon or two culturally sterile soil strata were encountered. All excavated soils were passed through one-quarter inch mesh hardware cloth. Artifacts identified during shovel testing were recorded, photographed if diagnostic, placed in plastic bags, and reburied at the approximate level found in the test. UTM coordinates were recorded with a Trimble GPS unit for later mapping.

Data gathered during the survey were recorded on shovel test forms and in the field notebook of the principal investigator. Items noted included the location of survey areas, the location of individual shovel tests, the depth of each shovel test and its associated soil profile, the presence or absence of cultural materials within each test, and the excavated soil texture, inclusions, and Munsell color.

Human Remains/Burials

In the event of a discovery believed to contain human remains, the investigators would comply with the procedures required by North Dakota Century Code § 23-06-27 and administrative rules North Dakota Administrative Code Chapter 40-02-03, Protection of Prehistoric and Historic Human Burial Sites, Human Remains, and Burial Goods. These rules require that any work be halted within a 100-ft radius from the point of discovery; that measures to protect the discovery from looting and vandalism are implemented until the completion of requirements under state law; and that the local law enforcement agency, the

SHSND, the North Dakota Department of Health (NDDH), RUS, and the tribes identified in Stipulation IX.B of the in-place Programmatic Agreement are notified.

Site Forms

Site forms were completed following the November 2011 and January 2012 field survey. HDR accessed forms via the SHSND website (<http://www.history.nd.gov/hp/index.html>) and followed the provided guidelines. Site numbers were requested from SHSND following the submittal of the draft Class III report.

Collection Policy

RUS is a funding agency, not a land managing agency. As such, the agency has no place to curate artifacts when collected in the field. The policy for this project was to not collect, but to record objects in the field. Cultural materials identified during the pedestrian survey were recorded, photographed if diagnostic or showed evidence of modification or use, and placed back on the ground surface. Cultural materials identified during shovel testing were recorded, photographed if diagnostic or showed evidence of modification or use, double bagged, labeled with provenience and project information, and placed back in the shovel test at the approximate recovery level.

Results of Investigations

Summary

Due to the size of the Project and multiple layout changes, the Class III Inventory was conducted over multiple mobilizations. The survey for this addendum was conducted from October 31st to November 7th, November 16th to 19th, and December 9th, 2011, and January 4th to 5th, 2012.

Areas identified within the transmission line corridor as needing survey were designated as Survey Segments and labeled with consecutive letters. These segments were created based on the probability zones determined by the *Final Center to Grand Forks Archaeological Predictive Model* (FCGFAPM), and on field observations of the corridor. The following work summary is subdivided by county, then by township, range, and section, and finally by Survey Segment. The Survey Segment descriptions move from west to east, starting at the Center Substation near Center, North Dakota, and terminating at the Prairie Substation, west of Grand Forks, North Dakota. Individual Survey Segment descriptions include specific location, land use, ground surface visibility, and survey methods used. Archaeological sites, shovel test areas, shovel testing results, and additional survey recommendations are also presented within individual Survey Segments.

In addition to Survey Segments, HDR completed a review of two fiber optic stations and four new potential laydown areas. The fiber optic stations and new laydown areas and the results of the fieldwork follow the Survey Segment descriptions. Fiber optic stations and laydown areas are represented in a similar manner to the Survey Segments, as the descriptions move from west to east.

If cultural resources were identified within a Survey Segment, fiber optic station, or laydown area, the site is noted briefly in the segment or area write-up. Complete archaeological site descriptions and recommendations are provided in the Identified Sites section of the report. If shovel testing was used, this is also noted briefly in the description. Individual shovel test information and profiles can be found in Appendix B.

In addition to newly identified archaeological sites, multiple Areas of Avoidance were recorded. These areas include features that cannot be assigned definitive cultural affiliation. Features may include stone piles and alignments (likely associated with Euro-American field-clearing activities), depressions, and earthen formations (such as earthen berms or field-clearing piles). Areas of Avoidance were identified in the field and assigned feature numbers, however, these areas are not considered archaeological sites and will not receive an official North Dakota State Site number. Although cultural affiliation cannot be determined, it is HDR's opinion that these areas should be avoided by construction activities. Areas of Avoidance are listed with the associated survey segment, fiber optic station, or laydown area.

Additional areas to consider include railroad segments that transect the project corridor both inside and outside of the identified Survey Segments. These include both abandoned railroad beds and segments that are still in use. A total of nine railroad segments transect the project corridor. Railroad segments that transect the project corridor within the Survey Segments include the Northern Pacific Railroad in Survey Segment CC in Section 28 in T142N, R81W which is still in use; the Soo Line Railroad in Survey Segment H in Section 17 of T143N, R80W which is still in use; and the abandoned Northern Pacific Railroad in Survey Segment L in Section 7 of T146N, R78W.

Railroad segments that transect the project corridor and fall outside of the Survey Segments include the Soo Line Railroad in Sections 25 and 26 of T148N, R70W; the Burlington Northern Railroad in Section 30 in T148N, R66W; the Great Northern Railroad in Sections 35 and 36 in T148N, R65W; the Northern

Pacific Railroad in Section 2 and 3 in T147N, R61W; the Great Northern Railroad in Section 6 in T148N, R57W; and the Great Northern Railroad in Section 32 in T150N, R54W. These railroad segments were not visited during the Class III Inventory as they were not included in identified Survey Segments.

Over the course of the Project, HDR received multiple route changes and updates from the project engineers as the planning proceeded. The archaeological crew followed the June 2011 layout provided by Minnkota to initiate the field survey. Permission to survey was not granted by all landowners. Locational information for these segments is provided, as well as survey recommendations.

Survey Segment Coverage

Oliver County

Township 142N, Range 83W, Sections 33, 34, and 36

Survey Segment A (Section 33)

Survey Segment A shifted from the original survey area and is now located southeast of the original survey segment. Survey Segment A begins at the Center 345 kV electrical substation in Section 33 just to the east of Nelson Lake (Appendix A, Figure 2, Page 1). The segment extends north from the substation for approximately 0.1 miles through a small pasture and then turns northeast and transects a harvested wheat field for approximately 0.3 miles until it reaches 33rd Avenue SW. The landscape is lightly rolling, and Lake Nelson is visible to the west. The portion of the Survey Segment closest to the substation appeared unnaturally flat and is likely disturbed from substation construction. According to the FCGFAPM, Survey Segment A traverses a mix of low, moderate, and high probability zones.

Pedestrian survey of Survey Segment A was conducted along eight transects spaced at 7 m intervals. Visibility in the pasture was poor at 0 percent, but gopher mounds were available for examination. The harvested wheat field offered approximately 0 to 25 percent visibility. During pedestrian survey, one secondary Knife River Flint (KRF) flake (FS 001) was identified [REDACTED]. A close-interval pedestrian survey in a 15 m area around the surface finds revealed no additional artifacts. One area within Area A was recommended for shovel testing (Shovel Test Area A-1).

Shovel Test Area A-1

Shovel Test Area A-1 traverses both low and moderate probability zones within a pasture and grassland adjacent to a harvested wheat field. One transect of seven shovel tests spaced at 15 m intervals was set out following the center of the ROW. Due to frozen ground, only two of the original seven shovel tests were excavated. Tests in the pasture were not completed as the soil was frozen. Shovel tests in the grassland were excavated as the tall grass provided insulation and the ground was not yet frozen. The typical soil profile of these two tests consisted of an average of 10 cm of dark brown (10YR 3/3) or a brown (10YR 4/3) silt loam over a pale brown (10YR 6/3) silty clay. Both tests were negative for cultural material. As shovel testing was not fully completed in this area, Shovel Test Area A-1 will need to be revisited in the spring of 2012.

Survey Segment A (Section 34)

Survey Segment A in Section 34 begins just to the west of 33rd Avenue and extends northeast, approximately 0.5 miles through a lightly rolling fallow field and wetland (Appendix A, Figure 2, Page 1). According to the FCGFAPM, Survey Segment A traverses a mix of low, moderate, and high probability zones.

Pedestrian survey of Survey Segment A in Section 34 was conducted along eight transects spaced at 7 m intervals. Visibility in the fallow field was fair at 0 to 25 percent, but gopher mounds were available for

examination. No cultural materials were identified within this survey segment, and no areas were recommended for shovel testing.

Survey Segment B - West portion (Section 36)

The west portion of Survey Segment B is located in the northeast quarter of Section 36 on either side of an unnamed creek (Appendix A, Figure 2, Page 1). The segment continues for approximately 0.25 miles. West of the creek, the segment is on a mostly flat terrace through grassland, and east of the creek the segment traverses rolling pasture. According to the FCGFAPM, the west portion of Survey Segment B traverses mostly high probability zones, although it does cross a few moderate probability zones.

Pedestrian survey was conducted along eight transects spaced at 7 m intervals on the eastern side of the unnamed creek. Although prairie grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. No features or cultural materials were identified during the pedestrian survey. Pedestrian survey was not completed on the western side of the unnamed creek; however, one area was recommended for shovel testing (Shovel Test Areas B-1).

Shovel Test Area B-1

Shovel Test Area B-1 traverses both moderate and high probability zones within a grassland adjacent to an unnamed creek. As this area is no longer the preferred route, shovel testing was not completed. No additional testing is recommended.

Township 142N, Range 82W, Sections 27, 31, 32, and 33

Survey Segment B - East portion (Sections 31 and 32)

The east portion of Survey Segment B begins in a rolling prairie/pasture at the edge of the Section 36 and Section 31 border. The segment continues southeast for approximately 0.30 miles before heading due east for an additional mile (Appendix A, Figure 2, Page 1). The segment crosses multiple ridges and small drainages as well as a small unnamed creek. The survey segment terminates just east of a field road in Section 32. According to the FCGFAPM, the east portion of Survey Segment B traverses low, moderate, and high probability zones.

Pedestrian survey was conducted along eight transects spaced at 7 m intervals. Although prairie grasses obscured surface visibility in this segment, gopher mounds were opportunistically examined. No features or cultural materials were identified during the pedestrian survey and six areas were identified for shovel testing (Shovel Test Areas B-2, B-3, B-4, B-5, B-6, and B-7).

Shovel Test Area B-2

Shovel Test Area B-2 traverses a high probability zone on a prairie/pasture ridge overlooking a small unnamed creek to the west. As this area is no longer the preferred route, shovel testing was not completed. No additional testing is recommended.

Shovel Test Area B-3

Shovel Test Area B-3 traverses moderate and high probability zones on a prairie/pasture ridge. As this area is no longer the preferred route, shovel testing was not completed. No additional testing is recommended.

Shovel Test Area B-4

Shovel Test Area B-4 traverses moderate and high probability zones on a prairie/pasture ridge west of a small drainage. As this area is no longer the preferred route, shovel testing was not completed. No additional testing is recommended.

Shovel Test Area B-5

Shovel Test Area B-5 traverses moderate and high probability zones on a prairie/pasture ridge. As this area is no longer the preferred route, shovel testing was not completed. No additional testing is recommended.

Shovel Test Area B-6

Shovel Test Area B-6 traverses moderate and high probability zones on a prairie/pasture ridge. As this area is no longer the preferred route, shovel testing was not completed. No additional testing is recommended.

Shovel Test Area B-7

Shovel Test Area B-7 traverses moderate and high probability zones on a prairie/pasture ridge. As this area is no longer the preferred route, shovel testing was not completed. No additional testing is recommended.

Survey Segment B - New portion (Sections 31 and 32)

The new portion of Survey Segment B begins west of an unnamed creek in the northwest quarter of Section 32 and extends for approximately 0.25 miles before terminating on a hilltop in the northeast quarter of Section 31 (Appendix A, Figure 2, Page 1). The segment is in a rolling upland within a pasture. According to the FCGFAPM, Survey Segment B is within a moderate to high probability zone.

A pedestrian survey was completed in six transects spaced at 15 m intervals. Ground surface visibility was poor at 0 percent. During the pedestrian survey, no cultural materials were encountered and one shovel testing area was identified (Shovel Test Area B-2).

Shovel Test Area B-2

Shovel Test Area B-2 traverses a moderate to high probability zone on a hilltop in pasture. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Survey Segment BB (Section 32)

Survey Segment BB begins in the northwest quarter of Section 32 and extends east for approximately 0.45 miles before angling northeast and continuing for an additional 0.20 miles and terminating approximately 0.10 miles south of the intersection of 23rd Street SW and 28th Avenue SW (Appendix A, Figure 2, Page 1). The segment transects a rolling upland in pasture/grassland, crossing an unnamed creek bordered by scrub brush and trees. According to the FCGFAPM, Survey Segment BB is within a moderate to high probability zone.

A pedestrian survey was completed in six transects spaced at 15 m intervals. Ground surface visibility was poor at 0 percent and gopher mounds were opportunistically examined along the route. During the pedestrian survey, one precontact stone cairn was recorded (CGF-BB-1) and two areas were identified for shovel testing (Shovel Test Areas BB-1 and BB-2).

Shovel Test Area BB-1

Shovel Test Area BB-1 traverses a moderate probability zone on a hilltop in prairie/pasture. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Shovel Test Area BB-2

Shovel Test Area BB-2 traverses a moderate to high probability zone on a hilltop in prairie/pasture.

Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Survey Segment BB (Section 33)

Survey Segment BB begins in the northwest quarter of Section 33 at 23rd Street SW and extends approximately 0.2 miles, in a southwest direction before terminating at the eastern section line of Section 32 (Appendix A, Figure 2, Page 1). The segment is within a flat, cut soybean field. According to the FCGFAPM, Survey Segment BB is within a moderate to high probability zone.

A pedestrian survey was completed in eight transects spaced at 7 m intervals. Ground surface visibility was fair at 0 to 25 percent. During the pedestrian survey, no cultural material was encountered and no shovel testing areas were identified.

Survey Segment C ()

Survey Segment C begins at [REDACTED] extending for approximately 0.5 miles before terminating (Appendix A, Figure 2, Page 1). The segment is within a gently rolling pasture. According to the FCGFAPM, Survey Segment C is within a moderate to high probability zone.

During the pedestrian survey in June 2011, two precontact stone features and a precontact lithic scatter were identified (32OL642). As project plans proceeded, structure placement became problematic. Due to the length of Site 32OL642, spanning the site completely would not be possible. Proposed structure locations were placed on the extreme western (Structure 37) and eastern (Structure 38) portions of the site within the site boundary. Following an email exchange with Mr. Paul Picha of the SHSND on October 21, 2011, it was determined that additional testing would be required at each structure location to assure that cultural resources would not be disturbed during construction.

Additional shovel testing was completed on October 31, 2011, at Structure 37 and Structure 38. Testing at Structure 37 on the western edge of the site boundary consisted of one shovel test at the structure location and four shovel tests in each cardinal direction, spaced at 5 m intervals. The typical soil profile of these tests consisted of an average of 18 cm of very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) silt loam. At an average depth of 42 cm below surface, a yellowish brown (10YR 5/4) silt loam was encountered. Of the five original shovel tests, one test (ST West) was positive and contained one precontact ceramic fragment. Additional shovel tests were excavated to the north (ST 5 North and ST 10 North), south (ST 5 South and ST 10 South), and west (ST 5 West and ST 10 West) of ST West to further delineate site boundaries. All tests were negative for cultural material and additional shovel tests were not excavated.

Shovel testing at Structure 38 consisted of excavating one shovel test at the structure location and four shovel tests in each cardinal direction, spaced at 5 m intervals. The typical soil profile of these tests consisted of an average of 25 cm of very dark grayish brown (10YR 3/2) silt loam over a brown (10YR 4/3) silt loam. At an average depth of 47 cm below surface, a yellowish brown (10YR 5/4) silt loam was encountered. All tests were negative for cultural material and additional shovel tests were not excavated.

Township 142N, Range 81W, Section 28 and 29

Survey Segment CC – East portion (Section 28)

The east portion of Survey Segment CC in Section 28 begins at the Northern Pacific Railroad and continues east approximately 0.50 miles, transecting a low area with marshy vegetation (Appendix A,

Figure 2, Page 1). According to the FCGFAPM, Survey Segment CC traverses moderate and high probability zones east of the railroad, adjacent to the Missouri River.

A pedestrian survey was completed in six transects at 15 m intervals. Ground surface visibility was poor in the marshy areas, at 0 percent. During the pedestrian survey, no sites were identified, no areas were recommended for shovel testing, and one area was recommended for deep testing (Deep Testing Locality 7a).

Deep Testing Locality 7a

Deep Testing Locality 7a is in the northeast quarter of Section 28 in Survey Segment CC, adjacent to the Missouri River. According to the FCGFAPM, the area traverses moderate and high probability zones in a grassy/marshy area with poor ground surface visibility (0 percent). According to the Deep Testing Model, this area holds a high probability to contain buried soils and potentially intact cultural deposits that may range in depth from 1 to 3 m. Shovel testing can efficiently identify subsurface cultural deposits to a depth of 1 m; however, as this area contains the potential for deposits ranging from 1 to 3 m, deep testing would be required.

Survey Segment CC (Section 29)

Permission to survey was not granted by the landowner for Survey Segment CC in Section 29 (Appendix A, Figure 2, Page 1). HDR recommends revisiting Survey Segment CC once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

McLean County

Township 143N, Range 81W, Sections 13, 24, 25, and 36

Survey Segment EE – South Portion (Section 36)

The south portion of Survey Segment EE begins at the southern edge of Section 36, along the McLean/Burleigh county line and 18th Street SW, and continues north, approximately one mile, transecting a gently rolling grassland (Appendix A, Figure 2, Page 1). According to the FCGFAPM, the south portion of Survey Segment EE traverses moderate and high probability zones.

During the pedestrian survey completed on June 23, 2011, and the shovel testing completed on June 30, 2011, Site 32ML1237 and Site Lead 32MLx768 were identified on Survey Segment EE. In an effort to further delineate site boundaries and assist in transmission line structure placement, additional subsurface testing was completed in and around Site 32ML1237 and Site Lead 32MLx768 on November 1, 3, and 16, 2011. Following multiple site visits it was determined that structure placement should be limited to a cleared area on the western portion of the site. Therefore, the 150 ft corridor was adjusted to avoid Site 32ML1237 by shifting Structure 110 241 ft west of its original location. From Structure 109 the transmission line turns northwest to Structure 110 and turns northeast back to Structure 111, thereby avoiding Site 32ML1237 (Appendix A Figures 7a and 7b). Please refer to the Precontact Sites section of the report for the complete site description and additional information.

Survey Segment EE – North Portion (Sections 24 and 25)

Survey Segment EE begins just south of Highway 83 in the southeast quarter of Section 24 (Appendix A, Figure 2, Page 1). The survey segment transects rolling hills in pasture before transitioning to a harvested soybean field west and south of Lake Yanktonai. According to the FCGFAPM, the north portion of Survey Segment EE traverses moderate and high probability zones.

Pedestrian survey was conducted along eight transects spaced at 7 m intervals. Visibility in the pasture was poor at 0 percent and gopher mounds were opportunistically examined along the route. Visibility was good in the harvested soybean field at 50 to 75 percent. No features or cultural materials were identified during the pedestrian survey and three areas were identified for shovel testing (Shovel Test Areas EE-1, EE-2, and EE-3).

Shovel Test Area EE-1

Shovel Test Area EE-1 traverses a high probability zone on a hilltop in prairie/pasture. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Shovel Test Area EE-2

Shovel Test Area EE-2 traverses a high probability zone on a hilltop in prairie/pasture. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Shovel Test Area EE-3

Shovel Test Area EE-3 traverses a high probability zone on a hilltop in prairie/pasture. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Survey Segment FF – West Portion (Section 13)

Permission to survey was not granted by the landowner for Survey Segment FF in Section 13 (Appendix A, Figure 2, Page 1). HDR recommends revisiting Survey Segment FF once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Township 143N, Range 80W, Section 18

Survey Segment FF – East Portion (Section 18)

Permission to survey was not granted by the landowner for Survey Segment FF in Section 18 (Appendix A, Figure 2, Page 1). HDR recommends revisiting Survey Segment FF once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

Township 144N, Range 80W, Section 24

Survey Segment HH (Section 24)

Survey Segment HH begins approximately 0.25 miles north of 422nd Avenue NE on the half section line of Section 24 (Appendix A, Figure 2, Page 2). The segment continues north-south for approximately 0.75 miles, and ends at the northern edge of Section 24, along 435th Avenue NE. The segment transects a flat, harvested wheat field and a steep sloping grassland. According to the FCGFAPM, Survey Segment HH traverses moderate and high probability zones.

The northern portion of Survey Segment HH was previously surveyed in June 2011. Pedestrian survey of southern portion of Survey Segment HH was conducted in eight transects spaced at 7 m intervals. Ground surface visibility was fair at 0 to 25 percent in the harvested wheat field and poor at 0 percent in the grassland. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. During the pedestrian survey, no cultural material was encountered and no shovel testing areas were identified.

Township 145N, Range 79W, Section 2

Grassland Easement 1 – South Portion (Section 2)

Grassland Easement 1 begins east of the intersection of Highway 41 and Main Street in Section 2 (Appendix A, Figure 2, Page 2). The segment extends south for approximately 0.25 miles in grassland transected by multiple wetlands and small bodies of water. According to the FCGFAPM, Grassland Easement 1 traverses moderate and high probability zones.

Pedestrian survey was conducted along six transects spaced at 15 m intervals. Visibility in the grassland was poor at 0 percent and gopher mounds were opportunistically examined along the route. No features or cultural materials were identified during the pedestrian survey and one area was identified for shovel testing (Shovel Test Area GE-1).

Shovel Test Area GE-1

Shovel Test Area GE-1 traverses a moderate to high probability zone on a hilltop in a grassland overlooking multiple wetlands and small bodies of water. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Township 146N, Range 79W, Section 13 and 35

Grassland Easement 1 – North Portion (Section 35)

Grassland Easement 1 begins east of the intersection of Highway 41 and Main Street in Section 2 (Appendix A, Figure 2, Page 2). The segment extends north for approximately 0.30 miles in grassland transected by multiple wetlands and small bodies of water. According to the FCGFAPM, Grassland Easement 1 traverses moderate and high probability zones.

Pedestrian survey was conducted along six transects spaced at 15 m intervals. Visibility in the grassland was poor at 0 percent and gopher mounds were opportunistically examined along the route. No features or cultural materials were identified during the pedestrian survey and no areas were identified for shovel testing.

Sheridan County

Township 146N, Range 78W, Sections 7, 8, and 18

Survey Segment II (Sections 7 and 18)

Survey Segment II shifted from the original survey area and is now located approximately 0.20 miles to the east. Survey Segment II begins just south of Highway 200, in the southeast corner of Section 7 and extends approximately 0.60 miles crossing into and ending in the northwest corner of Section 18 (Appendix A, Figure 2, Page 3). The segment transects a low grassland, a wetland, and a gently rolling grassland before terminating in an un-harvested winter wheat field. According to the FCGFAPM, the southern portion of Survey Segment II traverses moderate and high probability zones.

A pedestrian survey was completed in eight transects spaced at 7 m intervals. Visibility was 0 percent in the grassland; however gopher mounds were examined where available. The visibility in the winter wheat field was good, and ranged from 0 to 50 percent. During the survey no cultural material was encountered. Two areas within Survey Segment II were recommended for shovel testing (Shovel Test Area II-1 and Shovel Test Area II-2).

Shovel Test Area II-1

Shovel Test Area II-1 traverses a high probability zone on a hilltop in a grassland. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Shovel Test Area II-2

Shovel Test Area II-2 traverses a moderate probability zone on a hilltop in a grassland. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Survey Segment L (Sections 7 and 8)

Survey Segment L has shifted from the original survey area and is now located approximately 0.3 miles east of the original survey segment, and connects to the original segment in the northeast quarter of Section 8 (Appendix A, Figure 2, Page 3). Survey Segment L begins along Highway 200 in the southeast quarter of Section 7, transects an earthen berm associated with the abandoned Northern Pacific Railroad, and extends north-northeast for approximately 0.5 miles before crossing into Section 8 for approximately 0.1 miles. The segment then turns due east and follows the northern edge of Section 8 and 5th Street NW for approximately 0.6 miles and terminates in the northeast quarter of Section 8. The segment cuts across pasture transected by multiple wetlands and small bodies of water. According to the FCGFAPM, the southern portion of Survey Segment L traverses low, moderate, and high probability zones.

Permission to survey was not granted by the landowner for Survey Segment L in Section 7. HDR recommends revisiting Survey Segment L once landowner permission has been granted. This area will require a pedestrian survey and/or shovel testing to determine the presence/absence of cultural materials.

A pedestrian survey was completed in eight transects spaced at 7 m intervals for Survey Segment L in Section 8. Visibility ranged from 0 to 25 percent and gopher mounds were examined in the pasture where available. During the survey, the remnant of the Northern Pacific Railroad was recorded as a site (CGF-L-3), two areas were recommended for shovel testing (Shovel Test Area L-1 and Shovel Test Area L-2) and one Area of Avoidance was recorded.

Shovel Test Area L-1

Shovel Test Area L-1 traverses moderate and high probability zones on a rise in a pasture. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Shovel Test Area L-2

Shovel Test Area L-2 traverses moderate and high probability zones on a rise in a pasture. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Township 147N, Range 78W, Sections 13, 23, 24, and 26

Survey Segment KK1 (Sections 23 and 26)

Survey Segment KK1 begins along 2nd Avenue SW, in the northwest quarter of Section 26, trending northeast for approximately 0.8 miles and terminating in the southeast quarter of Section 23 (Appendix A, Figure 2, Page 2). The segment transects a gently rolling pasture. According to the FCGFAPM, Survey Segment KK1 traverses mostly moderate and high probability zones.

Pedestrian survey of southern portion of Survey Segment KK1 was conducted in eight transects spaced at 15 m intervals. Ground surface visibility was poor in the pasture at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. During the pedestrian survey, no cultural materials were encountered, four areas were identified as shovel testing areas (Shovel Test Area KK1-1, Shovel Test Area KK1-2, Shovel Test Area KK1-3, and Shovel Test Area KK1-4), and two Areas of Avoidance were noted.

Shovel Test Area KK1-1

Shovel Test Area KK1-1 traverses low and high probability zones on a rise in a pasture overlooking multiple wetlands and small water bodies. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Shovel Test Area KK1-2

Shovel Test Area KK1-2 traverses a high probability zone on a rise in a pasture overlooking multiple wetlands and small water bodies. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Shovel Test Area KK1-3

Shovel Test Area KK1-3 traverses a high probability zone on a rise in a pasture overlooking multiple wetlands and small water bodies. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Shovel Test Area KK1-4

Shovel Test Area KK1-4 traverses moderate and high probability zones on a rise in a pasture overlooking multiple wetlands and small water bodies. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Survey Segment KK2 (Sections 13 and 24)

Survey Segment KK2 begins in the northwest quarter of Section 24 and continues northeast, approximately 0.8 miles, crossing 9th Street NW and terminating in the southeast quarter of Section 13 (Appendix A, Figure 2, Page 3). The segment transects a gently rolling, recently tilled grassland north of 9th Street NW and a rolling grassland to the south. According to the FCGFAPM, Survey Segment KK2 traverses low, moderate, and high probability zones.

Pedestrian survey of Survey Segment KK2 was conducted in eight transects spaced at 7 m intervals. Ground surface visibility was good, at 25 to 50 percent in the tilled grassland north of 9th Street NW, and poor at 0 percent in the grassland south of 9th Street NW. Although grasses obscured surface visibility, gopher mounds were opportunistically examined. No cultural materials were identified during the pedestrian survey, no shovel testing areas were identified, and three Areas of Avoidance were noted.

Township 147N, Range 74W, Section 12

Survey Segment MM (Section 12)

Survey Segment MM begins near the intersection of 10th Street NE and 23rd Avenue NE and extends approximately 0.50 miles east (Appendix A, Figure 2, Page 4). The segment transects a rolling landscape and is divided into cultivated fields and grassland separated by a large wetland. According to the FCGFAPM, Survey Segment MM traverses a high probability zone.

Pedestrian survey was conducted along six transects spaced at 15 m intervals. Visibility in the grassland was poor at 0 percent and gopher mounds were opportunistically examined along the route. Visibility in the harvested soybean field was good, ranging from 50 to 75 percent. No features or cultural materials

were identified during the pedestrian survey and two areas were identified for shovel testing (Shovel Test Areas MM-1 and MM-2).

Shovel Test Area MM-1

Shovel Test Area MM-1 traverses a high probability zone on a rise in a grassland overlooking a large wetland. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Shovel Test Area MM-2

Shovel Test Area MM-2 traverses a high probability zone on a rise in a grassland overlooking a large wetland. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Survey Segment O (Section 12)

Survey Segment O begins approximately 0.50 miles west of 24th Avenue SE on the southern border of Section 12, near the half section point (Appendix A, Figure 2, Page 4). The segment transects a gently rolling harvested soybean field. According to the FCGFAPM, Survey Segment O traverses mostly moderate and high probability zones.

Pedestrian survey of Survey Segment O was conducted in six transects spaced at 15 m intervals. Ground surface visibility was good and ranged from 50 to 75 percent. No cultural materials were identified during the pedestrian survey and no areas were identified for shovel testing.

Wells County

Township 147N, Range 73W, Sections 1, 2, 7, and 8

Survey Segment O (Section 7)

Survey Segment O begins in the southwest corner of Section 7, at the intersection of 24th Avenue SE and 10th Street NE, and continues east one mile, terminating in the southeast corner of Section 7, at the intersection of 25th Avenue SE and 10th Street NE (Appendix A, Figure 2, Page 4). The segment transects a gently rolling grassland with multiple low areas and wetlands. According to the FCGFAPM, Survey Segment O traverses a mix of low, moderate, and high probability zones.

Pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility was poor, at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. During the pedestrian survey, no cultural materials were encountered, and three areas were identified for shovel testing (Shovel Test Area O-1, Shovel Test Area O-2, and Shovel Test Area O-3).

Shovel Test Area O-1

Shovel Test Area O-1 traverses a moderate probability zone on a rise in a grassland. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Shovel Test Area O-2

Shovel Test Area O-2 traverses moderate and high probability zones on a rise in a grassland. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Shovel Test Area O-3

Shovel Test Area O-3 traverses moderate and high probability zones on a rise in a grassland. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Survey Segment NN (Section 8)

Survey Segment NN begins in the southwest corner of Section 8 at the intersection of 25th Avenue SE and 10th Street NE and continues east 0.5 miles before turning due north and continuing for 0.25 miles (Appendix A, Figure 2, Page 4). The segment initially transects a gently rolling grassland, followed by a flat harvested soybean field, and a rolling grassland. According to the FCGFAPM, Survey Segment NN traverses a mostly high probability zone.

Pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility was poor in the grassland areas at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. Ground surface visibility was good at 50 to 75 percent in the soybean field. During the pedestrian survey, no cultural materials were encountered and one area within the grassland was identified for shovel testing (Shovel Test Area NN-1).

Shovel Test Area NN-1

Shovel Test Area NN-3 traverses moderate and high probability zones on a rise in a grassland. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Survey Segment OO (Sections 1, 2, and 11)

Survey Segment OO transects three sections and forms an “L” shape. The majority of the north-south trending portion of Survey Segment OO was surveyed in May 2011 with the exception of an approximate 0.10 mile north-south trending portion in the southeast quarter of Section 11 (Appendix A, Figure 2, Page 4). The east-west portion of the segment is divided at Highway 3 and continues approximately 0.25 miles to the west in Section 2 and approximately 0.50 miles to the east in Section 1. Land use consisted of a cultivated cornfield in Section 11, a rolling pasture in Section 2, and a cut hayfield in Section 1. According to the FCGFAPM, Survey Segment OO traverses moderate and high probability zones.

Pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility within the pasture in Section 1 was poor at 0 percent. Although grasses obscured surface visibility within the pasture in Section 1, gopher mounds were opportunistically examined along the route. The hayfield in Section 2 yielded good visibility at 50 percent and the cultivated field in Section 11 afforded fair visibility at 0 to 25 percent. During the pedestrian survey, no cultural material was encountered and one area within Section 1 was identified for shovel testing (Shovel Test Area OO-1).

Shovel Test Area OO-1

Shovel Test Area OO-1 traverses a high probability zone on a rise in a pasture. Shovel testing was not completed due to frozen soils. HDR recommends revisiting this location in spring 2012 to complete subsurface testing.

Wells County

Township 147N, Range 72W, Section 3

Survey Segment PP (Section 3)

Survey Segment PP begins at the southwest corner of Section 3 and extends for one mile along the southern border of Section 3 before terminating at 34th Avenue SW (Appendix A, Figure 2, Page 4). Land use in Survey Segment PP consists of a hummocky pasture transected by multiple harvested hayfields. According to the FCGFAPM, Survey Segment PP traverses a low probability zone.

Pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility was poor in the pasture at 0 percent and gopher mounds were opportunistically examined along the route. Visibility was good in the harvested hayfields, ranging from 25 to 50 percent. No cultural materials were identified during the pedestrian survey and no areas were recommended for shovel testing.

Township 148N, Range 68W, Sections 29 and 30

Survey Segment QQ (Sections 29 and 30)

Survey Segment QQ shifted approximately 50 ft south of the original location and begins just east of the half-section line within Section 30 and continues east about 1.0 mile, terminating approximately 0.6 miles east of 55th Avenue NE in Section 29 (Appendix A, Figure 2, Page 5). The segment transects a low and flat soy field in Section 30, and a low and flat hayfield in Section 29. According to the FCGFAPM, Survey Segment QQ traverses a moderate probability zone.

Pedestrian survey of the original segment was completed in May 2011. During the survey, no cultural materials were identified during the pedestrian survey and no shovel testing areas were identified. Due to the minor shift in the corridor and moderate probability of the area, additional pedestrian survey was not recommended or completed. No additional testing is recommended.

Eddy County

Township 148N, Range 67W, Sections 26, 27, 28, 29, and 30

Survey Segment RR (Section 30)

Survey Segment RR begins in the northeast quarter of Section 30, along 61st Avenue NE, and continues west 0.4 miles, traversing a flat cultivated field transected by a windbreak with multiple junked appliances (Appendix A, Figure 2, Page 5). According to the FCGFAPM, Survey Segment RR traverses a mostly low and probability zone.

Pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility was good at 25 percent. No cultural materials were identified during the pedestrian survey and no areas were recommended for shovel testing.

In January 2012, the route shifted approximately 50 ft to the south. Due to the minor shift in the corridor and mostly low probability of the area, additional pedestrian survey was not recommended or completed. No additional testing is recommended.

Survey Segment HHH (Sections 28 and 29)

Survey Segment HHH transects two sections and forms an inverted "Z" shape (Appendix A, Figure 2, Page 5). The segment begins approximately 0.10 miles west of 62nd Avenue NE on the half section line of Section 29. The segment then transects 62nd Avenue NE and turns north, adjacent to 62nd Avenue NE for approximately 0.40 miles before turning east and terminating at Rosefield Slough. West of 62nd Avenue NE, the land use consisted of a harvested soybean field and to the east land use consisted

of a planted winter wheat field. As the segment approached the slough, land use transitioned to a low, wet area. According to the FCGFAPM, Survey Segment HHH traverses a low probability zone.

Pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility was good in the harvested soybean field at 25 to 50 percent and 50 percent in the planted winter wheat field. No cultural materials were identified during the pedestrian survey and no areas were recommended for shovel testing.

In January 2012, the preferred route was adjusted and the northern portion of Survey Segment HHH was affected (Appendix A, Figure 2, Page 5). Previously, the northern portion of Survey Segment HHH trended east, running adjacent to Rosefield Slough. Following the route change, the segment no longer trends east, but instead continues north approximately 350 ft, transecting the slough. As the route adjustment includes a considerable shift and falls within a previously identified survey segment, additional pedestrian survey of Survey Segment HHH is recommended in spring 2012.

Survey Segment III (Sections 26 and 27)

Survey Segment III transects two sections and forms a “Z” shape (Appendix A, Figure 2, Page 6). The segment begins approximately 0.10 miles west of 64th Avenue NE in the northeast quarter of Section 27. The segment then turns south at 64th Avenue NE, running parallel to the road for approximately 0.40 miles before turning east and continuing approximately 0.10 miles and terminating in Section 26. Land use included a cultivated field on either side of Rosefield Slough near the center of the segment. East of 64th Avenue NE land use included a low, hummocky pasture. According to the FCGFAPM, Survey Segment III traverses a low probability zone.

Pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility in the cultivated field was good at 75 percent and poor in the pasture at 0 percent. No cultural materials were identified during the pedestrian survey and no areas were recommended for shovel testing.

In January 2012, the preferred route was adjusted and the majority of Survey Segment III was removed from consideration (Appendix A, Figure 2, Page 5). The new route transects the southern portion of Survey Segment III in Sections 26 and 27. As the route adjustment includes a considerable shift and falls within a previously identified survey segment, additional pedestrian survey of Survey Segment III is recommended in spring 2012.

Township 148N, Range 64W, Section 36

Survey Segment SS (Section 36)

Survey Segment SS begins in the southeast corner of Section 36 and continues due east for approximately 0.25 miles, crossing and unnamed creek and terminating at 84th Avenue NE (Appendix A, Figure 2, Page 6). The segment transects a low, flat pasture and grassland that had been cultivated at one time. According to the FCGFAPM, Survey Segment WW1 covers low and moderate probability zones.

Pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility was poor at 0 percent in both the pasture and the grassland gopher mounds were opportunistically examined along the route. No cultural materials were encountered during the survey and no areas for shovel testing were identified.

Griggs County

Township 147N, Range 61W, Sections 16 and 17

Survey Segment WW1 (Section 17)

Survey Segment WW1 begins approximately 0.40 miles east of 97th Avenue NE on the southern border of Section 17 (Appendix A, Figure 2, Page 7). The segment transects a gently rolling cut hayfield. According to the FCGFAPM, Survey Segment WW1 covers low, moderate, and high probability zones.

Pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility was good at 25 to 50 percent. No cultural materials were encountered during the survey and no areas for shovel testing were identified.

Survey Segment WW2 (Section 16)

Survey Segment WW2 begins at 98th Avenue NE on the southern border of Section 16 (Appendix A, Figure 2, Page 7). The segment extends approximately 0.25 miles in a tilled field. According to the FCGFAPM, Survey Segment WW2 covers moderate and high probability zones.

Pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility was good at 25 to 50 percent. No cultural materials were encountered during the survey and no areas for shovel testing were identified.

Survey Segment WW3 (Section 16)

Survey Segment WW3 begins approximately 0.10 miles east of Survey Segment WW2 on the southern border of Section 16 (Appendix A, Figure 2, Page 7). The segment extends approximately 0.50 miles in a tilled field. According to the FCGFAPM, Survey Segment WW3 covers moderate and high probability zones.

Pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility was good at 25 to 50 percent. No cultural materials were encountered during the survey and no areas for shovel testing were identified.

Nelson County

Township 149N, Range 57W, Section 1

Survey Segment CCC (Section 1)

The majority of Survey Segment CCC was surveyed in May 2011 and only a small portion remained in the northeast quarter of Section 1 (Appendix A, Figure 2, Page 9). This portion of the segment begins on the eastern border of Section 1, in the northeast quarter and continues approximately 0.10 miles southwest, adjacent to a tributary of Goose Creek. Land use consisted of a cut alfalfa field and due to the presence of the drainage; many areas were low and wet. According to the FCGFAPM, the west portion of Survey Segment CCC traverses both moderate and high probability zones.

Pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility within the alfalfa was good at 25 percent. No cultural materials were identified during the pedestrian survey and no shovel testing areas were identified.

Grand Forks County

Township 150N, Range 53W, Section 24

Survey Segment Y-Western Portion (Section 24)

The western portion of Survey Segment Y begins along 26th Street NE, in the northwest quarter of Section 24 (Appendix A, Figure 2, Page 10). The segment is one mile long and transects a flat soybean field and a flat tilled corn field. According to the FCGFAPM, the western portion of Survey Segment Y is located within a moderate probability zone.

A pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility ranged from 50 to 75 percent in both fields. No cultural materials were encountered during the survey and no areas for shovel testing were identified.

Township 150N, Range 52W, Sections 1, 19, 20, 21, and 36

Survey Segment Y – East Portion (Sections 19, 20, and 21)

The eastern portion of Survey Segment Y begins along 25th Street NE in the northwest quarter of Section 19. The segment continues approximately 2.20 miles, through Section 20, and terminates in the northwest quarter of Section 21 (Appendix A, Figure 2, Page 10). Topography for this segment is flat and transected by multiple drainages and wetlands, including English Coulee. Land use included grasslands, a tilled agricultural field, and tilled hay fields. According to the FCGFAPM, the eastern portion of Survey Segment Y is located within a moderate probability zone.

A pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility ranged from 0 percent in the grasslands to 75 to 100 percent in the tilled agricultural field, and 50 to 75 percent in the tilled hay fields. No cultural materials were encountered during the survey and no areas for shovel testing were identified.

Survey Segment Z – South portion (Section 1)

The southern portion of Survey Segment Z begins near the center of Section 1 (Appendix A, Figure 2, Page 10). The segment continues for approximately 0.30 miles, and terminates at 12th Avenue NE. Topography consists of a flat, low pasture transected by multiple drainages. According to the FCGFAPM, the south portion of Survey Segment Z traverses a moderate probability zone.

A pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility was poor, at 0 percent. Gopher mounds and bare patches of soil were examined where possible. No cultural resources were identified during the survey and no areas were recommended for shovel testing.

Township 151N, Range 52W, Section 36

Survey Segment Z – North portion (Section 36)

The northern portion of Survey Segment Z begins along 12th Avenue NE at the center of Section 36 (Appendix A, Figure 2, Page 10). The segment continues for one mile. Topography consists of a flat, low pasture transected by multiple drainages. According to the FCGFAPM, the north portion of Survey Segment Z traverses a moderate probability zone.

A pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility was poor, at 0 percent. Gopher mounds and bare patches of soil were examined where possible. No cultural materials were identified during the pedestrian survey and no areas were recommended for shovel testing, but one Area of Avoidance was noted.

Laydown Areas

Eight laydown areas will be established for the proposed Project. Two new laydown areas were reviewed as part of the Addendum; New Laydown Area A1 and New Laydown Area 4.

Oliver County

Township 141N, Range 83W, Section 5

New Laydown Area A1 (Section 5)

New Laydown Area A1 is located in the northwest quarter of Section 5, adjacent to Hagel Creek, near the intersection of 24th Street SW and 35th Avenue SW (Appendix A, Figure 2, Page 1). The laydown area covers an area of approximately 5.8 acres and is within a gravel pit/staging area for the nearby power plant. Although New Laydown Area A1 falls outside the area covered by the FCGFAPM, it would have been coded as low probability because of the previous disturbance.

The area was visited and photographed; however, pedestrian survey was not completed due to the clear indications of previous disturbance. No areas for shovel testing were identified and no additional survey is recommended.

Foster County

Township 147N, Range 65W, Section 4

New Laydown Area 4c (Section 4)

New Laydown Area 4c is located in the southwest corner of Section 4 at the intersection of 5th Street NE and 74th Avenue NE (Appendix A, Figure 2, Page 6). The laydown area covers an area of approximately 10 acres within a flat grassland adjacent to a gravel pit. According to the FCGFAPM, New Laydown Area 4 covers moderate and high probability zones.

Pedestrian survey was conducted in 12 transects spaced at 15 m intervals. Ground surface visibility was poor at 0 percent. Although grasses obscured surface visibility, gopher mounds were opportunistically examined. No cultural material was encountered and no areas for shovel testing were identified.

Grand Forks County

Township 151N, Range 51W, Section 12

New Laydown Area 7 (Section 12)

New Laydown Area 7 is located in the southeast corner of Section 12, approximately 375 ft north of the proposed location of Laydown Area 7 (Appendix A, Figure 2, Page 10). The laydown area covers an area of approximately 20 acres and is within a fenced, graded, and gravel-covered yard previously utilized for staging activities. According to the FCGFAPM, New Laydown Area 7 covers a moderate probability zone.

Due to previous disturbance, a pedestrian survey was not completed for New Laydown Area 7. No areas are recommended for shovel testing and no additional survey is recommended.

Fiber Optic Stations

Four Fiber Optic Stations will be established for the proposed Project and the four proposed locations were reviewed and surveyed.

McLean County

Township 146N, Range 79W, Section 13

Fiber Optic Station #1 (Section 13)

Fiber Optic Station #1 (RS1) is located in the southeast corner of Section 13 adjacent to 3rd Street NW (Appendix A, Figure 2, Page 3). The station covers an area of approximately 3.6 acres within a small grassy, hummocky hill and a wetland. According to the FCGFAPM, Fiber Optic Station #1 covers moderate and high probability zones.

Fiber Optic Station #1 was visited during the survey and photographed. However, pedestrian survey was not completed as the station was within a wetland and partially inundated. During the visit, no cultural materials were encountered and no areas for shovel testing were identified.

Wells County

Township 147N, Range 70W, Section 5

Fiber Optic Station #2 (Section 5)

Fiber Optic Station #2 (RS2) is located in the northwest corner of Section 5 adjacent to 12th Street NE (Appendix A, Figure 2, Page 5). The station covers an area of approximately 1.9 acres within a partially wooded flat grassy area with multiple junked vehicles. According to the FCGFAPM, Fiber Optic Station #2 covers a moderate probability zone.

Pedestrian survey was conducted in six transects spaced at 15 m intervals. No cultural materials were encountered during the survey and no areas for shovel testing were identified.

Foster County

Township 147N, Range 63W, Section 13

Fiber Optic Station #3 (Section 13)

Fiber Optic Station #3 (RS3) is in the southeast corner of Section 13 at the intersection of 3rd Street NE and 90th Avenue NE in a rolling grassland that was cultivated at one time (Appendix A, Figure 2, Page 7). The station covers an area of approximately 1.6 acres. According to the FCGFAPM, Fiber Optic Station #3 covers a moderate probability zone.

Pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility was poor at 0 percent. Although grasses obscured the ground surface, gopher mounds were opportunistically examined. No cultural materials were encountered and no areas for shovel testing were identified.

Grand Forks County

Township 150N, Range 56W, Section 35

Fiber Optic Station #4 (Section 35)

Fiber Optic Station #4 (RS4) is near the half section of Section 35, adjacent to 6th Avenue NE in an overgrown, grassy area (Appendix A, Figure 2, Page 9). The station is approximately 2.5 acres and according to the FCGFAPM, Fiber Optic Station #4 covers a moderate probability zone.

Pedestrian survey was conducted in six transects spaced at 15 m intervals. Ground surface visibility was poor at 0 percent. Although grasses obscured surface, gopher mounds were opportunistically examined. No cultural materials were encountered, no areas for shovel testing were identified, and one Area of Avoidance was recorded.

Identified Sites

During the Class III Intensive Archaeological Resources Inventory Supplemental Addendum 1 for the Center to Grand Forks 345 kV Transmission Line Project, three newly recorded precontact sites (CGF-A-1, CGF-BB-1, and CGF-MM-1) and one newly recorded historic site (CGF-L-3) were identified (**Error! Reference source not found.**). Newly identified sites within the 150-ft ROW have the potential to be impacted by construction activities. None of the sites have been evaluated for NRHP eligibility with the exception of one isolated find (CGF-MM-1) that is recommended as not eligible for listing on the NRHP.

In addition to the newly recorded sites, three previously identified sites were revisited to further delineate site boundaries (32OL642, 32MLx768, and 32ML1237) (**Error! Reference source not found.**).

HDR recommends avoidance of all recorded archaeological sites. If sites cannot be avoided, additional investigations will be needed to further evaluate significance.

Table 1: Identified Sites

| Site Number | Field Number | Site Type | Potential Impacts | Project Recommendations | NRHP Recommendations |
|--------------------|---|--|---------------------------------------|--|-----------------------------|
| Pending | CGF-A-1 (Appendix A, Figures 3a and 3b) | Precontact Isolated Find | No structures within site boundary | Additional testing is recommended to determine site boundaries | Unevaluated |
| Pending | CGF-BB-1 (Appendix A, Figures 4a and 4b) | Precontact Stone Feature | No structures are within the boundary | Additional testing is recommended to determine site boundaries | Unevaluated |
| 32OL642 | CGF-C-1 (Appendix A, Figures 5a and 5b) | Precontact Stone Features and Artifact Scatter | 2 structures within site boundary | Site across entire ROW, construction activities should be limited to HDR recommended areas | Unevaluated |
| 32MLx768 | CGF-EE-2 (Appendix A, Figures 6a and 6b) | Precontact Lithic Scatter | No structures are within the boundary | Construction activities should be limited to HDR recommended areas | Unevaluated |
| 32ML1237 | CGF-EE-3 (Appendix A, Figures 7a and 7b) | Precontact Lithic Scatter | No structures are within the boundary | Construction activities should be limited to HDR recommended areas | Unevaluated |
| Pending | CGF-L-3 (Appendix A, Figures 8a and 8b) | Abandoned Railroad Bed | No structures are within the boundary | Site across entire ROW, to avoid direct impacts, spanning the site is recommended | Potentially Eligible |
| Pending | CGF-MM-1 (Appendix A, Figures 9a and 9b) | Precontact Isolated Find | No structures within site boundary | No additional testing | Not Eligible |

Precontact Sites

During the Class III Intensive Archaeological Resources Inventory Supplemental Addendum 1 for the Center to Grand Forks 345 kV Transmission Line Project, three newly recorded precontact sites were identified (CGF-A-1, CGF-BB-1, and CGF-MM-1) and three previously identified precontact sites were updated (32OL642, 32MLx768, and 32ML1237) (**Error! Reference source not found.**).

Site CGF-A-1 (ND SHPO Site Number Pending)

Site CGF-A-1 consists of one precontact isolated surface find (SF) 001 identified during the pedestrian survey of the western portion of Survey Segment A (Appendix A, Figures 3a and 3b) (Photo 1). The site consists of one secondary KRF flake and was identified in a gently rolling harvested wheat field [REDACTED]. A close-interval pedestrian survey in the harvested wheat field in a 15 m area around the flake revealed no additional artifacts.

The site was revisited on November 17, 2011, to shovel test the pasture and small grassland area adjacent to the wheat field. One transect of seven shovel tests were set out at 15 m intervals; five tests in the pasture (ST 001- ST 005) and two tests (ST 006 and ST 007) in the grassland. Due to frozen ground, none of the shovel tests within the pasture were excavated. The two shovel tests in the grassland were excavated as the grass provided insulation and the ground was not frozen. The two shovel tests excavated in the grassland were negative for cultural material.

Recommendations

At this time Site CGF-A-1 is considered an isolated find, but NRHP eligibility is unresolved pending further shovel testing of the pasture area. HDR recommends revisiting Site 001 in spring 2012 to complete shovel testing in the pasture area prior to transmission line construction.



Photo 1: Site CGF-A-1, View to Southwest

CGF-BB-1 (ND SHPO Site Number Pending)

Site CGF-BB-1 consists of one precontact stone feature (F 001) identified during the pedestrian survey of Survey Segment BB (Appendix A, Figures 4a and 4b) (Photo 2). The site is in a pasture/grassland on a hilltop overlooking a small creek [REDACTED]. The precontact stone feature includes one cairn

consisting of 12 visible small to medium size stones (F 001). The cairn is approximately 2 m by 2 m and is circular in shape.



Photo 2: Site CGF-BB-1, View to East

Recommendations

HDR recommends shovel testing to determine the full extent of the site boundaries. Following the delineation of the site, HDR recommends avoidance. The recommended NRHP eligibility of Site CGF-BB-1 has not been determined.

Features similar to those recorded at Site CGF-BB-1 may be important expressions of Native American traditional religious and cultural activities. Consequently, Site CGF-BB-1 may be NRHP-eligible under Criterion A as a property of traditional religious and cultural importance. Consultation with tribes may be needed to determine if this site exhibits traditional values and if the tribes can offer interpretational information concerning the features. HDR suggests that Site CGF-BB-1 may also be eligible for the NRHP under Criterion D for its potential to yield important information regarding the nature and distribution of feature types as expressions of social, economic, and subsistence activities characteristic of sites in the region. Further investigation is needed before eligibility can be determined for this site under any of the criteria.

32OL642

Site 32OL642 includes two precontact stone features and a lithic scatter identified during the pedestrian survey of Survey Segment C completed in June 2011 (Appendix A, Figures 5a and 5b). The site is within a gently rolling pasture area [REDACTED]
(Photo 4: Site 32OL642, Ceramic Sherd, ST 004

). The two precontact stone features include two cairns (F 001 and F 002) within the pasture and the lithic scatter includes one partial Besant projectile point (SF 001), one broken KRF biface (SF 012), one primary KRF flake (SF 006), one retouched secondary KRF flake (SF 011), three secondary KRF flakes (SF 003, SF 007, and SF 008), and five tertiary KRF flakes (SF 002, SF 004, SF 005, SF 009, and SF 010) identified a dirt roadbed.

One transect of shovel tests was excavated at 15 m intervals in the pasture area to further delineate site boundaries. The tests ran parallel to the lithic scatter [REDACTED]. A total of 12 shovel tests were excavated and all tests were negative.

As project plans proceeded, structure placement became problematic. Due to the length of Site 32OL642, spanning the site completely would not be possible. Proposed structure locations were placed on the extreme western (Structure 37) and eastern (Structure 38) portions of the site within the boundary. Following an email exchange with Mr. Paul Picha of the SHSND on October 21, 2011, it was determined that additional testing would be required at each structure location to assure that cultural resources would not be disturbed during construction.

Additional shovel testing was completed on October 31, 2011, at Structure 37 and Structure 38 within the boundaries of Site 32OL642. Testing at Structure 37 on the western edge of the site boundary consisted of one shovel test at the structure location and four shovel tests in each cardinal direction, spaced at 5 m intervals. The typical soil profile of these tests consisted of an average of 18 cm of very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) silt loam. At an average depth of 42 cm below surface, a yellowish brown (10YR 5/4) silt loam was encountered. Of the five original shovel tests, one test (ST W) was positive and contained one precontact ceramic fragment at 0 to 25 cm (Photo 4). The identified ceramic consisted of one cord-marked, grit-tempered body sherd with a smoothed buff exterior and smooth interior. Measurements include a maximum height of 2 cm, a maximum width of 1.8 cm, and a maximum thickness of 0.7 cm. Additional shovel tests were excavated to the north (ST 5 North and ST 10 North), south (ST 5 South and ST 10 South), and west (ST 5 West and ST 10 West) of ST West to further delineate site boundaries. All tests were negative for cultural material and additional shovel tests were not excavated.

Shovel testing at Structure 38 consisted of excavating one shovel test at the structure location and four shovel tests in each cardinal direction, spaced at 5 m intervals. The typical soil profile of these tests consisted of an average of 25 cm of very dark grayish brown (10YR 3/2) silt loam over a brown (10YR 4/3) silt loam. At an average depth of 47 cm below surface, a yellowish brown (10YR 5/4) silt loam was encountered. All tests were negative for cultural material and additional shovel tests were not excavated.



Photo 3: Site 32OL642, View to Southwest



Photo 4: Site 32OL642, Ceramic Sherd, ST 004

Recommendations

Although the majority of Site 32OL642 falls within a two-track dirt road, HDR recommends avoidance of this site due to the presence of precontact stone features and the lithic scatter that includes a diagnostic artifact. If this site cannot be avoided, additional consultation with SHSND and additional investigations are recommended to further evaluate the significance of this site.

Features similar to those recorded at site 32OL642 may be important expressions of Native American traditional religious and cultural activities. Consequently, 32OL642 may be NRHP-eligible under Criterion A as a property of traditional religious and cultural importance. Consultation with tribes may be needed to determine if this site exhibits traditional values and if the tribes can offer interpretational information

concerning the features. HDR suggests that 32OL642 may also be eligible for the NRHP under Criterion D for its potential to yield important information regarding the nature and distribution of feature types as expressions of social, economic, and subsistence activities characteristic of sites in the region. Further investigation is needed before eligibility can be determined for this site under any of the criteria.

32MLx768

Site 32MLx768 was initially recorded as a precontact lithic scatter identified during the pedestrian survey of Survey Segment EE (Appendix A, Figures 6a and 6b). Originally, the site included one tertiary flake of unidentified chert (FS 002) identified on a gopher mound, one secondary KRF flake, and one tertiary KRF flake identified during shovel testing (ST 004). A reevaluation of an adjacent site boundary (32ML1237) completed by pedestrian survey and additional shovel testing revealed that Site Lead 32MLx768 and Site 32ML1237 overlap. Therefore, Site Lead 32MLx768 has been incorporated into Site 32ML1237.

Recommendations

HDR recommends avoidance of Site 32ML1237, formerly referred to as Site Lead 32MLx768. If this site cannot be avoided, additional investigations will be needed to further evaluate the significance of this site.

32ML1237

Site 32ML1237 is a large precontact lithic scatter identified during the pedestrian survey of Survey Segment EE (Appendix A, Figures 7a, 7b, and 7c) (Photo 5). The site is within a rolling pasture area with spotty visibility ranging from 0 to 25 percent. Initially, the site included one broken tertiary KRF flake (SF 003) identified on a gopher mound on June 23, 2011. Over the course of the project, Site 32ML1237 and adjacent areas within the 1000-ft corridor were revisited on four separate occasions to determine the extent of the site boundaries: June 30, November 1, November 3, and November 16, 2011.

To delineate site boundaries, on June 30, 2011, one line of shovel tests were excavated north of SF 003 at 5 m intervals. The typical soil profile of these tests consisted of an average of 23 cm of a very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) silt loam. At an average depth of 54 cm below surface a yellowish brown (10YR 5/4) silt loam was encountered. A total of five shovel tests were excavated, four of which were positive. Positive shovel tests included ST 009 (two tertiary KRF flakes at 0 to 30 centimeters below surface [cmbs]), ST 010 (one tertiary KRF flake at 0 to 15 cmbs), ST 011 (one tertiary KRF flake at 0 to 23 cmbs, and ST 013 (two tertiary KRF flakes and one tertiary Tongue River Silica [TRS] flake at 0 to 35 cmbs, five large mammal bone fragments at 50 cmbs, and one calcine bone fragment at 60 cmbs). Due to time constraints, additional shovel tests were not excavated and the site was revisited at a later date to continue testing.

On November 1, 2011, shovel testing and pedestrian survey was initiated at proposed Structure 110 to determine if the site boundaries of Site 32ML1237 extended north. The original proposed location of Structure 110 was approximately 0.10 miles north of SF 003. Initially, five shovel tests were excavated; one at the proposed structure location and four in each cardinal direction. The typical soil profile of these tests consisted of an average of 18 cm of a very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) silt loam. At an average depth of 41 cm below surface a brown (10YR 5/3) sandy silt was encountered. Of the initial five shovel tests, one shovel test (ST 110 W) was positive and contained one tertiary KRF flake at 10 to 27 cmbs. Six additional shovel tests were set out around the one positive shovel test. One of the six shovel tests (ST 110 W10) was not excavated as it was on a cut bank. However, the test area was recorded as positive as a secondary Swan River Chert (SRC) flake was identified on the ground surface. Of the remaining five shovel tests, three were positive and contained

one tertiary KRF flake and one tertiary SRC flake at 37 to 54 cmbs (ST 110 W N10), one tertiary KRF flake at 10 to 27 cmbs (ST 110 W5), and one tertiary KRF flake and one KRF core at 14 to 42 cmbs (ST 110 W S5).

One additional shovel test was completed west of the positive shovel tests. The shovel test to the west was negative and no additional testing to the west was completed on November 1, 2011. Testing was not continued to the south, as a cut bank with 90 to 100 percent visibility was available for review. During the pedestrian survey three surface finds were recorded. They included one KRF scraper (SF 005), one secondary KRF flake (SF 006), and one primary KRF flake (SF 007). Testing was not continued to the east, as the creek was used as a temporary site boundary.

In an effort to identify the northern extent of the lithic scatter, shovel test intervals were increased from 5 m to 10 m. An additional eight shovel tests were excavated. Of the eight shovel tests, five were positive. Artifacts included two tertiary KRF flakes at 29 to 70 cmbs and one KRF drill at 35 to 45 cmbs (ST 110 W N20) (Photo 6), one tertiary KRF flake and one KRF shatter from 0 to 23 cmbs (ST 110 W N50), one tertiary KRF flake from 15 to 30 cmbs (ST 110 W N60), one tertiary KRF flake from 0 to 55 cmbs (ST W N70), and three tertiary KRF flakes and one KRF shatter from 26 to 62 cmbs (ST 110 W N80). Following the shovel testing and pedestrian survey completed on November 1, 2011, the boundaries of Site 32ML1237 were extended to include the positive shovel tests and surface finds.

Site 32ML1237 was revisited on November 3, 2011, to determine if Site 32ML1237 and Site Lead 32MLx768 connected. One transect of five shovel tests was excavated between the two sites. The typical soil profile of these tests consisted of an average of 27 cm of a very dark grayish brown (10YR 3/2) silt loam over a dark grayish brown (10YR 4/2) silt loam. At an average depth of 38 cm below surface a brown (10YR 5/3) silt loam or a pale brown (10YR 6/3) sandy loam was encountered. Tests were set 5 m west of the transect excavated on November 1, 2011. Of the five shovel tests, one was positive and contained two tertiary KRF flakes from 12 to 30 cmbs (ST 110 N90 W10 N10). As multiple gopher mounds were available for review, a pedestrian survey of the area was also completed. During the pedestrian survey, two precontact surface finds were recorded. Surface finds included two tertiary KRF flakes (SF 004) and one tertiary KRF flake (SF 001).

The identification of these two surface finds and the positive shovel test closed the gap between Site 32ML1237 and Site Lead 32MLx768, leaving only approximately 35 m between the two sites. It was determined that Site Lead 32MLx768 would therefore be incorporated into Site 32ML1237. Additional shovel testing and pedestrian survey was not completed on northern portion of the site as the boundaries for Site Lead 32MLx768 had been completed at an earlier date (June 30, 2011).

To determine the extent of the southern boundary, additional shovel testing was completed around the original surface find (SF 003) and the line of shovel tests excavated on June 30, 2011. Testing was completed on November 3, 2011. Six shovel tests on one transect were excavated south of SF 003 up to the bank of Yanktonai Creek. Tests were excavated at 10 m intervals. The typical soil profile of these tests consisted of an average of 77 cm of a very dark grayish brown (10YR 3/2) silt loam over a pale brown (10YR 6/3) loamy silt. Of the six shovel tests, two contained cultural materials. Artifacts included one tertiary KRF flake from 0 to 10 cmbs and one tertiary KRF flake from 15 to 32 cmbs (ST S10) and one tertiary KRF flake from 18 to 48 cmbs (ST S20). Although the remaining four shovel tests failed to produce cultural materials, the subsoil was never reached. Site boundaries to the south include all negative shovel tests and terminate at the northern bank of Yanktonai Creek.

Additional tests were excavated north of the transect excavated on June 30, 2011, in an attempt to connect the southern portion of Site 32ML1237 to the surface finds (SF 005, SF 006, and SF 007) identified in the cut bank on November 1, 2011. Working north of ST 013 (the final positive shovel test excavated on June 30, 2011) 11 shovel tests were excavated at 10 m intervals. The typical soil profile of these tests consisted of an average of 74 cm of a very dark grayish brown (10YR 3/2) silt loam over a dark gray (10YR 4/1) silt loam. At an average depth of 87 cm below surface, a pale brown (10YR 6/3) silt loam was encountered. Of the 11 shovel tests, four were positive. Recorded artifacts include one tertiary KRF flake from 40 to 50 cmbs, one tertiary KRF flake from 60 to 70 cmbs, two tertiary KRF flakes from 70 to 80 cmbs (ST N10), two tertiary KRF flakes from 20 to 30 cmbs (ST N20), one KRF shatter from 50 to 60 cmbs (ST N70), one tertiary KRF flake from 0 to 10 cmbs, and one tertiary KRF flake from 30 to 40 cmbs (ST N80). Following the shovel testing approximately 35 m separated the last positive shovel test (ST N80) and the southernmost surface find (SF 003) identified in the cut bank. Therefore, the boundaries of Site 32ML1237 were once again expanded.

As of November 3, 2011, Site 32ML1237 extended approximately 0.30 miles from [REDACTED] to the [REDACTED] of Site Lead 32MLx768. The eastern and western boundaries of the site were limited to the 1000-ft corridor as time constraints prohibited additional testing of the entire 0.30 mile site.

As the length of Site 32ML1237 included an area too great to span, additional shovel testing was required at proposed Structure 110 to identify an area suitable for structure placement. As multiple positive shovel tests were previously identified at the proposed location for Structure 110, a new set of tests was completed to the east and west of the previously excavated shovel tests. Testing was completed on November 16, 2011. Nine shovel tests were excavated east of Structure 110. Three shovel tests were excavated on three transects. Spacing between the shovel tests and transects were at 5 m intervals. The typical soil profile of these tests consisted of an average of 16 cm of a very dark grayish brown (10YR 3/2) sandy loam over a brown (10YR 4/3) sandy loam. At an average depth of 33 cm below surface a light yellowish brown (10YR 6/4) silt loam was encountered. Of the nine shovel tests, five were positive. Recorded artifacts included four tertiary KRF flakes and one fragment of fire cracked rock (FCR) from 12 to 33 cmbs (ST N1), four tertiary KRF flakes from 17 to 29 cmbs (ST N2), one secondary white chert flake, one tertiary TRS flake, one fragment of FCR from 0 to 28 cmbs (ST E1), one tertiary KRF flake (ST E2), and one secondary KRF flake (ST S1). Additional testing was not completed to the east as the testing would have been on a steep slope leading down to Yanktonai Creek and outside the 1000-ft corridor.

Testing to the west of proposed Structure 110 consisted of 11 shovel tests on three transects. The typical soil profile of these tests consisted of an average of 23 cm of a very dark grayish brown (10YR 3/2) silt loam over a brown (10YR 4/3) silt loam. At an average depth of 38 cm below surface a brown (10YR 5/3) silt loam was encountered. Spacing between tests and transects were at 15 m intervals. Of the 11 shovel tests, one was positive and contained one tertiary KRF flake from 0 to 37 cmbs (ST W2). This concluded testing at Site 32ML1237.

It is Minnkota's policy to avoid placing structures within the boundaries of archaeological sites. Therefore, the 150 ft ROW corridor was adjusted to avoid Site 32ML1237 by shifting Structure 110 241 ft west of its original location to the area cleared by negative shovel testing. From Structure 109, the transmission line turns northwest to Structure 110 and turns northeast back to Structure 111, thereby avoiding Site 32ML1237 (Appendix A Figures 7a and 7b).



Photo 5: Site 32ML1237, View to Southwest



Photo 6: Site 32ML1237, KRF Drill, ST W5 N20

Recommendations

At this time, the complete boundaries of Site 32ML1237 are unclear. Shovel testing was generally restricted to the 1000-ft corridor and it is possible that the site extends outside this corridor. Shovel testing was completed at proposed Structure 110 in an effort to identify an appropriate location for structure placement. A large number of positive shovel tests were identified around the proposed structure and east of Structure 110. As a result, the 150 ft corridor was adjusted to avoid Site 32ML1237 by shifting Structure 110 241 ft west of its original location. From Structure 109 the transmission line turns northwest to Structure 110 and turns northeast back to Structure 111, thereby avoiding Site 32ML1237. If Structure 110 requires further adjustment and cannot be placed within the area cleared by

HDR during shovel testing, HDR recommends additional testing to identify another appropriate structure location or to determine the site's full extent.

CGF-MM-1 (ND SHPO Site Number Pending)

Site CGF-MM-1 consists of a precontact isolated find (SF 001) identified during the pedestrian survey of Survey Segment MM (Appendix A, Figures 9a and 9b) (Photo 7). The site is located in a gently rolling tilled soybean field. This precontact isolated find consists of one tertiary flake of KRF. A close-interval pedestrian survey in a 15 m area around this flake revealed no additional artifacts.



Photo 7: Site CGF-MM-1, View to West

Recommendations

At this time Site CGF-MM-1 is considered an isolated find and is recommended as not eligible for listing on the NRHP. No further work is recommended for this location. HDR recommends that Site CGF-MM-1 be avoided during transmission line construction.

Historic Sites

During the Class III Intensive Archaeological Resources Inventory Supplemental Addendum 1 for the Center to Grand Forks 345 kV Transmission Line Project, one newly recorded historic site was identified (CGF-L-3) (**Error! Reference source not found.**).

CGF-L-3 (ND SHPO Site Number Pending)

Site CGF-L-3 consists of an abandoned segment of the Northern Pacific Railroad identified during the pedestrian survey of Survey Segment L (Appendix A, Figures 8a and 8b). The track remnant transects a rolling topography in grassland divided by multiple wetlands and small water bodies. The site consists of a large earthen berm approximately 3 m wide that trends northwest to southeast and runs parallel to State Highway 200. No remnants of the railroad track or ballast were identified on the ground surface and the berm is heavily overgrown with prairie grasses.

A review of available plat maps revealed that the Great Northern Land and Stock Company owned and the entirety of Section 7 and operated the railroad in 1914 (Geo. A. Ogle and Company 1914). By the 1940's the land had changed ownership to Floyd N. White and although the railroad is denoted, the

name is not available (L. Roe Directory Service 194x). No additional plat maps were available for review.

Recommendations

At this time Site CGF-L-3 is considered potentially eligible under Criterion A. HDR recommends that site CGF-L-3 be spanned to avoid direct impacts during transmission line construction.

Areas Remaining for Survey

The archaeological survey for this Project included multiple mobilizations from October 31st to November 7th, November 16th to 19th, and December 9th, 2011, and January 4th to 5th, 2012. Over the course of the Project, both pedestrian survey and shovel testing was completed.

During the 2010 survey, the archaeological crew avoided only those areas without landowner permission or access issues (i.e. poor road conditions). In 2011, additional Survey Segments were added to address route changes. The 2011 archaeological survey focused on completing remaining Survey Segments from the original 2010 layout and new Survey Segments from the updated 2011 layout. Once again, multiple landowners denied access to their property and those Survey Segments were not surveyed. In addition, in January 2012, Minnkota provided a revised preferred route to HDR that added several new areas for pedestrian survey. Survey Segments with denied access, areas affected by route changes, and areas recommended for additional shovel testing are presented in Table 2 below.

Table 2: Areas Remaining for Survey

| Survey Segment | Township | Range | Section | Access | Recommendations |
|----------------|----------|-------|---------|-------------------|--|
| A-1 | 142N | 83W | 33 | Access Granted | Additional Shovel Testing Recommended |
| B-1 | 142N | 82W | 31 | Access Granted | Additional Shovel Testing Recommended Around Proposed Structure #22 |
| B-2 | 142N | 82W | 31 | Access Granted | Shovel Testing Recommended |
| BB-1 | 142N | 82W | 32 | Access Granted | Shovel Testing Recommended |
| BB-2 | 142N | 82W | 32 | Access Granted | Shovel Testing Recommended |
| C | 142N | 81W | 29 | Access Denied | Survey Recommended |
| EE-1 | 143N | 81W | 25 | Access Granted | Shovel Testing Recommended |
| EE-2 | 143N | 81W | 25 | Access Granted | Shovel Testing Recommended |
| EE-3 | 143N | 81W | | Access Granted | Shovel Testing Recommended |

Center to Grand Forks Transmission Line
 Class III Intensive Archaeological Resources Inventory

| Survey Segment | Township | Range | Section | Access | Recommendations |
|-----------------------|-------------------|-------|---------|----------------|----------------------------|
| | 25 | | | | |
| FF | 143N 81W 13 | | | Access Denied | Survey Recommended |
| | 143N 80W 18 | | | | |
| Grassland Easement #1 | 145N 79W 2 | | | Access Granted | Shovel Testing Recommended |
| II-1 | 146N 78W 7 | | | Access Granted | Shovel Testing Recommended |
| II-2 | 146N 78W 7 | | | Access Granted | Shovel Testing Recommended |
| L-1 | 146N 78W 7 | | | Access Granted | Shovel Testing Recommended |
| L-2 | 146N 78W 7 | | | Access Granted | Shovel Testing Recommended |
| L-1 | 146N 78W 8 | | | Access Granted | Shovel Testing Recommended |
| L-2 | 146N 78W 8 | | | Access Granted | Shovel Testing Recommended |
| KK1-1 | 147N 78W 26 | | | Access Granted | Shovel Testing Recommended |
| KK1-2 | 147N 78W 26 | | | Access Granted | Shovel Testing Recommended |
| KK1-3 | 147N 78W 26 | | | Access Granted | Shovel Testing Recommended |
| KK1-4 | 147N 78W 26 | | | Access Granted | Shovel Testing Recommended |

Center to Grand Forks Transmission Line
Class III Intensive Archaeological Resources Inventory

| Survey Segment | Township | Range | Section | Access | Recommendations |
|----------------|-------------------|-------|---------|----------------|--|
| MM-1 | 147N 74W 12 | | | Access Denied | Shovel Testing Recommended |
| MM-2 | 147N 74W 12 | | | Access Denied | Shovel Testing Recommended |
| O-1 | 147N 73W 7 | | | Access Granted | Shovel Testing Recommended |
| O-2 | 147N 73W 7 | | | Access Granted | Shovel Testing Recommended |
| O-3 | 147N 73W 7 | | | Access Granted | Shovel Testing Recommended |
| NN-1 | 147N 73W 8 | | | Access Granted | Shovel Testing Recommended |
| OO-1 | 147N | | | Access Granted | Shovel Testing Recommended |
| HHH | 147N | | | Access Granted | Additional Pedestrian Survey Recommended |
| III | 147N | | | Access Granted | Additional Pedestrian Survey Recommended |

Areas of Avoidance

Areas of Avoidance include features that can not be assigned definitive cultural affiliation, such as stone piles and alignments (likely associated with Euro-American field-clearing activities), depressions, and earthen formations (such as earthen berms or field-clearing piles) (Table 3: Areas of Avoidance).

These areas were identified in the field and assigned feature numbers; however, these areas are not considered archaeological sites and will not receive an official North Dakota State Site number. Although cultural affiliation cannot be determined, it is HDR’s opinion that these areas should be avoided by construction activities.

Table 3: Areas of Avoidance

| Survey Segment | Township | Range | Section | Feature Type | Recommendations |
|------------------------|-------------------|-------|---------|--------------|-----------------|
| L | 146N 78W 8 | | | Rock Pile | Avoidance |
| KK1 | 147N 78W 26 | | | Rock Pile | Avoidance |
| KK1 | 147N 78W 26 | | | Rock Pile | Avoidance |
| KK2 | 147N 78W 13 | | | Rock Pile | Avoidance |
| KK2 | 147N 78W 13 | | | Rock Pile | Avoidance |
| KK2 | 147N 78W 13 | | | Rock Pile | Avoidance |
| Fiber Optic Station #4 | 150N 56W 35 | | | Depression | Avoidance |
| Z | 151N 52W 36 | | | Rock Pile | Avoidance |

Conclusions and Recommendations

This report is provided to RUS to assist with its responsibilities for compliance with Section 106 of the NHPA, as amended (36 CFR 800).

The Class III Intensive Archaeological Resources Inventory Supplemental Addendum 1 resulted in the identification of three previously unrecorded precontact sites and one previously unrecorded historic site (CGF-L-3). Of the three previously unrecorded precontact sites, one is an isolated find and is considered not eligible for listing on the NRHP (CGF-MM-1). The remaining two precontact sites (CGF-A-1 and CGF-BB-1) have not been evaluated for the NRHP and further work would be needed to determine their eligibility. The one previously unrecorded historic site consists of an abandoned railroad bed (CGF-L-3). This site is recommended for additional evaluation to determine National Register eligibility using the historic context "Railroads in North Dakota, 1872–1956" Multiple Property Documentation Form.

In addition to the four previously unrecorded sites, three precontact sites identified during the Class III Inventory were revisited to further delineate site boundaries (32OL642, 32MLx768, and 32ML1237). These three sites have not been evaluated for the NRHP and further work would be needed to determine their eligibility.

HDR recommends all recorded sites within the ROW be avoided during construction activities (**Error! Reference source not found.**). If avoidance is not possible, HDR recommends that the sites be formally evaluated to determine their eligibility status. Those found eligible should be reviewed for adverse effects. If adverse effects are identified, strategies should be developed by the appropriate parties (the applicant, RUS, SHPO, and other interested parties if necessary), to resolve those effects. Such strategies may include avoidance, data recovery, or other mitigation to be determined.

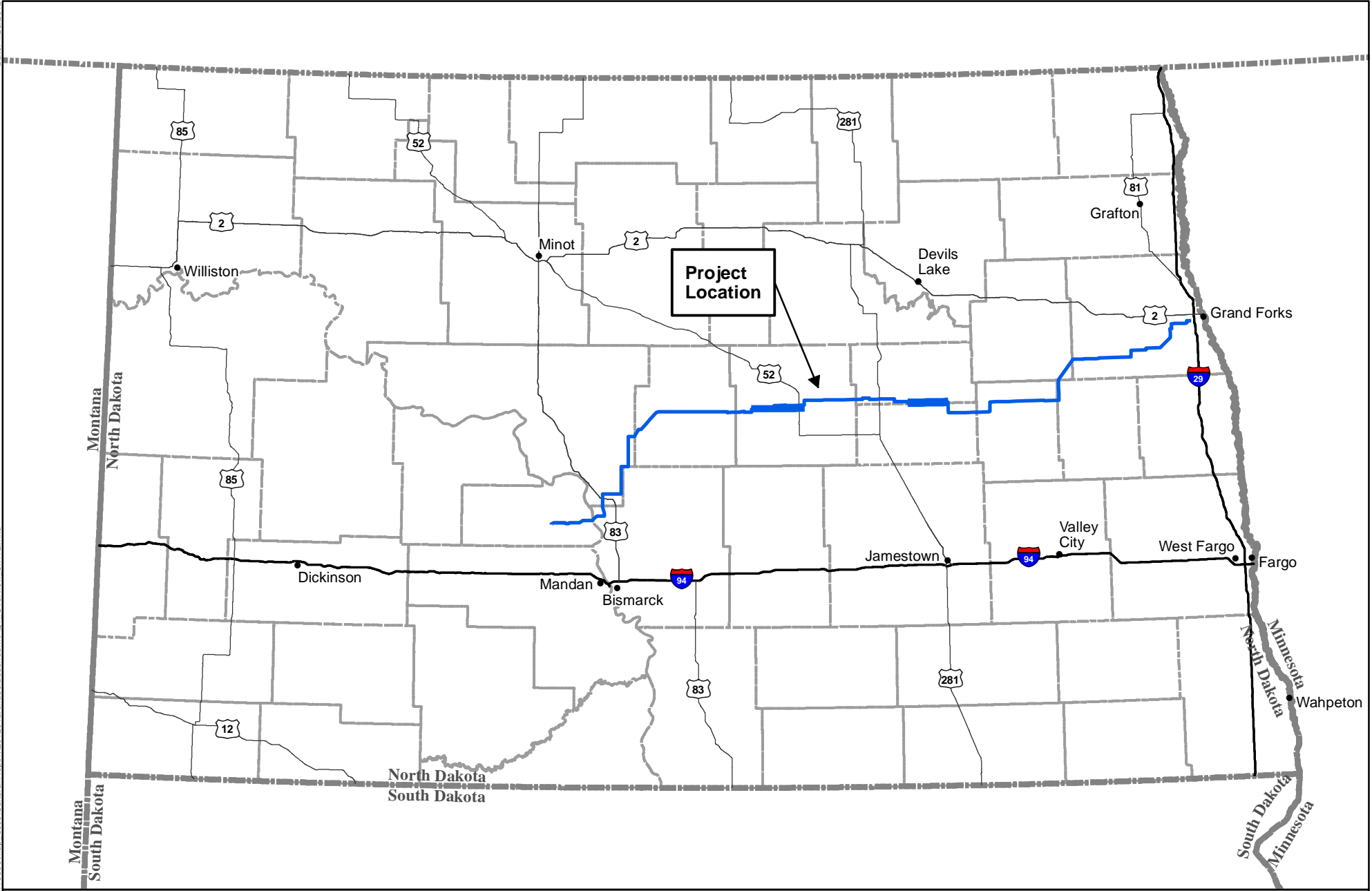
Table 4: National Register Status of Sites within ROW

| Site Number | Field Number | Site Type | Project Recommendations | NRHP Recommendations |
|-------------|--------------|--|--|----------------------|
| Pending | CGF-A-1 | Precontact Isolated Find | Additional testing is recommended to determine site boundaries | Unevaluated |
| Pending | CGF-BB-1 | Precontact Stone Feature | Additional testing is recommended to determine site boundaries | Unevaluated |
| 32OL642 | CGF-C-1 | Precontact Stone Features and Artifact Scatter | Site across entire ROW, construction activities should be limited to HDR recommended areas | Unevaluated |
| 32MLx768 | CGF-EE-2 | Precontact Lithic Scatter | Construction activities should be limited to HDR recommended areas | Unevaluated |
| 32ML1237 | CGF-EE-3 | Precontact Lithic Scatter | Construction activities should be limited to HDR recommended areas | Unevaluated |
| Pending | CGF-L-3 | Abandoned Railroad Bed | Site across entire ROW, to avoid direct impacts, spanning the site is recommended | Potentially Eligible |
| Pending | CGF-MM-1 | Precontact Isolated Find | No additional testing | Not Eligible |

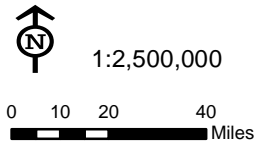
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Appendix A: Figures (Sensitive Location Information Removed).

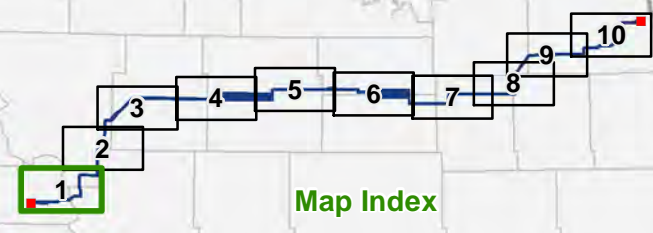
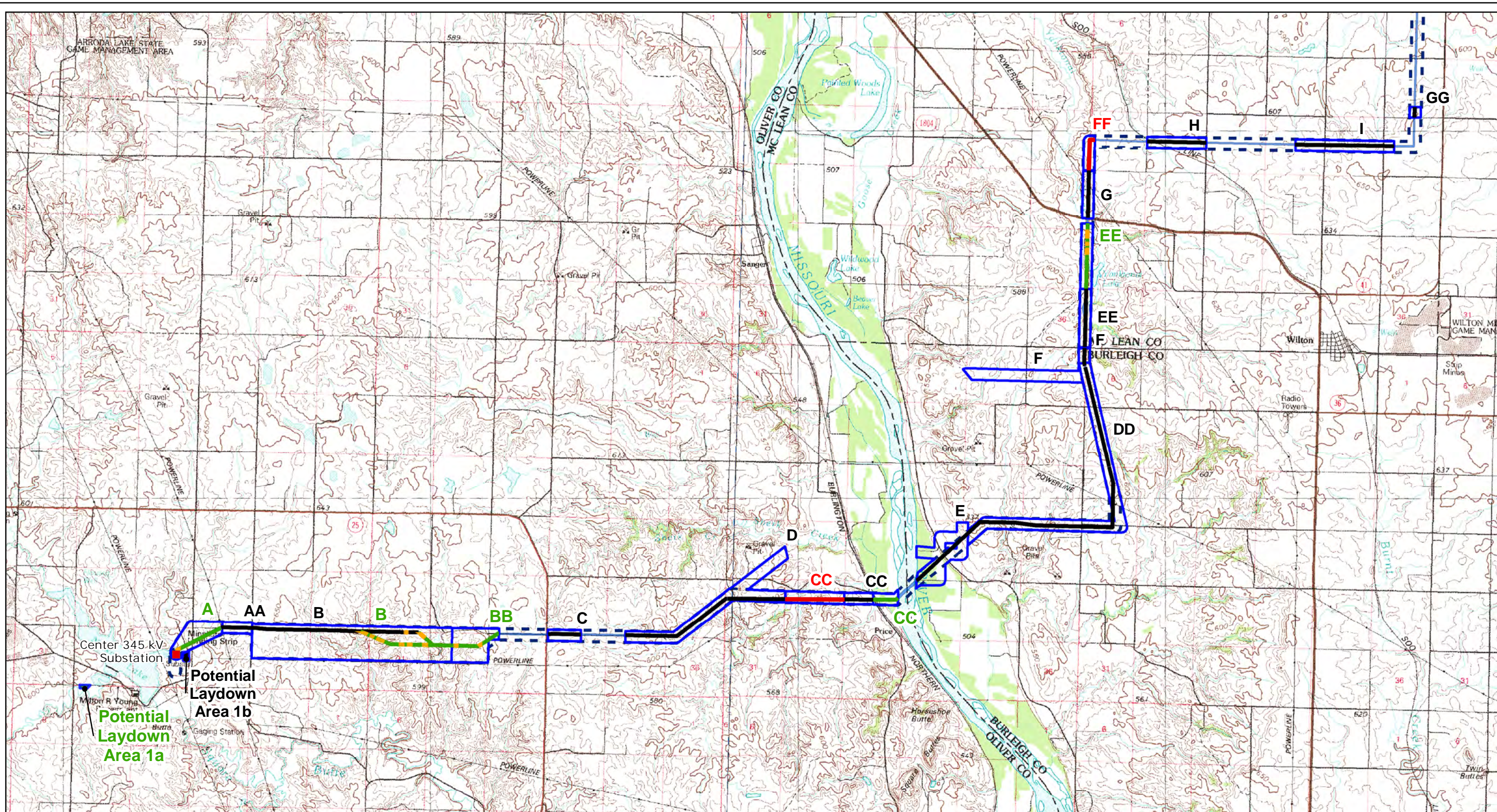


Project Location



— Project Corridor

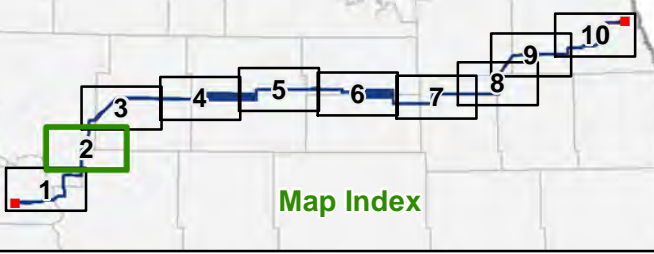
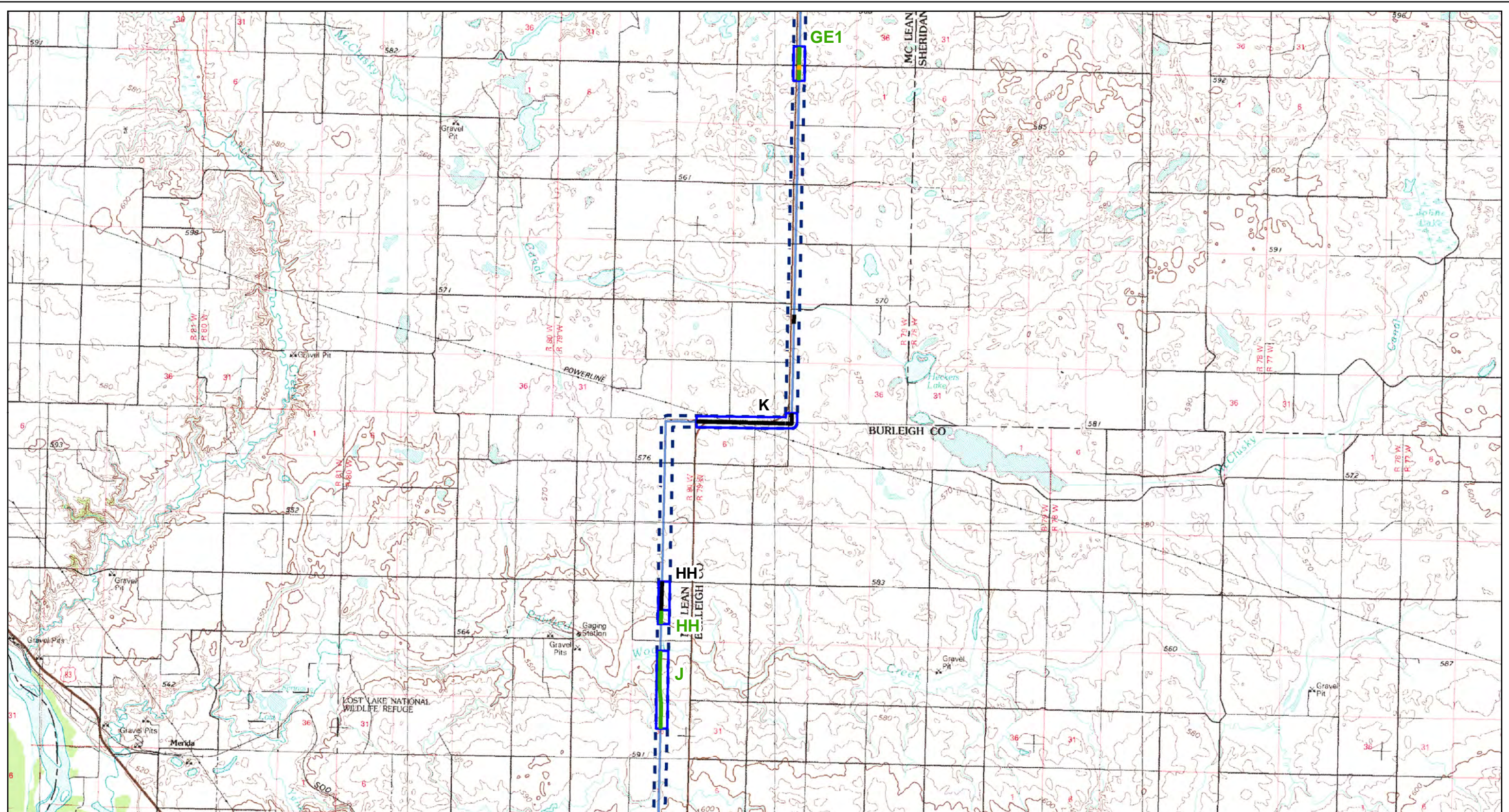
Figure 1
Project Location
 Center to Grand Forks Project
 Minnkota Power Cooperative, Inc.



- Project Substation
- Newly Surveyed Areas
- Previously Surveyed Areas
- Proposed Modified Corridor - January 13, 2012
- Survey Corridor
- Pedestrian
- Shovel Test
- Project ROW - January 13, 2012

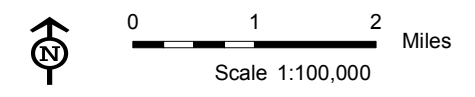
Figure 2: Page 1 of 10
 Area of Potential Effects and Survey Segments
 Center to Grand Forks Project
 Minnkota Power Cooperative, Inc.

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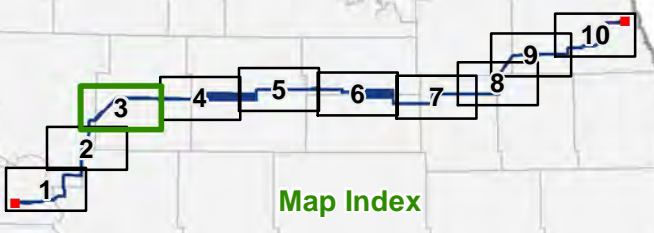
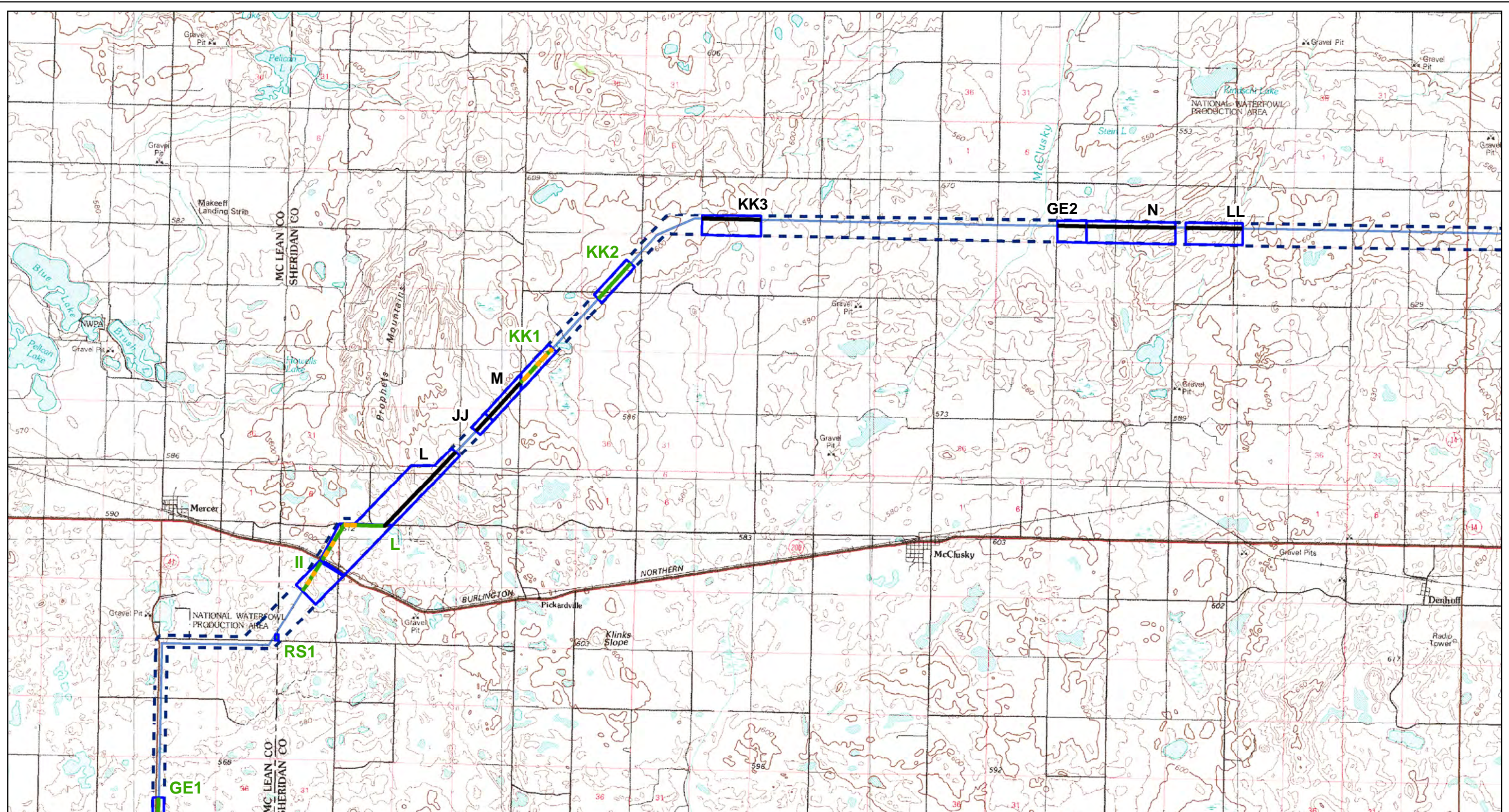


- Project Substation
- Newly Surveyed Areas
- Proposed Modified Corridor - January 13, 2012
- Survey Corridor
- Previously Surveyed Areas
- Project ROW - January 13, 2012
- Cultural Survey Needed
- Pedestrian
- Shovel Test

Figure 2: Page 2 of 10
Area of Potential Effects and Survey Segments
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

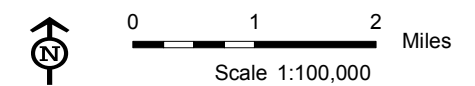


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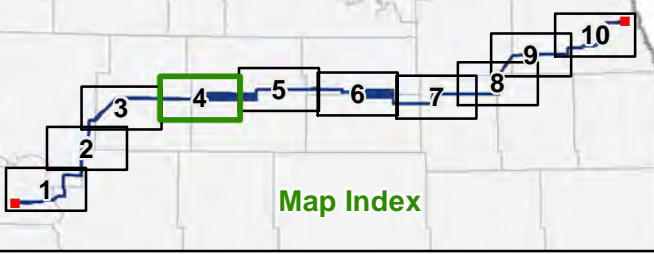
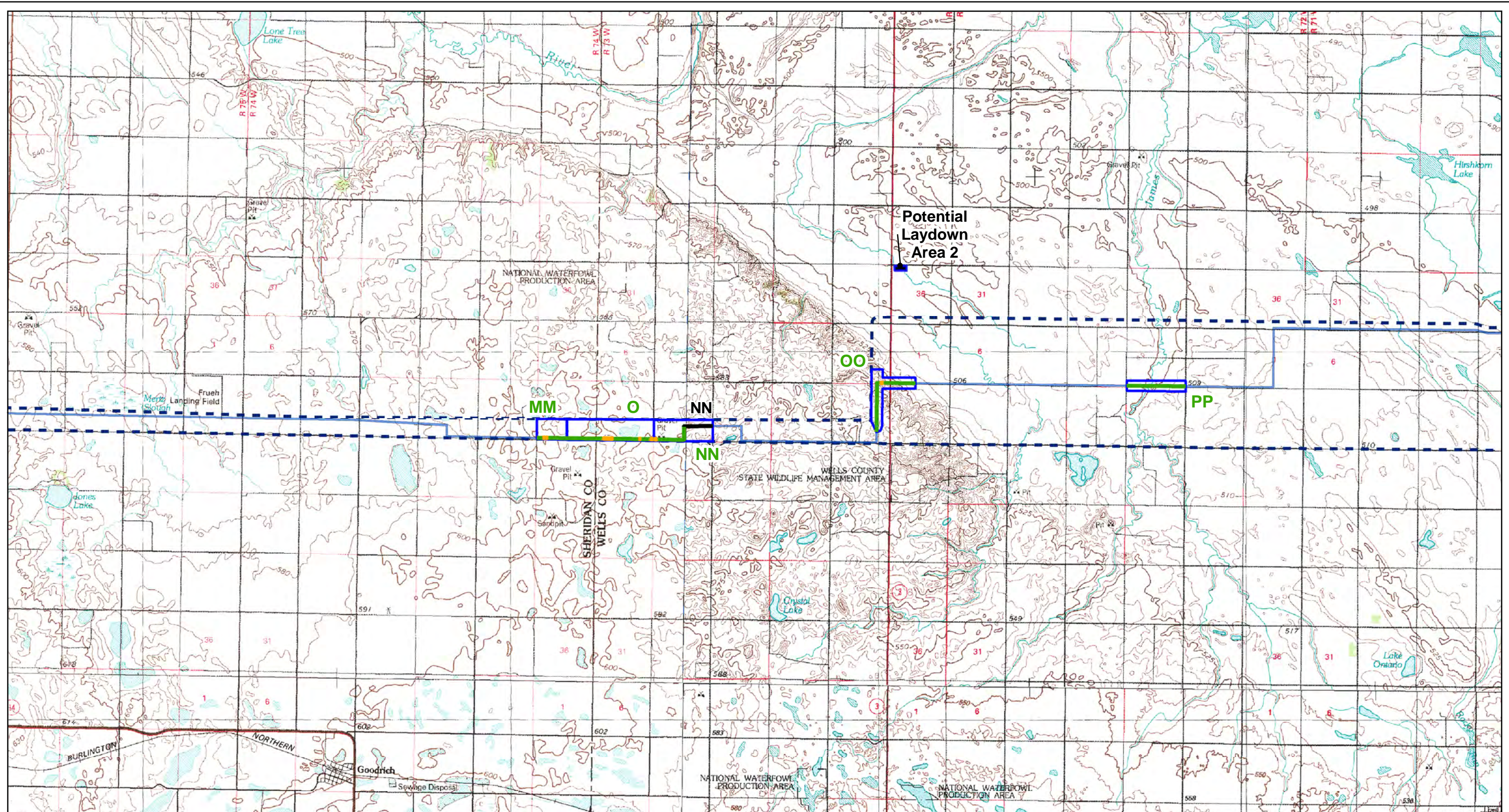


- Project Substation
- Newly Surveyed Areas
- Proposed Modified Corridor
- January 13, 2012
- Previously Surveyed Areas
- Survey Corridor
- Cultural Survey Needed**
- Pedestrian
- Shovel Test
- Project ROW
- January 13, 2012

Figure 2: Page 3 of 10
Area of Potential Effects and Survey Segments
Center to Grand Forks Project
Minnetonka Power Cooperative, Inc.

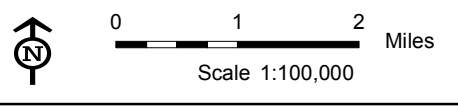


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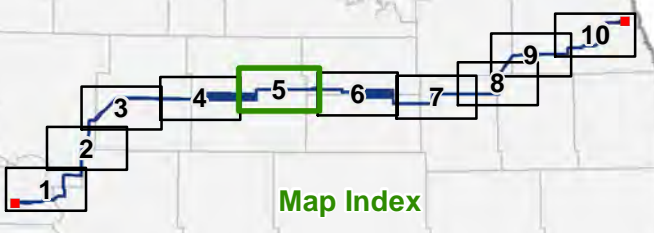
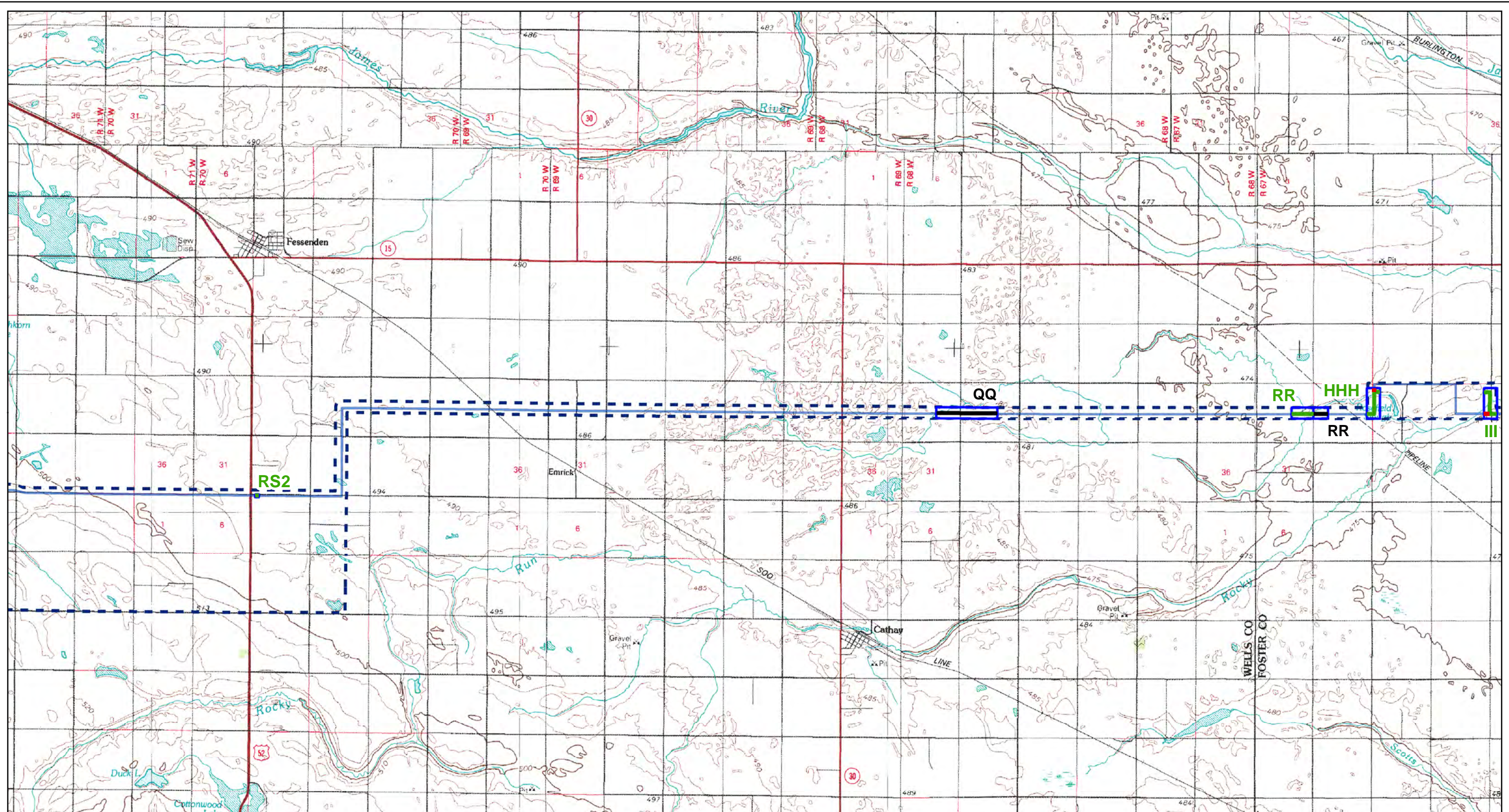


- Project Substation
- Newly Surveyed Areas
- Previously Surveyed Areas
- Cultural Survey Needed
- Pedestrian
- Shovel Test
- Survey Corridor
- Project ROW - January 13, 2012
- Proposed Modified Corridor - January 13, 2012

Figure 2: Page 4 of 10
Area of Potential Effects and Survey Segments
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

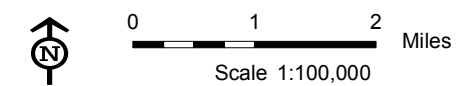


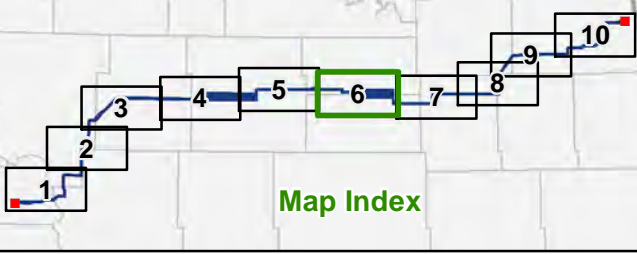
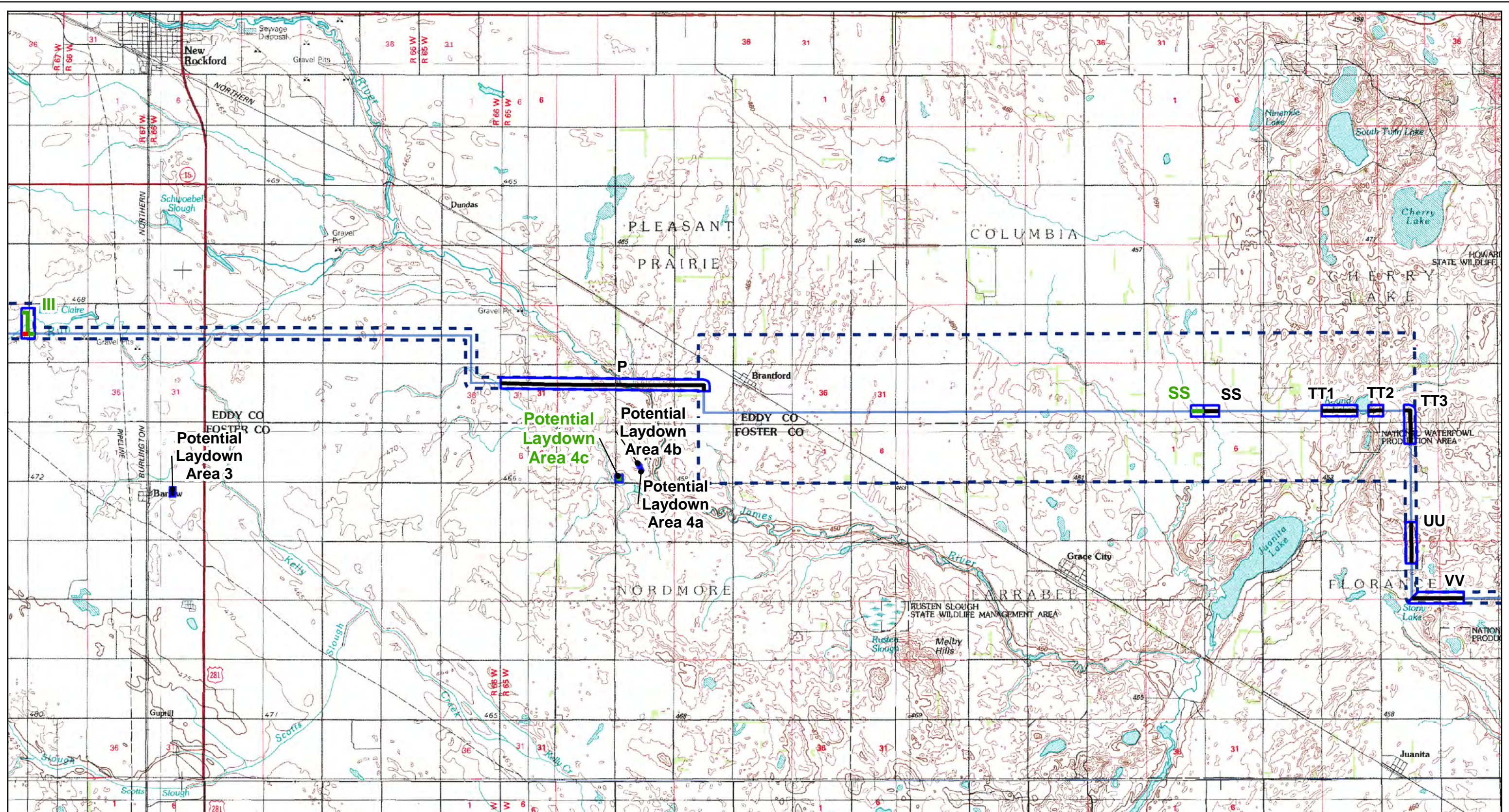
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- Project Substation
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- Shovel Test
- Proposed Modified Corridor - January 13, 2012
- Survey Corridor
- Project ROW - January 13, 2012

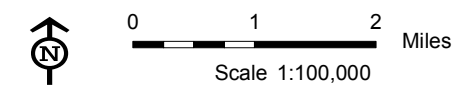
Figure 2: Page 5 of 10
Area of Potential Effects and Survey Segments
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.



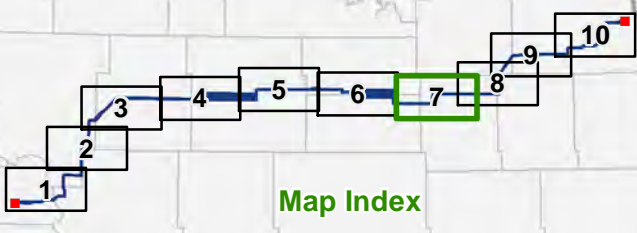
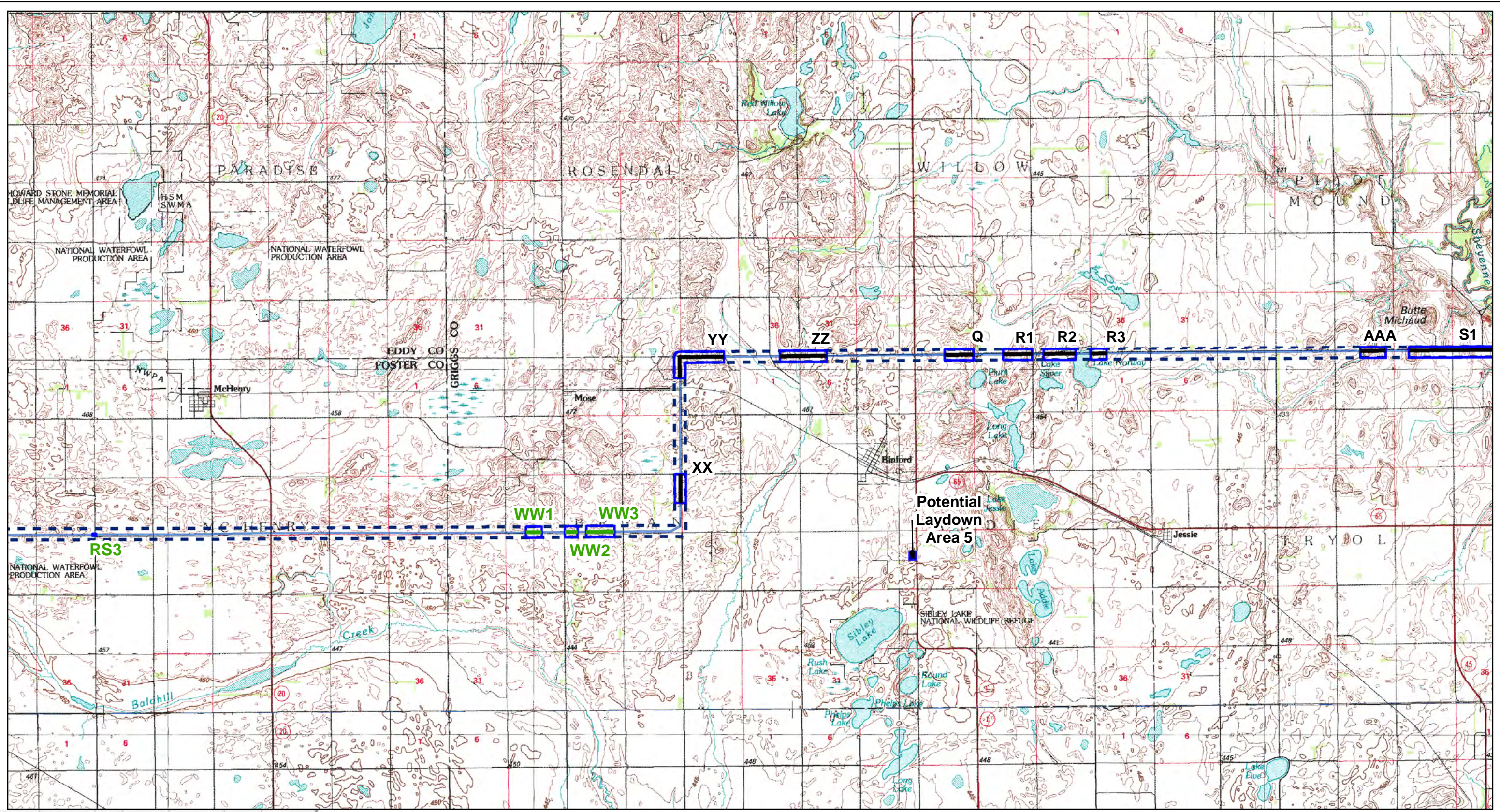


- Project Substation
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- Project ROW - January 13, 2012
- Previously Surveyed Areas
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- Shovel Test

Figure 2: Page 6 of 10
 Area of Potential Effects and Survey Segments
 Center to Grand Forks Project
 Minnkota Power Cooperative, Inc.

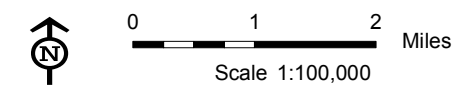


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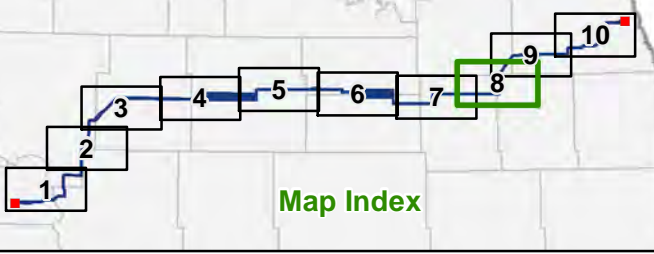
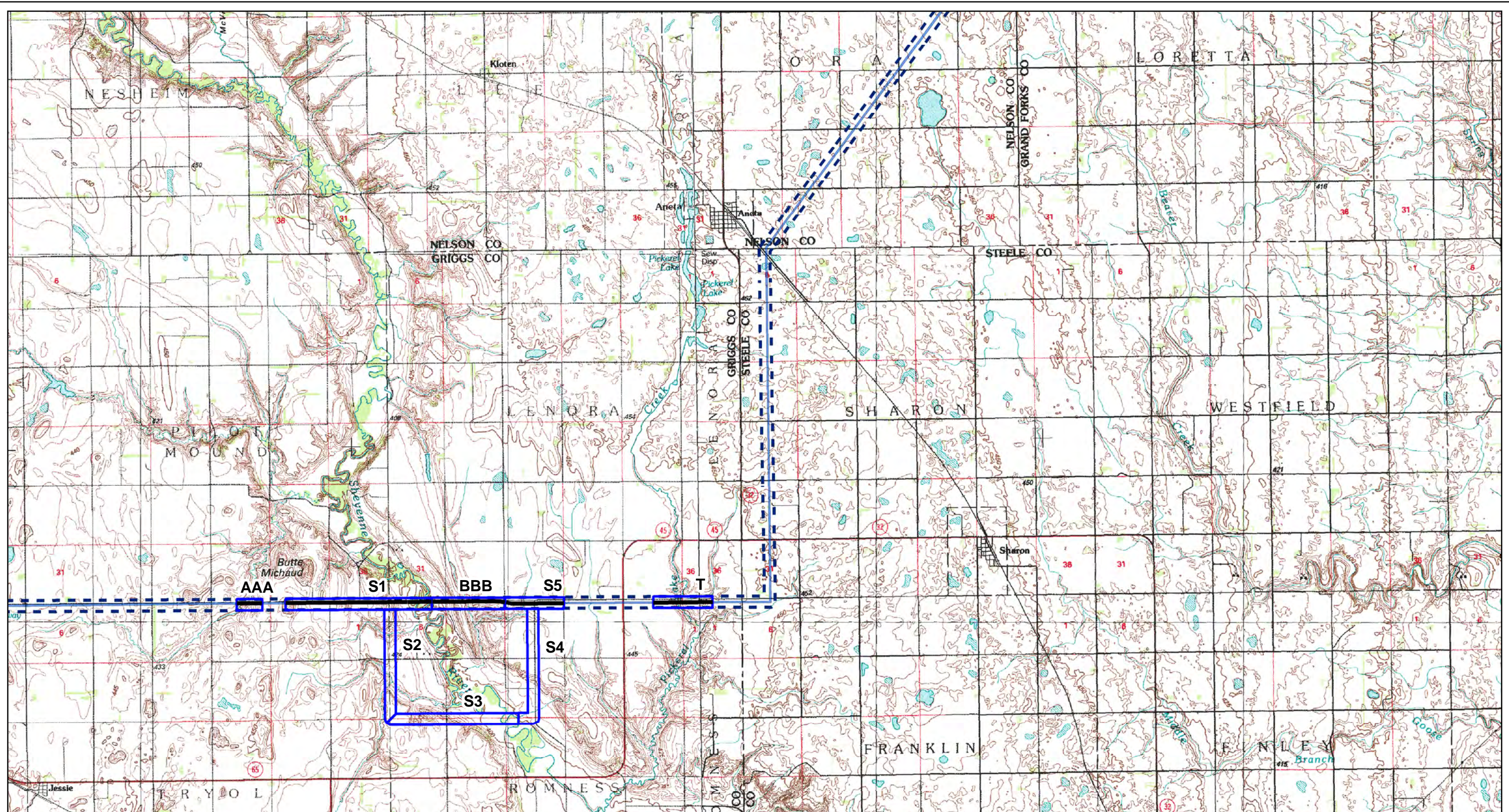


- Project Substation
- - - Proposed Modified Corridor - January 13, 2012
- ▭ Survey Corridor
- ▭ Project ROW - January 13, 2012
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Figure 2: Page 7 of 10
Area of Potential Effects and Survey Segments
Center to Grand Forks Project
Minnetonka Power Cooperative, Inc.

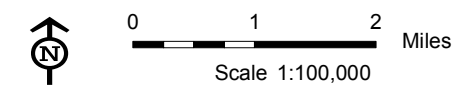


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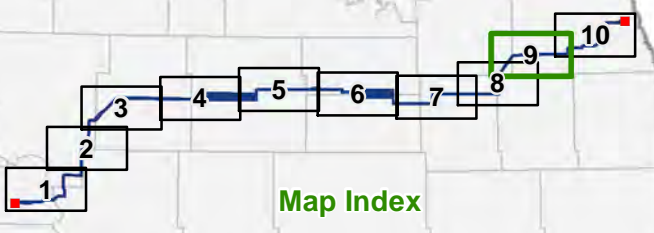
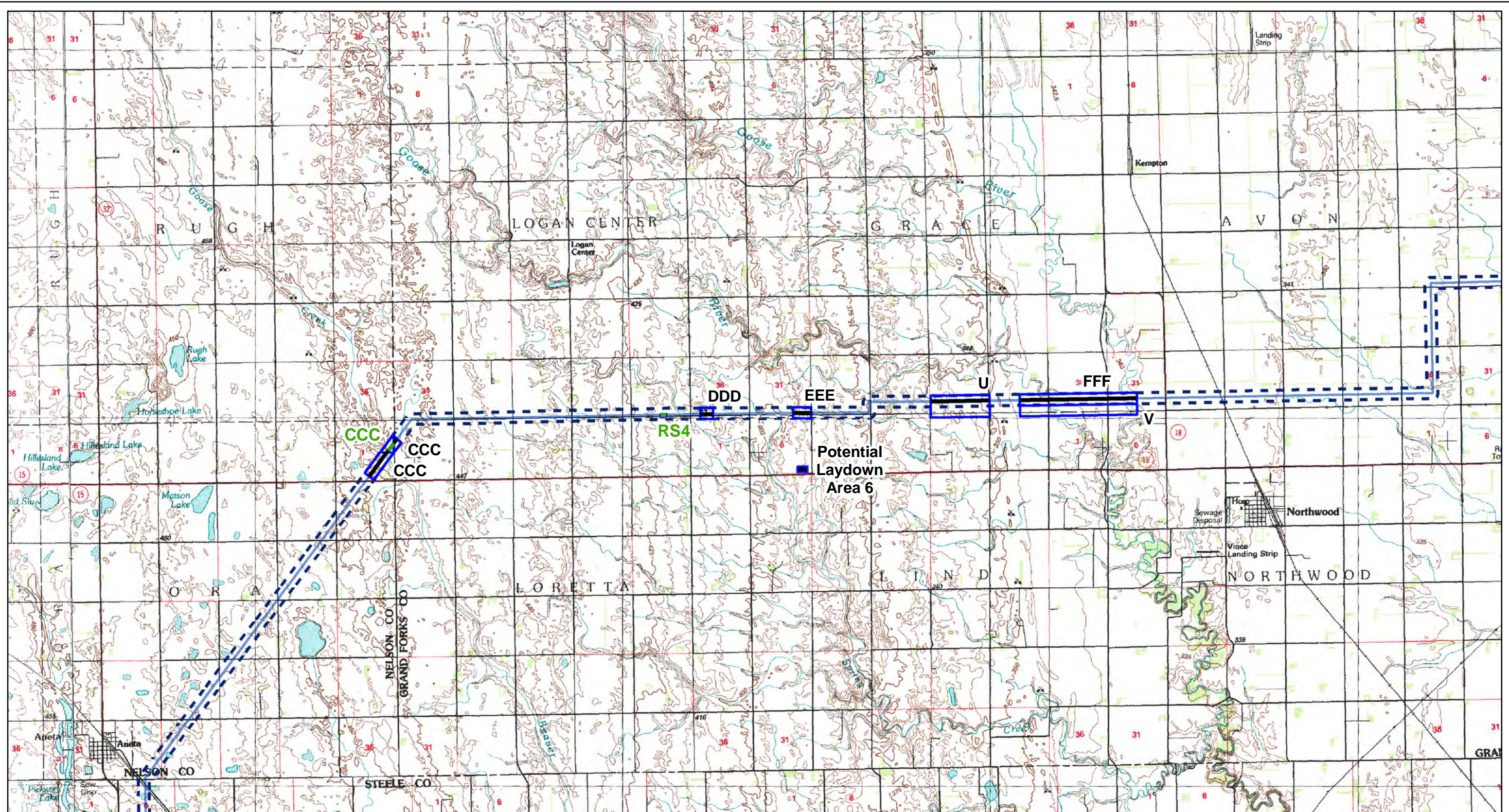


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- Cultural Survey Needed
- Pedestrian
- Shovel Test
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- Project ROW - January 13, 2012

Figure 2: Page 8 of 10
Area of Potential Effects and Survey Segments
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

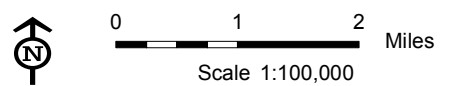


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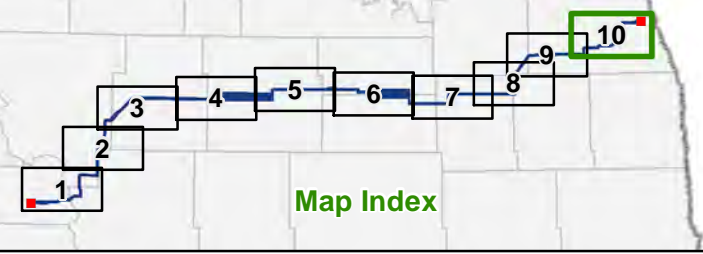
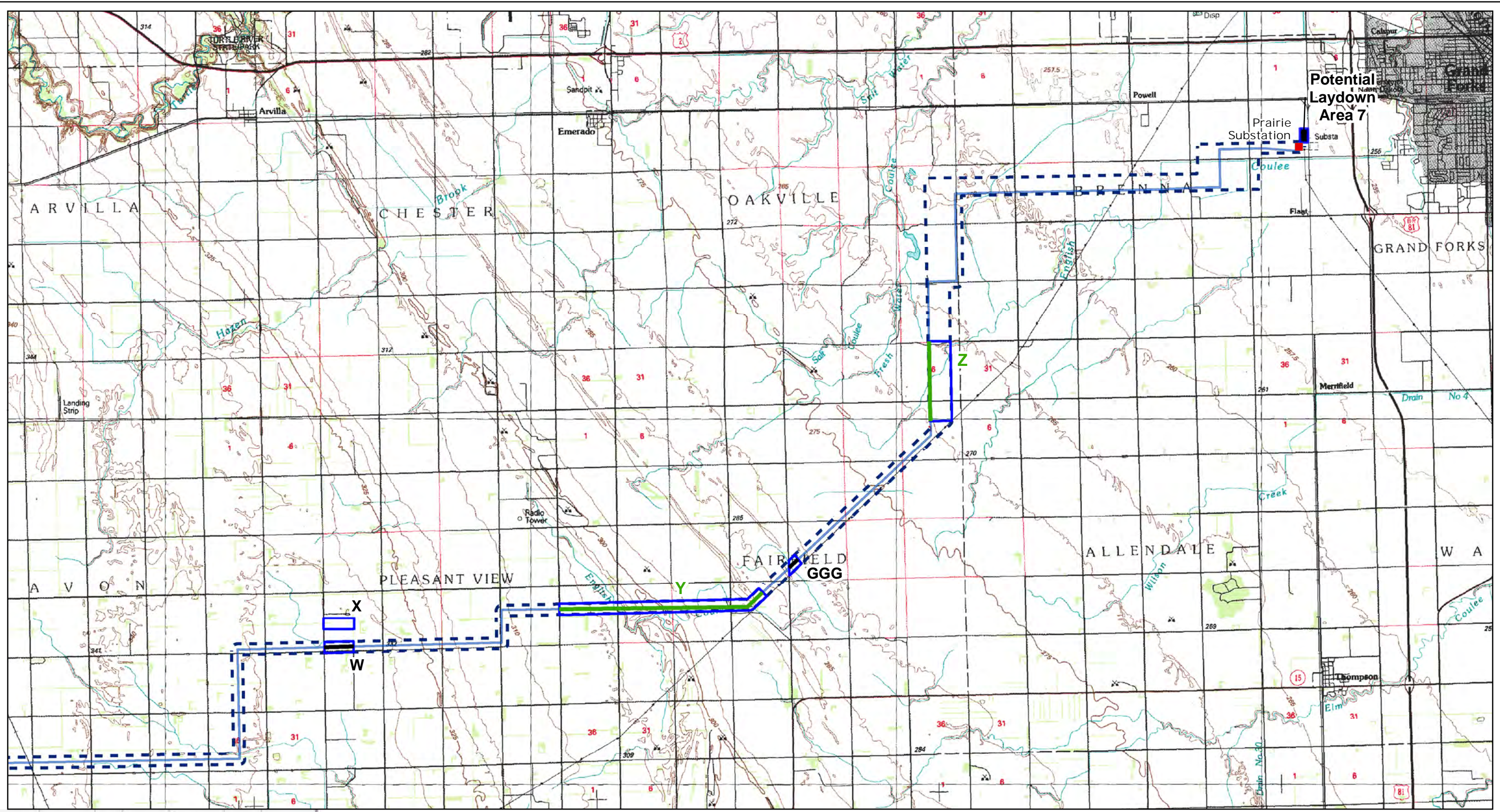


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- Cultural Survey Needed
- Pedestrian
- Shovel Test
- Proposed Modified Corridor - January 13, 2012
- Survey Corridor
- Project ROW - January 13, 2012

Figure 2: Page 9 of 10
Area of Potential Effects and Survey Segments
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

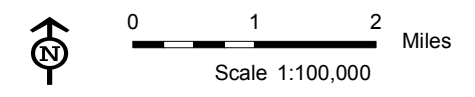


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- Project Substation
- Proposed Modified Corridor - January 13, 2012
- ▭ Survey Corridor
- ▭ Project ROW - January 13, 2012
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- Previously Surveyed Areas
- Cultural Survey Needed**
- Pedestrian
- Shovel Test

Figure 2: Page 10 of 10
Area of Potential Effects and Survey Segments
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.



Appendix B: Shovel Test Soil Profiles

Center to Grand Forks Transmission Line
Class III Intensive Archaeological Resources Inventory Supplemental Addendum 1

| Shovel Test Number | Location | Positive/Negative | Soil Description | Final Depth/Comments |
|----------------------------|---------------------------|-------------------|--|---|
| 1 | Area A1 | Negative | 0-12 cm 10YR 4/3 silt loam 12-26 cm 10YR 6/3 silty sub | 26 cm |
| 6 | Area A1 | Negative | 0-13 cm 10YR 3/3 silty clay loam 13-29 cm 10YR 5/6 clay | 29 cm *Disturbed* |
| 7 | Area A1 | Negative | 0-7 cm 10YR 3/3 silt loam 7-25 cm 10YR 6/3 clay sub | 25 cm |
| 1 (5 m N of Pole Location) | Area C – Pole Location 37 | Negative | 0-25 cm 10YR 3/2 silt loam 25-40 cm 10YR 4/3 silt loam 40-56 cm 10YR 5/4 silt loam | 56 cm |
| 2 (5 m E of Pole Location) | Area C – Pole Location 37 | Negative | 0-16 cm 10YR 3/2 silt loam 16-41 cm 10YR 4/2 silt loam 41-72 cm 10YR 5/4 silt loam | 72 cm |
| 3 (5 m S of Pole Location) | Area C – Pole Location 37 | Negative | 0-17 cm 10YR 3/2 silt loam 17-56 cm 10YR 4/2 silt loam 56-60 cm 10YR 5/4 silt loam | 60 cm |
| 4 (5 m W of Pole Location) | Area C – Pole Location 37 | Positive | 0-11 cm 10YR 3/2 silt loam 11-25 cm 10YR 4/3 silt loam 25-37 cm 10YR 5/4 silt loam | 37 cm *1 precontact decorated ceramic body sherd 0-25 cmbs |
| 4 N5 | Area C – Pole Location 37 | Negative | 0-20 cm 10YR 3/2 silt loam 20-33 cm 10YR 4/3 silt loam 33-47 cm 10YR 5/4 silt loam | 47 cm |

Center to Grand Forks Transmission Line
 Class III Intensive Archaeological Resources Inventory Supplemental Addendum 1

| Shovel Test Number | Location | Positive/Negative | Soil Description | Final Depth/Comments |
|--------------------------|---------------------------|-------------------|--|---|
| 4 N10 | Area C – Pole Location 37 | Negative | 0-12 cm 10YR 3/2 silt loam 12-37 cm 10YR 4/3 silt loam 37-46 cm 10YR 5/4 silt loam | 46 cm |
| 4 W5 | Area C – Pole Location 37 | Negative | 0-12 cm 10YR 3/2 silt loam 12-36 cm 10YR 4/3 silt loam 36-42 cm 10YR 5/4 silt loam | 42 cm *6 recent bone fragments 0-36 cmbs |
| 4 W10 | Area C – Pole Location 37 | Negative | 0-18 cm 10YR 3/2 silt loam 18-36 cm 10YR 4/3 silt loam 36-46 cm 10YR 5/4 silt loam | 46 cm |
| 4 S5 | Area C – Pole Location 37 | Negative | 0-12 cm 10YR 3/2 silt loam 12-50 cm 10YR 4/3 silt loam 50-62 cm 10YR 5/4 silt loam | 62 cm |
| 4 S10 | Area C – Pole Location 37 | Negative | 0-17 cm 10YR 3/2 silt loam 17-34 cm 10YR 4/3 silt loam 34-44 cm 10YR 5/4 silt loam | 44 cm |
| 5 (Actual Pole Location) | Area C – Pole Location 37 | Negative | 0-20 cm 10YR 3/2 silt loam 20-45 cm 10YR 4/2 silt loam 45-56 cm 10YR 5/4 silt loam | 56 cm |
| 38 N5 | Area C – Pole Location 38 | Negative | 0-15 cm 10YR 3/2 silt loam 15-38 cm 10YR 4/3 silt loam 38-63 cm 10YR 5/4 silt loam | 63 cm |

Center to Grand Forks Transmission Line
Class III Intensive Archaeological Resources Inventory Supplemental Addendum 1

| Shovel Test Number | Location | Positive/Negative | Soil Description | Final Depth/Comments |
|---------------------------|-----------------------------|-------------------|--|---|
| 38 E5 | Area C – Pole Location 38 | Negative | 0-34 cm 10YR 3/2 silt loam 34-59 cm 10YR 4/3 silt loam 59-70 cm 10YR 5/4 silt loam | 70 cm |
| 38 S5 | Area C – Pole Location 38 | Negative | 0-39 cm 10YR 3/2 silt loam 39-58 cm 10YR 4/3 silt loam 58-68 cm 10YR 5/4 silt loam | 68 cm |
| 38 W5 | Area C – Pole Location 38 | Negative | 0-14 cm 10YR 3/2 silt loam 14-38 cm 10YR 4/3 silt loam 38-62 cm 10YR 5/4 silt loam | 62 cm |
| 38 (Actual Pole Location) | Area C – Pole Location 38 | Negative | 0-23 cm 10YR 3/2 silt loam 23-42 cm 10YR 4/3 silt loam 42-52 cm 10YR 5/4 silt loam | 52 cm |
| W15 | Area EE – Pole Location 110 | Positive | 0-18 cm 10YR 3/2 silt loam 18-40 cm 10YR 4/2 silt loam 40-55 cm 10YR 5/3 silt sand | 55 cm *1 flake of translucent chert at 0-15 cmbs *1 flake of clear chert with black specks at 0-50 cmbs |
| W5 N10 | Area EE – Pole Location 110 | Positive | 0-17 cm 10YR 3/2 silt loam 17-37 cm 10YR 4/2 silt loam 37-54 cm 10YR 5/3 silt sand | 54 cm *2 tertiary flakes (1 KRF and 1 SRC) microdebitage at 37-54 cmbs |
| W5 S10 | Area EE - Pole Location 110 | Positive | 0-4 cm 10YR 3/2 silt loam 4-14 cm 10YR 4/2 silt loam 14-42 cm 10YR 5/3 silt sand | 42 cm *1 tertiary KRF flake at 14-42 cmbs |

Center to Grand Forks Transmission Line
 Class III Intensive Archaeological Resources Inventory Supplemental Addendum 1

| Shovel Test Number | Location | Positive/Negative | Soil Description | Final Depth/Comments |
|-------------------------------|-----------------------------|-------------------|--|---|
| W5 S15 | Area EE – Pole Location 110 | Negative | 0-7 cm 10YR 4/3 silt loam 7-28 cm 10YR 4/2 silt loam 28-50 cm 10YR 5/3 silt sand | 50 cm |
| W5 N20 | Area EE – Pole Location 110 | Positive | 0-29 cm 10YR 3/2 silt loam 29-70 cm 10YR 4/2 silt loam 70-87 cm 10YR 5/3 silt sand | 87 cm *recent cow bone 0-20 cmbs *1 KRF drill at 35-45 cmbs *2 tertiary KRF flakes at 29-70 cmbs |
| W5 N30 | Area EE – Pole Location 110 | Negative | 0-18 cm 10YR 3/1 loam 18-62 cm 10YR 3/2 silt loam 62-80 cm 10YR 4/3 silt loam | 80 cm |
| Center – Actual Pole Location | Area EE – Pole Location 110 | Negative | 0-20 cm 10YR 3/2 sandy loam 20-38 cm 10YR 4/2 sandy loam 38-55 cm 10YR 5/3 silt sand | 55 cm |
| W5 | Area EE – Pole Location 110 | Positive | 0-10 cm 10YR 3/2 sandy silt loam 10-27 cm 10YR 4/2 silty sand loam 27-42 cm 10YR 5/4 silt sand | 42 cm *1 tertiary KRF flake at 10-27 cmbs |
| E5 | Area EE – Pole Location 110 | Negative | 0-39 cm 10YR 4/2 sandy loam 39-58 cm 10YR 5/3 silt sand | 58 cm |

Center to Grand Forks Transmission Line
Class III Intensive Archaeological Resources Inventory Supplemental Addendum 1

| Shovel Test Number | Location | Positive/Negative | Soil Description | Final Depth/Comments |
|--------------------|-----------------------------|-------------------|--|---|
| N5 | Area EE – Pole Location 110 | Negative | 0-14 cm 10YR 3/2 silt loam 14-34 cm 10YR 4/2 silt loam 34-47 cm 10YR 5/3 silt sand | 47 cm |
| S5 | Area EE – Pole Location 110 | Negative | 0-13 cm 10YR 4/2 sandy loam 13-58 cm 10YR 5/3 silt sand | 58 cm |
| W5 N5 | Area EE – Pole Location 110 | Negative | 0-19 cm 10YR 3/2 silt loam 19-37 cm 10YR 4/2 silt loam 37-56 cm 10YR 5/3 silt sand | 56 cm |
| W5 N40 | Area EE – Pole Location 110 | Negative | 0-18 cm 10YR 3/2 silt loam 18-63 cm 10YR 4/2 silt loam 63-80 cm 10YR 5/3 silt loam | 80 cm |
| W5 N50 | Area EE – Pole Location 110 | Positive | 0-23 cm 10YR 3/2 silt loam 23-55 cm 10YR 4/2 silt loam 55-65 cm 10YR 5/3 silt loam | 65 cm *1 tertiary KRF flake and 1 KRF shatter at 0-23 cmbs |
| W5 N60 | Area EE – Pole Location 110 | Positive | 0-15 cm 10YR 3/2 silt loam 15-30 cm 10YR 4/2 silt loam 30-42 cm 10YR 5/3 silt loam | 42 cm *1 tertiary KRF flake at 15-30 cmbs |
| W5 N70 | Area EE – Pole Location 110 | Positive | 0-12 cm 10YR 3/2 silt loam 12-34 cm 10YR 4/2 silt loam 34-55 cm 10YR 5/3 silt loam | 55 cm *1 tertiary KRF flake at 0-55 cmbs |
| W5 N80 | Area EE – Pole Location 110 | Positive | 0-26 cm 10YR 3/2 silt loam 26-62 cm 10YR 4/2 silt loam 62-73 cm 10YR 6/2 silt loam | 73 cm *3 tertiary KRF flakes, 1 KRF shatter at 26-62 cmbs |

Center to Grand Forks Transmission Line
 Class III Intensive Archaeological Resources Inventory Supplemental Addendum 1

| Shovel Test Number | Location | Positive/Negative | Soil Description | Final Depth/Comments |
|--------------------|--|-------------------|--|--|
| W5 N90 | Area EE – Pole Location 110 | Negative | 0-20 cm 10YR 3/2 silt loam 20-40 cm 10YR 4/2 silt loam 40-70 cm 10YR 5/3 silt loam | 70 cm |
| S10 | Area EE – South of southernmost ST of 32ML1237 | Positive | 0-32 cm 10YR 3/2 silt loam 32-61 cm 10YR 6/3 loamy silt | 61 cm *1 tertiary KRF flake at 0-18 cmbs *1 tertiary KRF flake at 18-32 cmbs |
| S20 | Area EE – South of southernmost ST of 32ML1237 | Positive | 0-48 cm 10YR 3/2 silt loam 48-63 cm 10YR 6/3 loamy silt | 63 cm 1 tertiary KRF flake at 0-40 cmbs |
| S30 | Area EE – South of southernmost ST of 32ML1237 | Negative | 0-105 cm 10YR 3/2 silt loam | 105 cm |
| S40 | Area EE – South of southernmost ST of 32ML1237 | Negative | 0-90 cm 10YR 3/2 silt loam 90-100 cm 10YR 3/2 silt loam mottled with 10YR 4/2 silt loam | 100 cm |
| S50 | Area EE – South of southernmost ST of 32ML1237 | Negative | 0-90 cm 10YR 3/2 silt loam | 90 cm |

Center to Grand Forks Transmission Line
Class III Intensive Archaeological Resources Inventory Supplemental Addendum 1

| Shovel Test Number | Location | Positive/Negative | Soil Description | Final Depth/Comments |
|--------------------|--|-------------------|--|--|
| S60 | Area EE – South of southernmost ST of 32ML1237 | Negative | 0-100 cm 10YR 3/2 silt loam | 100 cm |
| N10 | Area EE – North of northernmost ST of 32ML1237 | Positive | 0-100 cm 10YR 3/2 silt loam | 100 cm |
| N20 | Area EE – North of northernmost ST of 32ML1237 | Positive | 0-63 cm 10YR 3/2 silt loam 63-73 cm 10YR 5/3 sandy loam | 73 cm *12 tertiary KRF flakes at 20-30 cmbs |
| N30 | Area EE – North of northernmost ST of 32ML1237 | Negative | 0-84 cm 10YR 2/1 silt loam 84-100 cm 10YR 4/1 silt loam-sticky | 100 cm |
| N40 | Area EE – North of northernmost ST of 32ML1237 | Negative | 0-95 cm 10YR 3/1 silt clay | 95 cm |
| N50 | Area EE – North of northernmost ST of 32ML1237 | Negative | 0-43 cm 10YR 2/1 silt loam 43-83 cm 10YR 2/1 silt loam-sticky 83-95 cm 10YR 4/4 silt loam-sticky | 95 cm |

Center to Grand Forks Transmission Line
 Class III Intensive Archaeological Resources Inventory Supplemental Addendum 1

| Shovel Test Number | Location | Positive/Negative | Soil Description | Final Depth/Comments |
|--------------------|--|-------------------|---|---|
| N60 | Area EE – North of northernmost ST of 32ML1237 | Negative | 0-100 cm 10YR 4/1 clay loam | 100 cm |
| N70 | Area EE – North of northernmost ST of 32ML1237 | Positive | 0-79 cm 10YR 3/2 silt loam 79-90 cm 10YR 5/4 silt loam | 90 cm *1 KRF shatter with cortex at 50-60 cmbs |
| N80 | Area EE – North of northernmost ST of 32ML1237 | Positive | 0-23 cm 10YR 3/2 silt loam 23-26 cm 10YR gravel lens 26-54 cm 10YR 3/2 silt sand 54-60 cm 10YR 6/3 silt loam 60-100 cm 10YR 3/2 silt loam | 100 cm *1 tertiary KRF flake at 0-10 cmbs *1 tertiary KRF flake at 30-40 cmbs |
| N90 | Area EE – North of northernmost ST of 32ML1237 | Negative | 0-100 cm 10YR 3/2 silt loam | 100 cm |
| N100 | Area EE – North of northernmost ST of 32ML1237 | Negative | 0-41 cm 10YR 3/2 silt loam 41-83 cm 10YR 4/2 silt loam 83-93 cm 10YR 5/3 silt sand-wet | 93 cm |
| N110 | Area EE – North of northernmost ST of 32ML1237 | Negative | 0-30 cm 10YR 5/3 loamy silt 30-45 cm 10YR 6/3 loamy silt | 45 cm |

Center to Grand Forks Transmission Line
Class III Intensive Archaeological Resources Inventory Supplemental Addendum 1

| Shovel Test Number | Location | Positive/Negative | Soil Description | Final Depth/Comments |
|--------------------|---|-------------------|--|---|
| W20 | Area EE – Pole Location 110 | Negative | 0-30 cm 10YR 4/2 silt loam 30-45 cm 10YR 7/3 silt loam | 45 cm |
| N90 W10 | Area EE – Pole Location 110 | Negative | 0-40 cm 10YR 4/2 silt loam 40-57 cm 10YR 7/3 silt loam | 57 cm |
| N90 W10 N10 | Area EE – Pole Location 110 | Positive | 0-12 cm 10YR 3/2 silt loam 12-30 cm 10YR 4/2 silt loam 30-40 cm 10YR 5/3 silt loam | 40 cm *2 tertiary KRF flakes at 12-30 cmbs |
| N90 W10 N20 | Area EE – Pole Location 110 | Negative | 0-30 cm 10YR 3/2 silt loam 30-38 cm 10YR 6/3 slightly gravelly sandy loam 38-65 cm 10YR 6/4 sand loam with gravels and cobbles | 65 cm |
| N90 W10 N30 | Area EE – Pole Location 110 | Negative | 0-23 cm 10YR 3/2 silt loam 23-43 cm 10YR 4/2 silt loam 43-57 cm 10YR 5/3 silt loam | 57 cm |
| N90 W10 N40 | Area EE – Pole Location 110 | Negative | 0-30 cm 10YR 3/2 silt loam 30-42 cm 10YR 3/2 silt loam-compact 42-52 cm 10YR 6/4 sandy loam | 52 cm |
| N001 | Area EE – Pole Location 110 – West Side | Negative | 0-21 cm 10YR 3/2 silt loam 21-37 cm 10YR 4/3 silt loam 37-48 cm 10YR 5/3 silt loam | 48 cm *1 bone at 0-30 cmbs |

Center to Grand Forks Transmission Line
 Class III Intensive Archaeological Resources Inventory Supplemental Addendum 1

| Shovel Test Number | Location | Positive/Negative | Soil Description | Final Depth/Comments |
|--------------------|---|-------------------|--|---|
| N002 | Area EE – Pole Location 110 – West Side | Negative | 0-24 cm 10YR 3/2 silt loam 24-40 cm 10YR 4/3 silt loam 40-51 cm 10YR 5/3 silt loam | 51 cm |
| N003 | Area EE – Pole Location 110 – West Side | Negative | 0-21 cm 10YR 3/2 silt loam 21-35 cm 10YR 4/3 silt loam 35-48 cm 10YR 5/3 silt loam | 48 cm |
| N004 | Area EE – Pole Location 110 – West Side | Negative | 0-25 cm 10YR 3/2 silt loam 25-39 cm 10YR 4/3 silt loam 39-54 cm 10YR 5/3 silt loam | 54 cm |
| N005 | Area EE – Pole Location 110 – West Side | Positive | 0-17 cm 10YR 3/2 silt loam 17-37 cm 10YR 4/3 silt loam 37-51 cm 10YR 5/3 silt loam | 51 cm *1 tertiary KRF flake at 0-37 cmbs |
| N006 | Area EE – Pole Location 110 – West Side | Negative | 0-26 cm 10YR 3/2 silt loam 26-42 cm 10YR 4/3 silt loam 42-52 cm 10YR 5/3 silt loam | 52 cm *1 bone at 20-30 cmbs |
| W004 | Area EE – Pole Location 110 – West Side | Negative | 0-21 cm 10YR 3/2 silt loam 21-31 cm 10YR 4/3 silt loam 31-46 cm 10YR 5/3 silt loam | 46 cm |
| S001 | Area EE – Pole Location 110 – West Side | Negative | 0-19 cm 10YR 3/2 silt loam 19-38 cm 10YR 4/3 silt loam 38-53 cm 10YR 5/3 silt loam | 53 cm |

Center to Grand Forks Transmission Line
Class III Intensive Archaeological Resources Inventory Supplemental Addendum 1

| Shovel Test Number | Location | Positive/Negative | Soil Description | Final Depth/Comments |
|--------------------|---|-------------------|--|---|
| S002 | Area EE – Pole Location 110 – West Side | Negative | 0-20 cm 10YR 3/2 silt loam 20-35 cm 10YR 4/3 silt loam 35-45 cm 10YR 5/3 silt loam | 45 cm |
| S003 | Area EE – Pole Location 110 – West Side | Negative | 0-32 cm 10YR 3/2 silt loam 32-41 cm 10YR 4/3 silt loam 41-52 cm 10YR 5/3 silt loam | 52 cm |
| S004 | Area EE – Pole Location 110 – West Side | Negative | 0-29 cm 10YR 3/2 silt loam 29-40 cm 10YR 4/3 silt loam 40-59 cm 10YR 5/3 silt loam | 59 cm |
| N1 | Area EE – Pole Location 110 | Positive | 0-12 cm 10YR 3/2 sandy loam 12-38 cm 10YR 4/3 sandy loam 38-59 cm 10YR 6/4 silty sub | 59 cm *4 tertiary KRF flakes and 1 FCR at 12-38 cmbs |
| N2 | Area EE – Pole Location 110 | Positive | 0-17 cm 10YR 3/2 sandy loam 17-29 cm 10YR 4/3 sandy loam 29-53 cm 10YR 6/4 silty sub | 53 cm *4 tertiary KRF flakes at 17-29 cmbs |
| E2 | Area EE – Pole Location 110 | Positive | 0-12 cm 10YR 3/4 sandy loam 12-25 cm 10YR 4/3 sandy loam 25-45 cm 10YR 6/4 silty sub | 45 cm *1 tertiary KRF flake at 12-25 cmbs |
| E1 | Area EE – Pole Location 110 | Positive | 0-23 cm 10YR 3/2 sand loam 23-45 cm 10YR 6/4 silty sub | 45 cm *1 FCR, 1 secondary white chert flake and one TRS secondary flake at 0-23 cmbs |

Center to Grand Forks Transmission Line
 Class III Intensive Archaeological Resources Inventory Supplemental Addendum 1

| Shovel Test Number | Location | Positive/Negative | Soil Description | Final Depth/Comments |
|--------------------|-----------------------------|-------------------|--|---|
| S2 | Area EE – Pole Location 110 | Negative | 0-12 cm 10YR 3/2 sandy loam 12-23 cm 10YR 4/3 sandy loam 23-50 cm 10YR 6/4 silty sub | 50 cm |
| S1 | Area EE – Pole Location 110 | Positive | 0-13 cm 10YR 3/2 sandy loam 13-35 cm 10YR 4/3 sand silt 35-50 cm 10YR 6/4 silty sub | 50 cm *1 secondary KRF flake at 13-35 cmbs |
| N3 | Area EE – Pole Location 110 | Negative | 0-16 cm 10YR 3/2 sand silt 16-35 cm 10YR 3/4 sand silt 35-45 cm 10YR 4/3 silty sub | 45 cm |
| S3 | Area EE – Pole Location 110 | Negative | 0-22 cm 10YR 3/2 sand silt 22-30 cm 10YR 4/3 sandy silt 30-50 cm 10YR silty sub | 50 cm |
| E3 | Area EE – Pole Location 110 | Negative | 0-25 cm 10YR 3/4 sandy silt 25-38 cm 10YR 6/4 silty sub | 38 cm |

| | | | |
|-------|---|----------|---|
| To: | Dennis Rankin USDA Rural Utilities Service | | |
| From: | Michael Justin and Erika Eigenberger | Project: | Center to Grand Forks 345kV Transmission Line |
| cc: | | | |
| Date: | 2/13/2012 | Job No: | 110900 Task 018 Department 164 |

Re: Class III Intensive Archaeological Resources Inventory Center to Grand Forks 345kV Line Supplemental Addendum 2¹

Introduction

Minnkota Power Cooperative, Inc., (Minnkota) proposes to build a 248-mile-long, 345-kilovolt (kV) Transmission Line (Project) from the Center 345 kV Substation, near Center, North Dakota, to the Prairie Substation, located just west of Grand Forks (Figure 1). The U.S. Department of Agriculture Rural Utilities Service (RUS) is considering a request for funding. RUS has determined that the Project requires consultation under Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations (36 Code of Federal Regulations (CFR) Part 800). Section 106 requires federal agencies to consider the effects of undertakings within their jurisdictions on properties listed, or eligible for listing, on the National Register of Historic Places (NRHP). The Project also requires consideration of cultural resources under Section 101(b) of the National Environmental Policy Act (NEPA). RUS must complete an environmental analysis and prepare an Environmental Assessment with scoping (EA) in accordance with its Environmental Policy and Procedures for Implementing the National Environmental Policy Act (7 CFR Part 1794) before the proposed Project can be considered for financing. The draft EA was published in November 2010, prior to the completion of historic property identification studies. However, a Programmatic Agreement among the consulting parties, which includes the State Historical Society of North Dakota (SHSND), the U.S. Fish and Wildlife Service (USFWS) and Minnkota, details the specific project concerns relating to historic property identification, possible adverse effects, and treatment of historic properties.

Methods

The previous Class I inventory provided useful information on where known sites were located, gave an indication of where previous investigations were concentrated, and which areas lacked systematic study. RUS is of the opinion that the regulations require a good faith effort to identify historic properties and that this does not equate with identifying every possible archaeological site on the landscape. RUS contends that previous years of archaeological research have given us a fairly good idea of where on the landscape important archeological sites may be concentrated. Therefore, in response, HDR developed a predictive model to use as a guide for ongoing inventory efforts. HDR has been

¹ Sensitive location information has been removed (Figures 3a, 3b, 4a, and 4b).

implementing a program of intensive field work to locate buried and near-surface archaeological and cultural sites, and to test the model.

For a complete description of the Predictive Model, the Area of Potential Effects, the methods utilized for the Field Survey, and the Collection Policy, please refer to the *Class III Intensive Archaeological Resources Inventory Center to Grand Forks 345kV Line* report (Justin and Eigenberger 2011) and *Class III Intensive Archaeological Resources Inventory Center to Grand Forks 345kV Line Supplemental Addendum 1* (Justin and Eigenberger 2012).

Results of Investigations

Summary

Due to the size of the Project and multiple layout changes, the Class III archaeological survey was conducted over multiple mobilizations from October 3 to November 18, 2010, and from May 16 to July 1, 2011. The survey for the Class III Addendum 1 was conducted from October 31 to November 7, November 16 to 19, and December 9, 2011, and January 4 to 5, 2012.

HDR subcontracted the pedestrian survey for this addendum (Class III Addendum 2), to Kadrmass, Lee & Jackson (KLJ). The pedestrian survey was conducted February 6, 2012, by Duane Klinner and February 7, 2012 by Brian O'Donnchadha.

Survey Segment Coverage

Oliver County

Township 142N, Range 81W, Section 29

Survey Segment CC – West Portion (Section 29)

This portion of Survey Segment CC begins on the western border of Section 29 and continues one mile east across the northern half of the section, terminating at the eastern border of Section 29 (Figure 2, Page 1). Land use consisted of grassland and pasture area in rolling topography transected by multiple drainages and a small, seasonal wetland. According to the Final Center to Grand Forks Archaeological Predictive Model (FCGFAPM), Survey Segment CC traverses low to moderate probability zones. Pedestrian survey was conducted in four transects spaced at 15 meter intervals. Ground surface visibility in the grassland/pasture ranged from 0 to 25 percent. Although prairie grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. During the pedestrian survey, one precontact site was identified (CGF-CC-1). No areas were recommended for shovel testing.

McLean County

Township 143N, Range 81W, Section 13

Survey Segment FF – West Portion (Section 13)

The western portion of Survey Segment FF begins at the southeastern corner of Section 13 and extends approximately one-half mile north, adjacent to the eastern border of Section 13 (Figure 2, Page 1). Land use consisted of grassland with deciduous trees and scrub brush in rolling topography. According to the FCGFAPM, Survey Segment FF traverses moderate to high probability zones.

Pedestrian survey was conducted in four transects spaced at 15 meter intervals. Ground surface visibility in the grassland ranged from 0 to 25 percent. Although prairie grasses obscured surface visibility, gopher

mounds were opportunistically examined along the route. During the pedestrian survey three Areas of Avoidance were recorded. No areas were recommended for shovel testing.

Township 143N, Range 80W, Section 18

Survey Segment FF – East Portion (Section 18)

The eastern portion of Survey Segment FF begins at the western border of Section 18, near the half-section point, and continues east approximately 300 feet (Figure 2, Page 1). Land use consisted of grassland with deciduous trees and scrub brush in rolling topography. According to the FCGFAPM, Survey Segment FF traverses moderate to high probability zones.

Pedestrian survey was conducted in four transects spaced at 15 meter intervals. Ground surface visibility in the grassland ranged from 0 to 25 percent. Although prairie grasses obscured surface visibility, gopher mounds were opportunistically examined along the route. During the pedestrian survey, one historic site was identified (CGF-FF-1) and no areas were recommended for shovel testing.

Eddy County

Township 148N, Range 67W, Sections 27 and 28

Survey Segment HHH (Section 28)

This portion of Survey Segment HHH begins in the northwest quarter of Section 28 near the southern edge of Rosefield Slough. The segment continues for approximately 250 feet, crossing the slough and terminating near the northern edge (Figure 2, Page 2). Land use consisted of the slough channel and a seasonal wetland with intermittent clumps of wetland vegetation. According to the FCGFAPM, Survey Segment HHH traverses a low probability zone.

The majority of the southern portion of Survey Segment HHH was within the channel of the Rosefield Slough and was not subject to survey. The northern portion of the survey segment transected a seasonal wetland and a pedestrian survey was conducted in four transects spaced at 15 meter intervals. Ground surface visibility was poor at 0 percent. No cultural materials were identified during the pedestrian survey and no areas were recommended for shovel testing.

Survey Segment III (Section 27)

This portion of Survey Segment III begins near the half section line of Section 27, south of Rocky Run Creek. The segment continues east approximately 500 feet before terminating near 64th Avenue NE (Figure 2, Page 2). Land use consisted of a cultivated field in flat topography transected by multiple seasonal wetlands and low areas. According to the FCGFAPM, Survey Segment III traverses a low probability zone.

Pedestrian survey was conducted in four transects spaced at 15-meter intervals. Ground surface visibility was excellent at 100 percent. No cultural materials were identified during the pedestrian survey and no areas were recommended for shovel testing.

Identified Sites

During the Class III Intensive Archaeological Resources Inventory Supplemental Addendum 2 for the Center to Grand Forks 345 kV Transmission Line Project, one newly recorded precontact site (CGF-CC-1) and one newly recorded historic site (CGF-FF-1) were identified (Table 1). Newly identified sites within

the 150-foot ROW have the potential to be affected by construction activities. None of the sites have been evaluated for NRHP eligibility.

HDR recommends avoidance of all recorded archaeological sites. If sites cannot be avoided, additional investigations will be needed to further evaluate significance.

Table 1: Identified Sites

| Site Number | Field Number | Site Type | Potential Impacts | Project Recommendations | NRHP Recommendations |
|--------------------|---------------------|---|-------------------------------|--------------------------------|-----------------------------|
| Pending | CGF-CC-1 | Precontact Stone Feature | No poles within site boundary | No additional testing | Unevaluated |
| Pending | CGF-FF-1 | Historic Artifact Scatter and Associated Features | No poles within site boundary | No additional testing | Unevaluated |

Precontact Sites

Site CGF-CC-1 (ND SHPO Site Number Pending)

Site CGF-CC-1 consists of one precontact stone feature (F 001) identified during the pedestrian survey of the western portion of Survey Segment CC (Figures 3a and 3b) (Photo 1). The site is in a grassland/pasture on a hillside overlooking the bottomlands and consists of one cairn comprised of seven visible cobbles heavily sodded into the ground. The cairn is circular in shape and approximately one-half meter wide.



Photo 1: Site CGF-CC-1 overview facing south

Recommendations

HDR recommends avoidance of this site. If this site cannot be avoided, further investigation will be needed to further evaluate its significance.

Features similar to those recorded at Site CGF-CC-1 may be important expressions of Native American traditional religious and cultural activities. Consequently, Site CGF-CC-1 may be NRHP-eligible under Criterion A as a property of traditional religious and cultural importance. Consultation with tribes may be needed to determine if this site exhibits traditional values and if the tribes can offer interpretational information concerning the features. HDR suggests that Site CGF-CC-1 may also be eligible for the NRHP under Criterion D. It may provide important information on the nature and distribution of feature types as expressions of social, economic, and subsistence activities characteristic of sites in the region. Further investigation is needed before eligibility can be determined for this site under any of the criteria.

Historic Sites

Site CGF-FF-1 (ND SHPO Site Number Pending)

Site CGF-FF-1 is a historic artifact scatter and four associated features identified during the pedestrian survey of the eastern portion of Survey Segment FF (Figures 4a and 4b) (Photo 2). The site was identified

within a grassland with deciduous trees and scrub brush in rolling topography. Historic materials identified within the site consist of metal fragments and sheets of metal associated with farm equipment. Features include three depressions and one rock pile with historic materials.



Photo 2: Site CGF-FF-1 overview facing east

Feature 001 (F 001) is a circular depression, approximately five meters wide and one meter deep (Photo 3). No historic materials were identified within the depression.

Feature 002 (F 002) is a large rock pile that may be covering a foundation or depression (Photo 4). Feature 002 includes multiple fence posts, milled lumber, wire, a metal barrel, metal, plastic containers, and plastic fragments.

Feature 003 (F 003) is a circular depression measuring approximately six meters wide and one meter (Photo 5). The eastern side of F 003 contains a semi-oval set of large rocks that extend approximately three meters out from the depressions edge.

Feature 004 (F 004) consists of a rectangular depression that measures approximately 5 by 11 meters and two meters deep (Photo 6). The feature is generally aligned northeast/southwest and is at the edge of a landform overlooking a shallow runoff channel to the north. During the pedestrian survey, several metal fragments were identified within F 004.



Photo 3: Site CGF-FF-1, Feature 001 overview facing north



Photo 4: Site CGF-FF-1, Feature 002 overview facing east



Photo 5: Site CGF-FF-1, Feature 003 overview facing west



Photo 6: Site CGF-FF-1, Feature 004 overview facing west

A review of the available plat maps failed to identify any nearby structures or residences that may have been associated with the historic surface scatter and features (Geo. A. Ogle and Company 1914 and Thomas O. Nelson 1962). In 1914, the parcel was owned by the Bismarck Development Company. By 1962 ownership had transferred to Andrew W. Gregoryk.

Recommendations

At this time, the function of Site CGF-FF-1 is unclear. HDR recommends avoidance of this site. If CGF-FF-1 cannot be avoided, further investigation will be needed to further evaluate the significance of this site.

Areas of Avoidance

Areas of Avoidance include features that can not be assigned definitive cultural affiliation, such as stone piles and alignments (likely associated with Euro-American field-clearing activities), depressions, and earthen formations (such as earthen berms or field-clearing piles) (Table 2).

These areas were identified in the field and assigned feature numbers; however, these areas are not considered archaeological sites and will not receive an official North Dakota State Site number. Although cultural affiliation cannot be determined, it is HDR’s opinion that these areas should be avoided.

Table 2: Areas of Avoidance

| Survey Segment | Township | Range | Section | Feature Type | Recommendations |
|-----------------------|-----------------|--------------|----------------|---------------------|------------------------|
| FF | 143N | 81W | 13 | Rock Pile | Avoidance |
| FF | 143N | 81W | 13 | Rock Pile | Avoidance |
| FF | 143N | 81W | 13 | Rock Line | Avoidance |

Conclusions and Recommendations

This report is provided to RUS to assist with its responsibilities for compliance with Section 106 of the NHPA, as amended (36 CFR 800).

The Class III Intensive Archaeological Resources Inventory Supplemental Addendum 2 resulted in the identification of one previously unrecorded precontact site (CGF-CC-1) and one previously unrecorded historic site (CGF-FF-1). The precontact site consists of a cairn and the historic site consists of a historic material scatter and associated features. The newly identified sites have not been evaluated for the NRHP and further work would be needed to determine their eligibility.

HDR recommends all recorded sites within the ROW be avoided during construction activities (Table 3). If avoidance is not possible, HDR recommends that the sites be formally evaluated to determine their eligibility status. Those found eligible should be reviewed for adverse effects. If adverse effects are identified, strategies should be developed by the appropriate parties (the applicant, RUS, SHPO, and other interested parties if necessary), to resolve those effects. Such strategies may include avoidance, data recovery, or other mitigation to be determined.

Table 3: National Register Status of Sites within ROW

| Site Number | Field Number | Site Type | Project Recommendations | NRHP Recommendations |
|-------------|--------------|---|-------------------------|----------------------|
| Pending | CGF-CC-1 | Precontact Stone Feature | No additional testing | Unevaluated |
| Pending | CGF-FF-1 | Historic Artifact Scatter and Associated Features | No additional testing | Unevaluated |

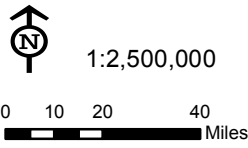
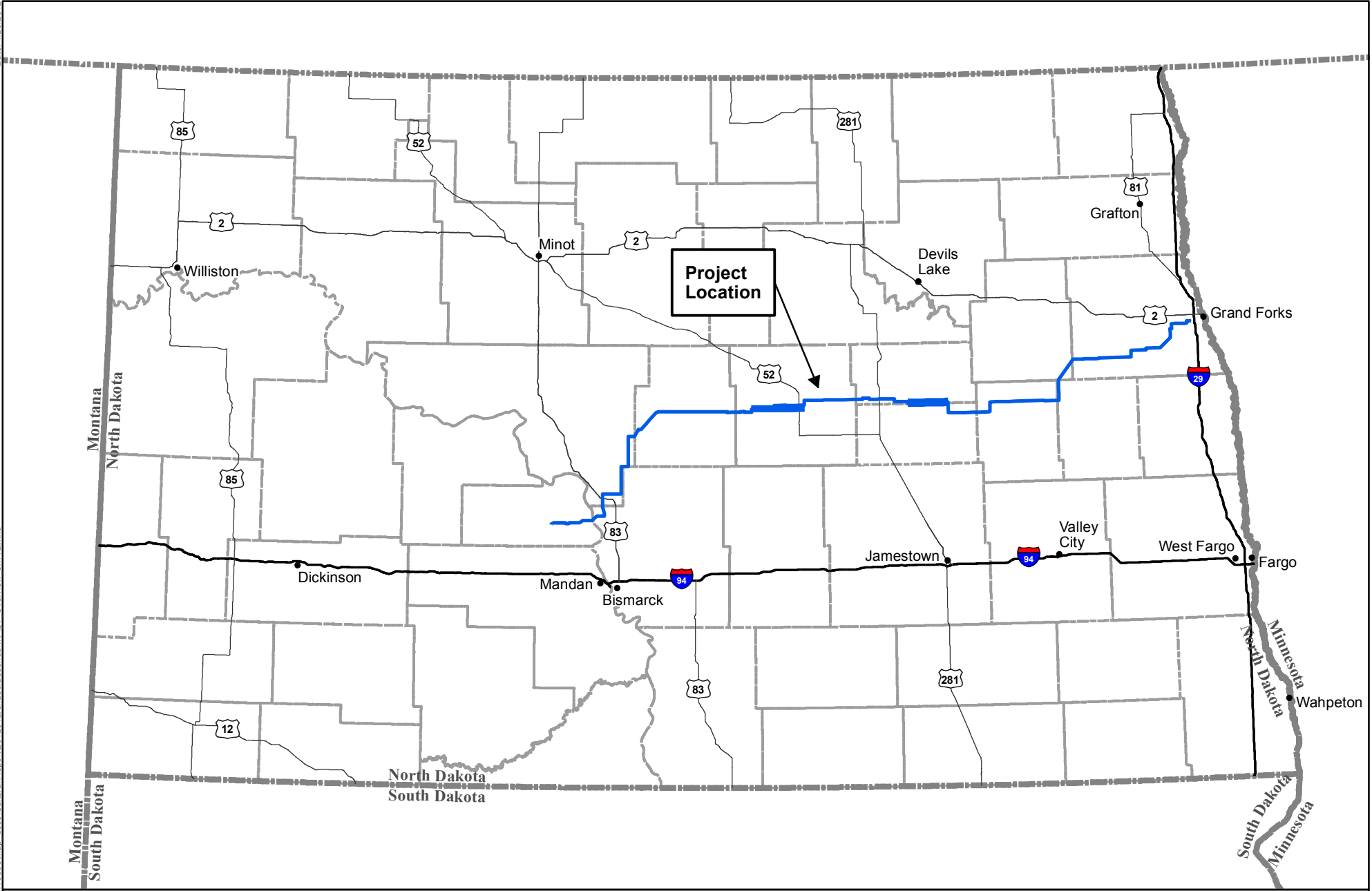
References

Geo. A. Ogle and Company. 1914. Standard Atlas of McLean County, North Dakota. Geo. A. Ogle and Company, Chicago, Illinois. Available online at: www.historicmapworks.com

Justin, Michael and Erika Eigenberger. 2011. Class III Intensive Archaeological Resources Inventory Center to Grand Forks 345 kV Line. Final report prepared for Minnkota Power.

Justin, Michael and Erika Eigenberger. 2012. *Class III Intensive Archaeological Resources Inventory Center to Grand Forks 345kV Line Supplemental Addendum 1. Final report prepared for Minnkota Power.*

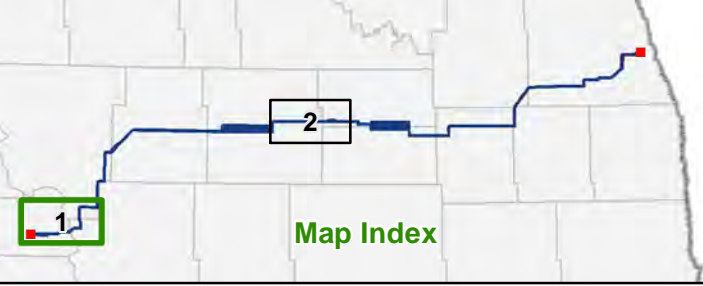
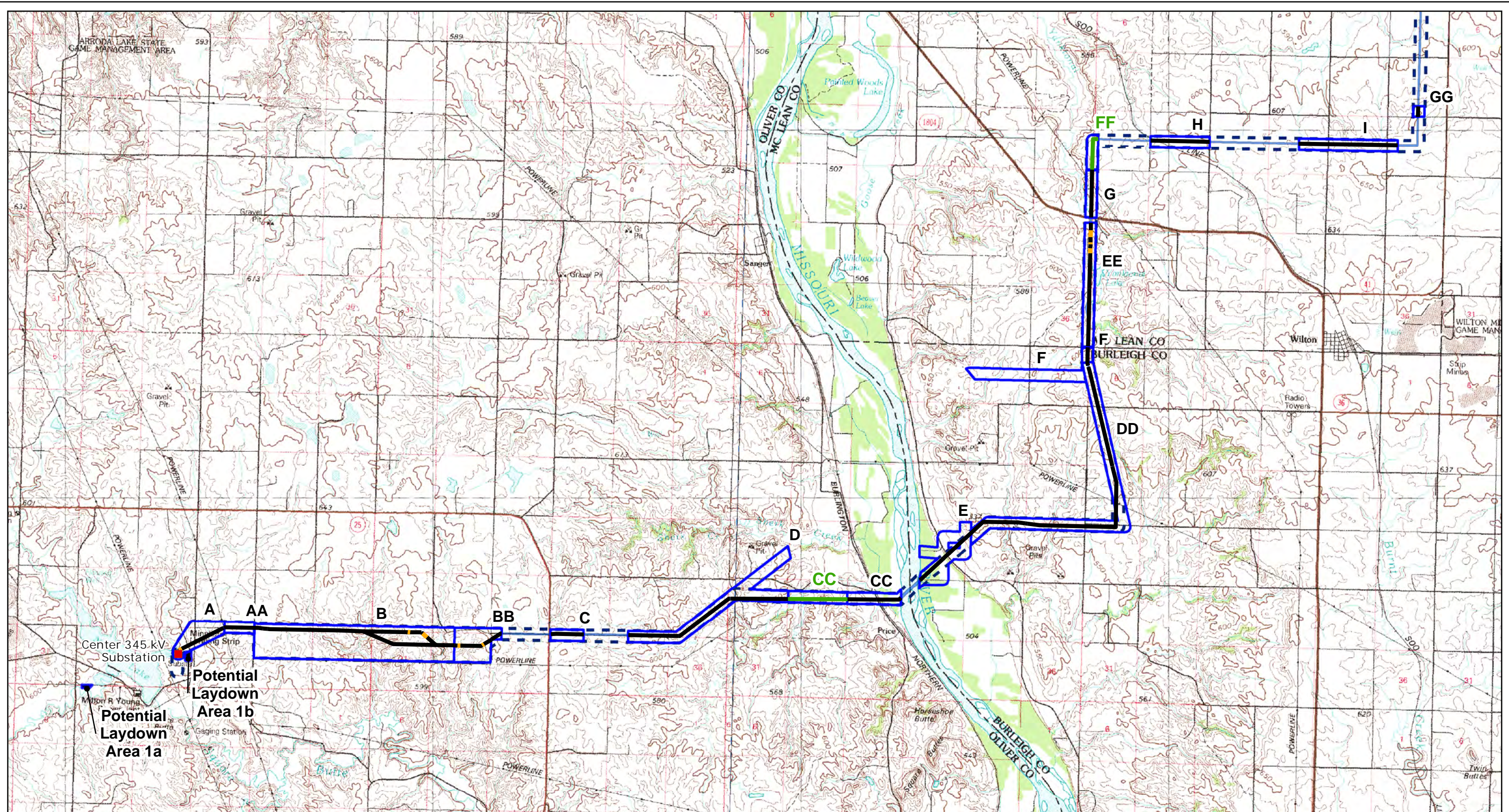
Thomas O. Nelson. 1962. Atlas of McLean County, North Dakota. Thomas O. Nelson Company, Fergus Falls, Minnesota. Available online at: www.historicmapworks.com



— Project Corridor

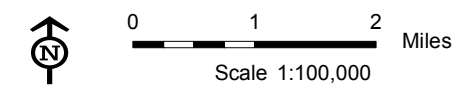
Figure 1
 Project Location
 Center to Grand Forks Project
 Minnkota Power Cooperative, Inc.

Date: 2/10/2012
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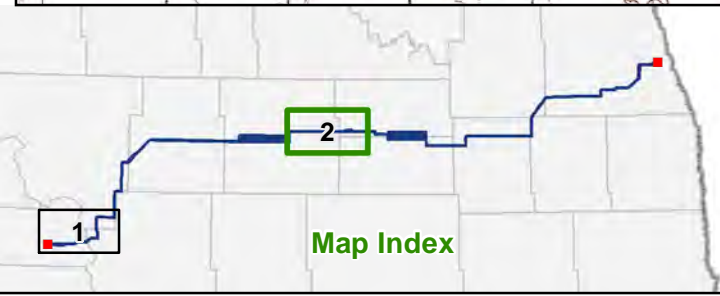
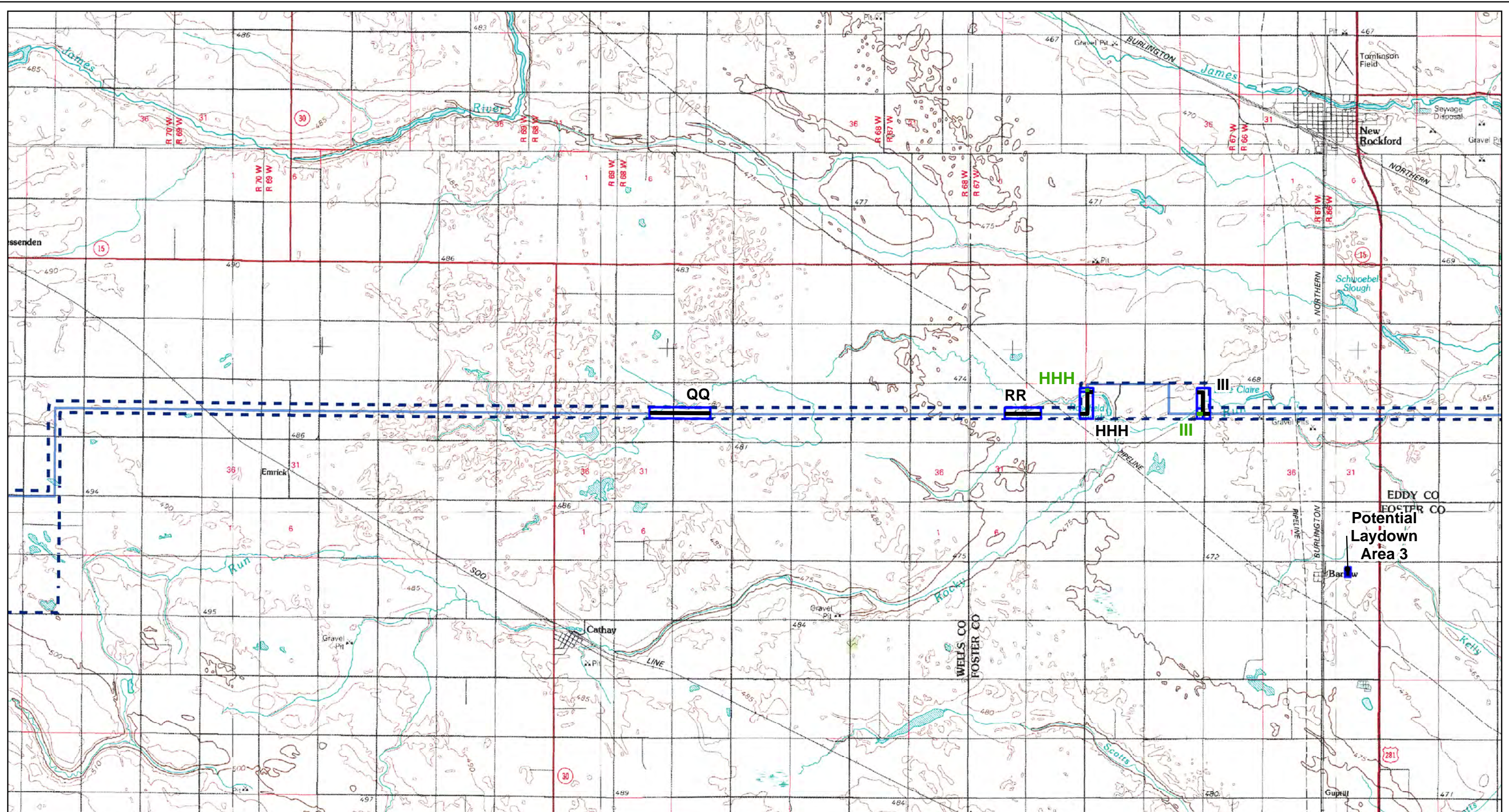


- Project Substation
- February 2012 Surveyed Areas
- Previously Surveyed Areas
- Cultural Survey Needed
- Shovel Test
- Proposed Modified Corridor - January 13, 2012
- Survey Corridor
- Project ROW - January 13, 2012

Figure 2: Page 1 of 2
Area of Potential Effects and Survey Segments
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.



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- Project Substation
- ▬ Proposed Modified Corridor - January 13, 2012
- Survey Corridor
- Project ROW - January 13, 2012
- ▬ February 2012 Surveyed Areas
- Previously Surveyed Areas
- Cultural Survey Needed**
- ▬ Shovel Test

Figure 2: Page 2 of 2
Area of Potential Effects and Survey Segments
Center to Grand Forks Project
Minnkota Power Cooperative, Inc.

