DRAFT
ENVIRONMENTAL IMPACT STATEMENT

Deer Creek Station Energy Facility Project
Brookings County, South Dakota

U.S. Department of Energy
Western Area Power Administration
Upper Great Plains Region
Billings, Montana

DOE/EIS-0415
January 2010

Western
AREA POWER
ADMINISTRATION

COVER SHEET

Lead Federal Agency: U.S. Department of Energy, Western Area Power Administration
Cooperating Agency: U.S. Department of Agriculture, Rural Utilities Service

Title: Deer Creek Station Project, Brookings and Deuel Counties, South Dakota

Please send comments or information requests on this Draft Environmental Impact Statement to:

Mr. Matt Marsh
Western Area Power Administration
P. O. Box 35800
Billings, MT 59107-5800
Telephone: (406) 247-7385
DeerCreekStationEIS@wapa.gov

For general information on the U.S. Department of Energy National Environmental Policy Act process, please contact:

Ms. Carol M. Borgstrom, Director
Office of National Environmental Policy Act
(NEPA) Policy and Compliance
Environment, Safety and Health (GC-54)
U.S. Department of Energy
Washington, DC 20585
Telephone: (202) 586-4600

Abstract: In response to a request from Basin Electric Power Cooperative (Basin Electric), Western Area Power Administration (Western) proposes to provide interconnection services, and Rural Utilities Service (RUS) proposes to provide financial assistance, for the Deer Creek Station Project, a proposed 300-megawatt (MW) natural gas-fired generation facility. The facility is being proposed to meet projected intermediate demands for electricity in the eastern portion of Basin Electric Power Cooperative's service territory, as determined from a power supply analysis. Basin Electric's alternatives analysis included alternative power generation technologies and alternative sites. Basin Electric proposes to construct a proposed natural gas-fired combined-cycle facility at one of two sites near White, South Dakota (SD). The alternative sites are convenient to a natural gas supply pipeline and to a transmission line owned by Western. If the proposed Project was not constructed, there would be no effects in the immediate vicinity; however, the underlying power demand would still need to be met and power supply infrastructure would likely be constructed somewhere. If the generation facility were to be constructed at White Site 1, a 13.2-mile natural gas pipeline, a 0.75-mile transmission line, two water wells, and a 1.25-mile water supply line would be constructed, and one mile of local roads would be improved. Most of the impacts associated with the facility site would be on cultivated cropland and pastureland; however, the natural gas pipeline would temporarily impact two small areas of native prairie and several areas of wetlands, and the water supply wells would require pumping from a Well Head Protection Area along Deer Creek. If the generation facility were to be constructed at White Site 2, a 10-mile natural gas pipeline, a one-mile rural water pipeline extension, a one-half mile transmission line, and an on-site substation would also be constructed. Most of the impacts would be on cultivated cropland and pastureland; however, some permanent wetland impacts could be expected. Adverse effects would be minimized by use of best management practices for erosion control and dust suppression, by pipeline construction in the fall, and by avoiding the breeding season for Dakota skipper in native prairie. Monitoring wells would be used to ensure that groundwater pumping does not adversely affect hydrological conditions in Deer Creek.

Comments on this Draft EIS should be sent only to Matt Marsh at Western Area Power Administration at the address above. Comments must be postmarked no later than **March 22, 2010**.

(THIS PAGE INTENTIONALLY LEFT BLANK)

TABLE OF CONTENTS

Page No.

APPENDICES

* * * * *

LIST OF TABLES

* * * * *

LIST OF FIGURES

* * * * *

LIST OF ACRONYMS

A

A .... Agricultural zoning district
ADT .... average daily traffic
AE & SSS .... Alternatives Evaluation and Site Selection Study
AERMOD .... AMS/EPA Regulatory Model

B

Basin Electric .... Electric Power Cooperative
BGEPA .... Bald and Golden Eagle Protection Act
BMP .... best management practice

C

CAA .... Clean Air Act
CadnaA .... Computer Aided Design for Noise Abatement
CCCT .... Combined-cycle combustion turbines
CCTV .... closed-circuit television system
CEQ .... Council on Environmental Quality
CFR .... Code of Federal Regulations
CH_4 .... methane
CI .... commercial/industrial zoning district
CO .... carbon monoxide
CO_2 .... carbon dioxide
CREP .... Conservation Reserve Enhancement Program
CRP .... Conservation Reserve Program
CTG .... Combustion Turbine Generator
CWA .... Clean Water Act

D

dB .... decibel
dBA .... A-weighted decibel
DEIS .... Draft EIS
DOE .... Department of Energy
DOT .... Department of Transportation
DSM .... demand side management

E

EIA .... Energy Information Administration
EIS .... Environmental Impact Statement
EMF .... Electromagnetic Fields
EO .... Executive Order
EPA .... Environmental Protection Agency
ESA .... Endangered Species Act

F

FAA........ Federal Aviation Administration
FEMA .... Federal Emergency Management Agency
FERC........ Federal Energy Regulatory Commission
FSA .... Farm Service Agency
FWP .... Farmable Wetlands Program

G

GHG........ greenhouse gas
GPA........ Game Production Area
GPS .... Global Positioning System

H

HAP........ hazardous air pollutants
HCM .... Highway Capacity Manual
HP/IP........ high pressure and intermediate pressure
HRSG........ Heat Recovery Steam Generator
HUD........ Housing and Urban Development
Hz........ Hertz

I

IPCC........ Intergovernmental Panel on Climate Change
IS........ Integrated System

L

LGIA........ Large Generator Interconnection Agreement
LGIP........ Large Generator Interconnection Procedures
LOS........ level of service
lp .... low pressure
LP........ Lake Park zoning district
L_X .... exceedance sound level

M

MAPP........ Mid-Continent Area Power Pool
MBPP........ Missouri Basin Power Project
MBTA........ Migratory Bird Treaty Act
MEC........ Mid-American Energy Company
MISO........ Midwest Independent Transmission System Operator
msl........ mean sea level
MW .... megawatt

N

N_2O ... nitrous oxide
NAAQS ... National Ambient Air Quality Standards
NBPL ... Northern Border pipeline
NESHAP ... National Emission Standards for Hazardous Air Pollutants
NHPA ... National Historic Preservation Act
NLCD ... National Land Cover Data
NO_X ... nitrogen oxide
NPDES ... National Pollutant Discharge Elimination System
NPPD ... Nebraska Public Power District
NR ... Natural Resources zoning district
NRHP ... National Register of Historic Places
NWI ... National Wetland Inventory
NWP ... Nationwide Permit

O

O_3 ... ozone
OHWM ... ordinary high water mark
OSHA ... Occupational Safety and Health Administration

P

Pb ... lead
PEM ... palustrine emergent
PFO ... palustrine forested
PM ... particulate matter
PSA ... Power Supply Analysis
PSD ... Prevention of Significant Deterioration
PSE ... Power Systems Engineering
PSS ... palustrine scrub-shrub
PUB ... palustrine unconsolidated bottom

R

REG ... Recovered Energy Generation
RFP ... Request for Proposals
ROW ... right-of-way
RUS ... Rural Utilities Service

S

SCR ... Selective Catalytic Reduction
SD ... South Dakota
SDDA ... South Dakota Department of Agriculture
SDDENR ... South Dakota Department of Environment and Natural Resources
SDDOT ... South Dakota Department of Transportation
SDGFP ... South Dakota Department of Game, Fish and Parks

SDPUC .... South Dakota Public Utilities Commission
SGIA .... Small Generator Interconnection Agreement
SGIP .... Small Generator Interconnection Procedures
SHPO .... State Historic Preservation Office
SO_2 .... sulfur dioxide
SPCC .... Spill prevention, control, and countermeasure
SWPPP .... Storm Water Pollution Prevention Plan

T

Tariff .... Open Access Transmission Service Tariff
TCP .... Traditional Cultural Properties
TD .... Town zoning district
TMDL .... Total Maximum Daily Limit
tpy .... tons per year
TSI .... Trophic Scale Index

U

USACE .... U.S. Army Corps of Engineers
USDA .... U.S. Department of Agriculture
USFWS .... U.S. Fish and Wildlife Service

V

v/c .... volume to capacity ratio
VOC .... volatile organic compounds

W

Western .... Western Area Power Administration
WIA .... Walk-In Area
WPA .... Waterfowl Production Area
WRP .... Wetlands Reserve Program

* * * * *

EXECUTIVE SUMMARY

PROPOSED FEDERAL ACTIONS

In response to a request from Basin Electric Power Cooperative (Basin Electric or Applicant), Western Area Power Administration (Western) proposes to provide interconnection services at its White Substation for the Deer Creek Station proposed Project, a proposed 300-megawatt (MW) natural gas-fired generation facility in Brookings County, South Dakota. If Western decided to approve the interconnection request, it would add a transformer bay to the White Substation and make other minor system modifications within the substation.

In response to a separate request from Basin Electric, Rural Utilities Service (RUS) proposes to provide financial assistance to Basin for Deer Creek Station construction. The financial assistance would consist of a loan or loan guarantee.

The two requests to Federal agencies trigger environmental reviews under the National Environmental Policy Act (NEPA) (42 U.S.C. 4321-4347). In accordance with the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations (CFR) parts 1500 to 1508), Western has agreed to be the lead agency and RUS has agreed to participate in Western's NEPA review as a cooperating agency. The cooperating agency provisions of NEPA are an efficiency measure that allows the production of one environmental document to serve the decision-making needs of both agencies. Western and RUS prepared this Environmental Impact Statement (EIS) to describe the environmental effects of the Federal and non-Federal actions that would occur if the interconnection and financing actions were to take place.

APPLICANT'S PROPOSED PROJECT

Basin Electric proposes to construct, own, and operate a 300-MW natural gas-fired combined-cycle generation project at a site near White, South Dakota. White Site 1, the Applicant's preferred site, is located six miles southeast of White on 484th Avenue between US Route 14 and South Dakota Route 30 (SD 30). The proposed Project would use combined-cycle technology, in which a gas turbine powers an electric generator. Under the combined-cycle configuration, the exhaust from the combustion turbine generator (CTG) passes through a heat recovery steam generator (HRSG) that extracts heat from the turbine exhaust. This waste heat is used to generate steam that then passes through a steam turbine generator. The recovery of waste heat increases the efficiency of the unit. The footprint of the power generation facility would take up 40 acres of a 100-acre site.

To provide natural gas for the Deer Creek Station facility, a 13.2-mile natural gas line with a right-of-way (ROW) of 75 feet would be constructed northward from the site to access the Northern Border Pipeline (NBPL) in Deuel County, South Dakota. Electricity generated by the facility would be transmitted south of the site to Western's 345-kV White Substation by a 0.75-mile, 345-kV transmission line. Cooling water would be provided by a well site located near Deer Creek, and the water would be transmitted northward to the site by a 1.25-mile, 60-foot wide ROW width, water pipeline. A road to the east of the proposed plant, 484th Street, would be paved for approximately one mile to accommodate construction and operational traffic.

WHY IS THE ACTION NEEDED?

Western is required to respond to an applicant's interconnection request by Federal Energy Regulatory Commission (FERC) orders, which ensure non-discriminatory transmission system access. These FERC orders implement Section 211 of the Federal Power Act, which requires that transmission service be provided upon request if transmission capacity is available. Under Western's Open Access Transmission Service Tariff (Tariff), which implements these FERC orders, Western must ensure that system reliability and service to existing customers is not adversely affected by new interconnections. If the proposed interconnection is compatible with all requirements, Western must approve the interconnection request, subject to NEPA review.

RUS provides financial assistance to rural utilities to upgrade, expand, maintain and replace electric infrastructure in rural areas such as Basin Electric's service territory. Before providing financing, RUS determines that the proposed Project is feasible from both an engineering and financial perspective. Under the authority of the Rural Electrification Act of 1936, RUS makes direct loans and loan guarantees to electric utilities to serve customers in rural areas.

In 2007, Basin Electric developed a Power Supply Analysis (PSA) to assess projected needs of its members (Basin Electric 2007). The PSA indicated that additional intermediate capacity would be needed by mid-2012 to meet its members' growing energy demand. Based on the PSA, a 700 to 800 MW capacity deficit is projected in the eastern portion of Basin Electric's service area by the year 2014. Basin Electric is proposing to meet this increased demand by implementing a resource expansion plan that includes 200 MW of peaking generation, 300 MW of wind generation, 250 MW of intermediate generation, and 600 MW of baseload generation. The Deer Creek Station proposed Project is a means to meet the additional intermediate power supply needs in the area. Intermediate capacity units are designed to be cycled at low load periods, such as evenings and weekends. The units can be cycled up and down rapidly to handle the load swings of the system. The proposed Project has been sized for 300 MW in order to meet the 250 MW intermediate power supply need and have a 50 MW reserve to meet peak intermediate needs. An advantage of using intermediate generation is that wind generation on the grid in the same area can be integrated with the combined-cycle natural gas generation. During periods of high wind generation, gas-fired generation can be reduced. During periods of low wind generation, the gas-fired generation will be available to back up the wind generation.

PUBLIC AND AGENCY ISSUES

A notice of intent to prepare an EIS and to conduct scoping meetings was published on February 6, 2009, in the *Federal Register*. An open house public meeting was held in White, South Dakota on February 24, 2009. There were 59 attendees at the scoping meeting. In addition, Federal, State, and local agencies and interested parties were notified of the proposed Project by letter from Western. The period to receive written comments was open until April 7, 2009. As a result of the scoping process, 14 comments were received from 12 agencies and two individuals. Concerns noted in the comments included local traffic impacts from construction and operation, dust issues from heavy traffic, impacts to air quality, groundwater and Well Head Protection Areas, wetlands, impacts to endangered species and the bald eagle, impacts to birds from transmission lines, and economic benefits to local communities.

ALTERNATIVES FOR INTERMEDIATE POWER SUPPLY NEEDS

In order to meet intermediate power supply needs, Basin Electric considered several power supply alternatives for intermediate needs. These included demand side management (DSM), renewable energy resources, fossil fuels, repowering and uprating of existing facilities, and power purchase contracts.

DSM actions are actions taken on the customer's side of the meter to change the amount or timing of energy consumption. Basin Electric currently has 6 to 10 megawatt (MW) of DSM available to reduce power usage during peak periods. Even if this could be greatly expanded, it would not be enough to meet all intermediate power needs.

As indicated above, wind is a renewable energy resource that would integrate well with a natural gas intermediate facility because the gas can be quickly brought on-line during periods of low wind generation. Solar energy and new hydroelectric power are other intermediate power resources, but they are very costly and additional hydroelectric power is not available in the upper Midwest. Other renewable energy resources such as geothermal and biomass are more suitable to baseload applications. High temperature geothermal resources suitable for power production are not available in eastern South Dakota.

Basin Electric screened five potential sites within its eastern South Dakota service area for development of an intermediate capacity facility. Screening criteria used included access to a high-voltage transmission system with available capacity, natural gas fuel supply, water supply, existing land use and terrain, and proximity to residences. The sites considered suitable were near Aberdeen (Groton site), Watertown (one site), and Brookings (three sites). Based on a field review of the five sites, Groton was rejected because of transmission constraints and the previous installation of two simple-cycle peaking facilities. Watertown was rejected due to distances to the nearest substation. White Site 3 was determined to be too small for a combined-cycle combustion turbine facility. The proposed facility at White Site 1 is described above.

White Site 2 has been evaluated as an alternative in this EIS. A facility at White Site 2 would be located north of SD 30 and four miles northeast of White, South Dakota on 482nd Avenue. Its footprint of 40 acres on a 100-acre site would be similar to White Site 1; however, an additional six acres of the site would be needed for a substation. To provide natural gas for the White Site 2 facility, a 10-mile natural gas line would be constructed northward from the site along 481st Avenue to access the NBPL in Deuel County, South Dakota. Electricity generated by the facility would be transmitted east of the site from the new substation to the Western Split Rock to White 345-kV transmission line located 0.5 miles east of the site. Cooling water would be provided by municipal water supply. A water line extension of one mile would be constructed along 202nd Street from 481st Avenue east to the site.

Repowering and uprating of existing intermediate generating units was also an option considered. Repowering and uprating has been underway at the Laramie River Station, a project owned by Basin Electric and other utilities. Each of the three units at Laramie River Station has achieved 12- MW uprates due to upgrades. In addition, the Leland Olds Station has also been uprated by 5.5 MW. While these upgrades have increased the intermediate capacity, the scale of these past improvements, suggests that uprates and repowering alone would not alleviate the need for intermediate resources provided by the proposed combined-cycle facility.

Power purchase from facilities within the region or outside the region was another option evaluated. Basin Electric has negotiated a power purchase agreement with Recovered Energy Generation (REG) power plants for 22 MW, but has determined that other power purchase options were more expensive than Basin Electric’s self-build options. In addition, many other options would require the construction of additional transmission.

Based on the power supply options analysis and the screening conducted by Basin Electric, Western, and RUS decided that White Sites 1 and 2 and the No Action Alternative would be selected for evaluation in this EIS.

COMPARISON OF ALTERNATIVES

Under the No Action Alternative, Western would not approve an interconnection agreement to its transmission system and RUS would not award a loan or loan guarantee to finance the construction and operation of the proposed Project. Given the lack of a Western interconnection and RUS funding, Basin Electric would not likely construct the proposed Project as described in this EIS. As Basin Electric is a regulated utility having load growth responsibility, it is reasonable to expect that it would construct a similar generation facility elsewhere in eastern South Dakota. Such a facility may not connect to a Federal transmission system, involve Federal financing, or have any other Federal nexus and, therefore, would not initiate a NEPA process. If Western were not to approve the interconnection agreement and RUS were not to award a loan or loan guarantee, the environmental impacts associated with the construction and operation of the proposed Project at this location would not occur. Basin Electric would have to find an alternate means to increase the intermediate generation demand for electric power in the eastern portion of its service area through some other project proposal, which could result in environmental impacts similar to, or greatly different from, those identified for the proposed Project.

Construction at either White Site 1 or White Site 2 would likely have similar impacts to the natural and socioeconomic resources. The terrain of White Site 1 allows for better drainage than White Site 2. White Site 1 is also further away from the nearest occupied residence (1 mile compared to 0.5 mile). However, White Site 1 would require a longer natural gas pipeline. In addition, water supply wells would be constructed in the floodplain of Deer Creek in order to provide cooling water to White Site 1. White Site 2 would have a greater facility footprint, due to the need to construct a substation, and would be more visible to travelers and residents of the area because it is close to SD 30. Table ES-1 summarizes and compares the environmental impacts as described in this EIS. Standard mitigation measures to be used by Basin Electric for the proposed Project are provided in Appendix F.

Table ES-1: Summary of Potential Impacts of Deer Creek Station

Resource	White Site 1	White Site 2	No Action Alternative
Air	Increase in emissions during construction from vehicles and equipment would be minimal for carbon monoxide (CO), nitrogen oxide (NO_x), and volatile organic compounds (VOC); particulates (dust) from site preparation and traffic on unpaved roads; all construction and operation emissions meet regulations; *de minimis* emissions of hazardous air pollutants (HAP); largest potential HAP is formaldehyde at 4.5 tons per year (tpy)		No impact
Greenhouse Gas (GHG) Emissions	Not a major source of GHG emissions; estimated carbon dioxide (CO_2) emissions three one thousandths of one percent (0.00003) of global man-made emissions		No impact
Geology, Soils and Farmland	No unique geologic features; prime farmland impacts of 40 acres of the 100-acre facility site (40 acres of permanent impact and 60 acres still available for hay or pasture); loss of 1 acre at water well supply site	No unique geologic features; prime farmland impacts of 46 acres of the 100 acre facility site (46 acres of permanent impact and 54 acres remaining available for hay or pasture)	No impact
Water Quality	Potential sedimentation from site preparation, pipeline construction, transmission line construction, road improvements, and water line construction. No disturbance of pre-existing contamination; some use of hazardous chemicals on site	Potential sedimentation from site preparation, pipeline construction, transmission line construction, substation construction, and water line construction. No disturbance of pre-existing contamination; some use of hazardous chemicals on site	No impact
Floodplains	No floodplains on facility site; water well located in Deer Creek floodplain; pipeline construction crosses floodplains	No floodplains on facility site; pipeline construction crosses floodplains	No impact
Groundwater	Pumping of six million gallons per year or 18 acre-feet from Big Sioux aquifer for cooling water; crossing by natural gas pipeline of Zone B Well Head Protection Areas (29,262 linear feet)	Six million gallons per year of water would be obtained from municipal water supply, which is obtained from Big Sioux aquifer. Crossing by natural gas pipeline of Zone A Well Head Protection Area (805 linear feet) and Zone B (8,033 linear feet)	No impact

Resource	White Site 1	White Site 2	No Action Alternative
Wetlands and Streams	Based on National Wetland Inventory (NWI), impacts of 0.0 acres on facility site, 0.0 acres for transmission line corridor, and 0.0 acres for water pipeline corridor; temporary impacts of 1.75 acres in natural gas pipeline corridor; delineated wetlands of 3.2 acres on facility site, to be avoided to the extent practicable; delineated temporary impacts of 6.6 acres in natural gas pipeline corridor, 2.5 acres in water pipeline corridor, and 0.2 acres in transmission line corridor; some high quality potholes crossed	Based on NWI, wetland impacts of 0.02 acres on facility site and 0.21 acres for substation; temporary impacts of 1.70 acres for transmission line corridor, 0.05 acres in rural water pipeline corridor, and 0.61 acres in natural gas pipeline corridor; some high quality prairie potholes crossed	No impact
Vegetation	Existing site is cultivated cropland; a 100-foot wide corridor would be cut through an existing narrow forested shelterbelt along the eastern edge of the site for a waterline and access road; natural gas pipeline is 47 percent cultivated cropland and 34 percent pasture; distance through native prairie is 2,620 linear feet	Existing site is cultivated cropland; woodland on site would be avoided; natural gas pipeline is 55 percent pasture and 40 percent cultivated cropland, and 5 percent forested shelterbelt; no native prairie impacts	No impact
Wildlife	Minimal impacts; generation facility would be near inactive raptor nests and great horned owl nest; transmission line of 0.75 mile poses some collision risk to avian species	Minimal impacts; transmission line of 0.50 mile poses some collision risk to avian species	No impact
Special Status Species	Topeka shiner habitat in nearby Deer Creek and tributaries would not be impacted; also suitable habitat for Dakota skipper	Suitable habitat for Dakota skipper	No impact
Socioeconomics	360 temporary construction workers and 30 permanent employees; local government services adequate for worker influx; positive benefits from property taxes and right-of-way (ROW) easements		No impact
Environmental Justice	No impact	No impact	No impact

Resource	White Site 1	White Site 2	No Action Alternative
Land Use	115 acres converted to utility uses (75 still available for agriculture); new 13.2-mile pipeline ROW (all still available for agricultural uses)	109 acres converted to utility uses (63 still available for agriculture); new 10 mile pipeline ROW (all still available for agricultural uses)	No impact
Transportation	No adverse level of service impacts; roadways to be paved at intersections and near plant site; heavy haul temporary bridge over Deer Creek	No adverse level of service impacts; roadways to be paved near plant site	No impact
Visual	Project visible for up to four miles but would mix in with wind turbine views	Project visible for up to four miles; highly visible from SD 30; would mix in with wind turbine views; new substation would be additional new visual intrusion	No impact
Noise	Construction noise impacts; short term steam blow event; operational impacts within Department of Housing and Urban Development (HUD) guidelines	Construction noise impacts; short term steam blow event; operational impacts within HUD guidelines	No impact
Public Health and Safety	Conformance to all Occupational Safety and Health Administration (OSHA) safety procedures for plant workers; minor general public impacts from increased traffic		No impact
Intentional Destruction	Minor security issues		No impact
Cultural Resources	No impacts to National Register of Historic Places (NRHP) eligible properties	Potentially NRHP-eligible sites on natural gas pipeline route	No impact
Recreation	Temporary impact to one Walk-in Area (WIA) (State hunting lease area) during pipeline construction	No impacts to public lands or hunting lease areas	No impact

MAJOR CONCLUSIONS

Construction of a natural gas combined-cycle generation facility at either White Site 1 or White Site 2 would not result in any significant environmental impacts. Approximately 100 acres of agricultural land would be within the proposed Project fence; at White Site 1, 40 acres would be permanently converted to utility uses and 60 acres would be available for hay or pasture. At White Site 2 an additional 6 acres would be permanently converted. White Site 1 would result in groundwater pumping from the Big Sioux aquifer along Deer Creek, but water for White Site 2 would be obtained from a municipal water supply, which withdraws from a different location within the same aquifer. There is the potential for temporary impact to native prairie and Dakota skipper habitat along the White Site 1 Natural Gas Pipeline route. These impacts would be minimized through a consultation process with State and Federal wildlife agencies. Positive social and economic impacts would be expected from Deer Creek Station construction. The relatively minor environmental impacts of Basin Electric's proposed Project on environmental resources would be offset by the societal benefits of a new source of electricity. It is not possible to quantify this benefit, as individuals would weigh the tradeoffs differently, and assign widely variable values to each resource.

AREAS OF CONTROVERSY

No areas of controversy were identified during the scoping stages. This section will be updated following review of responses to the Draft EIS (DEIS).

ISSUES TO BE RESOLVED

The analysis of impacts in this DEIS is based on conceptual design. The precise impacts to environmental resources such as wetlands and endangered species will be determined during the environmental permitting and consultation stage. However, as a result of this analysis, Basin Electric has committed to implement the following measures to avoid and minimize the potential for adverse effects:

- Best management practices (BMPs) for sediment and erosion control
- Stormwater Pollution Prevention Plan (SWPPP) including BMPs, Spill Prevention Control and Countermeasure Plan (SPCC), and good housekeeping measures for construction
- Dust control plan for roads and site construction
- Improvements to traffic control, including removal of a stop sign on northbound 484th Avenue at 207th Street intersection, and designated delivery route to avoid traffic on additional routes
- Monitoring wells would be installed to determine the cone of influence from water pumping along the Deer Creek floodplain and avoid permanent impacts to Deer Creek

* * * * *

(THIS PAGE INTENTIONALLY LEFT BLANK)

1.0 INTRODUCTION

Basin Electric Power Cooperative (Basin Electric) is proposing to construct, own, operate, and maintain a new 300-megawatt (MW) net natural gas generation facility and infrastructure facilities (proposed Project). After a review of alternative site locations, Basin Electric determined that a location in eastern Brookings County, South Dakota, would best meet that need. As a result of the alternative site location studies, Basin Electric identified two potential sites. The proposed Project area is located approximately 14 miles northeast of the City of Brookings (figure 1-1). In addition to the generation facility, the proposed Project would include ancillary facilities such as a natural gas pipeline for fuel delivery, electrical transmission facilities to connect to the existing Department of Energy (DOE) Western Area Power Administration (Western) White Substation, either a water well system or water delivery from existing rural water system, and wastewater processing. Basin intends to request financing from the U.S. Department of Agriculture (USDA) Rural Utilities Service (RUS) to construct the proposed Project. The Federal action would consist of interconnection of the proposed Project transmission facilities with Western's transmission system at its existing White Substation, installation of terminal equipment within the substation, and or the granting of a loan or loan guarantee from RUS.

Basin Electric is a regional wholesale electric generation and transmission cooperative owned and controlled by the member cooperatives it serves. It was created in May 1961 as a result of regional efforts by electric distribution cooperatives and the Rural Electrification Administration, now RUS. Basin Electric includes more than 120 rural electric systems and is one of the largest electric generation and transmission cooperatives in the U.S. Basin Electric serves approximately 2.5 million customers in 430,000 square miles covering portions of nine states: Colorado, Iowa, Minnesota, Montana, Nebraska, New Mexico, North Dakota, South Dakota, and Wyoming (figure 1-2).

Basin Electric, as the Applicant, has submitted requests to interconnect its proposed Project to Western's transmission system and has submitted a loan application to RUS for financing. Requests for interconnection and financial assistance are Federal actions, triggering appropriate environmental review under the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations (CFR) parts 1500-1508), DOE National NEPA Implementing Procedures, 10 CFR part 1021, and RUS Environmental Policies and Procedures, 7 CFR 1794, as amended. Western is the lead Federal agency as defined at 40 CFR part 1501.5; RUS is serving as a cooperating agency.

(THIS PAGE INTENTIONALLY LEFT BLANK)

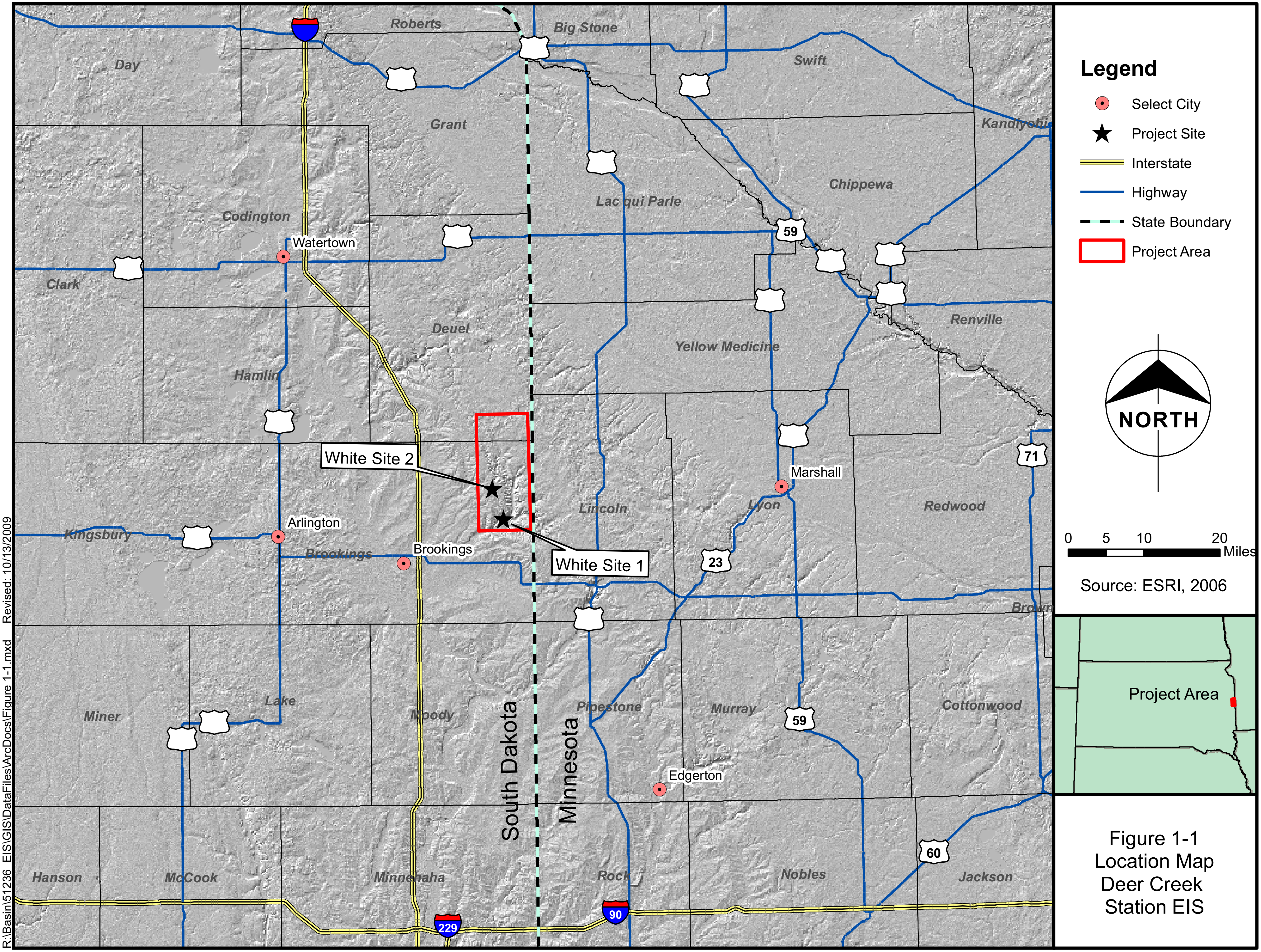
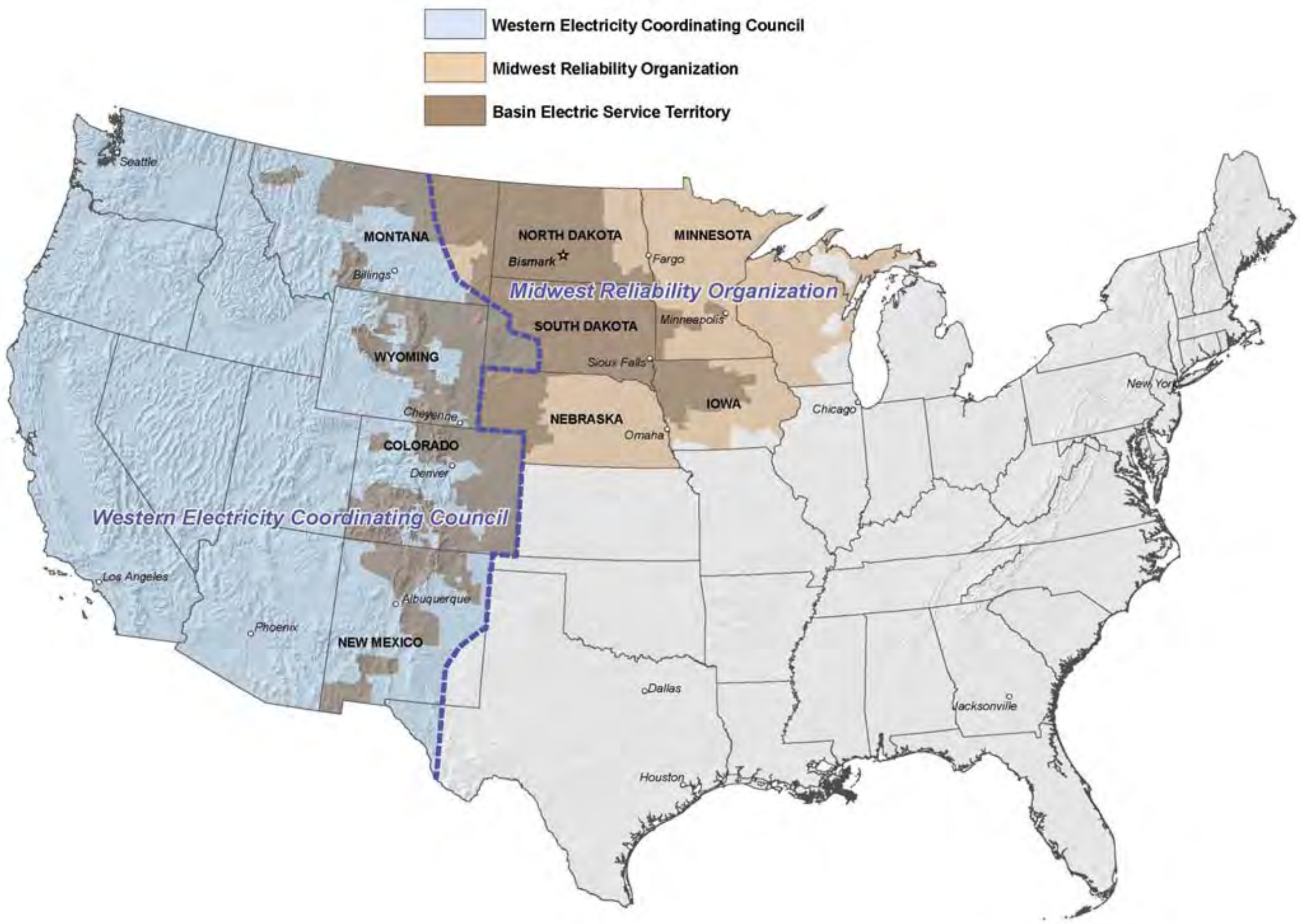


Figure 1-1
Location Map
Deer Creek
Station EIS

R:\Basin\51236 EIS\GIS\DataFiles\ArcDocs\Figure 1-1.mxd Revised: 10/13/2009

(THIS PAGE INTENTIONALLY LEFT BLANK)

Figure 1-2: Basin Electric Service Area



Western and RUS have prepared this Environmental Impact Statement (EIS) under these regulations to describe the environmental effects of their respective Federal actions and Basin Electric's proposed Project and alternatives, including the No-Action Alternative.

1.1 WESTERN'S PURPOSE AND NEED

The Applicant proposes to interconnect its proposed Project with Western's White Substation. Western's purpose and need is to consider this interconnection request in accordance with section 211 of the Federal Power Act and Western's Open Access Transmission Service Tariff (Tariff). Section 211 of the Federal Power Act requires that transmission service be provided upon request if transmission capacity is available. Western's Tariff provides open access to its transmission system. If there is available capacity in the transmission system Western provides transmission services through an interconnection. This interconnection request requires Federal action, which triggers NEPA review. When responding to the need for agency action, Western is bound by the following:

Providing Transmission Service - Under Western's Tariff, Western offers capacity on its transmission system to deliver electricity when capacity is available. The Tariff complies with the Federal Energy Regulatory Commission's (FERC) Final Orders, which are intended to ensure non-discriminatory transmission system access. Western submitted revisions to its non-jurisdictional Tariff on January 25, 2005 as to certain terms and for inclusion of the Large Generator Interconnection Procedures (LGIP) and a Large Generator Interconnection Agreement (LGIA). On March 1, 2007, Western submitted revisions to its Tariff to FERC pursuant to FERC Orders No. 2003-C, 661, 661-A, 676, 676-A, 2006, 2006-A and 2006-B. The main purpose of this filing was to incorporate FERC's Small Generator Interconnection Procedures (SGIP) and Small Generator Interconnection Agreement (SGIA), and also to include revisions of certain terms relating to the LGIP and the LGIA. Western received final approval on its 2005 and 2007 filings from FERC on September 6, 2007. In order to comply with FERC's recent Order Nos. 890, 890-A, 890-B, and 890-C, and sections 35.28(e) and (f)(iv)(2) of its Regulations, Western submitted proposed revisions to its Tariff in September 2009.

Protecting Transmission System Reliability and Service to Existing Customers - Western must ensure that existing reliability and service is not degraded. Western's LGIP provides for transmission and system studies to ensure that system reliability and service to existing customers are not adversely affected by new interconnections. These studies also identify any system upgrades or additions necessary to accommodate the proposed Project and ensure that they are in the project scope.

1.2 RUS PURPOSE AND NEED

Under the authority of the Rural Electrification Act (REA) of 1936, the Electric Programs of RUS provide loans and loan guarantees to rural electric cooperatives to finance the construction of electric distribution, transmission and generation facilities, including system improvements and replacements, energy conservation programs, and on-grid and off-grid renewable energy systems. The Applicant has requested financial assistance from RUS. This request is a Federal action; therefore, RUS has the need to respond to the Applicant's request for assistance by approving or denying the request.

In deciding whether to approve a loan or loan guarantee, RUS considers if the Applicant has provided sufficient justification for pursuing a proposal. This decision is based upon a review of an Alternatives Evaluation and Site Selection Study (AE &SSS), energy demand and transmission load forecasts, and potential environmental impacts associated with a proposal. In 2007, Basin Electric developed a Power

Supply Analysis (PSA) to assess projected needs of its members from Basin Electric's 2007 Load Forecast, which was approved by RUS on November 26, 2007. RUS has determined that approving a loan or loan guarantee for the proposed Project may constitute a major Federal action that could significantly affect the quality of the human environment; therefore, an EIS would have to be prepared prior to a decision on financing.

1.3 APPLICANT PURPOSE AND NEED

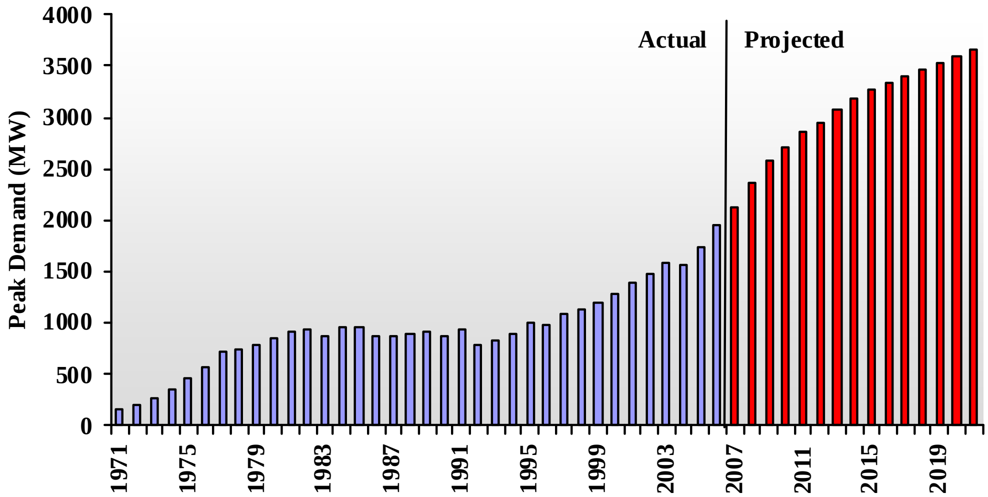
The purpose of the Basin Electric's proposed Project is to help serve the increased demand for electrical power to member cooperatives in the eastern portion of Basin Electric's nine-state service area. To meet this purpose and need, Basin Electric proposes to construct their generation facility and to connect it to Western's electrical transmission grid. An additional value of this generation is the potential to combine the operation of this combined-cycle intermediate generation with Basin Electric wind energy development on the electrical transmission grid. Under this combined Basin Electric resource operation, the gas-fired generation would be operated during periods of high demand and low wind generation, and would be backed down during periods of high wind generation.

In 2007, Basin Electric developed a PSA to assess projected needs of its members (Basin Electric 2007). This analysis identified an increasing use and demand for electricity within Basin Electric's service area due to industrial growth, energy-sector development (coal, oil, and natural gas), and new rural residential development. Figure 1-3 shows Basin Electric's actual peak demand from 1971 through 2006 and Basin Electric's forecasted peak demand from 2007 through 2021. Between 1999 and 2006, Basin Electric's total system peak demand increased 752 MW, from 1,195 MW to 1,947 MW. This is an increase of approximately 107 MW per year.

Basin Electric prepared a forecast showing load and capability surpluses and deficits through the year 2021. The forecast predicts that by 2014, there will be an anticipated deficit of 700-800 MW for the eastern portion of its service area (figure 1-4). According to the PSA, Basin Electric proposed to meet this increased demand by implementing a resource expansion plan that includes:

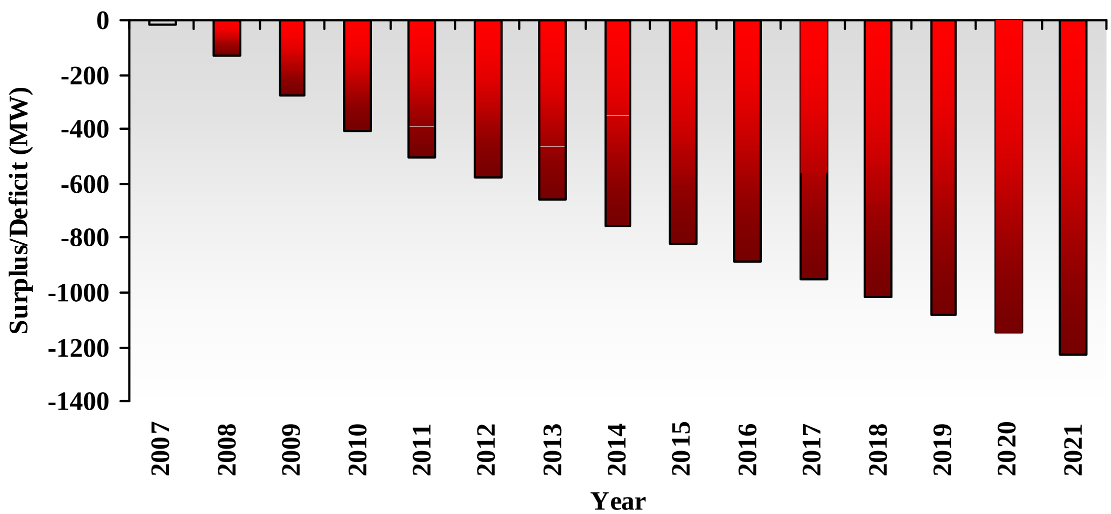
- 200 MW of peaking generation (2009)
- 300 MW of wind generation (2011)
- 250 MW of intermediate generation (2012)
- 600 MW of baseload generation (2016)

Figure 1-3: Basin Electric Peak Demand



Source: Basin Electric 2007

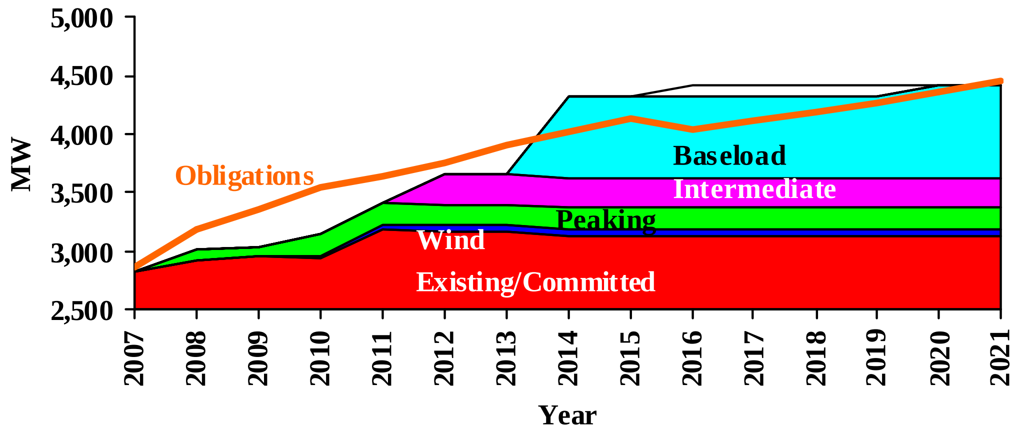
Figure 1-4: Basin Electric Power Supply Deficit in Eastern Service Area



Source: Basin Electric 2007

Although the study was completed in 2007, Basin Electric believes that its long-term projections are still accurate. Figure 1-5 shows the preferred resource expansion plan identified in the PSA. One recommendation of the PSA was that Basin Electric should move ahead with the development of 250 MW of intermediate generation, such as a combined-cycle combustion turbine within Basin Electric's eastern system. The proposed Project has been identified as a means to meet the determined need for 250 MW of intermediate generation by 2012. The proposed Project has been sized for 300 MW in order to meet the 250 MW need and have a 50 MW reserve to meet peak intermediate needs.

Figure 1-5: Basin Electric Power Supply Expansion Plan



Source: Basin Electric 2007

1.4 AUTHORIZING ACTIONS

The proposed Project must comply with all Federal, State, and local regulations requiring permits or approvals. Table 1-1 lists agencies and their respective permit/authorizing responsibilities with respect to the proposed Project. The South Dakota Public Utilities Commission (SDPUC) has jurisdiction over the siting of power plants within the State of South Dakota. The Applicant submitted applications for an Energy Conversion Facility Permit and a natural gas pipeline to support the facility on July 28, 2009 (SDPUC 2009a; SDPUC 2009b). If granted, the SDPUC permit would authorize construction of the proposed Project under South Dakota rules and regulations.

Table 1-1: Authorizations and Agencies

Law/Regulation	Agency
Federal	
NEPA	Western / RUS
Clean Water Act (CWA), section 404 Nationwide Permit (NWP)	U.S. Army Corps of Engineers (USACE)
CWA, section 401 (Water Quality Certification)	South Dakota Department of Environment and Natural Resources (SDDENR)
National Pollutant Discharge Elimination System (NPDES) Permit	U.S. Environmental Protection Agency (EPA)
Migratory Bird Treaty Act (MBTA)	United States Fish and Wildlife Service (USFWS), Western/RUS
Endangered Species Act (ESA)	USFWS, RUS
Bald and Golden Eagle Protection Act (BGEPA)	USFWS, Western
Interconnection/Transmission Service Agreement	Western

Law/Regulation	Agency
NHPA	Western/RUS, South Dakota State Historic Preservation Office (SHPO), Federally Recognized Tribes
Native American Grave Protection and Repatriation Act	Western/RUS, SHPO
American Indian Religious Freedom Act	Western
Oil Pollution Prevention and Spill Prevention Control and Countermeasure Plans	EPA
State	
Temporary Water Rights Permit (if dewatering is required)	SDDENR
Easement Grants and Road Crossing Permits	South Dakota Department of Transportation (SDDOT)
Highway Access Permit/Utility Permit	SDDOT
Stormwater Discharge Permit and Stormwater Construction Discharge Permit	SDDENR
Facilities Permit (for Project)/Siting Authorization	SDPUC
State Threatened and Endangered Species	South Dakota Department of Game, Fish and Parks (SDGFP)
County	
Soil Erosion and Sediment Control Plan	Brookings and Deuel Counties
Zoning Ordinance	Brookings and Deuel Counties

1.5 AGENCY CONSULTATION AND PUBLIC INVOLVEMENT

Agency and public scoping occurred during February 6, 2009, to April 7, 2009. During that period public notices were published, a scoping meeting was conducted and 14 written comments were received.

1.5.1 Scoping Process

A Notice of Intent to prepare an EIS was drafted by Western and published in the *Federal Register* on February 6, 2009. The scoping meeting for the proposed Project was held approximately 2 miles west of the Project Area, at the McKnight Community Center in White, South Dakota, on February 24, 2009. Western mailed letters announcing the scoping meeting to Federal, State, Tribal, local agencies and landowners near the proposed Project sites during early February, 2009. RUS was not involved in the scoping process, since Basin Electric had not yet approached that agency for Project funding.

Notice of the public scoping meeting was published in two local newspapers. The notice was published in the Brooking Register on February 6, February 13, and February 20, 2009, and in the White Tri-City Star on February 12 and February 19, 2009. Radio spots announcing the scoping meeting were aired seven times a day during February 16-20, 2009, on both Brookings radio station KBRK-FM 93 and

Watertown radio station KWAT-AM. Additionally, flyers publicizing the scoping meeting were distributed to local businesses.

Basin Electric participated in lease negotiations with area landowners during the development of the proposed Project, and consulted with various local, State, and Federal agencies to provide information about and identify concerns regarding the proposed Project.

During the scoping meeting, project factsheets and comment response/distribution list request forms were available for all meeting participants. Western and Basin Electric also provided display boards to present project information for public viewing.

1.5.2 Identified Issues

During the scoping period, letters requesting project-related comments were mailed to Federal, State, and local agencies as well as Native American tribes located near the proposed Project area. During the scoping meeting, attendees were provided with comment forms. They were asked to write down any comments and either return the forms at the meeting or mail them in order that they would be received or postmarked by the close of the scoping period, which ended on April 7, 2009. Western received a total of 12 written comments from agencies and two written comments from individuals. Listed below are the topics identified in the comments received and Western's responses. A Scoping Summary has been prepared and is included as appendix A.

Cultural Resources

One comment requested that Western initiate the section 106 process and consult with the South Dakota SHPO, Native American tribes, and other concerned parties with regard to protection of historic properties. Potential impacts to cultural resources are addressed in section 4.14.

Water Resources

Five comments were received requesting discussion and analysis of potential impacts to groundwater, surface water, drinking water, irrigation waters, and floodplains as a result of the construction and operation of the proposed Project. Two of these comments also addressed potential impacts to Wellhead Protection Areas and impacts to local groundwater supply near the proposed well site for the proposed Project. Two comments specifically requested compliance with section 404 of the CWA. Appropriate permitting requirements and potential impacts to water resources within the proposed Project area are discussed in section 4.3.

Wetland Resources

Three comments were received requesting analysis of potential impacts to wetlands within the proposed Project area, and two of these comments specifically requested compliance with section 404 of the CWA. These comments also requested that the EIS include mitigation measures if avoidance of wetlands is not possible. Regulatory compliance with section 404, along with potential wetland impacts, is discussed in section 4.4.

Biological Resources

Three comments were received that included biological resources concerns. Two of these comments requested prevention of the introduction and spreading of invasive plants and noxious weeds. One comment requested evaluation of the effects of the proposed Project on vegetation, wildlife, and hunting and fishing opportunities. Two comments also expressed concern over threatened and endangered species possibly occurring in the proposed Project area, and requested an evaluation be completed to determine if impacts to any species is expected, and that measures be put into place to protect any sensitive species that are encountered. One comment expressed a concern for avian mortality resulting from collisions with transmission lines associated with the proposed Project, and recommended incorporating measures to prevent line strike and electrocution hazards for avian species. All potential impacts to biological resources, including threatened and endangered species, are discussed in detail in section 4.5.

Air Quality

Two comments were received regarding impacts to air quality in the proposed Project area. One comment recommended an evaluation of potential contribution to near and far-field air quality and greenhouse gas (GHG) emissions resulting from the construction and operation of the proposed Project. One comment recommended a detailed plan for addressing dust suppression during construction of the proposed Project, and one commenter expressed concern over general air pollution resulting from the proposed Project. Air quality issues and potential impacts are discussed in detail in section 4.1.

Socioeconomics

Two comments were received regarding socioeconomic concerns or issues. One comment requested the disclosure and evaluation of any environmental justice impacts, and one comment requested information on economic benefits to the communities of Toronto, Astoria, and White. This comment also requested information on the long-term outlook for wind energy in the area. Socioeconomic issues and impacts related to the proposed Project are discussed in section 4.6.

Transportation

Three comments were received regarding transportation issues related to the proposed Project. Two comments focused on impacts to local roads and bridges, and their ability to handle heavy loads and increased traffic associated with the proposed Project. One commenter expressed concern over impacts to living conditions, traffic congestion, and dust from gravel roads impacting residences. One comment requested that Western contact Federal Aviation Administration (FAA) Technical Operations, Brookings Municipal Airport, and White Airport to identify possible impacts to aircraft navigation and/or communication equipment. This comment also requested that the design, construction, and operation of the proposed Project not create a hazardous wildlife attractant to surrounding airports. Transportation issues, including regulatory issues from FAA, are discussed in section 4.9.

Soil/Land Resources

Three comments regarding soil or land resources were received during the scoping period. One comment requested that, should contaminated soil or materials be encountered during construction activities, the contamination would be reported to the appropriate agency, and that contaminated soil will be stockpiled and sampled to determine disposal requirements. One comment requested the completion of the Farmland Conversion Impact Rating form for the proposed Project site to determine impacts to prime farmland, and another comment stated that there are no Farm Service Agency (FSA) mortgages or Conservation Reserve Program (CRP) tracts known to be in place within the proposed Project area. Contaminated soil is discussed in section 4.12 and farmland is discussed in section 4.2.

Hazardous Materials

One comment was received regarding hazardous materials associated with the proposed Project. The commenter suggested that additional research be conducted regarding past petroleum and chemical releases in the area that could affect the proposed Project area. Issues relating to hazardous materials are discussed in section 4.12.

Safety

One comment was received regarding a concern for worker safety due to weather during the construction phase of the proposed Project. Safety during construction and operation of the proposed Project is discussed in section 4.12.

Cumulative Impacts

One comment was received requesting a cumulative impacts analysis for resources of concern. Cumulative impacts are discussed with each environmental resource in section 4 following discussion of direct and indirect impacts.

* * * * *

2.0 PROPOSED ACTION AND ALTERNATIVES

This chapter describes Western's and RUS's Federal actions and Basin Electric's proposed Project, including the proposed Project area, generating facility, and associated facilities. The chapter also describes alternatives to the proposed Project, including the No-Action Alternative, and discusses other alternatives considered but not evaluated in detail.

2.1 FEDERAL ACTIONS

2.1.1 Western's Federal Action

Western's proposed Federal action is to approve the interconnection request from Basin Electric. If the interconnection request is approved, Western would make the necessary modifications within the White Substation and any other system modifications or upgrades required to accommodate the interconnection. The interconnection would require the addition of an electrical transformer bay within the existing White Substation. The White Substation was constructed with space available to accommodate additional transformers on site to provide future electrical transmission in eastern South Dakota. No increase in the physical boundaries of the White Substation would be required. No other transmission system improvements are expected for this proposed Project. Western is not proposing alternatives because the Applicant's request to interconnect at White Substation limits Western to looking at that site alone. Other locations do not fit Western's or Basin's purpose and need.

Because Western's Federal action results from Basin Electric's interconnection request under Western's Tariff, which was developed to conform with applicable FERC Orders, Western is obligated to consider the Applicant's proposed Project as presented, and at the interconnection point designated by the Applicant, after first considering environmental effects under NEPA. Western's Federal action is limited to determining whether existing capacity is available on Western's transmission, system, whether the proposed interconnection would negatively affect power deliveries to existing customers, whether system upgrades or additions would be necessary to accommodate the interconnection, and whether operation of the transmission system would be adversely affected. Subject to its review under NEPA, if the proposed interconnection is compatible with all requirements, Western must approve the interconnection request. Western's Federal action also includes making any necessary upgrades or improvements at the Applicant's expense, and making any substation changes necessary to interconnect the applicant's proposed Project to the transmission system. In this case, no system upgrades or improvements are needed, and Western's Federal action only includes minor interconnection accommodations within the developed area of Western's existing White Substation. With the exception of the No Action Alternative, no reasonable alternatives to Western's Federal action exist, and none is analyzed in this EIS.

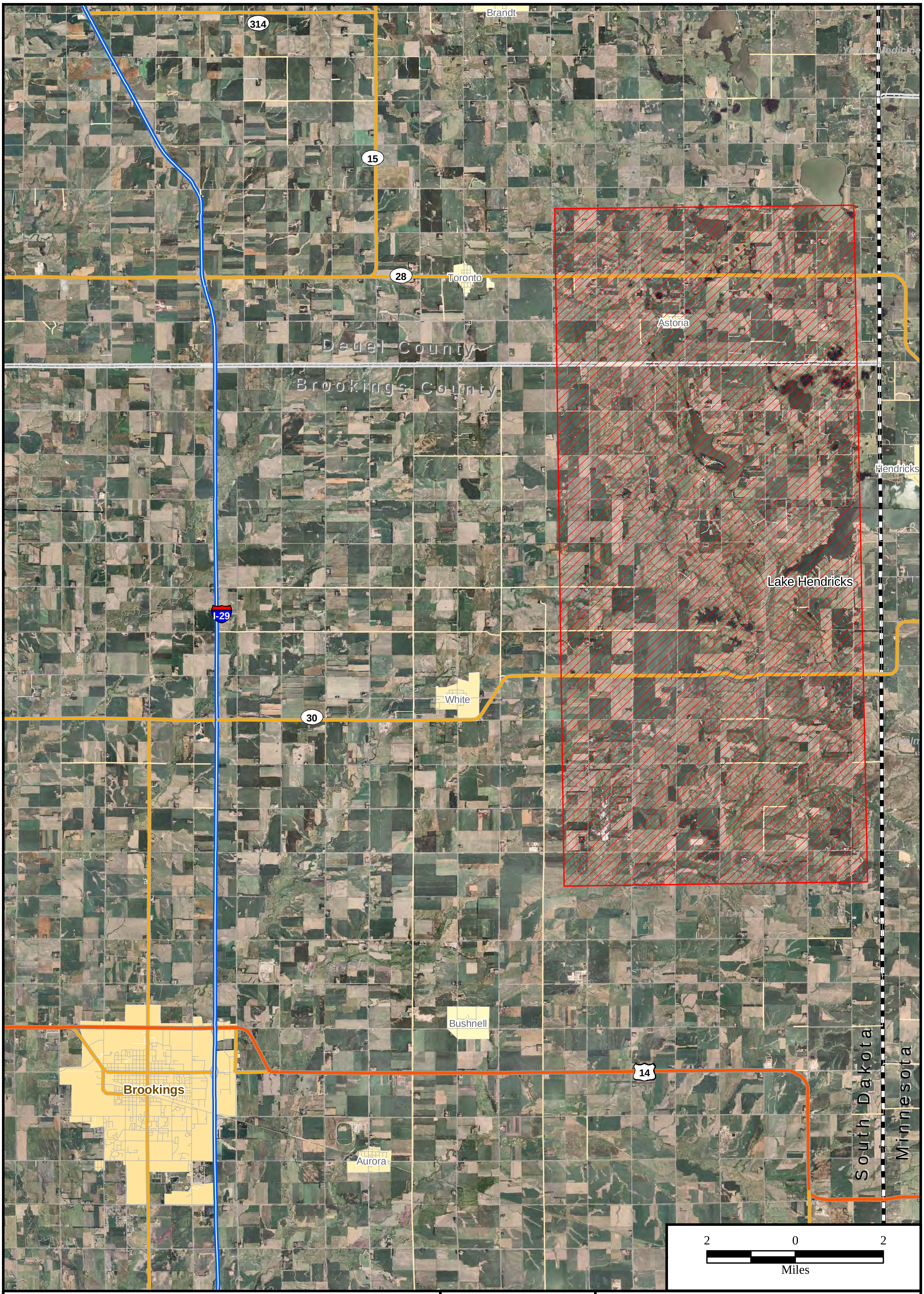
Western is not treating alternatives identified during Basin Electric's development of their proposed Project as alternatives to Western's federal action in the context of NEPA, but those alternatives are discussed within the body of this EIS (see section 2.1.2, 2.3, and 2.4). Western has the responsibility to disclose the environmental impacts of its proposed Federal action, and of Basin Electric's proposed Project, a goal that this EIS will accomplish.

2.1.2 RUS's Federal Action

RUS's Federal action is to approve or deny a request from Basin Electric to finance the construction and operation of the proposed Project. This decision is based on the review and approval of an Alternatives Evaluation and Site Selection Study (AE & SSS) in addition to the consideration of the Applicant's energy demand and transmission load forecasts and potential environmental impacts associated with the proposed Project. The Applicant has prepared an AE & SSS for RUS, which demonstrates the Applicant's purpose and need for the proposed Project and provides an analysis of alternatives evaluated in the Applicant's planning process (i.e., generation and transmission system design, facility siting, etc.). Because RUS includes the review and approval of the AE & SSS in its decision making process, alternatives documented in the AE & SSS, which are discussed in sections 2.3 to 2.4 of this DEIS, are considered NEPA alternatives for RUS and will be included in RUS's Record of Decision. RUS does have the discretion to provide financing for alternatives that may not be preferred by the Applicant, but are analyzed in this EIS.

2.2 PROPOSED PROJECT

Basin Electric is proposing to construct a 300-MW combined-cycle combustion turbine natural gas generation facility and supporting infrastructure in eastern South Dakota, approximately 14 miles northeast of the center of Brookings in Brookings County (figure 2-1). Combustion turbine generators (CTG) fueled by natural gas are used in both simple-cycle and combined-cycle configurations. In a simple-cycle configuration, gas turbines are used to power an electric generator without any recovery of heat from the exhaust gases. Gas turbine generators in a simple-cycle configuration are commonly used for peaking power applications during summer and winter months, when the demand is high for short periods of time.



LEGEND

Study Area
Municipal Areas
County Boundary
State Boundary

NORTH

Elkton

Figure 2-1

Study Area Location
Deer Creek Station EIS

Moody Pipestone

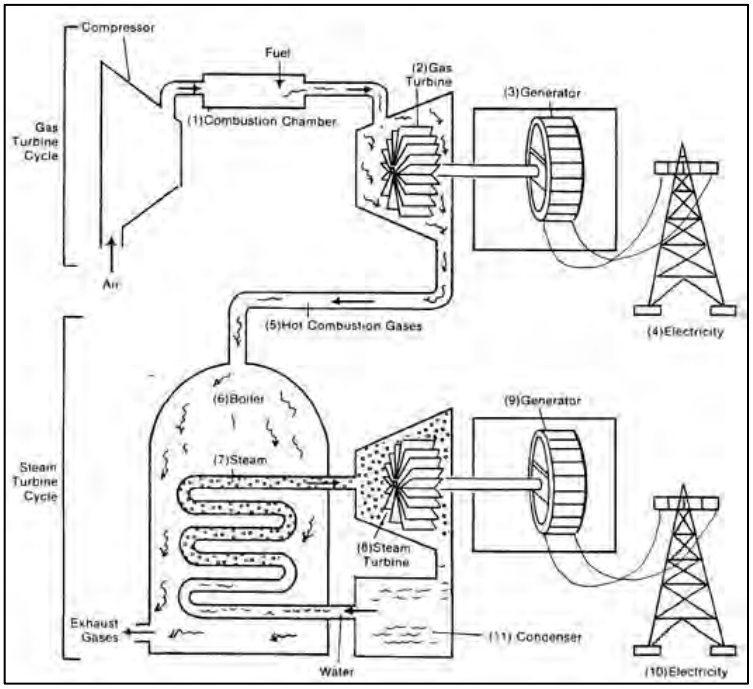
Source: NAIP County Mosaic, Brookings and Deuel counties, North Dakota; ESRI

\\espsrv\data\projects\Basin\51236_EIS\GIS\DataFiles\ArcDocs\Revised_Figures_11_19_09\Figure 2-1_11_19_09.mxd Revised: 11/19/2009

In a combined-cycle configuration, the exhaust from the CTG passes through a heat recovery steam generator (HRSG) that extracts waste heat from the turbine exhaust (figure 2-2). This waste heat is used to generate steam that then passes through a steam turbine generator.

The recovery of the waste heat greatly increases the efficiency of the unit in the combined-cycle configuration. Natural gas combined-cycle generators are commonly used in both intermediate and baseload power generation.

Figure 2-2: Typical Natural Gas Combined Cycle Process



Source: Arizona State University (2006)

To support the CTG, there would be water supply lines, natural gas supply lines and connection to electrical substation and transmission lines constructed in the vicinity of the proposed Project. A stormwater pond would be constructed to collect stormwater that drains from disturbed areas of the plant site. Water delivered from the groundwater supply would require treatment to improve its quality before it is used in the plant’s steam cycle. Reject water from this process would be discharged as surface water after additional treatment to meet water quality standards. In addition, the road leading to the plant would be paved and key intersections will also be paved.

Two tanks of approximately 500 gallons each would be used on site to store diesel fuel for the emergency generator and fire pump. Ammonia tanks supporting the air pollution selective catalytic reduction (SCR) system and various water and wastewater storage tanks would be present. All tanks will be aboveground or in vault-type structures to minimize the potential for subsurface contamination. Additionally, there would be miscellaneous lubricants and hydraulic oils stored on site in appropriate storage areas. The remainder of this chapter examines alternatives Basin Electric considered in formulating their final proposed Project.

2.3 ENERGY ALTERNATIVES

Basin Electric's 2007 PSA provides a review of its current operating system, future load growth and the framework for future expansion, including both supply-side and demand-side resource expansion. Twelve resource expansion portfolios were created to meet the forecasted needs of Basin Electric and were evaluated with respect to cost, performance, and risk. All portfolios included some component of wind energy development. The twelve portfolios ranged from emphasizing nearly all baseload development to all peaking development, with various combinations in-between.

A number of demand-side and supply-side resource alternatives have been considered as a means of meeting the forecasted electrical need for Basin Electric identified in section 1.0. The alternatives evaluated include:

- Demand Side Management (DSM)
- Renewable Energy Sources
    - Wind
    - Solar
    - Hydroelectric
    - Geothermal
    - Biomass Power
    - Biogas
    - Municipal Solid Waste
- Fossil Fuel Generation
    - Simple Cycle Combustion Turbines
    - Combined-Cycle Combustion Turbines
    - Microturbines
    - Coal Facility
- Nuclear Power
- Repowering/Updating of Existing Generating Units
- Purchased Power / Request for Proposals (RFP)

- New Transmission Capacity

The most economical means of supplying power to a load that varies every hour on an electric power system is to have three basic types of generating assets available for use. These generation assets are commonly referred to as baseload, intermediate, and peaking capacity.

Baseload capacity runs at its full capacity continuously, day and night, throughout the year. The output of baseload-type plants cannot be rapidly decreased or increased to “follow load.” Baseload units are designed to optimize the balance between high capital/installation cost and low fuel cost, resulting in the lowest overall production cost under the assumption that the unit will be heavily utilized for most of its life. Typically, baseload capacity units are operated around 80 percent capacity factor or more. Coal-fired power plants, nuclear plants, and hydroelectric plants are examples of baseload generation capacity; however, hydro plants that follow load are not considered baseload units.

Intermediate capacity units are designed to be cycled at low load periods, such as evening and weekends. The units are loaded up and down rapidly to handle the load swings of the system while the unit is online. Typically, intermediate capacity units are operated between a 20 and 80 percent capacity factor, or between baseload and peaking.

Peaking capacity is only operated during peak load periods and during emergencies. Very low capital/installation costs are important due to the fact these units are typically not operated very often. The operational costs are relatively high due to the high cost and volatility in the price of fuel. Types of peaking capacity power plants include combustion turbines, internal combustion engine plants, and pumped-storage hydroelectric facilities. Typically, peaking resources are operated under a 20 percent capacity factor.

Of the twelve resource expansion portfolios that would satisfy Basin Electric’s needs over the next 12 years as analyzed in the PSA, the optimum portfolio included 300 MW of wind, 200 MW of peaking generation, 250 MW of intermediate generation and 600 MW of baseload coal generation. The Deer Creek Station is proposed to meet Basin Electric’s projected intermediate generation requirement.

2.3.1 Demand Side Management

DSM is the process of managing the consumption of energy, generally to optimize available and planned generation resources. According to the DOE, DSM refers to actions taken on the customer’s side of the meter to change the amount or timing of energy consumption. Utility DSM programs offer a variety of measures that can reduce energy consumption and consumer energy expenses. Electricity DSM strategies have the goal of maximizing end-use efficiency to avoid or postpone the construction of new generating plants.

DSM programs aim to achieve three broad objectives: energy conservation, energy efficiency, and load management. Energy conservation can reduce the overall consumption of electricity by reducing the need for heating, lighting, cooling, cooking energy and other uses. Energy efficiency can encourage consumers to use energy more efficiently, and thus get more out of each unit of electricity produced. Load management allows generation companies to better manage the timing of their consumers' energy use, and thus help reduce the large discrepancy between on peak and off-peak demand.

Approximately half of the Basin Electric members are utilizing load management to manage their power purchases from Basin Electric. Basin Electric has implemented a system-wide load management program on its eastern system, which enables Basin Electric to target large loads and/or generation that are not included in the members' load management programs to be used during Basin Electric's seasonal peak periods. Basin Electric has approximately 6-10 MW of load management available at this time.

DSM programs are capable of reducing the energy demand and reducing the required capacity of future additional generation facilities. It is apparent, however, that energy savings through DSM are not enough to alleviate the need for the intermediate resource fulfilled by the proposed Project.

2.3.2 Renewable Energy Resources

The renewable generation types capable of meeting an intermediate need of Basin Electric's would be the alternatives that have a capacity factor between 20 percent and 50 percent, which include wind, solar, and hydroelectric. Wind is an intermittent resource that cannot be scheduled when to operate, however it is low-cost when considering operating and maintenance costs due to the fact that there is no fuel cost. Wind would integrate very well with gas-fired generation because gas-fired generation can be shut down quickly during periods of wind generation, which offsets the fuel costs associated with gas-fired generation. Solar is also an intermittent resource that cannot be scheduled when to operate, and is very costly. Hydroelectric power generally operates between 40 and 50 percent capacity factor; however, it is very dependent on annual rainfall and therefore can go through some long periods of low generation. Currently, the upper Midwest has been experiencing several years of drought so water is limited. Other renewable forms of energy, such as geothermal, biomass power, biogas power, and municipal solid waste are typically used in a baseload generation mode and are most cost effective in this mode of operation. High temperature geothermal resources suitable for power generation are not available in eastern South Dakota (Geo-Heat Center 2008).

2.3.3 Fossil Fuel Generation

Of the four types of fossil fuel generation types listed in section 2.3, only the combined-cycle combustion turbine would provide the amount of power and flexibility to be used as an intermediate source of power. The simple cycle combustion turbines are small units that are used for peaking load capacity because of their quick start up capability, but are less efficient and more costly to operate than the combined-cycle system. As a new facility, the proposed Deer Creek Station would represent a state-of-the-art facility for natural gas combined-cycle combustion turbines. Microturbines are too small to provide the amount of power needed by Basin Electric for an intermediate generation source. Coal facilities are considered baseload operations because they are not capable of quick start up or shut down needed for an intermediate load facility.

2.3.4 Nuclear Power

Nuclear power is a baseload type of facility that is not capable of quick start up or shut down needed for an intermediate load facility.

2.3.5 Repowering/Uprating of Existing Generating Units

Basin Electric has completed upgrading the high pressure and intermediate pressure (HP/IP) turbine section of the main turbine at all three coal-fired units of the Laramie River Station. The Unit 2 upgrade occurred in the spring 2007 routine maintenance outage, Unit 3 upgrade occurred in the spring 2008 routine maintenance outage and Unit 1 upgrade occurred in the spring 2009 routine maintenance outage. The upgrade to the HP/IP turbine was anticipated to increase the net output of each unit by 8-12 MW for a total of 24-36 MW at the Laramie River Station. Each unit at the Laramie River Station has achieved at least the 12 MW increases, with two of the units increasing more than 12 MW. Basin Electric received 42.27 percent of this increased net output due to its 42.27 percent ownership share of the Missouri Basin Power Project (MBPP). Basin Electric has retrofitted the low-pressure (lp) turbine sections of Unit 2 in the Leland Olds Station. This upgrade increased the net output by 5.5 MW. These increases in net output are due to efficiency increases, without increasing the fuel input to the units.

While Basin Electric has made progress in upgrading existing facilities, it is apparent that the scale of the improvements does not alleviate the need for the intermediate resource fulfilled by the current proposal.

2.3.6 Purchased Power/Request for Proposals (RFP)

Basin Electric has signed a 25-year contract with the developer of the four current Recovered Energy Generation (REG) power plants, which are fueled by hot exhaust heat off the Northern Border Pipeline (NBPL), to purchase the output from four additional REG power plants. There will be one site each in

Montana and Minnesota, and two sites in North Dakota. These additional four sites should have a total combined output of 22 MW and are anticipated to be operational in 2009-2010. The generation is environmentally benign, using virtually no additional fuel and producing virtually zero emissions.

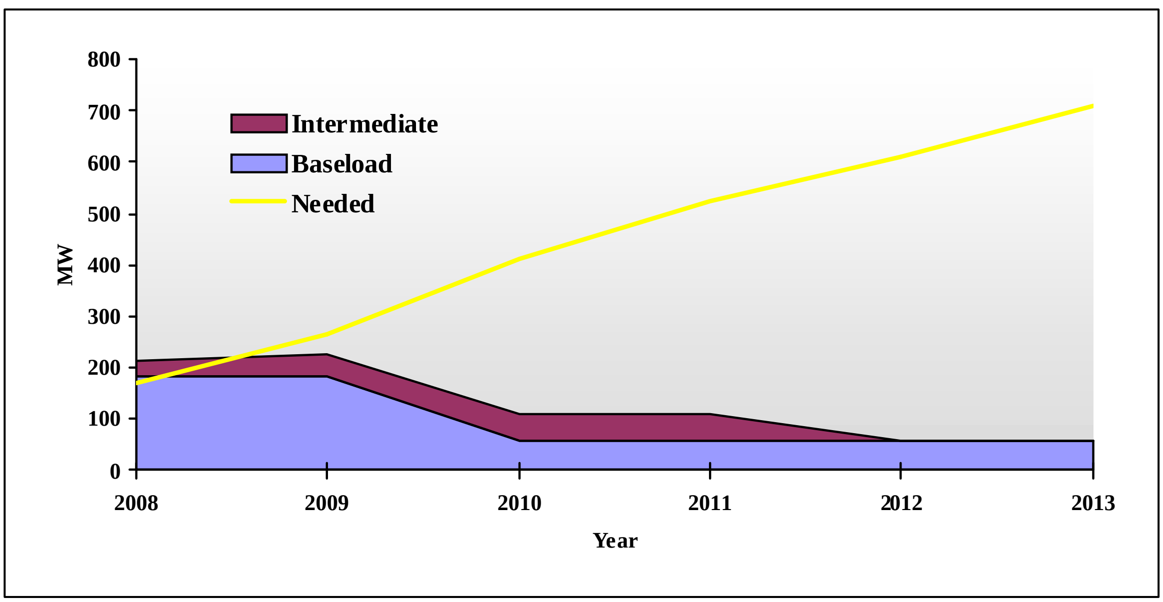
Basin Electric hired a contractor to develop and issue a RFP in early 2007 for short and long-term power supply on both its eastern and western system. The long-term proposals were used to evaluate against Basin Electric's self-build options. The short-term proposals could be utilized to meet some of Basin Electric's need in the next couple of years. Renewable proposals were also sought.

2.3.6.1 Short-term Proposals

Basin Electric received short-term proposals from nine different entities for power products located in both of Basin Electric's eastern and western systems. The short-term proposals were evaluated by the contractor.

Figure 2-3 compares Basin Electric's eastern system needed generation capacity to the magnitude of proposals received. From this information it was determined that Basin Electric could purchase the needed power from the market through 2009 but would need to develop additional resources to meet the needed obligations beyond 2009. Basin Electric did elect to short-list one proposal from the proposals received for delivery into Basin Electric's eastern system. It was determined that the short-term proposals were more costly than Basin Electric's self-build options.

Figure 2-3: Eastern System Short-Term RFP Proposals



2.3.6.2 Long-term Proposals

Basin Electric received four conventional long-term power purchase proposals from two different entities for either coal generation or a combination combined-cycle and simple cycle generation. These conventional long-term proposals were evaluated and it was determined that the four long-term proposals were more costly than Basin Electric's self-build options.

2.3.6.3 Renewable Proposals

Basin Electric received 12 proposals from nine different entities for wind generation to provide intermittent power. These 12 wind proposals were located in North Dakota, South Dakota, Montana, and Wyoming. Wind generation, however, is not an "on call" resource and, therefore, is not capable of fulfilling the purpose and need for an intermediate resource on its own.

2.3.7 New Transmission Capacity

Today there is limited available transmission capacity on the transmission system to move power into the Integrated System (IS) from Nebraska Public Power District (NPPD), Mid-American Energy Company (MEC), Midwest Independent Transmission System Operator (MISO) or Saskatchewan. In order to bring in enough power to cover Basin Electric's total need, additional transmission would need to be built and there would probably be upgrades needed to third-party transmission systems in order to move the power into the region.

The other question is whether there is existing generation outside the region to meet Basin Electric's need. The RFPs provided few responses for power outside the IS area during the short term: one proposal within MISO, one proposal within MEC, and one proposal from within NPPD. One proposal for a long-term output of a new coal plant was received that would result in either additional transmission to be built or additional wheeling expense to move the power into the IS, or both. Because of these anticipated higher costs, Basin Electric determined it would be a better economic decision to build the new generation within the IS and therefore avoid some unnecessary transmission costs to provide power to the membership at the lowest reasonable cost.

2.3.8 Summary of Energy Alternatives

For the reasons described above, neither DSM, renewables (excluding wind), fossil fuel baseload and peaking units, nuclear, repowering/uprating of existing units, project partnerships, purchased power, nor new transmission capacity would meet the need for the intermediate generation resource needed by Basin Electric because they were either technically not feasible within Basin Electric's eastern service territory, they were not economically the lowest cost option, or they were best operated not at an intermediate mode of generation and therefore did not meet the need for intermediate generation. Combined-cycle combustion turbines (CCCT) are an excellent source to meet Basin Electric's intermediate generating resource need both economically and technically. CCCTs do not tend to have a stable fuel cost; however, the fuel is generally available when needed. Wind is also a source for intermediate generation, although not always available on a consistent basis. Wind can be combined with gas generation, where wind reduces the need to operate gas-fired generation to produce energy. Through Basin Electric's resource expansion analysis, Basin Electric determined an amount of wind generation and CCCT generation that was most economical to meet Basin Electric's need. For this particular EIS, the proposed Project is the CCCT component that was determined economically and technically feasible to meet Basin Electric's purpose and need.

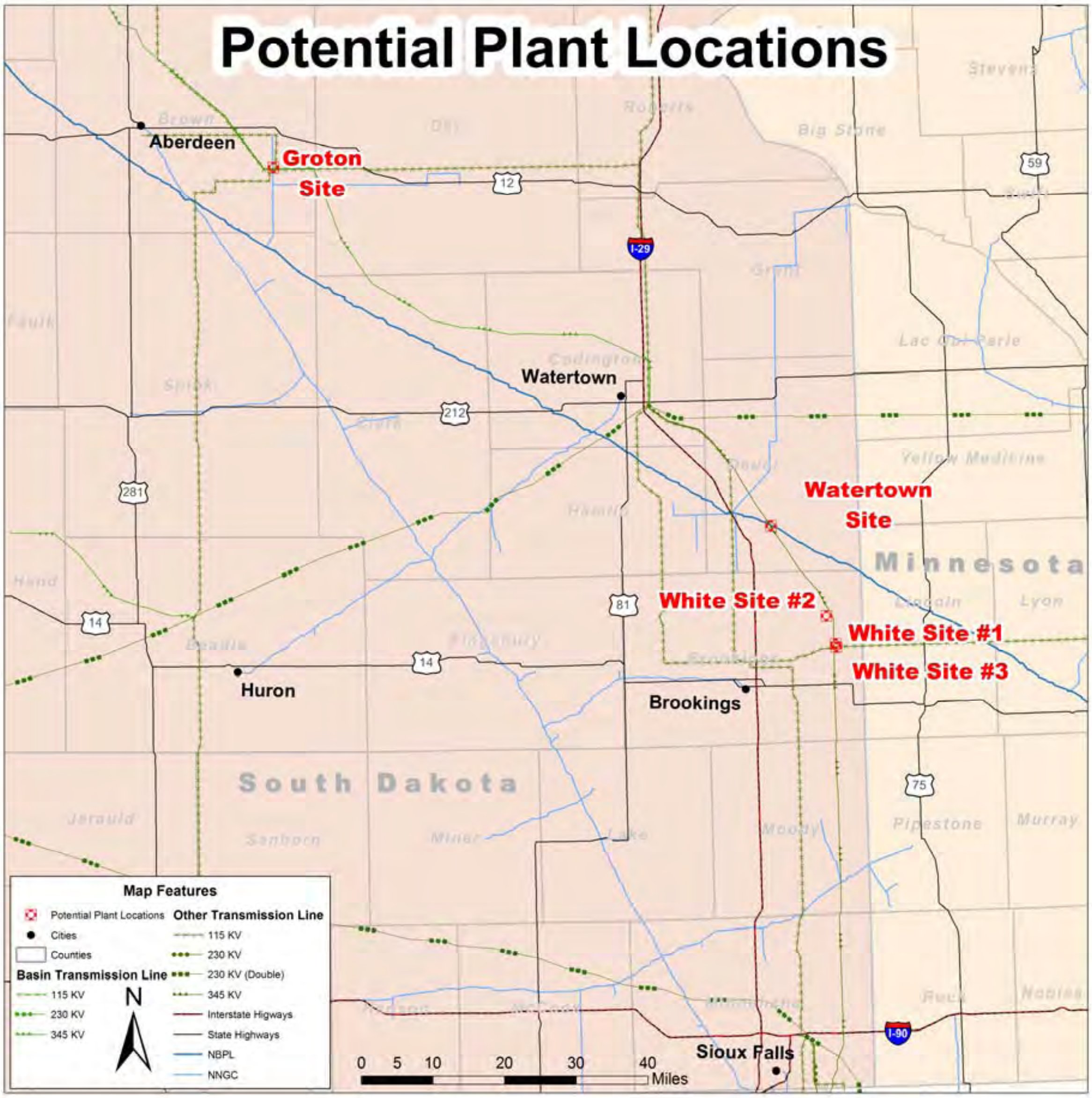
2.4 SITE ALTERNATIVES

Based on its PSA, Basin Electric has established the need for additional intermediate capacity to serve forecasted member load growth. Basin Electric has concluded that an intermediate resource located in eastern South Dakota is necessary to fulfill its member obligations. As discussed in the previous section, a CCCT facility appears to be the best alternative for Basin Electric's use as an intermediate resource. There were several factors considered in evaluating potential plant sites: access to a high-voltage transmission system with available capacity, natural gas fuel supply, water supply, existing land use and terrain, and proximity to residences.

Five potential plant sites (figure 2-4), located within Basin Electric's membership areas in eastern South Dakota, were initially identified as candidate sites that did not contain environmentally sensitive areas and had natural gas and transmission lines in the immediate vicinity. The Groton Site is located near Aberdeen, SD, the Watertown Site is about halfway between Watertown and Brookings, SD, and the White Sites 1, 2, and 3 are located near Brookings, SD.

Basin Electric staff completed an initial field review of these five sites in August and September 2007. The purpose of this site-screening field review was to verify the accuracy of databases used to locate existing natural gas pipelines, transmission lines and substations, and the spatial relationship of these resources to each other in the area surrounding the potential sites. Existing water supplies and transportation access were also identified. Potential environmental and human constraints in the area surrounding the potential sites were also noted. Regional air quality constraints, land use compatibility, geologic hazards, potential biological or cultural resource constraints, wetlands, and any potential for hazardous waste or spill sites in the general area were considered during this screening analysis.

Figure 2-4: Potential Plant Sites



Based on this initial field review, Basin Electric rejected three of the five potential sites from future consideration. The three sites rejected were the Groton Site, the Watertown Site, and White Site 3. The Groton Site was rejected due to property and transmission constraints associated with the previous installation of two simple-cycle peaking facilities. The Watertown Site was rejected due to the long distances to the nearest substation. White Site 3 was rejected because it is not large enough for a CCCT facility. The two sites that were suitable for further study following the initial screening were White Sites 1 and 2 (figure 2-5).

(THIS PAGE INTENTIONALLY LEFT BLANK)

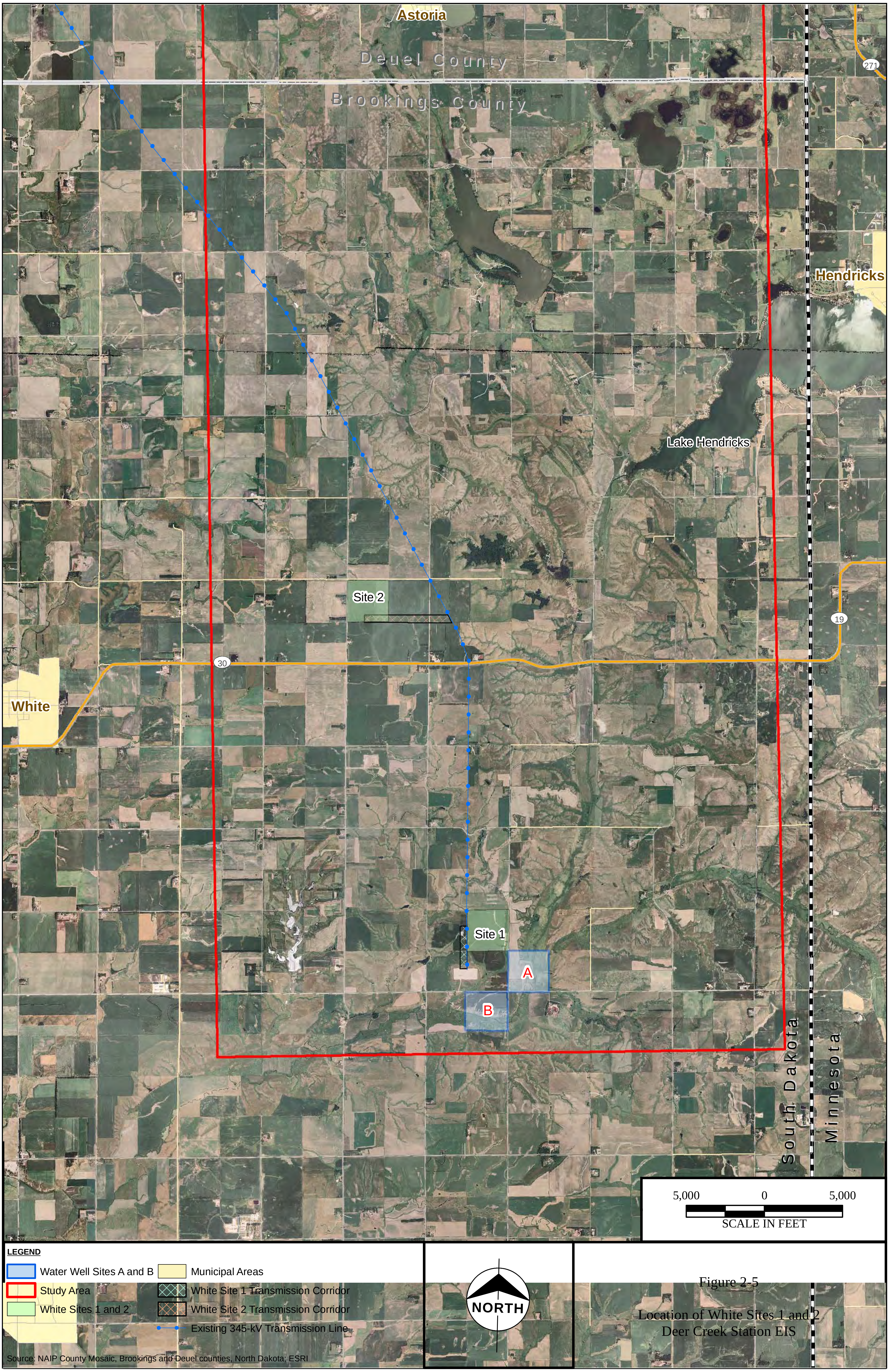


Figure 2-5

Location of White Sites 1 and 2
Deer Creek Station EIS

\\espsrv\data\projects\Basin\51236_EIS\GIS\DataFiles\ArcDocs\Revised_Figures_11_19_09\Figure 2-1_11_19_09.mxd Revised: 11/19/2009

2.4.1.1 Preliminary Site Analysis for Candidate Sites White Site 1 and 2

White Site 1 is located approximately 6 miles southeast of White, South Dakota, in the northeast quarter of Section 25, Township 111 North, Range 48 West, of the Fifth Principal Meridian, Brookings County. White Site 2 is located approximately 4 miles east-northeast of White, South Dakota, in the northwest quarter of Section 2, Township 111 North, Range 48 West, of the Fifth Principal Meridian, Brookings County.

2.4.1.1.1 Fuel Supply

The two sites under consideration (figure 2-6 and figure 2-7) are located near the NBPL, thus ensuring a reliable natural gas fuel source is available. Firm gas supply and transportation agreements are in place with the Dakota Gasification Company for delivery through the NBPL that meets Mid-Continent Area Power Pool (MAPP) accreditation requirements. The compressor station locations are also favorable because of existing aboveground pipeline taps. White Site 1 is located further from the NBPL than White Site 2; however, the rugged topography of the area near White Site 2 dictates that the pipeline to either site would be nearly the same length. As a result, neither site has an advantage over the other with respect to fuel supply. The initial potential natural gas pipeline routes are noted in figure 2-8 and the final proposed natural gas pipeline routes are identified in figure 2-9.

Figure 2-6: View Looking South from the North Boundary of White Site 1

Figure 2-7: View Looking Southeast from the Northwest Corner of White Site 2

During the initial routing phase for the gas pipeline routes, several variations were identified to connect the alternate pipeline route from White Site 2 to the preferred pipeline route from White Site 1. Three variations were included that would allow crossover from the alternate route to the preferred route, and vice versa, at various points along the routes (figure 2-8). After initial evaluations, it was determined that the original preferred (from White Site 1) and alternate (from White Site 2) pipeline routes were sufficient and more practical from a constructability standpoint, and that the crossover segments were unnecessary. Therefore, these segments were removed from further consideration as part of the gas pipeline route alternatives. As part of final evaluation to determine proposed routes, field investigations were conducted by the proposed pipeline constructor, and they identified slight modifications of the proposed preferred routes. These are noted in figure 2-9.

2.4.1.1.2 Land Use/Terrain

The terrain in the White Site 1 study area is relatively flat and slopes from the northwest to the southeast; the area surrounding the site is well drained. The area under consideration for White Site 1 is agricultural, consisting primarily of farmland. The elevation of White Site 1 is approximately 1850 feet above mean sea level (msl). The terrain around the White Site 2 study area is very flat consisting primarily of farmland. The elevation of White Site 2 is approximately 1935 feet above msl.

Since both sites are relatively flat, neither site has an advantage over the other with respect to constructability. However, White Site 1 is preferred with respect to terrain because the slope of White Site 1 would allow better drainage than White Site 2. Both sites are currently used for agriculture. White Site 1 has approximately 1.60 acres of wetlands, while White Site 2 has 1.69 acres; however, the proposed Project would be configured to avoid wetlands to the extent practicable.

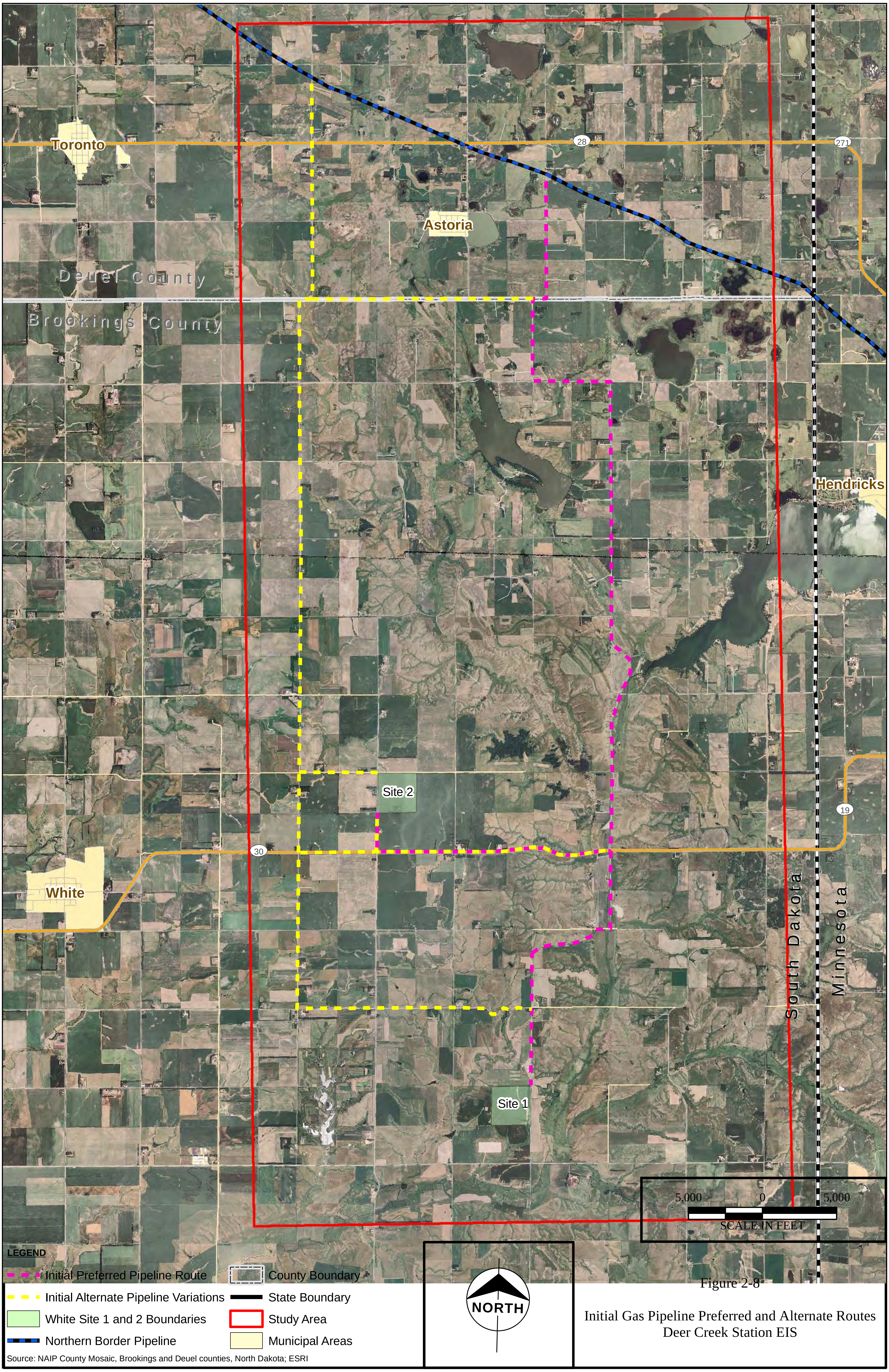


Figure 2-8

Initial Gas Pipeline Preferred and Alternate Routes
Deer Creek Station EIS

\\espsrv\data\projects\Basin\51236_EIS\GIS\DataFiles\ArcDocs\Revised_Figures_11_19_09\Figure 2-8_11_19_09.mxd Revised: 11/19/2009

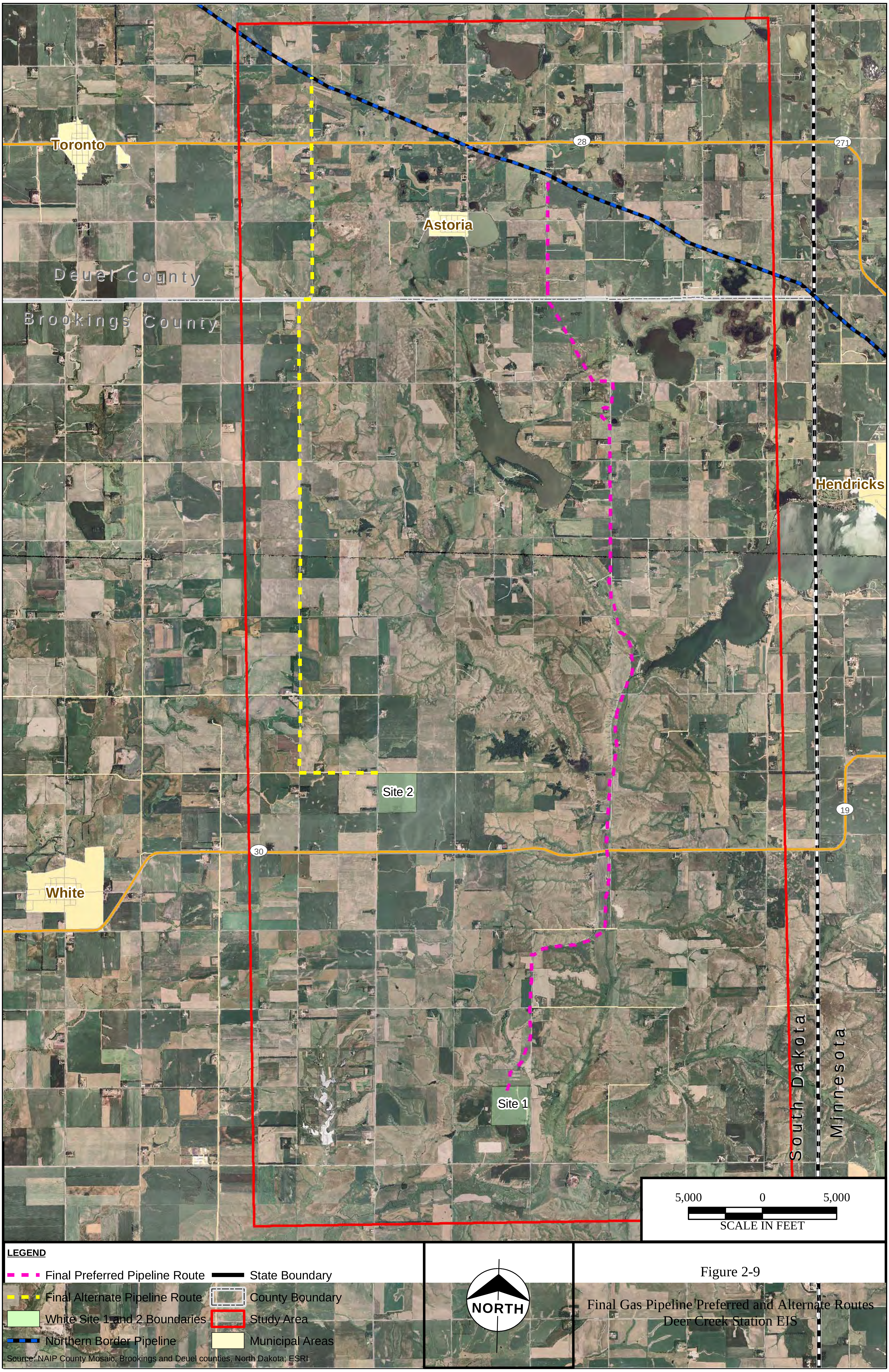


Figure 2-9

Final Gas Pipeline Preferred and Alternate Routes
Deer Creek Station EIS

\\espsrv\data\projects\Basin\Basin\51236_EIS\GIS\DataFiles\ArcDocs\Revised_Figures_11_19_09\Figure 2-9_11_19_09.mxd Revised: 11/19/2009

2.4.1.1.3 Water Supply

Water usage for the proposed CCCT facility would be minimal because an air-cooled condenser would be used to condense the steam that exits the steam turbine, rather than a water-cooled condenser and cooling tower combination for this purpose. The facility would use water for control of nitrogen oxide (NO_x) emissions, evaporative cooling, and for make-up water for steam supply. A single-unit facility would normally consume 25 gallons of treated water per minute with a maximum of 60 gallons of treated water per minute. The facility is proposing to use groundwater as a source of water if a source is identified that meets quantity and quality criteria. Water provided by the existing rural water system would be pursued as an alternative. Currently, the exact location of a sufficient groundwater source for the sites remains undetermined; several test wells would be required to locate a source capable of delivering both sufficient water supply and properties to satisfy various station service water requirements. Two alternative sites were investigated as a water supply source for White Site 1. These are designated Water Well Sites A and B on figure 2-5. Water Well Supply Site A did not offer adequate pumping rates or aquifer recharge and therefore was not a feasible location. This left Water Well Supply Site B to be evaluated in detail in the EIS. For White Site 2, access to rural water supply infrastructure is readily available, and wells were not investigated. A one-mile rural water line extension along 202nd Street is included in the proposed action.

2.4.1.1.4 Transmission Access

Existing transmission in the vicinity of White Site 1 includes Western's Watertown to White 345-kV line just west of the site. The existing 345/115-kV White Substation owned by Western is located approximately 0.5 mile southwest of the potential site. Western's Split Rock to White 345-kV runs south of the White Substation. There are presently two 115-kV transmission lines (one owned by Western and one owned by East River Electric Power Cooperative) tied into this substation. A 345/115-kV substation owned by Xcel is located approximately 0.3 mile south of White Site 1. White Site 2 is located approximately 0.3 mile west of the same Western 345-kV line. Should White Site 2 be pursued a new 345-kV substation would be required at the plant and a double-circuit 345- kV transmission line would be required to tie into the existing Western 345-kV line at a point located approximately 0.75 miles east of the plant site. The proposed transmission line corridors are identified on figure 2-5.

The shorter transmission line associated with White Site 1 would cause less land to be disturbed by construction activities and would also be less costly due to fewer materials and less labor being required. White Site 2 would require an electrical substation to be built on site in order to get the power out of the site. White Site 1 would not require the construction of a new substation. As such, White Site 1 has a significant advantage over White Site 2 since it is much closer to the high-voltage transmission system.

2.4.1.1.5 Proximity to Residences

A facility on White Site 1 would be located approximately one mile away from the nearest occupied residence while on White Site 2 it would be located approximately 0.5 mile away from the nearest occupied residence. Therefore, White Site 1 has an advantage over White Site 2 because it is located farther away from the nearest occupied residence.

2.4.1.1.6 Site Selection Summary

Based on the evaluation criteria applied in the site selection process (access to a high voltage transmission system with available capacity, fuel supply, water supply, existing land use and terrain, and proximity to nearest occupied residences), White Site 1 has advantages over White Site 2. The terrain of White Site 1 allows for better drainage than White Site 2. The lower elevation of White Site 1 means that a gas turbine would perform marginally better at White Site 1 than at White Site 2. The relatively short distances to high voltage transmission facilities at White Site 1 would cause fewer disturbances of natural resources and be less costly because fewer materials and less labor would be required when compared to White Site 2. White Site 1 is also further away from the nearest occupied residence than White Site 2. For the reasons listed above, Basin Electric has selected White Site 1 as its Preferred Site.

2.5 NO ACTION ALTERNATIVE

Under the No Action Alternative, Western would not approve an interconnection agreement to its transmission system and RUS would not award a loan or loan guarantee to finance the construction and operation of the proposed Project. For the purpose of impact analysis and comparison in this EIS, it is assumed that Basin Electric's proposed Project would not be built and the environmental impacts, both positive and negative, associated with construction and operation would not occur. However, as Basin Electric is a utility obligated with load growth responsibility to its membership, it is reasonable to expect that it would construct a similar generation facility elsewhere in eastern South Dakota. For example, the facility could potentially interconnect with a non-Federal substation. Such a facility may not connect to a Federal transmission system, involve Federal financing, or have any other Federal nexus and, therefore, would not initiate a NEPA process. If Western were not to approve the interconnection agreement and RUS were not to award a loan or loan guarantee, the environmental impacts associated with the construction and operation of the proposed Project at this location would not occur. Basin Electric would have to find an alternate means to increase the intermediate generation demand for electric power in the eastern portion of its service area through some other project proposal, which would likely result in environmental impacts similar to, but potentially greatly different from, those identified for the proposed Project.

2.6 SUMMARY OF IMPACTS BY RESOURCE

Table 2-1 is a summary of construction and/or operational impacts associated with the proposed Project. Discussion of these impacts is found in chapter 4 of this EIS.

Table 2-1: Summary of Impacts

Resource	White Site 1	White Site 2	No Action Alternative
Air	Increase in emissions during construction from vehicles and equipment would be minimal for CO, NO_x, and VOC; particulates (dust) from site preparation and traffic on unpaved roads; all construction and operation emissions meet regulations; *de minimis* emissions of hazardous air pollutants (HAP); largest potential HAP is formaldehyde at 4.5 tpy		No impact
GHG Emissions	Not a major source of GHG emissions; estimated carbon dioxide (CO_2) emissions three one thousandths of one percent (0.00003) of global man-made emissions		No impact
Geology, Soils and Farmland	No unique geologic features; permanent prime farmland impacts of 40 acres of the 100 acre facility site (60 acres still available for hay or pasture); loss of 1 acre at water well supply site	No unique geologic features; permanent prime farmland impacts of 46 acres of the 100 acre site (54 acres still available for hay or pasture)	No impact
Water Quality	Potential sedimentation from site preparation, pipeline construction, transmission line construction, road improvements, and water line construction. No disturbance of pre-existing contamination; some use of hazardous chemicals on site	Potential sedimentation from site preparation, pipeline construction, transmission line construction, substation construction, and water line construction. No disturbance of pre-existing contamination; some use of hazardous chemicals on site	No impact
Floodplains	No floodplains on facility site; water well located in Deer Creek floodplain; pipeline construction crosses floodplains	No floodplains on facility site; pipeline construction crosses floodplains	No impact
Groundwater	Pumping of six million gallons per year or 18 acre-feet from Big Sioux aquifer for cooling water; crossing by natural gas pipeline of Zone B Well Head Protection Areas (29,262 linear feet)	Six million gallons per year of water would be obtained from municipal water supply, which is obtained from Big Sioux aquifer. Crossing by natural gas pipeline of Zone A Well Head Protection Area (805 linear feet) and Zone B (8,033 linear feet)	No impact

Resource	White Site 1	White Site 2	No Action Alternative
Wetlands and Streams	Based on National Wetland Inventory (NWI), impacts of 0.0 acres on facility site, 0.0 acres for transmission line corridor, 0.0 acres for water pipeline corridor; temporary impacts of 1.75 acres in natural gas pipeline corridor; delineated wetlands of 3.2 acres on facility site, to be avoided to the extent practicable; delineated temporary impacts of 6.6 acres in natural gas pipeline corridor, 2.5 acres in water pipeline corridor, and 0.2 acres in transmission line corridor; some high quality prairie potholes crossed	Based on NWI, wetland impacts of 0.02 acres on facility site and 0.21 acres for substation; temporary impacts of 1.70 acres for transmission line corridor, 0.05 acres in rural water pipeline corridor and 0.61 acres in natural gas pipeline corridor; some high quality prairie potholes crossed	No impact
Vegetation	Existing site is cultivated cropland; a 100-foot wide corridor would be cut through existing narrow forested shelterbelt along eastern edge of the site for waterline and access road; natural gas pipeline is 47 percent cultivated cropland and 34 percent pasture; distance through native prairie is 2,620 linear feet	Existing site is cultivated cropland; woodland on site would be avoided; natural gas pipeline is 55 percent pasture and 40 percent cultivated cropland, and 5 percent forested shelterbelt; no native prairie impacts	No impact
Wildlife	Minimal impacts; generation facility would be near inactive raptor nests and great horned owl nest; transmission line of 0.75 mile poses some collision risk to avian species	Minimal impacts; transmission line of 0.50 mile poses some collision risk to avian species	No impact
Special Status Species	Topeka shiner habitat in nearby Deer Creek and tributaries would not be impacted; also suitable habitat for Dakota skipper	Suitable habitat for Dakota skipper	No impact

Resource	White Site 1	White Site 2	No Action Alternative
Socioeconomics	360 temporary construction workers and 30 permanent employees; local government services adequate for worker influx; positive benefits from property taxes and right-of-way (ROW) easements		No impact
Environmental Justice	No impact	No impact	No impact
Land Use	115 acres needed (75 acres of site still available for agricultural uses); new 13.2-mile pipeline ROW (all still available for agricultural uses)	109 acres converted to utility uses (63 acres still available for agricultural uses); new 10-mile pipeline ROW (all still available for agricultural uses)	No impact
Transportation	No adverse level of service impacts; roadways to be paved at intersections and near plant site; heavy haul temporary bridge over Deer Creek	No adverse level of service impacts; roadways to be paved near plant site	No impact
Visual	Project visible for up to four miles but would mix in with wind turbine views	Project visible for up to four miles; highly visible from SD 30; would mix in with wind turbine views; new substation would be additional new visual intrusion	No impact
Noise	Construction noise impacts; short term steam blow event; operational impacts within HUD guidelines	Construction noise impacts; short term steam blow event; operational impacts within HUD guidelines	No impact
Public Health and Safety	Conformance to all OSHA safety procedures for plant workers; minor general public impacts from increased traffic		No impact
Intentional Destruction	Minor security issues		No impact
Cultural Resources	No impacts to National Register of Historic Places (NRHP) eligible properties	Potentially NRHP-eligible sites on natural gas pipeline route	No impact
Recreation	Temporary impact to one Walk-in Area WIA (State hunting lease area) during pipeline construction	No impacts to public lands or hunting lease areas	No impact

* * * * *

(THIS PAGE INTENTIONALLY LEFT BLANK)

3.0 AFFECTED ENVIRONMENT

The affected environment is the physical area in which resources could be impacted by Western's and RUS's Federal actions and the construction, operation, and maintenance of Basin Electric's proposed Project. The boundaries of the region analyzed may vary depending on the resource. Because both sites are located in the same county and involve similar environmental resources, most statements generally describing the study area (figure 2-1) apply to both sites. This EIS addresses the requirements of all applicable laws and regulations including the requirements of section 102(2) of NEPA, the CEQ Regulations implementing the Procedural Provisions of NEPA (40 CFR parts 1500-1508), DOE NEPA Implementing Procedures (10 CFR part 1021), RUS Environmental Policies and Procedures (7 CFR part 1794, as amended), DOE regulations for Compliance with Floodplain and Wetland Environmental Review Requirements (10 CFR part 1022), and other applicable laws, regulations, and Executive Orders (EOs), including, but not limited to, the following:

- ESA, section 7
- Farmland Protection Policy Act
- MBTA
- NHPA, section 106
- EO 11988 (Floodplain Management)
- EO 11990 (Protection of Wetlands)
- EO 12898 (Environmental Justice)
- EO 13007 (Indian Sacred Sites)
- EO 13045 (Protection of Children from Environmental Health Risks and Safety Risks)
- EO 13112 (Invasive Species)
- EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds)

Where applicable, this EIS also identifies additional permits and approvals that may be needed under other environmental laws, including the CWA and Safe Drinking Water Act. No Federal land is needed for the two alternative plant sites, natural gas pipeline route alternatives, water supply wells, or water pipeline extension. Termination of the transmission line would be the White Substation, a federally owned facility.

Based on scoping and proposed Project characteristics, the following resources could potentially be impacted:

- Air Resources, including GHG emissions and climate change
- Geological Resources, including prime, unique, and important farmland
- Water Resources, including surface water, wetlands, floodplains, and groundwater
- Biological Resources, including vegetation, wildlife, and endangered and threatened species
- Socioeconomic Resources, including environmental justice and protection of children
- Land Use
- Recreation
- Transportation
- Visual Resources
- Noise
- Public Health and Safety, including intentional acts of destruction
- Cultural Resources, including Indian Sacred Sites and historic properties

For air resources and socioeconomic resources, the area assessed includes the county affected and adjacent counties (Brookings, Moody, Deuel, Lake, Kingsbury, and Hamlin SD, and Lincoln MN).

For aquatic resources, the area assessed includes the Lac Qui Parle River watershed upstream of Lake Hendricks, the poorly defined drainages in the vicinity of Oak Lake and Astoria Lake, and the Deer Creek and Six Mile Creek watersheds.

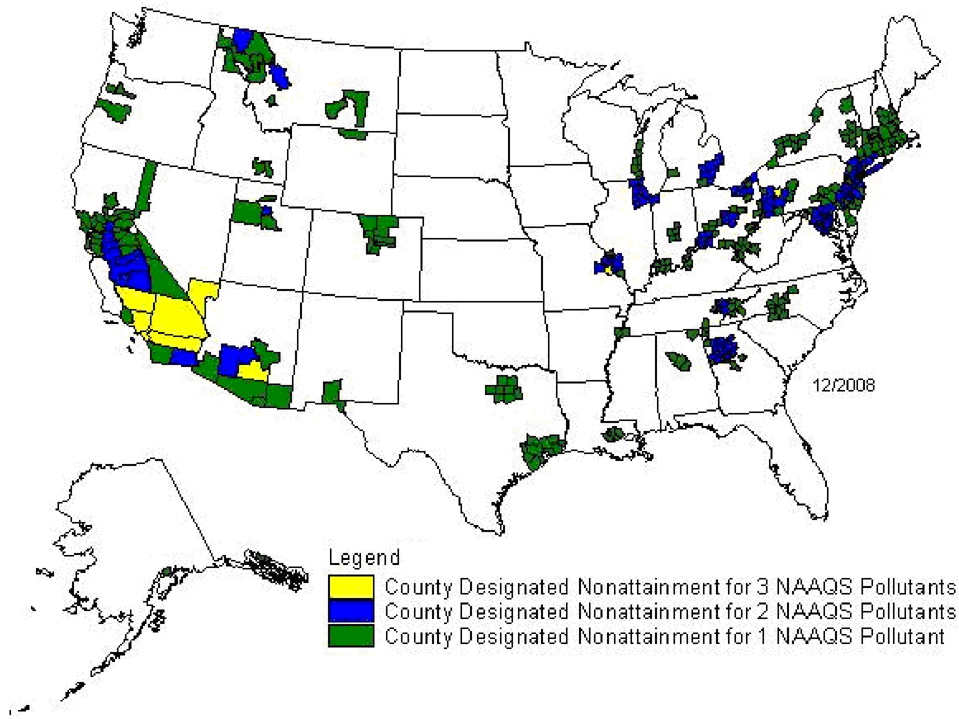
For terrestrial resources, the area assessed includes the ecoregion where the facilities are to be located. Ecoregions denote areas of general similarity in the type, quality, and quantity of environmental resources. According to the EPA, the proposed Project area is within the Northern Glaciated Plains, Big Sioux Basin ecoregion. The alternative pipeline routes extend into the Northern Glaciated Plains, Prairie Coteau ecoregion, in the area around Oak Lake and Lake Hendricks. The natural vegetation of both ecoregions is described as the tallgrass-shortgrass prairie transition (Bryce et al. 1998).

3.1 AIR RESOURCES

3.1.1 Air Quality Standards

All counties in South Dakota are currently in attainment for all National Ambient Air Quality Standards (NAAQS). (figure 3-1).

Figure 3-1: Counties Designated "Nonattainment" for NAAQS



Source: Environmental Protection Agency 2009b.

One air-monitoring site is operated in Brookings, located at the City Hall building in the center of the city. The area to the west of the site is residential and the areas north, east, and south have service-oriented businesses and light industry. Both PM_{10} and $PM_{2.5}$ are monitored at this location (AQS ID Number 46-011-0002).

PM_{10} sampling began at this site in 1989. The annual averages range from a high of 38 µg/m^3 in 1990 to a low of 17 µg/m^3 in 1993, compared to the annual standard of 50 µg/m^3. The trend shows concentration levels declining over the 19 years the site has been operating. In 2007, PM_{10} concentrations were up slightly from the previous year but still well below the highest concentration in 1990 (SDDENR 2008a). The reasons for the decline in particulates are unknown, but the decline may be related to the near-normal moisture levels in the eastern part of South Dakota in recent years.

3.1.2 Greenhouse Gases and Climate Change

Climate change refers to changes in the long-term trends of many climatic factors such as temperature, precipitation, or wind. There continues to be a degree of uncertainty surrounding the contemporary causes of climate change, and the importance of those changes. Climate change may be the result of:

- Natural factors such as solar and orbital variations

- Natural processes and cycles within the climate system (e.g., ocean circulation changes)
- Human activities that change the atmosphere's composition (e.g., land use changes, burning fossil fuels) and the land surface

A large number of scientists believe that global warming is occurring and causing climate change. They also believe greenhouse gases (GHGs) are major contributors to global warming and climate change. Assessments by the Intergovernmental Panel on Climate Change (IPCC) suggest that the Earth's climate has warmed between 0.6 and 0.9 degrees Celsius over the past century and that human activity affecting the atmosphere is "very likely" an important driving factor. According to the IPCC, "very likely" indicates that there is a 90 percent chance that this is the case. In the IPCC Fourth Assessment Report (IPCC 2007), scientists conclude that "most of the observed increase in globally-averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations." The IPCC goes on to state, "The observed widespread warming of the atmosphere and ocean, together with ice mass loss, support the conclusion that it is extremely unlikely that global climate change of the past 50 years can be explained without external forcing, and very likely that it is not due to known natural causes alone."

GHGs are gases that trap heat in the earth's atmosphere by absorbing and re-emitting solar radiation. GHGs such as water vapor and CO_2 occur naturally and are emitted to the atmosphere through natural processes and human activities. The IPCC estimates that water vapor is responsible for 60 to 80 percent of the world's greenhouse effect. Other GHGs such as fluorocarbons are created and emitted solely through human activities. The principal GHGs are CO_2, methane (CH_4), nitrous oxide (N_2O), and fluorocarbon gases (EPA 2009a).

CO_2 enters the atmosphere through the burning of solid waste, wood, and fossil fuels (oil, natural gas, and coal), and also as a result of other chemical reactions (e.g., manufacture of cement). Most CO_2 that is naturally produced through respiration and decomposition is taken up by photosynthesis of plants on land and in the oceans. CO_2 emitted by combustion of fossil fuels and industrial processes is causing CO_2 concentrations to increase in the atmosphere (IPCC 2007). CO_2 accounts for approximately 70 percent of global man-made GHG emissions (EPA 2006).

CH_4 is emitted during the production and transport of coal, natural gas, and oil; CH_4 is also emitted from livestock, agricultural processes, and organic waste decay and amounts to about 24 billion metric tons annually in the U.S. Natural CH_4 emissions globally are from wetlands, oceans, hydrates, and fires. CH_4 accounts for approximately 15 percent of global man-made GHG emissions (EPA 2006).

N_2Os are emitted during the combustion of fossil fuels and solid wastes, as well as during agricultural and industrial activities. N_2O accounts for approximately eight percent of global man-made GHG emissions (EPA 2006).

Fluorocarbon gases such as perfluorocarbons, hydrofluorocarbons, and sulfur hexafluoride are emitted from a variety of industrial processes. They are seven percent of global GHG emissions. They are not naturally produced (EPA 2006).

3.2 GEOLOGY, SOILS AND FARMLAND

3.2.1 Glacial Geology

The entire area affected by the proposed Project was glaciated. However, during the last glaciation (Wisconsin), glaciers parted around both sides of the Big Sioux Basin. The river developed when glacial meltwater flowed southward between the two glacial lobes. This led to a better-developed drainage network, fewer wetlands, and less topographic relief. The Prairie Coteau is an area of outwash built up at the edge of the ice sheet under the two glacial lobes. The Prairie Coteau is a plateau approximately 200 miles in length and 100 miles in width, rising above the prairie flatlands in South Dakota and Minnesota. It is comprised of thick glacial deposits, reaching a thickness of approximately 900 feet. Pierre Shale of Cretaceous age (rocks dating from 145 to 65 million years in age) underlies the till in most of the area (Bryce et al. 1998). The shale is enriched in selenium and other trace elements (Leibbrand 1985). Precambrian rocks (with ages greater than 570 million years in age) occur at still deeper levels (Bryce et al. 1998). Granite is quarried at Milbank, South Dakota, and outcrops of Sioux Quartzite are common. Layers of silt in the quartzite near Pipestone, Minnesota, to the southeast of the proposed Project, were quarried by Native Americans, and the stone was carved for pipe bowls. Within the proposed Project area, there are no substantial mineral resources. Sand and gravel deposits exist within pockets which have been utilized for construction and road base and concrete aggregates (Martin et. al. 2004).

3.2.2 Soils and Agriculture

The dominant soil order in this area is Mollisols, which developed under grassland vegetation, and tends to be classified as prime farmland. The soils in the area have a soil temperature regime reflecting their northern location, a soil moisture regime reflecting a moist climate, and mixed mineralogy (USDA NRCS 2006). They generally are very deep, well drained to very poorly drained, and loamy. The soils in the proposed Project area are comprised of three main groups based on their geological history: loess (wind-blown sediment derived from finely ground rocks associated with glaciers) which lies on the ridge-tops, residual material that formed in glacial plains and moraines, and alluvial material that lies in stream terraces and glacial outwash plains. The majority of the soil types in the proposed Project area of Brookings and Deuel counties are hydric, meaning that they contain standing water or are saturated most of the year; the hydric soils are associated with swales/potholes, floodplains, and outwashes. However, these soil types also contain drier areas and are extensively used for agriculture.

More than two-thirds of the proposed Project area in Brookings and Deuel counties is in farm production. Major soil resource concerns are wind erosion, water erosion, maintenance of the content of organic matter and productivity of the soils, soil wetness, and management of soil moisture. Conservation practices on cropland generally include systems of crop residue management, especially no-till or other conservation tillage systems that conserve moisture and contribute to soil quality. Other practices include terraces, vegetative wind barriers, grass waterways, and nutrient management (Brady and Weil 1996).

3.2.3 Farmland

Prime farmland, as defined by the USDA, is land that has been determined to have the best combination of physical and chemical properties for agricultural production and is available for farming (USDA NRCS 2009). In addition to prime farmland, land may be classified as unique farmland, which is used for the production of specific high value food or fiber crops, and farmland of statewide or local importance, as determined by the State or local jurisdiction.

In Brookings County, 51 soils are classified as prime farmland, 18 soils are prime farmland if drained, five soils are prime farmland if irrigated, and 18 soils are classified as farmland of statewide importance. In Deuel County, 40 soils are listed as prime farmland, 11 soils are prime farmland if drained, three soils are prime farmland if irrigated, and seven soils are classified as farmland of statewide importance.

In the portion of the proposed Project area within Brookings County, 44 of the soils found in this area are listed as prime or statewide important farmland. In the portion of the proposed Project area within Deuel County, there are 39 soils classified as prime or statewide important farmland. These soils account for approximately 60 percent of the entire proposed Project area.

3.3 WATER RESOURCES

3.3.1 Surface Water

Most of the proposed Project facilities for White Site 1 or White Site 2 would be located within the Big Sioux River basin. However, the northern-most portions of the proposed natural gas pipeline routes are within the Minnesota River Basin. Surface waters located within and adjacent to the proposed Project facilities include Lac Qui Parle River, Deer Creek, Six Mile Creek, Lake Hendricks, Oak Lake, isolated wetlands, and numerous unnamed intermittent and ephemeral stream tributaries. There are two waterways designated as Deer Creek in the proposed Project area, one flowing north to Lake Hendricks and one flowing southwest toward the Big Sioux River.

Lac Qui Parle River flows into Lake Hendricks, located just east of the White Site 1 Natural Gas Pipeline Route. Lac Qui Parle River then flows northeast into the Minnesota River. Other small streams in the northern portion of both pipeline routes are also tributaries to the Lac Qui Parle River. Deer Creek and its tributaries generally flow south along the proposed White Site 1 Natural Gas Pipeline Route and turn in a southwesterly direction south of White Substation. Six Mile Creek generally flows southwest and is located to the west of the proposed Project. Both Deer Creek and Six Mile Creek are tributaries to the Big Sioux River. Oak Lake is a very large prairie pothole, located southwest of the northern portion of the proposed White Site 1 Natural Gas Pipeline Route. It does not have a surface drainage outlet.

All drainages within the proposed Project area are on privately owned lands. These lands have been impacted by agricultural use, including grazing, haying, and tilling.

As required under section 303(d) of the Federal CWA, the SDDENR has identified and created a list of impaired water bodies that require the development of Total Maximum Daily Limits (TMDLs). A TMDL is the amount of pollution a water body can receive and still maintain water quality standards established by the U.S. EPA. The main causes of impairment within the Big Sioux River basin are fecal coliform, mostly from livestock operations and municipal sewage, and total suspended solids, mostly from cropland and streambank erosion. Lakes within the Big Sioux Basin are eutrophic due to algae, nutrient enrichment, and siltation. Most prairie pothole lakes and wetlands are undergoing a natural process of gradually turning into marshes and eventually into dry land, as vegetation production and natural inputs of dust and sediment eventually displace the water features. Lakes in the Big Sioux Basin which are impaired include School Lake in Deuel County and West Oakwood Lake in Brookings County. Streams in the Big Sioux Basin that are listed as impaired include North Deer Creek, located to the west of I-29; and Spring Creek, located in southeastern Brookings County. Six Mile Creek, Deer Creek, and Medary Creek, which drain the proposed Project area, are unassessed.

The pipelines proposed to serve the alternative plant sites also enter the Minnesota River drainage. Lake Hendricks, located east of the White Site 1 Natural Gas Pipeline Route, is on the 303(d) list because it had a Trophic Scale Index (TSI) value that was higher than the assigned numeric standard for a warm water, semi-permanent fishery. TSI values quantify productivity based on algal biomass (SDDENR 2008b).

Water quality in Lake Hendricks has deteriorated due to nutrient and sediment loading. The Brookings County Conservation District works with landowners to install field windbreaks, shelterbelts, filter strips, cattle rock crossings, and riparian buffers. In addition, cattle access to Lake Hendricks has been reduced by fencing (BCD 2002).

3.3.2 Floodplains

Both Brookings and Deuel Counties participate in the Federal Emergency Management Agency’s (FEMA) National Flood Insurance Program, which allows residents to purchase special insurance at subsidized rates, although only Brookings County enforces the Flood Damage Prevention Ordinance. This ordinance puts specific restrictions on construction in floodplains. There are no designated 100-year flood plains in the rural areas of Deuel County. Within the proposed Project area in Brookings County, designated floodplains are along Deer Creek and Six Mile Creek (tributaries to Big Sioux River) and along the other stream designated as Deer Creek that flows into Lake Hendricks and the Lac Qui Parle River). These streams have wide floodplains due to the lack of time to develop meanders, as the streams are relatively younger than the streams they flow into, e.g. the Big Sioux River, and have overall less stream flow. The floodplains of Deer Creek and Six Mile Creek are generally hundreds of feet in width. The water well supply sites are located within the Deer Creek floodplain. The designated floodplains in the vicinity of White Site 1 and White Site 2 are delineated on figure 3-2.

3.3.3 Groundwater

The main source of groundwater occurring in Brookings County is that of the Big Sioux Aquifer. Most of the public water supply in this area comes from the Big Sioux Aquifer (BCPC 2000). Sediments and soils that overlie the Big Sioux aquifer are thin and very permeable, which means that the aquifer is susceptible to contamination from the land surface. In some locations, the groundwater from this aquifer is not suitable for human use because of high nitrate concentrations due to human or agricultural sewage. Other chemical substances present at levels considered high for drinking water are iron, manganese, and sulfate. However, the water is usually good in quality for other uses. The best water quality in the aquifer occurs where it is thickest and the potential to dilute pollutants is greatest, including in Brookings County (Liebbrand 1985).

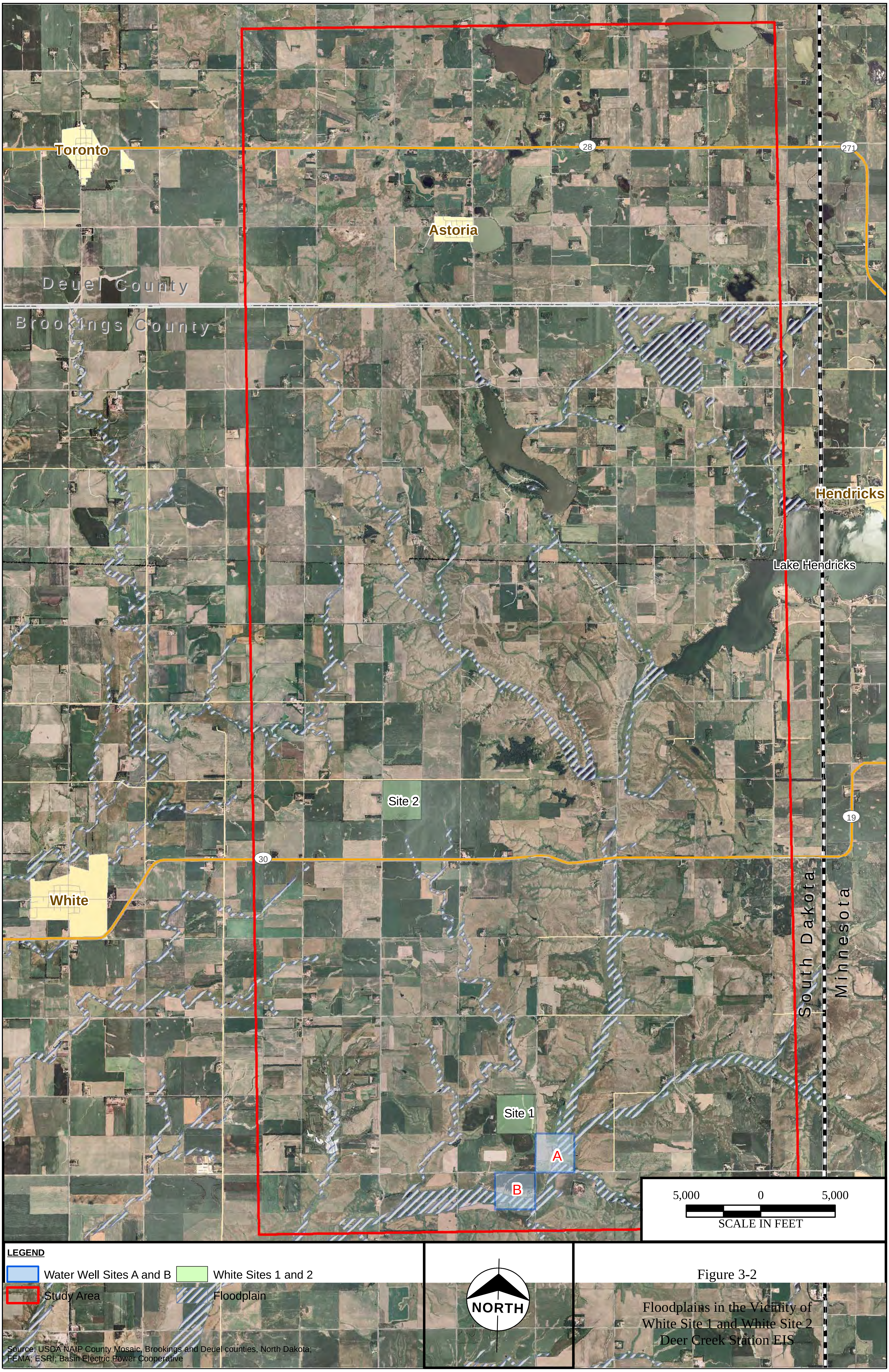


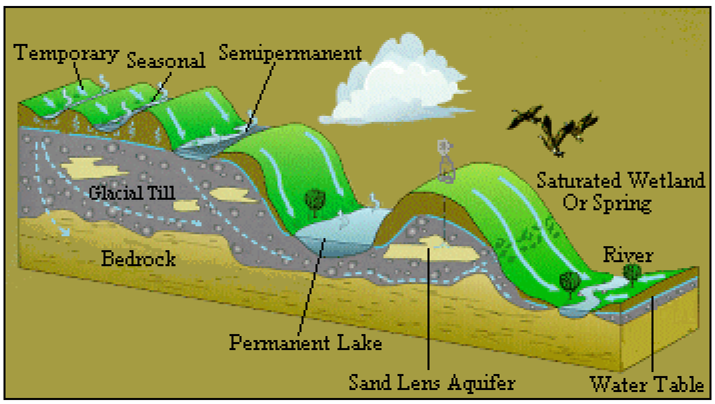
Figure 3-2

Floodplains in the Vicinity of White Site 1 and White Site 2
Deer Creek Station EIS

\espsrv\data\projects\Basin\Basin\51236_EIS\GIS\DataFiles\ArcDocs\Revised_Figures_11_19_09\Figure 3-2_11_19_09mxd Revised: 11/19/2009

Other groundwater can be found within the proposed Project area below streams and bodies of water, such as Lac Qui Parle River, Deer Creek, Six Mile Creek, Lake Hendricks, and Oak Lake. The water from these sources seeps down into the underlying sediment, which are glacial drift formations and deposits of outwash composed of sand and gravel. The groundwater in these aquifers is generally shallow at less than fifty feet from the surface (DCPC 2004a). The aquifers are complex, consisting of many small aquifers that are hydrologically associated with several large aquifers and the Big Sioux River. Yields in some areas are not reliable. For most uses, the water in these aquifers is of acceptable quality. However, in some locations, there are high nitrate concentrations due to livestock waste seepage into the water table (Amundson and Koch 1985; Leibbrand 1985). The complex pattern of hydrology in the prairie pothole region is illustrated in figure 3-3.

Figure 3-3: Hydrology of the Prairie Pothole Region



(Source: Johnson et al. 1997)

Eleven counties in eastern South Dakota, including Brookings and Deuel Counties, have delineated Well Head Protection Areas. Such protection involves protecting ground water supplies by eliminating and controlling pollution sources that may affect surface and sub-surface areas surrounding water wells or well fields. South Dakota has divided levels of protection into three different zones. Zone A is the area most immediate to wells and requires the highest degree of protection from potential contaminants. Zone B is an intermediate zone and requires less protection than Zone A; this generally includes shallow aquifer boundaries. Zone C includes the outermost portion of a wellhead protection area. Shallow aquifer boundaries, and thus Zone B areas, exist throughout the proposed Project area, generally underlying surface waters where groundwater recharge occurs. There are Zone A Well Head Protection Areas in and around the town of Astoria in Deuel County in the north-central part of the proposed Project area (DCPC 2004b).

3.3.4 Wetlands

Wetlands are scattered throughout much of eastern South Dakota. The types of wetlands found in this area range from large lakes to small temporary wetlands, such as prairie potholes. Wetlands are characterized by hydrological indicators, hydric soils, and hydrophytic vegetation. Examples of hydrophytic vegetation commonly found in eastern South Dakota include reed canarygrass (*Phalaris arundinacea*), prairie cordgrass (*Spartina pectinata*), cattails (*Typha* spp.), numerous sedge species, coyote willow (*Salix exigua*), peach-leaved willow (*Salix amygdaloides*), and plains cottonwood (*Populus deltoides*) (EDAW 2009a). Wetlands provide wildlife habitat, nutrient storage, water quality protection, flood control, and groundwater recharge. Wetlands in the proposed Project area of both alternative sites and associated facilities are indicated in appendix B.

The proposed Project area for both alternative sites and associated facilities contains a high density of small wetlands (Tiner 1999; SDDENR 2008b). These “prairie potholes” are an essential habitat for many migrating birds. Because the Upper Midwest region has a wide range of rainfall patterns, the boundaries of prairie potholes are difficult to identify during dry years because the drier portions of these wetlands are often cultivated and tilled (Tiner 1999).

The USFWS created Waterfowl Production Areas (WPAs) to protect and preserve wetland resources in South Dakota. An estimated 700 WPAs covering approximately 183,000 acres of wetlands and uplands were purchased by 1994. In addition, the FWS obtained easements on an estimated 613,000 wetland acres in South Dakota through 1994 (SDDENR 2008b). In the area of the proposed Project, WPAs are located to the east and west of the White Site 1 Natural Gas Pipeline route along the Deuel-Brookings county line. These WPAs are administered by the Madison Wetland Management District. In adjacent areas of Minnesota, WPAs in Lincoln County are administered by the Big Stone Wetland Management District.

The NRCS oversees the Wetlands Reserve Program (WRP), which is a voluntary program that provides financial incentives to landowners to protect, restore, and enhance wetlands on their property. Landowners either sell a conservation easement or enter into a cost-share restoration agreement with the USDA to protect and restore wetlands (USDA NRCS 2007).

As part of the look at the wetlands existing in the area, National Wetland Inventory (NWI) maps were reviewed in relation to the proposed Project facilities associated with the two alternative sites. This data allowed a comparison of the existing conditions for both proposed sites without conducting a detailed wetland delineation. This process was used as a screening tool to provide information about wetlands present for both sites and associated facilities. The more detailed wetland delineation used as part of the analysis to determine impacts to wetlands for the Applicant's preferred site is presented in section 4.4.2.

3.3.4.1 Facility Sites

White Site 1

NWI wetlands of 1.60 acres are indicated on maps for White Site 1. Wetlands at White Site 1 are associated with an intermittent drainage probably inundated during the wettest periods of the growing season. These are palustrine emergent (PEM) wetlands. Deer Creek is a tributary to the Big Sioux River, which is classified by the USACE as a traditional navigable water. Because the PEM wetlands are associated with an unnamed drainage which empties downstream into Deer Creek, these wetlands are likely jurisdictional waters. The jurisdictional status of the waters will be confirmed during section 404 permitting.

White Site 2

Based on available NWI maps and observations from public access roads, many of the small, isolated prairie pothole wetlands have been converted from hydrophytic vegetation to agricultural crops. However, some of the pothole wetlands are still intact. Many of the potholes have wetland hydrology and likely have hydric soils. NWI wetlands on White Site 2 total 1.69 acres. There are an additional 0.05 acres of NWI wetlands on the rural water pipeline extension.

3.3.4.2 Water Well Supply Site B and Water Pipeline

Water Well Supply Site B contains 5.18 acres of NWI wetlands. Most are associated with Deer Creek and adjacent topographic depressions on the southern half of the site. Deer Creek flows from east to west through the center of Site B. Hydrophytic vegetation associated with these wetlands includes reed canarygrass, barnyardgrass (*Echinochloa* spp.), bog yellow cress (*Rorippa palustris*), and creeping foxtail (*Alopecurus arundinaceus*). There are no NWI wetlands associated with the water pipeline to the facility site.

3.3.4.3 Natural Gas Pipeline Corridors

White Site 1 Natural Gas Pipeline Route

Approximately 1.75 acres of wetlands are indicated on NWI maps. Wetland features are associated with swales, topographic depressions, and perennial and intermittent drainages. The northern portion of the proposed corridor has several uncultivated prairie potholes and depressional wetlands. Most surface waters within the corridor contain wetland vegetation. The proposed corridor crosses nine drainages, including four tributaries to Deer Creek near the central and southern portions of the corridor and three tributaries to Oak Lake. Wetlands associated with the Deer Creek tributaries are likely classified as jurisdictional. The wetlands associated with isolated topographic depressions are likely non-jurisdictional, but are protected under EO 11990, Protection of Wetlands.

White Site 2 Natural Gas Pipeline Route

Upon the review of existing NWI maps and observations from public access roads, PEM, PSS, PFO wetlands totaling 0.61 acres are located within the White Site 2 Natural Gas Pipeline corridor. Wetland features are associated with swales, topographic depressions, and intermittent and perennial drainages. The northern portion of the alternative corridor contains numerous uncultivated prairie potholes and depressional wetlands that contain hydrophytic vegetation. This corridor crosses an estimated 17 drainages, including one tributary to Oak Lake, five tributaries to Deer Creek, and three intermittent tributaries to Six Mile Creek. Given the extensive involvement with streams, the alternative pipeline corridor would contain more area of wetlands than the preferred corridor.

3.3.4.4 Transmission Corridors

White Site 1 Transmission Line

No NWI wetlands are indicated in the White Site 1 Transmission Line corridor.

White Site 2 Transmission Line

Based upon observations from public access roads and the review of NWI wetland data, wetlands within the White Site 2 Transmission Line corridor include PEM, PSS, and PFO wetlands. Based on NWI maps, there are 1.7 acres of wetlands within the White Site 2 Transmission Line corridor. Wetland features are associated with swales, intermittent and perennial drainages, and topographic depressions. All perennial drainages appear to be south-flowing tributaries to Deer Creek. Wetland vegetation is similar to that found in the White Site 1 Transmission Line corridor.

3.4 BIOLOGICAL RESOURCES

3.4.1 Vegetation

The majority of the proposed Project area assessed for both sites and associated facilities is within the Big Sioux Basin, which has a well-developed drainage network. The ecoregion is in South Dakota and extends into southwestern Minnesota. The gentle topography and small number of wetlands in this ecoregion allow for more tilled land than adjacent ecoregions. Natural vegetation in the Big Sioux Basin ecoregion is primarily tall grass prairie plants, which includes big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), Indiangrass (*Sorghastrum nutans*), sideoats grama (*Bouteloua curtipendula*), and lead plant (*Amorpha canescens*). Other natural vegetation in this ecosystem includes hardwood trees, such as ash species (*Fraxinus* spp.), bur oak (*Quercus macrocarpa*), Osage orange (*Maclura pomifera*), as well as riparian plants, including willows (*Salix* spp.) and cord grasses (*Spartina* spp.). Cultivated crops include small grains, corn, sunflowers, and soybeans (Bryce et al. 1998).

A portion of the northeastern corner of the proposed Project area assessed for both sites is located in the Prairie Coteau ecoregion. The eastern arm of this ecoregion extends through parts of Minnesota and South Dakota. There is a poorly developed drainage pattern, as the landscape formed from glacial ice melting under a layer of sediment. The Prairie Coteau contains numerous wetlands and natural lakes. Natural vegetation in the Prairie Coteau ecoregion is also primarily tall grass prairie plants, including big and little bluestem, switchgrass, Indiangrass, and blue grama (*Bouteloua gracilis*). Land use includes pastureland in rolling areas and cultivated crops of small grains, corn, and soybeans in flat areas (Bryce et al. 1998).

Prior to field visits, aerial photography and National Land Cover Data (NLCD) were used in order to identify vegetation communities within the proposed Project area. During the field visits, Global Positioning System (GPS) units were used to record the density of noxious weeds and vegetation communities in the pipeline corridors. Although a complete inventory was not conducted during these field visits, a list of all observed vegetation species was created (EDAW 2009a). The vegetative composition of the proposed Project area is primarily cultivated crops and grassland (table 3-1).

Table 3-1: Vegetative Composition of the Proposed Project Area

Vegetation Type	Acres	Percent of Project Area
Open Water	2,119.20	2.71%
Developed, Open Space	2,628.00	3.36%
Barren Land (Rock/Sand/Clay)	12.01	0.02%
Deciduous Forest	463.69	0.59%
Grassland/Herbaceous	29,263.38	37.42%
Planted Pasture/Hay	6,632.93	8.48%
Cultivated Crops	34,366.45	43.95%
Woody Wetlands	23.57	0.03%
Emergent Herbaceous Wetlands	2,601.57	3.33%

The largest vegetation category, comprising about 44 percent of the proposed Project area, is cultivated annual crops. The areas under this classification also include lands being actively tilled. Agricultural crops in the proposed Project area include, in order of dominance, corn, hay, soybeans, and winter wheat (EDAW 2009a). The second largest vegetation type is grasslands, which account for more than 37 percent of the proposed Project area. These areas may be used for livestock grazing. The most common plants found in upland pasture areas are creeping bentgrass (*Agrostis stolonifera*), smooth brome (*Bromus inermis*), western wheatgrass (*Pascopyrum smithii*), Kentucky bluegrass (*Poa pratensis*), and tall dropseed (*Sporobolus asper*); bentgrass and brome are introduced species (EDAW 2009a). Smaller percentages of the area are in planted pasture and hay, developed lands, and wetlands.

3.4.2 Noxious Weeds

According to South Dakota statute FS 525, "Noxious Weed Control", landowners are required to control noxious weeds on their land. This is enforced by the South Dakota Department of Agriculture (SDDA). Federal agencies are also directed to prevent the introduction of invasive species and ensure that its actions are not likely to cause or promote the introduction or spread of invasive species (EO 13112). Noxious weeds are a problem for a number of reasons. They threaten wildlife by replacing natural vegetation and nesting habitat, threaten native plant species, and reduce crop productivity and increase soil erosion, contributing to sedimentation in water bodies, which in turn affects fish habitat (SDDOA DAS 2009).

South Dakota has two designations of noxious weeds, State and local. Table 3-2 and table 3-3 provide the State and locally listed noxious weeds and the acreage that each species affects in Brookings and Deuel Counties, as reported by the SDDA (2007). Noxious weeds identified during field surveys include Canada thistle (*Cirsium arvense*), musk thistle (*Carduus nutans*), and absinth wormwood (*Artemisia absinthium*).

Table 3-2: South Dakota State-Listed Noxious Weeds in Brookings and Deuel Counties

Scientific Name	Common Name	Infested Acres in Brookings County	Infested Acres in Deuel County
Cirsium arvense	Canada Thistle	>50,001	>50,001
Euphorbia esula	Leafy Spurge	1,001 - 5,000	>10,001
Lythrum salicaria	Purple Loosestrife	None Reported	<100
Sonchus arvensis	Perennial Sow Thistle	1,001 - 5,000	1,001 - 5,000

Source: South Dakota Department of Agriculture (2007), Retrieved February 4, 2009
http://www.state.sd.us/doa/das/noxious.htm

Table 3-3: South Dakota Locally Listed Noxious Weeds in Brookings and Deuel Counties

Scientific Name	Common Name	Infested Acres in Brookings County	Infested Acres in Deuel County
Artemisia absinthium	Absinth Wormwood	201 - 1,000	5,001 - 10,000
Carduus acanthoides	Plumeless Thistle	501 - 1,000	>10,000
Carduus nutans	Musk Thistle	501 - 1,000	>10,000

Source: South Dakota Department of Agriculture (2007), Retrieved February 4, 2009
http://www.state.sd.us/doa/das/noxious.htm

3.4.3 Wildlife

The Prairie Pothole Region, of which the Big Sioux and Prairie Coteau ecoregions are a small portion, is the most important waterfowl-producing region on the North American continent. Thousands of wildlife species likely occur within the State of South Dakota. There are more than 414 species of birds that occur within the State, including both resident and migratory species (Baker 2005). Appendix C lists some of the birds, mammals, reptiles, and amphibians that may occur near or within the proposed Project area. Appendix D lists fish species that may occur near or within the proposed Project area. The primary habitat types that occur within the proposed Project area are agricultural lands (pastureland and cropland), tall and mixed-grass prairie, woodlands (shelterbelts), wetlands, and riparian communities. The majority of the land within the proposed Project area is used for agricultural purposes. This section discusses common wildlife and habitats that may occur in the proposed Project area (EDAW 2009a).

The two species of big game that may occur within the proposed Project area are mule deer (*Odocoileus hemionus*) and white-tailed deer (*Odocoileus virginianus*). White-tailed deer are found throughout South Dakota and prefer wooded vegetation and river drainages on the prairie (Rice 1994). SDGFP harvest numbers indicate white-tailed deer are adapting and moving into agricultural landscapes and foraging in croplands. Wetlands, riparian areas, and shelterbelts are crucial for white-tailed deer cover during winter months and throughout the year. Mule deer are uncommon in the area, although their range within South Dakota does include the proposed Project area.

Coyote (*Canis latrans*), red fox (*Vulpes vulpes*), American badger (*Taxidea taxus*), raccoon (*Procyon lotor*), porcupine (*Erethizon dorsatum*), and striped skunk (*Mephitis mephitis*) are some of the larger mammals found within the proposed Project area, and these mammals use a variety of habitats including mixed-grass prairie, pastureland, forested areas, and drainages. Six species of bats are known to occur or have suitable habitat occurring within the proposed Project area (appendix C). Bats utilize tree cavities, crevices, caves, and overhangs as roosting sites, and are often found in proximity to surface water. The majority of other small mammals in eastern South Dakota are adapted to prairie and woodland habitats and associated drainages. These species include, but are not limited to, the least weasel (*Mustela nivalis*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), northern grasshopper mouse (*Onychomys leucogaster*), and prairie vole (*Microtus ochrogaster*).

Migrant and resident bird species in prairie habitat that may occur near the proposed Project include the brown-headed cowbird (*Molothrus ater*), eastern meadowlark (*Sturnella magna*), western meadowlark (*Sturnella neglecta*), red-winged blackbird (*Agelaius phoeniceus*), eastern bluebird (*Sialia sialis*), eastern kingbird (*Tyrannus tyrannus*), great blue heron (*Ardea herodias*), northern harrier (*Circus cyaneus*), killdeer (*Charadrius vociferus*), field sparrow (*Spizella pusilla*), northern flicker (*Colaptes auratus*), belted kingfisher (*Ceryle alcyon*), common nighthawk (*Chordeiles minor*), tree swallow (*Tachycineta bicolor*), turkey vulture (*Cathartes aura*), as well as numerous species of migrant shorebirds. Wild turkey (*Meleagris gallopavo*), mourning dove (*Zenaida macroura*), Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), as well as numerous other waterfowl species, are game bird species that may be found surrounding the proposed Project

Some common reptile and amphibian species that may occur near or within the proposed Project area include American toad (*Anaxyrus americanus*), bullfrog (*Lithobates catesbeiana*), tiger salamander (*Ambystoma tigrinum*), snapping turtle (*Chelydra serpentine*), ring-necked snake (*Diadophis punctatus*), and common garter snake (*Thamnophis sirtalis*). Amphibian species are most likely to be encountered around semi-permanent or permanent wetland areas, but are also found around man-made wetlands and riverine wetland areas (Fischer et al. 1999).

There are approximately 52 fish species that may occur near or within the proposed Project area. Water bodies located in and around the proposed Project range from small, unnamed tributaries to larger rivers and streams such as Deer Creek, as well as farm ponds and medium-sized lakes such as Lake Hendricks and Oak Lake. Common game fish species that may occur within the proposed Project area include channel catfish (*Ictalarus punctatus*), white crappie (*Pomoxis annularis*), smallmouth bass (*Micropterus dolomieu*), walleye (*Stizostedion vitreum*), and bluegill (*Lepomis macrochirus*). Nongame fish species such as creek chub (*Semotilus atromaculatus*), fathead minnow (*Pimephales promelas*), and banded killifish (*Fundulas diaphanous*) are likely to be found within the proposed Project area as well.

3.4.4 Special Status Species

County lists from the USFWS were used in determining which endangered species have the potential to occur in the proposed Project area. A recent EIS prepared for the White Wind Farm located adjacent to the proposed Project was also used to assist in the evaluation of impacts to endangered, threatened, proposed, and candidate species. In addition, an April 7, 2009, letter received from the USFWS contained lists of species and discussed other wildlife issues. The area of the proposed Project potentially contains habitat for two federally-listed endangered species, the Topeka shiner (*Notropis topeka*) and the American burying beetle (*Nicrophorus americanus*); one federally-listed threatened species, the western prairie fringed orchid (*Platanthera praeclara*); and one candidate species, the Dakota skipper (*Hesperia dacotae*). The list of plant and animal species considered threatened or endangered by the State of South Dakota was also reviewed (SDNHP 2008). Protected species with the potential to occur in the area of the proposed Project are listed in table 3-4.

Table 3-4: Threatened, Endangered, and Candidate Species

Name	Scientific Name	Federal Status	State Status
Invertebrates			
American burying beetle	*Nicrophorus americanus*	Endangered	
Dakota skipper	*Hesperia dacotae*	Candidate	Threatened
Fish			
Northern redbelly dace	*Phoxinus eos*		Threatened
Topeka shiner	*Notropis topeka*	Endangered	
Banded killifish	*Fundulus diaphanus*		Endangered
Blacknose shiner	*Notropis herolepis*		Endangered
Sturgeon chub	*Macrhybopsis gelida*		Threatened
Birds			
Bald eagle	*Haliaeetus leucocephalus*	*	Threatened
Osprey	*Pandion haliaetus*		Threatened
Whooping crane	*Grus americana*	Endangered	Endangered
Amphibians and Reptiles			
Eastern hognose snake	*Heterodon platirhinos*		Threatened
Lined snake	*Tropidoclonion lineatum*		Endangered
Northern red-bellied snake	*Storeria occipitomaculata*		Special Concern
Plants			
Western prairie fringed orchid	*Platanthera praeclara*	Threatened	

*Federally protected by the Bald and Golden Eagle Protection Act

Based on review of habitat information, state-listed species with the potential to occur in the proposed Project area are Dakota skipper, northern redbelly dace, banded killifish, blacknose shiner, and northern redbellied snake. Habitat descriptions for these protected species are found in Appendix E.

3.5 SOCIOECONOMIC RESOURCES

Various socioeconomic issues have been taken into consideration in analyzing the impacts of the proposed Project. Socioeconomic characteristics within the proposed Project area are discussed below and include population growth, racial and ethnic characteristics, housing trends, economic indicators, and employment.

3.5.1 Population Growth

Astoria, with a population of 150 persons in 2000, is one mile west of the proposed White Site 1 Natural Gas Pipeline Route and two miles east of the White Site 2 Natural Gas Pipeline Route (figure 2-1). White is six miles northwest of White Site 1 and four miles southwest of White Site 2, and has a 2000 population of 530. Astoria and White have remained relatively stable in population in recent years. The City of Brookings is located about 14 miles to the southwest of White Site 1 and 16 miles to the southwest of White Site 2. The population of Brookings grew from 16,270 in 1990 to 18,504 in 2000, a growth rate of 13.7 percent (U.S. Census Bureau 1990 and 2000). Brookings County grew by 12 percent from 1990 to 2000, while Deuel County lost 0.5 percent of its population (table 3-5). Adjacent Lincoln County, Minnesota also lost population.

Table 3-5: Population Change

	Population		% Change
	1990	2000	1990 to 2000
Counties			
Brookings County	25,207	28,220	12.0%
Deuel County	4,522	4,498	-0.5%
City/Town			
Astoria	155	150	-3.2%
Brandt	123	113	-8.1%
Brookings	16,270	18,504	13.7%
Bushnell	81	75	-7.4%
Toronto	201	202	0.5%
White	536	530	-1.1%

Source: US Census Bureau, 1990 and 2000 Census

The Brookings County comprehensive plan estimates that by 2015, the county will have a population of 28,228 persons, and the Deuel County comprehensive plan estimates that the county will experience a decrease in population by 2020 with 3,915 persons. The Lincoln County, Minnesota comprehensive plan estimates that by 2030 the population of the county will be between 4,500 and 6,500 persons.

3.5.2 Racial and Ethnic Characteristics

In order to characterize the racial and ethnic characteristics of the population in the area of the proposed Project, census data is analyzed at the county, city, and census block group levels.

The majority of the population of Brookings and Duel counties is white (table 3-6). The racial composition of the Block Groups covering the proposed Project area is similar to that of Brookings and Deuel counties. There are three census block groups that extend through the proposed Project area. The racial composition of the population in these census block groups is displayed with the county and city data in table 3-6, Population by Race. As compared to the population of Brookings County and the proposed Project area as a whole, the percent of the population that is American Indian/Alaskan and Hispanic is higher in Block Group 2 of Census Tract 9586. In this Block Group, 2.1 percent of the population is American Indian/Alaskan and 2.3 percent of the population is Hispanic. This Block Group also has the lowest percentage of white residents, with 95.6 percent. Overall, there is very little variation in the racial and ethic breakdown between the Block Groups, or between the Block Groups and the counties.

Table 3-6: Population by Race

	Total Pop.	White	Black or African American	American Indian/ Alaskan	Asian	Hawaiian/ Pacific Islander	Some other race	Two or more races	Hispanic*
Counties									
Brookings County	28,220	96.36%	0.31%	0.90%	1.34%	0.04%	0.30%	0.75%	0.88%
Deuel County	4,498	98.51%	0.09%	0.29%	0.18%	0.02%	0.24%	0.67%	0.76%
Lincoln County	6,429	98.82%	0.05%	0.28%	0.20%	0.00%	0.42%	0.23%	0.86%
Block Groups									
CT 9536, BG 3 (Deuel County)*	827	98.43%	0.24%	0.12%	0.24%	0.00%	0.36%	0.60%	0.48%
CT 9586, BG 1 (Brookings County)	1,306	98.62%	0.08%	0.54%	0.00%	0.00%	0.00%	0.77%	1.15%
CT 9586, BG 2 (Brookings County)	614	95.60%	0.00%	2.12%	0.81%	0.00%	0.81%	0.65%	2.28%

Source: US Census Bureau, 2000 Census

*CT (Census Tract), BG (Census Block Group)

3.5.3 Housing Trends

Single-family housing accounts for 58.4 percent of the housing in Brookings County, 84.3 percent of the housing in Deuel County, and 88.3 percent in Lincoln County (LCESO 2009). By comparison, all three census block groups within the proposed Project area have a higher percentage of single-family housing units as compared to both counties, with Block Group 1 of Census Tract 9586 having the highest at 87.9 percent. Block Group 3 of Census Tract 9536 has the lowest percentage with 86 percent (table 3-7).

In Brookings County, multi-family housing varies in the number of units per structure including structures with 50 or more units. Deuel and Lincoln counties have less variety in housing types than Brookings County, with no residential structures containing more than 10 to 19 units. Mobile homes comprise 11.8 percent of total housing in Brookings County, 6.8 percent of total housing in Deuel County, and 3.2 percent in Lincoln County. The block groups in the proposed Project area vary little in the percentage of mobile homes with 5.2 to 7.4 percent.

Table 3-7: Comparison of Housing Units by Type

	Housing Units	Single Family	Multi-Family (Number of Units in Structure)						Mobile Home
			2	3 or 4	5 to 9	10 to 19	20 to 49	50+	
Counties									
Brookings County	11,576	58.38%	2.51%	3.32%	6.82%	7.50%	8.42%	1.21%	11.80%
Deuel County	2,172	84.25%	0.97%	2.99%	2.99%	1.89%	0.00%	0.00%	6.81%
City/Town									
Astoria	77	76.62%	0.00%	10.39%	6.49%	0.00%	0.00%	0.00%	6.49%
Brandt	57	91.23%	0.00%	7.02%	0.00%	0.00%	0.00%	0.00%	1.75%
Brookings	7,371	47.23%	3.38%	4.40%	9.29%	11.19%	13.08%	1.90%	9.54%
Bushnell	28	75.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%
Toronto	109	79.82%	1.83%	13.76%	0.00%	0.00%	0.00%	0.00%	4.59%
White	220	80.45%	0.00%	0.00%	10.45%	0.91%	0.00%	0.00%	8.18%
Block Groups									
CT 9536, BG 3 (Deuel County)*	406	85.96%	0.49%	6.65%	1.72%	0.00%	0.00%	0.00%	5.17%
CT 9586, BG 1 (Brookings County)	555	87.93%	0.00%	0.00%	4.32%	0.36%	0.00%	0.00%	7.39%
CT 9586, BG 2 (Brookings County)	246	86.59%	2.85%	1.22%	2.44%	0.00%	0.00%	0.00%	6.91%

Source: US Census Bureau, 2000 Census
*CT (Census Tract), BG (Census Block Group)

Based on 2000 Census data, there is a 58.2 percent homeownership rate in Brookings County, a 80 percent homeownership rate in Deuel County, and an 80.3 percent homeownership rate in Lincoln County. Of the census block groups in the proposed Project area, homeownership rates vary only slightly. The vacancy rate for Brookings County is 7.9 percent, and the vacancy rate for Deuel County is 15.1 percent.

The median year built for residential structures is 1972 in Brookings County and 1952 in Deuel County. By comparison, all of the block groups have an older housing stock when compared to the county they are in. In 2000, the median home value was $88,500 in Brookings County, $44,400 in Deuel County, and $43,700 in Lincoln County. In 2000, the median rent for renter-occupied housing was $396 in Brookings County, $303 in Deuel County, and $326 in Lincoln County. Rents in the census block groups varied; the lowest was Block Group 3 of Census Tract 9536 with $296 and the highest, with $355, was Block Group 1 of Census Tract 9586 (table 3-8).

Table 3-8: Housing Characteristics

	Total Occupied Housing Units	Home-ownership Rate	Vacancy Rate	Median Year Structure Built	Median Value Owner-Occupied**	Median Rent Renter-Occupied**
Counties						
Brookings County	10,665	58.2%	7.9%	1972	$88,500	$396
Deuel County	1,843	80.0%	15.1%	1952	$44,400	$303
City/Town						
Astoria	73	79.5%	5.2%	1944	$17,800	$221
Brandt	43	88.4%	24.6%	1939	$10,000	$392
Brookings	6,963	46.2%	5.5%	1974	$93,900	$393
Bushnell	27	66.7%	3.6%	1956	$60,000	$575
Toronto	93	79.6%	14.7%	1939	$34,100	$338
White	205	76.6%	6.8%	1939	$53,000	$338
Block Groups						
CT 9536, BG 3 (Deuel County)**	348	84.8%	14.3%	1939	$26,000	$296
CT 9586, BG 1 (Brookings County)	479	83.3%	13.7%	1941	$60,000	$355
CT 9586, BG 2 (Brookings County)	231	78.4%	6.1%	1968	$60,600	$363

Source: US Census Bureau, 2000 Census
*CT (Census Tract), BG (Census Block Group)
**In 2000

3.5.4 Economic Indicators

In 2000, 4.9 percent of the 17,207 Brookings County residents in the civilian labor force were unemployed, and 1.3 percent of the 2,253 Deuel County residents in civilian labor force were unemployed (table 3-9). Lincoln County, Minnesota was similar, with a 2.2 percent unemployment rate.

Table 3-9: Economic Indicators

	Total Population	Civilian Labor Force	Unemployment Rate	Median Household Income, 1999	% Population Below Poverty in 1999
Counties					
Brookings County	28,220	17,207	4.9%	$35,438	12.6%
Deuel County	4,498	2,253	1.3%	$31,788	10.3%
City/Town					
Astoria	150	85	0.0%	$24,375	20.7%
Brandt	113	39	15.4%	$30,417	15.9%
Brookings	18,504	11,628	6.3%	$31,266	15.8%
Bushnell	75	43	7.0%	$45,625	8.0%
Toronto	202	86	1.2%	$23,750	8.9%
White	530	257	1.2%	$31,528	6.2%
Block Groups					
CT 9536, BG 3 (Deuel County)**	827	398	2.3%	$28,889	12.9%
CT 9586, BG 1 (Brookings County)	1,306	662	1.2%	$36,445	8.1%
CT 9586, BG 2 (Brookings County)	614	377	2.4%	$43,594	8.5%

Source: US Census Bureau, 2000 Census
*CT (Census Tract), BG (Census Block Group)

The median household income in 1999 was $35,438 in Brookings County, $31,788 in Deuel County, and $31,607 in Lincoln County. Median household incomes in the proposed Project area census block groups ranged from a low of $28,889 in Block Group 3 of Census Tract 9536 to a high of $43,594 in Block Group 2 of Census Tract 9586. The 1999 poverty rate for Brookings County was 12.6 percent, the rate for Deuel County was 10.3 percent, and the rate for Lincoln County was 9.7 percent. The proposed Project area census block group with the lowest poverty rate was Block Group 1 of Census Tract 9586, with an 8.1 percent rate. Block Group 3 of Census Tract 9536 had the highest poverty rate, or 12.9 percent.

3.5.5 Employment

In Brookings County, the industries with the highest percentage of employment included educational, health and social services (27.1 percent), followed by manufacturing (20.8 percent), and then retail trade (10 percent). The top three industries for Deuel County were educational, health and social services (21.1 percent), manufacturing (19.7 percent), and agriculture, natural resources, and mining (17.1 percent). The top three industries for Lincoln County were education, health and social services (25.6 percent), agriculture, natural resources and mining (16.7 percent), and manufacturing (12.5 percent).

In all of the census block groups in the proposed Project area, educational, health and social services had the highest percentage of employment. The percent employed in educational, health and social services for these block groups ranged from 20.6 percent in Block Group 3 of Census Tract 9536 to 25.8 percent in Block Group 2 of Census Tract 9586. Manufacturing was in the top three in all census block groups, ranging from 18.5 percent in Block Group 3 of Census Tract 9536 to 21.5 percent in Block Group 2 of Census Tract 9586. Agriculture, natural resources, and mining were also in the top three in all of the census block groups. The percent employed in this sector ranged from 13.9 percent in Block Group 1 of Census Tract 9586 to 18 percent in Block Group 3 of Census Tract 9536 (table 3-10).

3.6 ENVIRONMENTAL JUSTICE

Environmental justice concerns may arise from human health or environmental effects of a project on either minority or low-income populations. The need to identify environmental justice issues is stated in EO 12898, entitled “Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations.” The EO states “each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” A Presidential Memorandum accompanying the EO directed agencies to incorporate environmental justice concerns in their NEPA processes and practices.

Table 3-10: Employment by Industry

Employment by Industry	Counties		City / Town						Block Groups		
	Brookings County	Deuel County	Astoria	Brandt	Brookings	Bushnell	Toronto	White	CT 9536, BG 3 (Deuel County)**	CT 9586, BG 1 (Brookings County)	CT 9586, BG 2 (Brookings County)
Total Employed Civilian Labor Force	**16,369**	**2223**	**85**	**33**	**10900**	**40**	**85**	**254**	**389**	**654**	**368**
Agriculture, nat. resource, mining	5.9%	17.14%	5.88%	0.00%	3.85%	0.00%	8.24%	3.94%	18.0%	13.91%	17.7%
Construction	4.0%	6.03%	14.12%	12.12%	3.20%	5.00%	3.53%	6.30%	8.2%	6.27%	6.5%
Manufacturing	20.8%	19.66%	14.12%	24.24%	19.72%	45.00%	34.12%	24.41%	18.5%	21.10%	21.5%
Wholesale trade	1.6%	2.02%	3.53%	3.03%	1.24%	0.00%	0.00%	3.54%	2.8%	2.14%	0.8%
Retail trade	10.0%	8.01%	4.71%	6.06%	11.02%	12.50%	15.29%	10.63%	7.2%	9.63%	4.3%
Transportation and utilities	3.3%	6.21%	9.41%	6.06%	2.46%	7.50%	9.41%	5.91%	5.7%	5.81%	4.1%
Information	2.0%	2.11%	0.00%	0.00%	2.00%	0.00%	2.35%	2.76%	0.8%	1.07%	0.5%
Financial	4.2%	4.00%	10.59%	0.00%	4.09%	0.00%	0.00%	3.15%	6.9%	2.45%	4.1%
Professional and business	4.7%	2.11%	0.00%	6.06%	5.42%	15.00%	0.00%	3.54%	1.0%	4.74%	4.9%
Educ., health and social services	27.1%	21.14%	21.18%	21.21%	28.94%	5.00%	20.00%	27.56%	20.6%	25.08%	25.8%
Leisure, hospitality, food	9.9%	3.42%	3.53%	6.06%	12.12%	5.00%	0.00%	5.12%	1.5%	3.67%	2.2%
Other services	3.5%	4.95%	12.94%	15.15%	2.97%	0.00%	3.53%	1.57%	6.7%	2.75%	3.8%
Public administration	3.0%	3.19%	0.00%	0.00%	2.96%	5.00%	3.53%	1.57%	2.1%	1.38%	3.8%

Source: US Census Bureau, 2000 Census
*CT (Census Tract), BG (Census Block Group)

(THIS PAGE INTENTIONALLY LEFT BLANK)

Environmental justice issues are identified by determining whether minority or low-income populations in the proposed Project area are meaningfully greater than for Brookings and Deuel counties as a whole. If so, disproportionate effects on these populations will be considered. For the purposes of analyzing the proposed Project, minority populations are identified by comparing the percent minority residents for those census blocks within the vicinity to the percent for Brookings and Deuel counties as a whole. CEQ guidance (CEQ 1997) states that minority populations should be identified when the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population. Census blocks with minority populations that exceed the city level by more than ten percent are considered to be “meaningfully greater” for the purposes of this analysis.

Of the 149 census blocks in the proposed Project area, four census blocks have a minority population that is ten percent or more greater than the county as a whole. These four blocks are in Census Tract 9586 in Brookings County. Twenty-five percent of Census Block 1081 and 20 percent of Census Block 1149 identified themselves as American Indian or Alaskan in 2000. Eleven percent of Census Block 2002 and 21.4 percent of Census Block 1075 indentified themselves as Hispanic or Latino. Low-income populations are identified by comparing the percent of the population with incomes below established poverty levels for those census block groups within the proposed Project area to the percent below poverty for Brookings and Deuel counties as a whole. Census block groups with low-income populations that exceed the county level by more than ten percent are considered to be areas of environmental justice concern. None of the block groups in the proposed Project area exceed the county levels by 10 percent or more.

3.7 LAND USE

3.7.1 Comprehensive Plans

The Comprehensive Land Use Plan for Brookings County, adopted July 25, 2000, serves as a general policy guide for directing future land use within the unincorporated portions of the county (BCPC 2000). The plan includes general land development goals as well as a future land use map. The portion of the proposed Project area within Brookings County is classified as an Area of Development Stability on the future land use map. The goal for this land use category is the preservation of agricultural land by preventing the encroachment of urban land uses. The focus of these areas is agricultural, although there may be occasional residences or commercial/industrial (CI) developments.

The Comprehensive Land Use Plan for Deuel County, adopted May 5, 2004, guides the future land development of the unincorporated portions of the county (DCPC 2004a). The plan includes general land development goals and a future land use map. The portion of the proposed Project within Deuel County is primarily classified as an Area of Development Stability on the future land use map. The focus of this land use category is agriculture. The town of Astoria, which lies within the proposed Project area, is classified as an Area of Development Advantage on the future land use map. The goal for this land use category is to encourage growth within or immediately adjacent to municipalities in order to discourage the premature development of agricultural lands.

3.7.2 Zoning

Land use and development in unincorporated Brookings County is regulated by the Brookings County Zoning Regulation (BCPC 2007). The regulations establish four zoning districts, which include Agricultural (A), CI, Lake Park (LP), and Natural Resources (NR). The portion of the proposed Project area that is in Brookings County is primarily zoned Agricultural. The purpose of the district is "to maintain and promote farming and related activities within an environment which is generally free of other land use activities. Residential development will be discouraged to minimize conflicts with farming activities and reduce the demand for expanded public services and facilities" (p. 11.00-1). Within the proposed Project area, there are a few LP and NR zoned districts; they are primarily adjacent to Oak Lake, Lake Hendricks, and Black Slough. The LP district is established to regulate residential development along the lakeshores. The NR district provides protection for sensitive natural environments to preserve natural vegetation and protect wildlife habitat. The zoning regulations also establish two overlay districts, which include the Flood Plain Overlay District and the Aquifer Protection Overlay District. Floodplain and aquifer protection are discussed further in section 3.3.

The Deuel County Zoning Ordinance regulates land use and development in the unincorporated portions of the county (DCPC 2004b). The ordinance establishes five zoning districts and one overlay district, which include A, CI, LP, NR, Town (TD), and Aquifer Protection Overlay (AP). The portion of the proposed Project area that is in Deuel County is primarily zoned Agricultural. Permitted land uses in the A zone generally include agricultural related uses. There is a small area in the northern portion of the proposed Project area zoned CI. The CI District is "intended for commercial and industrial uses which due to their size and nature require highway access." There is also an area zoned NR near the town of Astoria. The NR District provides protection for sensitive natural resources and wildlife habitat and includes areas such as floodplains, abandoned quarries, wetlands, natural prairies, and historical sites.

3.7.3 Existing Land Use

The majority of land in Brookings County is unincorporated agricultural land. There are nine incorporated municipalities in the county, the largest of which is the City of Brookings with a population of 18,504 (U.S. Census Bureau 2000). The other municipalities (Arlington, Aurora, Bruce, Bushnell, Elkton, Sinai, Volga, and White) are small towns with populations of less than 1,500 (U.S. Census Bureau 2000). Within the unincorporated portions of Brookings County, there is very little development, consisting primarily of scattered farm and non-farm residences and occasional commercial or industrial establishments (BCPC 2000). A number of unoccupied, abandoned home sites also exist in the proposed Project area.

Deuel County also contains primarily unincorporated agricultural land. There are seven incorporated municipalities in the county (Altamont, Astoria, Brandt, Clear Lake, Gary, Goodwin and Toronto), one unincorporated community (Bemis), and one lakefront development (Lake Cochrane). Of the incorporated communities, Clear Lake is the largest, with a population of 1,335 (U.S. Census Bureau, 2000). The other municipalities have populations of less than 250 (U.S. Census Bureau 2000). The unincorporated portions of Deuel County are primarily agricultural land, with scattered farm and non-farm residences and occasional commercial and industrial establishments (DCPC 2004a). There are also approximately 71 construction aggregate mining sites in the county, which include both active and State permitted, non-active sites.

The proposed Project area extends through the townships of Lake Hendricks, Oaklake, Richland and Sherman in Brookings County and Scandinavia Township in Deuel County. Almost all of the proposed Project area is unincorporated agricultural land, except for the town of Astoria, which is located in the northern portion of the proposed Project area. Other land uses within the proposed Project area include scattered rural residences, livestock operations, the White substation, and transmission lines. A portion of Lake Hendricks lies within the proposed Project area, and there is a concentration of residential development along the lakeshore.

Based on NLCD, only 3.5 percent of the proposed Project area is developed (USDA SCA 2009). The majority of the land is cultivated crops (44 percent) and grassland (37.4 percent). The remaining is 8.5 percent pasture, 0.6 percent forest, 3.3 percent wetlands, and 2.7 percent open water.

3.7.4 Agriculture

Based on the 2007 Census of Agriculture, 90 percent (43,666,403 acres) of the total land area in the State of South Dakota is farmland, with an average farm size of 1,401 acres (USDA 2009). South Dakota ranked 17th in the U.S. in total value of agricultural products sold ($6.6 billion), with crop sales accounting for 51 percent and livestock sales accounting for 49 percent. The top crops in terms of acreage in the State include corn (4,455,368 acres), wheat (3,341,778 acres), hay (3,239,947 acres), and soybeans (3,222,872 acres). Land enrolled in the CRP, including the WRP, Farmable Wetlands Program (FWP) and Conservation Reserve Enhancement Program (CREP), in South Dakota totaled 1,599,477 acres in 2007, or 3.7 percent of farmland in the State.

In Brookings County, 91.2 percent (462,579 acres) of the total land area is farmland (USDA 2009). The average farm size in Brookings County (469 acres) is smaller in comparison to the State. The county ranked sixth of 66 counties in South Dakota for total value of agricultural products sold ($186,725,000), 47 percent of which was crop sales and 53 percent of which was livestock sales. The top crops in terms of acreage in Brookings County include corn (134,821 acres), soybeans (102,360 acres), hay (33,044 acres), and wheat (14,118 acres). There were 389 farms enrolled in CRP in 2007 in the county, totaling 41,381 acres (8.9 percent of all the farmland in the county).

In Deuel County, farmland accounts for 79.6 percent (317,164 acres) of the total land area in the county (USDA 2009). The average farm size in Deuel County is 544 acres. The county ranked 29th in the State for total value of agricultural products sold ($105,092,000). Crop sales accounted for 40 percent of this production value, and livestock sales accounted for 60 percent. The top crops in the county include corn (61,521 acres), soybeans (45,391 acres), hay (26,047 acres), and wheat (15,849 acres). In 2007, there were 315 farms enrolled in CRP in Deuel County, totaling 42,586 acres (13.4 percent of all farmland in the county).

The majority of land within the proposed Project area is farmland, and based on USDA-NASS Cropland Data, the top crops in terms of land area include corn (15,470 acres), soybeans (7,704 acres), and wheat (1,103 acres) (USDA SCA 2009). Based on correspondence with the FSA, there are not any sites within the proposed Project area that are enrolled in CRP or that have FSA mortgages. According to the NRCS, there are no easements administered by the agency within the proposed Project area.

There are four types of USFWS administered easements that occur within the proposed Project area, including conservation, grassland, WPA, and wetland. There are three conservation easements within the proposed Project area, totaling 550 acres. There are also three grassland easements (795 acres total), five

WPA easements (885 acres total), and seven wetland easements (709 acres total). None of these easements would be affected by the proposed Project.

3.8 TRANSPORTATION

The region of impact with respect to transportation includes the State and county highway network that would be used to deliver construction equipment, access for employees and deliveries during construction and operation of the proposed Project. White Site 1 is located near the intersection of 207th Street and 484th Avenue, roughly six miles southeast of the City of White. White Site 1 is approximately four miles south of SD 30 and four miles north of US 14. White Site 2 is located close to the intersection of 202nd Street and 482nd Avenue, about four miles east of the City of White and one mile north of SD 30.

Highways 14, 30, and 28 connect to Interstate 29, west of the site alternatives, at exits 132, 140, and 150, respectively. All highways are paved, two-lane roads maintained by the State Department of Transportation (DOT). The posted speed limits of the highways and interstate are 65 and 75 miles per hour (mph), respectively. Traffic volume data (average daily traffic, or ADT) on I-29 to the west ranges from 3,565 to 4,355, ADT values for US 14 range from 4,055 to 4,635, and ADT values for SD 30 range from 555 to 801. On other roads, values are much less and the majority of motor vehicle traffic is limited to local commuters and farm equipment.

A network of gravel or unimproved dirt roads provides access to the interior portions of the proposed Project area (table 3-11). The local roads follow section survey lines and are spaced one mile apart on north-south or east-west orientations.

Table 3-11: Road Network

North - South Roads	
Interstate 29	Concrete
478 Ave, 482 Ave (gravel north of 209 St), 486 Ave	Pave Asphalt
473 Ave, 474 Ave, 475 Ave, 476 Ave, 477 Ave, 479 Ave, 480 Ave, 481 Ave, 483 Ave, 484 Ave, 485 Ave (paved north of SD 30), 487 Ave	Gravel or Crushed Rock
East - West Roads	
US 14	Concrete
SD 28, SD 30	Pave Asphalt
195 St, 196 St, 197 St (paved asphalt from 478-SD/MN Border), 199 St (paved asphalt from 483B Ave - 487 Ave), 200 St (paved asphalt from 478 Ave - 483B Ave), 201 St, (paved asphalt from I-29 to 478 Ave), 202 St, 203 St, 204 St, 205 St, 206 St, 207 St, 208 St, 209 St (paved asphalt from I-29 to 476 Ave), 210 St, 211 St, 212 St, 213 St, 214 St, 216 St	Gravel or Crushed Rock

No regional or municipal airports are in the vicinity of the proposed Project area. The closest airport is in Brookings, approximately 14 miles southwest of White Site 1 and roughly 16 miles from White Site 2.

3.9 VISUAL RESOURCES

The Big Sioux Basin ecoregion has less topographic relief than the Prairie Coteau ecoregion, which has a more rolling, hilly appearance. The Prairie Coteau is also dotted with large and small lakes, which provide scenic diversity. The upper Deer Creek Valley, which cuts into the Prairie Coteau and extends all the way to Lake Hendricks, provides relatively greater topographic relief. Both the Big Sioux Basin and Prairie Coteau are rural, primarily cropland with a few scattered cattle operations. Occasional stands of trees are planted as windbreaks along the edges of fields or around the farmhouses. This flat to gently rolling area is punctuated by occasional farmsteads and barns and other agricultural outbuildings. Two substations, numerous transmission and distribution lines, and wind farms to the east and south now dominate the area. The nearest towns include White and Astoria.

3.10 NOISE

Sound is caused by vibration of air molecules and is measured on a logarithmic scale with units of decibels (dB). Sound is composed of various frequencies. Frequency is measured in Hertz (Hz), which is the number of cycles per second. The typical human ear can hear frequencies ranging from approximately 20 Hz to 20,000 Hz. Typically, the human ear is most sensitive to sounds in the middle frequencies (1,000 to 8,000 Hz) and is less sensitive to sounds in the low and high frequencies. As such, the A-weighting scale was developed to simulate the frequency response of the human ear to sounds at typical environmental levels. The A-weighting scale emphasizes sounds in the middle frequencies and de-emphasizes sounds in the low and high frequencies. Any sound level to which the A-weighting scale has been applied is expressed in A-weighted decibels, (dBA). For reference, the A-weighted sound pressure level and subjective loudness associated with some common noise sources are listed in table 3-12.

Table 3-12: Typical Sound Pressure Levels Associated with Common Noise Sources

Sound Pressure Level (dBA)	Subjective Evaluation	Environment	
		Outdoor	Indoor
140	Deafening	Jet aircraft at 75 ft	
130	Threshold of pain	Jet aircraft during takeoff at a distance of 300 ft	
120	Threshold of feeling	Elevated train	Hard rock band
110		Jet flyover at 1000 ft	Inside propeller plane
100	Very loud	Power mower, motorcycle at 25 ft, auto horn at 10 ft, crowd noise at football game	
90		Propeller plane flyover at 1000 ft, noisy urban street	Full symphony or band, food blender, noisy factory
80	Moderately loud	Diesel truck (40 mph) at 50 ft	Inside auto at high speed, garbage disposal, dishwasher
70	Loud	B-757 cabin during flight	Close conversation, vacuum cleaner, electric typewriter
60	Moderate	Air-conditioner condenser at 15 ft, near highway traffic	General office
50	Quiet		Private office
40		Farm field with light breeze, birdcalls	Soft stereo music in residence
30	Very quiet	Quiet residential neighborhood	Bedroom, average residence (without TV and stereo)
20		Rustling leaves	Quiet theater, whisper
10	Just audible		Human breathing
0	Threshold of hearing		

Source: Adapted from Egan 1988 and Ramsey and Sleeper 1994

It has been found that the A-scale weighting best approximates the frequency response of the human ear. The human ear responds to noises in the audible frequencies in a similar manner in most individuals. Most humans perceive the change in a noise level as follows:

- 3 dBA – Barely perceptible change
- 6 dBA – Readily perceptible change
- 10 dBA – Doubling (or halving) of the apparent loudness

There are also objective factors to consider when determining the noise and how people may be affected by the noise. Noise in the environment is constantly fluctuating, such as when a car drives by, a dog barks, or a plane passes overhead. Therefore, noise metrics have been developed to quantify fluctuating environmental noise levels. These metrics include the exceedance sound level (L_X). The L_X is the sound level exceeded "X" percent of the sampling period and is referred to as a statistical sound level. The most common L_X values are L_{eq}, L_{90}, L_{50}, and L_{10}. L_{eq} is the level of a constant sound over a specific time period that has the same sound energy as the actual sound over the same period. For this noise study, the most logical metric for noise measurements is L_{eq}.

The land in the vicinity of the proposed Project is generally used for agricultural and residential purposes. There are minimal noise sources in the area, with vehicular traffic, farming equipment, wind, and birds being the primary sources of existing sounds in the surrounding area. Accordingly, the background levels vary by time of day.

There are two substations located to the south of the proposed White Site 1 which would contribute to ambient noise levels at residences located close to the substations, primarily to the south of the proposed Project. Additionally, an existing wind farm is located approximately three miles east of the proposed Project and a proposed wind farm may be constructed to the west in the future. Because of the distance of the wind farms to the proposed Project, noise associated with the wind farms is not expected to contribute to ambient noise near the proposed Project.

An ambient noise survey was conducted for the community surrounding White Site 1. Background sound level measurements were taken during several time periods on May 19, 2009, and May 20, 2009, to capture the ambient sound levels near the proposed Project. Strong winds were present during each of the survey periods. High wind speeds generate higher noise levels as winds interact with vegetation and other nearby objects. These strong wind speeds are not uncommon in the proposed Project area. Sound level measurements were made at seven locations (figure 3-4). Each measurement was 5 minutes in duration. Noise measurements were not captured at three measurement points (MP2, MP3, and MP7) during three survey periods due to very high winds that were blowing dust into the microphone and meter. Because wind speeds were high during most measurements, when the wind was not blowing or was low, instantaneous noise levels were also recorded. This was done to determine noise levels during lighter wind conditions. Table 3-13 displays the L_{eq} noise level and minimum noise level that were captured during each measurement. Typical background noise levels for the project area range from 50 to 70 decibels.

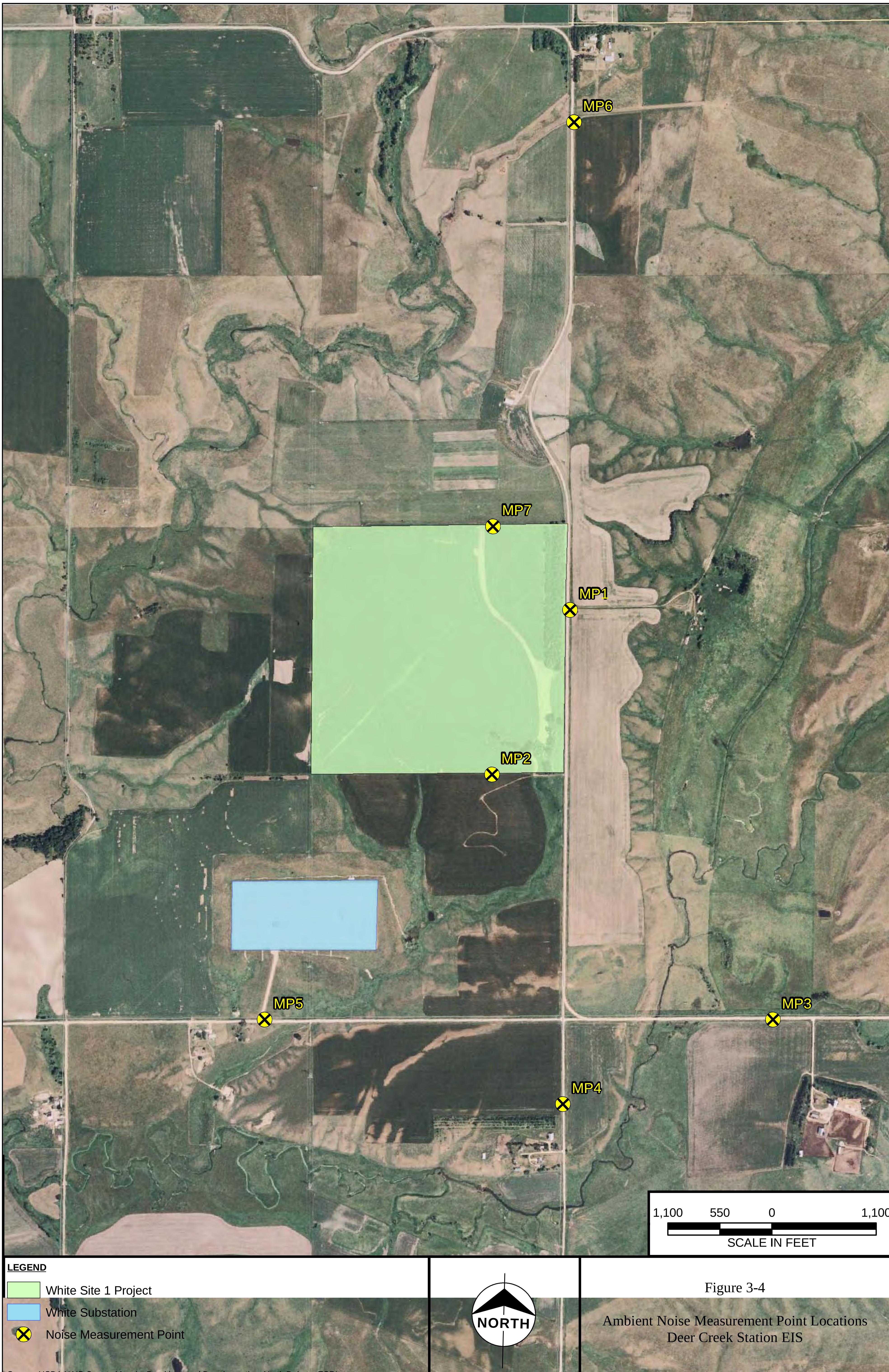


Figure 3-4

Ambient Noise Measurement Point Locations
Deer Creek Station EIS

\\espsrv\data\projects\Basin\Basin\51236_EIS\GIS\DataFiles\ArcDocs\Revised_Figures_11_19_09\Figure 3-4_11_19_09.mxd Revised: 11/19/2009

Table 3-13: Background Noise Levels

Measurement Point	Time Period	Measured L_{eq} (dBA)[1]	Minimum Measured Noise Level (dBA)	Extraneous Noises
MP1	6PM to 7PM	54	44	wind rustling trees and grass, birds
MP2	6PM to 7PM	--	--	
MP3	6PM to 7PM	--	--	
MP4	6PM to 7PM	57	44	wind rustling trees and grass, birds
MP5	6PM to 7PM	66	52	wind rustling trees and grass, birds, pole hitting fence
MP6	6PM to 7PM	59	43	Paper blowing, grass rustling, gate clanging, birds
MP7	6PM to 7PM	--	--	
MP1	11PM to 1AM	51	43	wind rustling trees and grass, creaking gate, slight insect noise
MP2	11PM to 1AM	55	48	wind rustling trees and grass, faint substations, frogs
MP3	11PM to 1AM	64	52	wind rustling grass
MP4	11PM to 1AM	56	42	wind rustling grass, frogs
MP5	11PM to 1AM	61	49	wind rustling trees and grass, frogs, pipe against gate
MP6	11PM to 1AM	49	39	wind rustling trees, wind howling through power lines
MP7	11PM to 1AM	52	42	wind rustling grass
MP1	6AM to 7AM	53	44	wind rustling trees and grass, gate clanging
MP2	6AM to 7AM	--	--	
MP3	6AM to 7AM	--	--	
MP4	6AM to 7AM	58	46	wind rustling trees and grass, birds
MP5	6AM to 7AM	61	49	wind rustling trees and grass, birds
MP6	6AM to 7AM	54	43	wind rustling trees and grass, birds
MP7	6AM to 7AM	--	--	
MP1	9AM to 11AM	53	47	wind rustling trees and grass, gate clanging, faint substation, faint birds
MP2	9AM to 11AM	--	--	
MP3	9AM to 11AM	--	--	
MP4	9AM to 11AM	65	50	wind rustling trees and grass, faint birds
MP5	9AM to 11AM	70	53	wind rustling grass, birds
MP6	9AM to 11AM	61	45	wind rustling trees and grass, gate clanging, faint birds
MP7	9AM to 11AM	--	--	

[1]Some measurements were not possible due to high winds blowing dust into the microphone.

3.11 PUBLIC HEALTH AND SAFETY

Public health and safety within and around both alternative sites depends on potential for hazards and risk. Occupational hazards include risks associated with construction and construction equipment, installation of equipment, heavy equipment transportation, and contact with electric lines. Potential public hazards include increased traffic volume due to construction vehicles in the area, and large construction vehicles and equipment using local roadways designed for lighter traffic.

Both proposed Project sites are located in a rural, agricultural area with low population density. Predominant activities are farm-related and include row crop production, livestock production, and haying. Access to private lands is restricted by landowners. Public safety is provided by local law enforcement or emergency response agencies. Fire services within the proposed Project area are provided by the White Volunteer Fire Department in White, South Dakota.

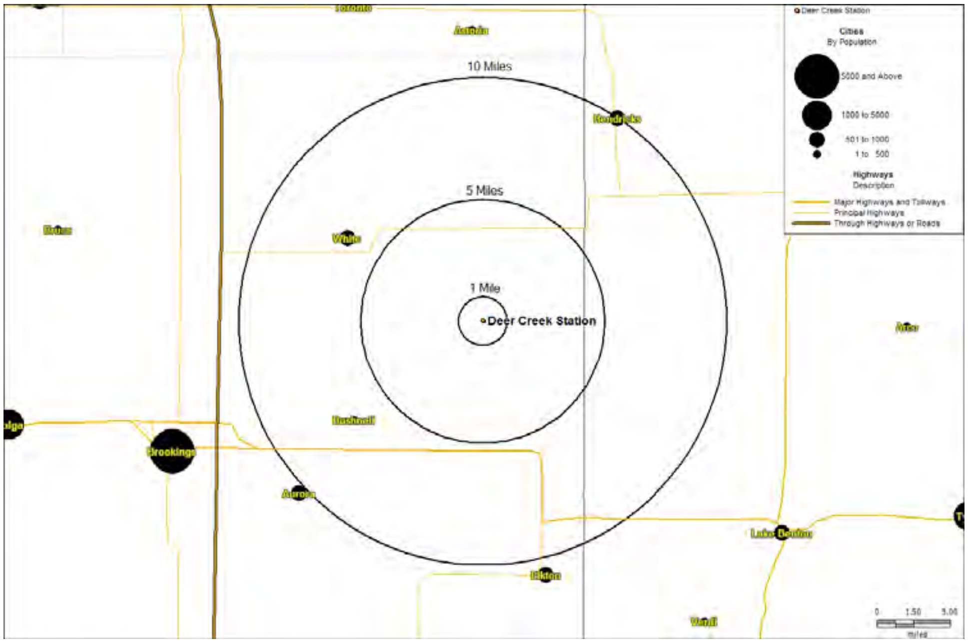
Although farming-related activities may use or produce hazardous materials within the proposed Project area of both sites (i.e. petroleum products used in farm machinery, herbicides/pesticides, and manure from large-scale cattle feeding operations), no specific occurrences or incidents regarding these hazards are known (EDAW 2009a). There is nothing to indicate that there are any existing unusual hazards to the environment within the proposed Project area.

3.12 INTENTIONAL DESTRUCTION

This section describes concentrated communities and resources within close proximity to the proposed Project. Population concentration and local resources are important considerations when evaluating the potential for intentional acts of destruction.

The proposed Project sites are located in eastern Brookings County, South Dakota. Two communities are between 5 and 10 miles from the proposed Project. The town of White has a population of less than 1,000 and the town of Bushnell has a population of less than 500. The towns of Hendricks, Aurora, and Elkton are approximately 10 miles from the proposed Project sites and have populations of less than 1,000. The city of Brookings is located approximately 14 miles from the proposed Project sites and has a population of approximately 20,000 (figure 3-5).

Figure 3-5: Proposed Site Proximity to Population Concentrations



The White Substation provides a connection between local power distribution lines and a Western 345-kV transmission line, which runs north and south. One local distribution line delivers power from the White Substation to the city of Brookings (southwest of the proposed site). Another local distribution line delivers power from the White Substation to communities directly east. The Western 345-kV transmission line provides power to Sioux Falls and surrounding communities, approximately 60 miles south of the proposed site.

The Northern Border Pipeline Co. interstate natural gas pipeline (42-in.) runs south and east and is located just north of Hendricks, MN. At its closest point, this pipeline is greater than 10 miles from the proposed site.

Brookings County relies exclusively on ground water from underground aquifers for safe drinking water and irrigation. In this area, there are shallow aquifers.

3.13 CULTURAL RESOURCES

3.13.1 Cultural History

Culturally the earliest occupation of this area is defined by archaeologists as the Early Prehistoric Period (10,000-3,000 B.C.), followed by the Middle Prehistoric Period (3000 B.C. to A.D. 900) and the Late Prehistoric (A.D. 900-1650) with subdivisions in each period. The period from A.D. 1650 to about 1800 is considered the protohistoric period by archaeologists. The historic period for the area is from A.D. 1800 to 1959.

Many Early Prehistoric sites are bison kill sites. Surface finds have been documented throughout the Region. The Middle Prehistoric Period exhibits a trend toward increased sedentism, intensified horticultural activity, expanding regional exchange networks, and elaboration of ceremonial activities and mortuary practices. Technological changes include the adoption of the bow and arrow and widespread use of ceramic vessels. In all cases, bison hunting remains the most important subsistence practice. Many of the sites appear to be short term seasonal occupations until the later part of the period when more and more groups experimented with plant domestication. The Late Prehistoric Period (A.D. 900-1650) sees major changes in ceramic, subsistence and settlement patterns, and differences in cultural orientations. This period shows influences from the Mississippian and Plains Village cultures. Most of the traditions identified for this period come from excavations along the Missouri River and the salvage work conducted during the 1950s before dams were constructed.

During the historic period, a number of peoples were known to pass through or trade in the area. These include the Cheyenne, Eastern or Santee Sioux (Mdewankanton, Wahpekute, Wahpeton, and Sesseton), the Middle or Wicheyela Sioux (Yankton and Yanktonai), the Western or Teton Sioux (Hunkpapa, Miniconjou, Blackfoot, Two-Kettle, Sansarc, Brule and Oglala), Arikara, Omaha, and Ponca.

Villages of the Omaha and Ponca were reported from the Big Sioux River to the south of the proposed Project. To the east, area residents would have found pipestone at the quarries in southwestern Minnesota and wood poles from the forest for lodge poles and other needs. When the French began trading with the people in the Dakotas it is known that the Teton Sioux would often travel to the James River to trade. The Arikara are Caddoan speakers and were documented as living on the Missouri River near the present day border of Nebraska and South Dakota in earth lodges. They continued to move upriver during the historic period mostly because of outbreaks of smallpox. It is likely they hunted in or passed through the proposed Project area.

Several locations near the proposed Project are associated with Sioux activities. The Oakwood Lakes, 22 miles to the west, were known by a Sioux name for the congregation of large herds of bison. Lake Benton, 16 miles to the east, was a location for collecting acorns. Deer Creek valley, adjacent to the Proposed Project, was known as *He Hdoka Sunkaku*, translated as Hole in the Mountain's Brother. This was a reference to a similarity between Deer Creek valley and one near Lake Benton. These areas were not identified during scoping as having cultural or religious significance to the tribes.

The Euro-Americans first explored the area as early as the 1630s. The early explorers of the Missouri River basin include Bourmont, the Mallet Brothers, and Truteau. The French occupied the territory on a limited basis into the eighteenth century. After the purchase of the area by the United States it was renamed the Louisiana Territory and later became the Missouri Territory after Louisiana became a State in 1812. The first official exploration of the territory was by Lewis and Clark.

Two major fur trading companies, the Hudson Bay Company and the North West Company, competed for trade throughout the territory. By the 1820s, the American Fur Company was coming into prominence in the Dakota Territory and several fortified posts were established along the Missouri River. One such post, Fort au Cedar or Old Fort George, was established along the Missouri River near the proposed Project at the mouth of Medicine Knoll Creek.

The military history of the area is generally associated with conflicts between the U.S. Government and the Native American or Indian population. One of the conflicts was close to the proposed Project. The Sioux Uprising of 1862 claimed the lives of between 450 and 800 whites and between 70 and 100 Sioux. Major battles were fought at New Ulm, Birch Coulee, and Wood Lake. The final battle was the Battle of Wood Lake; this was a decisive victory for the U. S. Army. The U.S. Army, militia, Yankton, and the raiding bands of Sioux, primarily Inkpaduta's band, repeatedly crossed through western Minnesota and eastern South Dakota. All of the Native Americans were eventually placed on reservations.

Much of eastern South Dakota was opened to Euro-American settlement in 1851 with the treaty of Traverse de Sioux. This early settlement was directly influenced by the railroads. The Great Dakota Boom in the 1880s led settlers from Norway, Germany, Russia, and other Midwesterners to establish homesteads in the eastern two-thirds of the Dakotas. Most of these settlers believed the climate was wet and humid due to unusual rains that occurred during this period. Many of these immigrants did not stay when the climate reverted to its normal dry cycle.

The opening of the settlement and establishment of towns in South Dakota is directly linked to railroad construction. Between 1878 and 1889, 285 towns were platted in South Dakota, of which 80 percent were found along rail lines. The remaining 20 percent were referred to as "inland towns" because they were not readily accessible. A section of the Chicago and Northwestern rail line that is close to or in the proposed Project area was constructed during 1879 and 1880 from Tracy, Minnesota to Pierre, South Dakota. Typical towns along the rail line were plotted in a T-shape with the rail line creating the crossbar of the T.

South Dakota is much the same today with the majority of towns and cities near the original rail lines. Agriculture and ranching are the primary subsistence. The outlying areas are sparsely populated but it is possible that early settlements may be found and dugouts and log structures may be found in or near the proposed Project.

3.13.2 Historic Properties in the Proposed Project Area

A historic property is any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP. An inventory of historic properties, including archaeological sites and historic structures was completed for those areas where construction and operational activities are proposed. Fifty-three total sites are included in the inventory; twelve of the sites have not been evaluated for listing in the NRHP, and five sites were determined eligible for listing in the NRHP. All of the recommended eligible sites are prehistoric in time period. None of the recommended eligible sites are near any potential construction or operational areas. One unevaluated site is located near the gas pipeline route, approximately one mile west of White Site 2. Tribal representatives of the following tribes were contacted by Western during scoping:

- Flandreau Santee Sioux
- Lower Sioux Indian Community of Minnesota
- Prairie Island Indian Community of Minnesota
- Santee Sioux Tribe of Nebraska
- Sisseton-Wahpeton Oyate
- Spirit Lake Tribe
- Upper Sioux Indian Community of Minnesota
- Yankton Sioux Tribe

No sites of cultural or religious significance were identified.

The White Site 1 Natural Gas Pipeline Route, White Site 1, and Water Well Supply Site B were further evaluated for cultural resources in detail. Sites investigated were abandoned farmsteads and prehistoric artifact scatters. None were determined eligible for inclusion in the NRHP. The archaeologists were accompanied by a tribal representative from the Sisseton-Wahpeton Reservation.

3.14 RECREATION

The proposed Project area for both sites consists of rolling prairies, agricultural lands, “prairie pothole” wetlands, lakes, ponds, and streams. There are many outdoor recreational opportunities in the region, with hunting, fishing, boating, and camping being the preferred activities for locals and tourists.

Numerous lakes and streams are found throughout the region. Lake Hendricks and Oak Lake are the largest lakes near to the alternative project sites, but there are other small lakes and ponds scattered throughout. Boating is popular on the larger lakes, and fishing opportunities are available on most lakes and streams. There is one South Dakota State park (Oakwood Lakes, 15 miles west of White), two State recreation areas (Lake Poinsett, 25 miles west of White; and Lake Cochrane, 10 miles north of Astoria), and one state natural area (Mound Springs Prairie, 15 miles north of Astoria) in the general vicinity. The parks and recreation areas offer boating, fishing, camping, and hiking opportunities (SDGFP 2009a). Mound Springs Prairie near Gary contains domed seepage wetlands, known as calcareous seepage fens. It is the largest remaining prairie complex in the Prairie Coteau. A city park with picnicking, swimming, and boating is located on Lake Hendricks. Oak Lake is a field station of South Dakota State University and is also used for recreation.

Hunting is a popular recreational activity in South Dakota, within the area of the proposed Project sites and in surrounding areas. Big game hunting for whitetail deer is popular, as well as upland game-bird hunting and waterfowl hunting. Much of the land within and surrounding the proposed Project areas is privately owned. However, there are Federal and State-managed public recreation areas in and around the proposed Project sites. WPAs are public hunting areas operated by the USFWS and exist to provide waterfowl hunters public access to enhanced waterfowl habitat. Areas within Brookings and Deuel counties are assigned to the Madison Wetland Management District. Game Production Areas (GPAs) are State-owned public hunting areas operated by the SDGFP and are managed for game production and public hunting access (SDGFP 2009b).

In addition to WPAs and GPAs, which are State and Federally owned properties, SDGFP provides Walk-In Areas (WIAs) for public hunting. WIA’s are privately owned parcels of land that are leased by the State to provide public hunting opportunities on WIA-enrolled parcels. Landowners are paid a yearly fee to enroll their property in the WIA program. A majority of land in the WIA program is enrolled in the CRP and provides quality habitat for pheasants, which is a popular quarry for hunters in South Dakota and within the proposed Project area (SDGFP 2009b). There are numerous WIAs in Brookings and Deuel counties, and several WIAs are located near the proposed Project sites.

Other recreational opportunities exist in and around the proposed Project. The City of Brookings, located approximately 14 miles to the southwest, provides many recreational and cultural opportunities such as golfing, theater, museums, shopping, and dining. In addition, there are numerous city parks located in Brookings and in neighboring communities surrounding the proposed Project (Brookings SD 2009).

No designated Wild and Scenic Rivers are located within the proposed Project area. However, the lower Big Sioux River 40 miles downstream is on the Nationwide Rivers Inventory of the National Park Service.

3.15 OTHER ACTIONS WITH POTENTIAL CUMULATIVE EFFECTS

Other actions are taking place in the Big Sioux River Basin and Prairie Coteau that affect the same resources impacted by the proposed Deer Creek Station. The following is a partial list of actions, and the resources potentially affected.

- White Wind Farm, Brookings County, water quality, wildlife
- Wind farm to south of plant, Brookings County, water quality, wildlife
- Yankee Substation to Brookings County Substation 115-kV transmission line project, water quality, wildlife
- Cropland erosion, all counties, Big Sioux and Lac Qui Parle watersheds
- Agricultural nutrients, Big Sioux and Lac Qui Parle watersheds
- Grassland conversion to agriculture, Big Sioux and Lac Qui Parle watersheds
- Sand and gravel mining, Brookings County, water quality in Deer Creek

* * * * *

4.0 ENVIRONMENTAL CONSEQUENCES

This section analyzes the potential impacts of Western's Federal action and Basin Electric's proposed Project and compares these impacts with the No Action Alternative. Under the No Action Alternative, Western would not approve an interconnection agreement to its transmission system, and RUS would not provide financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that Basin's proposed Project would not be built and the environmental impacts, both positive and negative, associated with construction and operation would not occur. It is noted that Basin Electric could decide to pursue interconnection with another transmission system, or the cooperative could explore other options to meet the underlying power demand, as discussed in Chapter 2.

If the interconnection agreement is approved and financing is provided, it is anticipated that Basin Electric would construct Deer Creek Station, a 300-MW combined-cycle natural gas-fired generation facility in Brookings County, South Dakota. Western would also need to make certain modifications within the existing White Substation in this case.

White Substation Impacts. The necessary improvements at the interconnection point at the White Substation would occur inside the developed area of the existing substation on Federal property. The site consists of a previously leveled and graded area covered with aggregate and having existing electrical equipment and bus work, inside a chain-link security fence. The layer of aggregate allows rapid drainage away from the surface and reduces "step and touch" electrocution hazard, but it also acts to reduce or eliminate vegetation within the substation. The substation is located in a rural area and is near two residences (approximately 3/4 mile away). There would be no substantive adverse impacts associated with the installation of additional equipment to allow the interconnection.

There would be minor, short-term impacts associated with the construction of the interconnection related to ground disturbance, primarily erosion/runoff, noise, and dust. These impacts are associated with construction activities that would occur primarily within the boundaries of the substation, would have negligible impacts to surrounding properties, and would be similar to impacts from local farming practices that occur in the area. Western's environmental quality protection construction standards (Western 2003) and BMPs would be employed to minimize erosion, sediment runoff, construction noise, and fugitive dust. The duration of the construction would be during approximately 3-6 months and would occur simultaneously with construction activities at the Deer Creek Station proposed Project. During operation, there would be negligible to minor noise impacts with the addition of the new transformer.

Because the impacts associated with the interconnection would occur within the boundaries of Western's White Substation, would be temporary and minor in severity, and could be effectively mitigated, the resultant impacts would be negligible to all environmental resources. No significant impacts would result from substation improvements. The remainder of the impact analysis in this chapter is devoted to the anticipated environmental impacts that would be associated with Basin Electric's proposed Project.

Basin Electric's Proposed Project. There are two alternative sites proposed for construction of the Deer Creek Station, White Site 1 and White Site 2. For White Site 1, the associated facilities would include an interconnection at the existing White Substation, a natural gas pipeline, and water supply wells. The White Substation is adjacent to White Site 1 and the impacts of a short transmission line connecting the two are included in the analysis of on-site impacts of the facility. For non-potable process water at the proposed Project, there were initially two water well supply sites considered for White Site 1, but Water Well Supply Site A did not provide a reliable ground water pumping rate. Therefore, the impacts of Water Well Supply Site B are emphasized in this analysis. White Site 1 would receive potable water from the rural water distribution line immediately adjacent to the county road that provides access to the site. White Site 1 also includes a natural gas pipeline route, designated the White Site 1 Natural Gas Pipeline Route. For White Site 2, the associated facilities would include a new on-site substation and transmission line interconnection with Western's system one mile to the east, a Rural Water Pipeline Extension west to 481st Avenue, and a natural gas pipeline route, designated the White Site 2 Natural Gas Pipeline Route. The two natural gas pipeline routes are discussed in sections where the pipeline would contribute to the total impacts of the proposed Project, such as water quality; the pipeline is not specifically discussed in sections where impacts of the pipeline would be *de minimis*, such as in air resources.

Basin Electric would comply with all Federal, State, and local laws and regulations that are applicable to its project. In addition, Basin Electric would incorporate BMPs and standard mitigation measures into its project to reduce and minimize the potential for adverse environmental impacts. Standard mitigation measures for air quality, water resources, geological resources, biological resources, land use, public health, visual resources, and noise to be used in the proposed Project are listed in appendix F.

4.1 AIR RESOURCES

Under the Clean Air Act (CAA) and its amendments, the EPA has established NAAQS for pollutants considered harmful to public health and the environment. The EPA has set NAAQS for seven principal, or "criteria", pollutants: NO_x, sulfur dioxide (SO_2), CO, ozone (O_3), particulate matter (PM) with an aerodynamic diameter less than 10 micrometers (PM_{10}), PM with an aerodynamic diameter less than 2.5

micrometers ($PM_{2.5}$), and lead (Pb). This section considers the potential for the proposed Project to comply with the NAAQS, as well as the potential to emit GHGs and HAP.

4.1.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no effects to air quality in the area associated with the No Action Alternative.

4.1.2 Proposed Project

The proposed Project sites are located southeast of White, South Dakota (population 530). The air quality analysis is applicable to either White Site 1 or White Site 2. For the purposes of this document, significance in air impacts is defined as:

- a violation of the NAAQS
- a violation of the National Emission Standards for Hazardous Air Pollutants (NESHAPs)

At this time, information on the effects of GHG emissions at a particular geographic location is incomplete or unavailable and a significance criterion has not been developed. With respect to GHG emissions, Western has identified the areas where information does not yet exist and relies on available information where it does exist. In accordance with this regulation, Western: (1) recognizes that information regarding impacts from GHGs is incomplete or unavailable, (2) recognizes that with the absence of this relevant information, it is unable to use available information to determine whether there are significant adverse impacts on the human environment, (3) has provided the relevant information regarding GHG emissions within the Final EIS, and (4) has discussed and evaluated the impacts of GHGs based upon theoretical approaches and generally accepted methods.

4.1.2.1 Construction and Growth-Related Emissions

Construction over a one and one-half year period on the proposed Project would have the potential for short-term adverse effects on air quality in the immediate area around the site. Diesel fumes from construction vehicles, delivery vehicles, and gas and water pipeline installation vehicles, and dust from site preparation and construction vehicle operation could affect local air quality during certain meteorological conditions. However, these instances would be limited in time and area of effect.

Emissions associated with the increase in vehicle miles traveled and emissions directly associated with the construction activities (e.g., grading, bulldozing, cranes, etc.) would increase overall air-shed emissions during the construction phase. The presence of temporary workers during the construction phase would likely cause a short-term demand for services in the area, including rental lodging, hotels, and restaurants. However, the construction phase would be temporary and would not contribute to permanent growth-related emissions in the area. Therefore, since the construction period would be short-term, the primarily transient work force would not contribute substantially to long-term growth-associated emissions. Following the construction phase, there would be approximately 30 permanent employees at the Deer Creek Station, many of which would be from the local community. These permanent jobs would not be expected to result in any substantive residential construction or construction-related emissions.

No significant industrial growth would be expected to accompany the proposed Project. Support services such as maintenance, cleaning, painting, and other related services already support existing industrial facilities in east-central South Dakota. Operating the Deer Creek Station would not be expected to trigger expansion of the existing support services industry in the area. The majority of growth-related emissions associated with the proposed Project would be expected to be related to the increased workforce (e.g., vehicle emissions associated with commuting). With respect to permanent employee vehicle emissions, it is anticipated that most workers would commute an average of 25 miles to the facility (First District Association of Local Governments 2009). Using emission factors summarized by EPA (1995), increased vehicle emissions associated with permanent employees at the proposed Deer Creek Station would be expected to be approximately 7.6 tons per year (tpy) CO, 1.4 tpy NO_x, and 1.0 tpy VOC. These emissions would be a tiny percentage of the emissions from the power plant facility and would not have the potential to violate the NAAQS.

4.1.2.2 NAAQS Emissions During Operation

As part of the air quality permitting process, the AMS/EPA Regulatory Model (AERMOD) was used to estimate downwind concentrations from single or multiple sources using meteorological data. AERMOD is the current EPA model used for modeling most industrial sources in Prevention of Significant Deterioration (PSD) permit applications and is an appropriate model for this type of facility. The PSD Permit Application was submitted in May 2009 (Sargent & Lundy 2009). The maximum predicted concentrations from the modeling analysis are less than the modeling and monitoring significance levels for each pollutant and averaging period (table 4-1). Therefore, the proposed Project would have insignificant impacts on the ambient air quality. Since the modeled maximum impacts are below their respective NAAQS significance levels, additional air quality modeling that compares impacts with NAAQS and PSD Increments was not required for the proposed Project.

Table 4-1: Air Quality Modeling Results and Standards (μg/m^3)*

Pollutant	Averaging Period	Maximum Modeled Impact	Modeling Significance	Monitoring Significance	NAAQS	PSD Increment
CO	1-hour	518	2000		40,000	
	8-hour	236	500	575	10,000	
NO_x	Annual	0.71	1	14	100	25
PM_{10}	24-hour	3.57	5	10	150	30
	Annual	0.12	1		50	17
$PM_{2.5}$	24-hour	26.6[1]			35	
	Annual	9.8[1]			15	

*Includes background concentration. Data source: Deer Creek PSD Application, May 29, 2009

4.1.2.3 Air Quality Impacts on Soils and Vegetation

Potential effects of NO_x and CO associated with the proposed Project on the nearby vegetation and soil were examined. Natural vegetation in Brookings and Deuel counties is tallgrass prairie and native vegetation is dominated by tall and mid grasses and forbs. Crops cultivated in the area include corn, soybeans, and small grains.

The potential effects of the air emissions to vegetation within the immediate vicinity of Deer Creek were evaluated by comparing modeled ambient air quality impacts to scientific research examining the effects of pollution on vegetation. Evaluations of impacts on sensitive vegetation were performed by comparing the predicted impacts attributable to the proposed Project with the screening levels developed by EPA (Smith and Levenson 1980). The screening procedure compares the maximum ambient concentrations associated with a proposed emissions source to the applicable screening concentrations. Maximum ambient air concentrations associated with the proposed Project were estimated using Class II ambient air quality impact modeling. Modeled ambient air quality impacts were compared to the EPA screening values. Concentrations in excess of any of the screening concentrations would indicate that the source might have adverse impacts on plants, soils, or animals. All potential impacts would be well below the screening levels. Most of the designated vegetation screening levels are equivalent to, or less stringent than, the NAAQS or PSD increments. Therefore, satisfaction of NAAQS and PSD increments also provides assurance that ambient air quality impacts would be below the sensitive vegetation screening levels.

Fugitive dust would pose a potential impact to local plant communities during construction, operation, and future maintenance. Fugitive dust is defined as dust that is not emitted from a definable point source. Construction equipment, travel on existing and newly constructed gravel access roads, and soil disturbance are all sources of fugitive dust. Fugitive dust can interfere with plant growth by obstructing stomata, thus reducing gas exchange with the environment, and reducing light interception. Fugitive dust associated with the proposed Project during construction activities would be negligible compared to that generated by farming activities in the surrounding areas, or wind pick-up from tilled fields. Dust impacts from construction and operation of the proposed Project would not be expected to be significant compared to other sources in the same area. Fugitive dust impacts were considered in the PSD permit application (Sargent & Lundy 2009) and would be addressed in the construction Storm Water Pollution Prevention Plan (SWPPP) prepared for the proposed Project. In order to minimize dust from Project activities, the following would be implemented for dust control, including the following:

- Limiting vehicle speeds on unpaved roads by posting signs along the construction route, clearly indicating the speed limit, placed so they are visible to vehicles entering and leaving the site of operations
- Applying an environmentally safe chemical soil stabilizer or chemical dust suppressant to the surface of unpaved roads, as needed, near residences along the primary construction traffic route
- Addition of road paving near the plant and at key intersections

4.1.2.4 Greenhouse Gases

No specific Federal, State, or regional GHG regulations apply to the proposed Project at this time, nor are there established standards to guide assessment of GHG emissions. CO_2 represents approximately 84 percent of all GHG emissions in the U.S. It is generated whenever a carbon-based fuel such as coal, wood, natural gas, or fuel oil is burned. It is the primary GHG emitted from fossil-fired utility boilers, with approximately 41 percent of U.S. man-made carbon emissions (primarily CO_2) coming from power plant sources (EPA 2009a). Other important sources are automobile and truck exhaust, industrial combustion sources, and residential heating sources. The operation of the 300-MW Deer Creek Station would release an estimated 1.02 million tons of CO_2 equivalent (0.93 million metric tons) into the atmosphere each year (table 4-2). Construction emissions were not estimated but would be a small fraction of the annual emissions from the plant. This may be compared to the total U.S. emissions of 7,150 million metric tons of CO2 equivalent in 2007 (EPA 2009a). The proposed Project would contribute an estimated three one-thousandths of one percent (0.00003) of world CO_2 emissions from global anthropogenic emissions (EIA 2008). As a further means of comparison, the projected annual emissions from the Project are 0.3 percent of the estimated 288 million tons of CO_2 emitted from wildfires during the period 2002-2006 (Wiedinmyer and Neff 2007). Using EPA's emissions equivalency calculator, the projected CO_2 emissions from the Project would be roughly equivalent to the annual CO_2 emissions from 168,191 passenger cars (EPA 2009c).

Western concludes that the proposed plant's emissions of CO_2 and other GHGs would have an undetermined effect on local, regional, or global climate change. Because numerous models produce widely divergent results, and there is insufficient information, Western is unable to identify the specific impacts of the proposed plant's CO_2 emissions on human health and the environment. Lack of sufficient information and the use of widely diverging models are evident in the IPCC report where it states in the Key Uncertainty section, "Difficulties remain in reliably simulating and attributing observed temperature changes to natural or human causes at smaller than continental scales. At these smaller scales, factors such as land use change and pollution also complicate the detection of anthropogenic warming influence on physical and biological systems. The same section also states, "Models differ considerably in their estimates of the strength of different feedbacks in the climate system, particularly cloud feedbacks, oceanic heat uptake, and carbon cycle feedbacks, although progress has been made in these areas." The lack of information and differences in predictive models have made it difficult for scientists and other experts to link a direct cause and effect of anthropogenic impacts of climate change on a global scale, much less on a local scale. As a result, Western believes that any attempt to analyze and predict the local or regional impacts of the proposed plant's CO_2 emissions on human health and the environment cannot be done in any way that produces reliable results.

However, Western did provide comparisons of the projected CO_2 emission rate from the proposed Project to other technologies, existing regional levels, and regulatory levels. Western believes the discussion provided in this section provides the relevant information regarding CO_2 and climate change issues of pubic interest.

Table 4-2: Estimated GHG Emissions from Operation of the Proposed Project

Emission Unit	Size	hr/yr	CO_2 Emission Factor	CH_4 Emission Factor	N_2O Emission Factor	Reference	CO_{2eq} lb/hr	CO_{2eq} tpy
Combustion Turbine	1434 MMBtu/hr	8,760	110 lb/MMBtu	0.0086 lb/MMBtu	0.003 lb/MMBtu	AP42 chapter 3.1 dated 4/00	159,333	697,877
HRSG and Duct Burner	610.4 MMBtu/hr	8,760	120 lb/MMBtu	0.0023 lb/MMBtu	0.0022 lb/MMBtu	AP42 chapter 1.4 dated 7/98	73,694	322,779
Heater	25 MMBtu/hr	150	120 lb/MMBtu	0.0023 lb/MMBtu	0.0022 lb/MMBtu	AP42 chapter 1.4 dated 7/98	3,018	226
Diesel Generator	22.53 MMBtu/hr	150	164 lb/MMBtu			AP42 chapter 3.3 dated 10/96	3,695	277
Diesel Fire Pump	577 hp	150	1.15 lb/hp hr			AP42 chapter 3.3 dated 10/96	664	50
								Total: 1,021,430 tons CO_{2eq}

Source: EPA 1995 and updates

4.1.2.5 Hazardous Air Pollutants

Section 112 of the CAA requires EPA to list categories and subcategories of major sources of hazardous air pollutants (HAPs), and to establish NESHAPs for each source category. The NESHAP regulations, codified under 40 CFR Parts 61 and 63 and incorporated in to the South Dakota Air Pollution Control Program at Chapter 74:36:08, are designed to regulate specific categories of stationary sources with the potential to emit one or more HAPs.

Each combustion source at the proposed Project would emit some level of HAPs. Emissions of HAPs were estimated based on fuel characteristics, heat input to each combustion source, and the applicable AP-42 emissions factors (EPA 1995). Based on emission calculations, total potential HAP emissions from all sources at the Deer Creek Station would be less than 25 tpy (table 4-3). Formaldehyde is the individual HAP constituent that would be emitted in the greatest quantity. Based on emission calculations, potential formaldehyde emissions from all emission sources would be 4.51 tpy. Emissions of other HAPs are much less than those of formaldehyde and minimal in quantity and impact (table 4-3). Because the facility does not have the potential to emit any single HAP at a rate greater than 10 tpy, or any combination of HAP at a rate of 25 tpy or more, the proposed Project does not meet the definition of a major source of HAP emissions and the NESHAP regulations do not apply to emission sources at the proposed Project. In summary, all construction and operation air emissions from the proposed Project would meet the NAAQS. Emissions of HAPs would be minimal in quantity and in impact.

4.1.3 Cumulative Air Quality Effects

The air quality modeling took into account current ambient air conditions; therefore, the impacts of past contributors to air quality impacts in the area have been considered. The receptor grid for the modeling extended 10 km (6 miles) from the facility fence line, and the visibility analysis extended 50 km (30 miles) to include Pipestone National Monument and several state parks. A coal-fired power plant previously proposed for northeastern South Dakota has been formally cancelled. The proposed Project meets the NAAQS and the air quality modeling took into account the cancelled Big Stone II project, in addition to the Deer Creek Station proposed Project. On an individual or cumulative basis, neither the proposed Project nor Big Stone II would violate the NAAQS. Accordingly, the proposed Project, in combination with the Big Stone II Project (since cancelled), would not significantly affect regional air quality on a cumulative basis.

Table 4-3: Estimated HAP Emissions from the Proposed Project

Pollutant	Combustion Turbines		Duct Firing		Diesel-Fired Water Pump		Inlet Air Heater		Diesel Generator		Total	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
1,3-Butidiene					1.74E-04	1.30E-05					1.74E-04	1.30E-05
2-Methylnaphthalene*							6.00E-07	4.50E-08			6.00E-07	4.50E-08
Acenaphthene					6.32E-06	4.74E-07			1.05E-04	7.91E-06	1.11E-04	8.38E-06
Acenaphthylene					2.25E-05	1.69E-06			2.08E-04	1.56E-05	2.31E-04	1.73E-05
Acetaldehyde	5.74E-02	2.51E-01			3.41E-03	2.56E-04			5.68E-04	4.26E-05	6.14E-02	2.51E-01
Acrolein	9.18E-03	4.02E-02			4.12E-04	3.09E-05			1.78E-04	1.33E-05	9.77E-03	4.02E-02
Anthracene					8.32E-06	6.24E-07			2.77E-05	2.08E-06	3.60E-05	2.70E-06
Arsenic			1.20E-04	1.44E-04			5.00E-06	3.75E-07			1.25E-04	1.44E-04
Benzene	1.72E-02	7.54E-02	1.26E-03	1.51E-03	4.15E-03	3.11E-04	5.25E-05	3.94E-06	1.75E-02	1.31E-03	4.02E-02	7.85E-02
Benzo(a)anthracene					7.48E-06	5.61E-07			1.40E-05	1.05E-06	2.15E-05	1.61E-06
Benzo(a)pyrene					8.37E-07	6.27E-08			5.79E-06	4.34E-07	6.63E-06	4.97E-07
Benzo(b)fluoranthene					4.41E-07	3.31E-08			2.50E-05	1.88E-06	2.54E-05	1.91E-06
Benzo(g,h,i)perylene					2.18E-06	1.63E-07			1.25E-05	9.40E-07	1.47E-05	1.10E-06
Benzo(k)fluoranthene					6.90E-07	5.17E-08			4.91E-06	3.68E-07	5.60E-06	4.20E-07
Beryllium			7.18E-06	8.61E-06			3.00E-07	2.25E-08			7.48E-06	8.63E-06
Cadmium			6.58E-04	7.89E-04			2.75E-05	2.06E-06			6.86E-04	7.91E-04
Chromium			8.37E-04	1.00E-03			3.50E-05	2.63E-06			8.72E-04	1.00E-03
Chrysene					1.57E-06	1.18E-07			3.45E-05	2.59E-06	3.61E-05	2.71E-06
Cobalt			5.02E-05	6.03E-05			2.10E-06	1.58E-07			5.23E-05	6.05E-05
Dibenz(a,h)anthracene					2.59E-06	1.95E-07			7.80E-06	5.85E-07	1.04E-05	7.80E-07
Dichlorobenzene			7.18E-04	8.61E-04			3.00E-05	2.25E-06			7.48E-04	8.63E-04
Ethylbenzene	4.59E-02	2.01E-01	0.00E+00	0.00E+00							4.59E-02	2.01E-01
Fluoranthene*			1.26E-03	1.51E-03	3.39E-05	2.54E-06	7.50E-08	5.63E-09	9.08E-05	6.81E-06	1.38E-03	1.52E-03
Fluorene*					1.30E-04	9.75E-06	7.00E-08	5.25E-09	2.88E-04	2.16E-05	4.18E-04	3.14E-05
Formaldehyde	1.02E+00	4.46E+00	4.49E-02	5.38E-02	5.25E-03	3.94E-04	1.88E-03	1.41E-04	1.78E-03	1.33E-04	1.07E+00	**4.51**
Hexane			1.08E+00	1.29E+00			4.50E-02	3.38E-03			1.13E+00	1.29E+00
Indeno(1,2,3-cd)pyrene					1.67E-06	1.25E-07			9.33E-06	7.00E-07	1.10E-05	8.25E-07
Lead			2.99E-04	3.59E-04			1.25E-05	9.38E-07			3.12E-04	3.60E-04
Manganese			2.27E-04	2.73E-04			9.50E-06	7.13E-07			2.37E-04	2.74E-04
Mercury			1.55E-04	1.87E-04			6.50E-06	4.88E-07			1.62E-04	1.87E-04
Napthalene	1.86E-03	8.17E-03			3.77E-04	2.83E-05	1.53E-05	1.14E-06	2.93E-03	2.20E-04	5.18E-03	8.42E-03

Pollutant	Combustion Turbines		Duct Firing		Diesel-Fired Water Pump		Inlet Air Heater		Diesel Generator		Total	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Nickel			1.26E-03	1.51E-03							1.26E-03	1.51E-03
Phenananthrene*			4.49E-02	5.38E-02	1.31E-04	9.81E-06	4.25E-07	3.19E-08	9.19E-04	6.89E-05	4.60E-02	5.39E-02
Propylene					1.15E-02	8.61E-04					1.15E-02	8.61E-04
Pyrene*			2.03E-03	2.44E-03	2.13E-05	1.60E-06	1.25E-07	9.38E-09	8.36E-05	6.27E-06	2.14E-03	2.45E-03
Selenium			1.44E-05	1.72E-05			6.00E-07	4.50E-08			1.50E-05	1.72E-05
Toluene	1.86E-01	8.17E-01	2.03E-03	2.44E-03	1.82E-03	1.37E-04	8.50E-05	6.38E-06	6.33E-03	4.75E-04	1.96E-01	8.20E-01
Xylene	9.18E-02	4.02E-01			1.27E-03	9.51E-05			4.35E-03	3.26E-04	9.74E-02	4.02E-01
Total HAP Emissions	**1.43**	**6.26**	**1.13**	**1.35**	**0.03**	**0.0021**	**0.05**	**0.0035**	**0.03**	**0.0025**	**2.72**	**7.67**

Source: Deer Creek PSD Application, May 29, 2009

4.2 GEOLOGY, SOILS AND FARMLAND

4.2.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no effects to geology, soils, and farmland in the area associated with the No Action Alternative.

4.2.2 Proposed Project

Impacts to geology, soils, or farmland would be considered significant if:

- A loss of unique geologic, mineral, or soil resources not available in other locations occurred
- More than one percent of the prime farmland within a county is taken out of production as a result of the proposed Project

The geologic resources at White Sites 1 and 2 are Quaternary Period glacial deposits of sand, gravel, and alluvial material. These geological features are common in the area, and there are no unique geological features at the two sites or along the pipeline or transmission corridors. If sources of gravel and fill are required during the proposed Project, the areas would be identified and documented. Sand and gravel deposits are uncommon within the soils that are found on White Site 1, White Site 2, and associated facilities. However, there are gravel quarries in the area, and the potential for gravel deposits would have to be confirmed by a site-specific investigation.

Prime farmland soils exist in the proposed Project area and would be affected by construction. Impacts to agriculture would include the removal of farmland, primarily for plant construction at either White Site 1 or 2 (about 100 acres in either alternative). This land would no longer be available for agricultural use for the life of the proposed Project. Cultivated croplands disturbed by construction and not permanently impacted by the proposed Project would be available for continued agricultural uses. This includes virtually all land affected by natural gas and water pipeline construction, transmission lines, or the Water Well Supply Site. A 200-foot-by-200-foot area for the Water Well Supply Site would be fenced. Permanently converted acreage would represent a very small percentage of the total 462,579 acres of farmland in Brookings County and 317,164 acres in Deuel County. This loss of farmland would not significantly affect the overall agricultural production in the county. The total value of agricultural products sold in 2007 was $186.7 million in Brookings County and $105.1 million in Deuel County. It is estimated that the loss in agriculture revenue in Brookings County as a result of the proposed Project would comprise a negligible percentage of these totals. In addition, the loss would be offset by new full-time jobs, payments to landowners for the property and easements, and general societal benefits of additional electrical resources.

Almost all land removed from agricultural production as a result of the proposed Project would be prime farmland. Virtually all well-drained level land in the region that would be suitable for a power plant site is prime farmland. Most impacts would be a result of plant construction at either White Site 1 or White Site 2. At White Site 1, although the plant footprint would be 40 acres, approximately 100 acres would be fenced and not available for cropland use. This property is currently in agricultural production and contains soils classified as prime or statewide important farmland, except for about five percent of the northeast corner of the site. At White Site 2, the plant and substation footprint would be 46 acres. Approximately 100 acres would be fenced and not available for cropland use. Table 4-4 and table 4-5 list the soils on White Site 1 and White Site 2, respectively.

Table 4-4: Soil and Farmland Impacts, White Site 1

Soil Symbol	Soil Name	Farmland Classification
BoE	Buse-Langhei complex, 15 to 40 percent slopes	not prime or important farmland
DoB	Doland loam, 2 to 6 percent slopes	all areas are prime farmland
EsA	Estelline silt loam, 0 to 2 percent slopes	all areas are prime farmland
Mu	McIntosh-Lamoure silty clay loams, 0 to 2 percent slopes	prime farmland if drained
StB	Strayhoss-Maddock complex, 2 to 6 percent slopes	prime farmland if irrigated
VaB	Venagro-Svea loams, 1 to 6 percent slopes	all areas are prime farmland
VnC	Vienna-Buse complex, 6 to 9 percent slopes	farmland of statewide importance

Source: USDA 2009

Table 4-5: Soil and Farmland Impacts, White Site 2

Soil Symbol	Soil Name	Farmland Classification
BbA	Barnes clay loam, 0 to 2 percent slopes	all areas are prime farmland
BbB	Barnes clay loam, 2 to 6 percent slopes	all areas are prime farmland
Hb	Hamerly-Badger complex, 0 to 2 percent slopes	prime farmland if drained
Mu	McIntosh-Lamoure silty clay loams, 0 to 2 percent slopes	prime farmland if drained

Source: USDA 2009

The natural gas and water pipelines, transmission facilities, and water well supply sites would involve prime farmland but would not permanently remove farmland from production, except for a 200- by 200- foot area of the water well supply site or the immediate area of transmission structures. Soils disturbed within the natural gas and water pipeline corridors would be contained within a 75-foot wide construction easement where equipment would be used to construct the trench and bury the facility. The actual disturbance area would be less than the 75-foot wide easement along much of the corridor. Permanent impact would be limited to the width of the trench. Typical construction diagrams for trenching and directional drilling are provided in appendix G. During actual trench construction, topsoil would be removed separately, stockpiled until the pipeline is installed, and the topsoil replaced at the top of the fill to minimize productivity impacts. Outside of the immediate trench construction area, some temporary soil compaction would be expected from trucks and construction equipment. There would be little permanent impact to the soils along the path of the White Site 1 Natural Gas Pipeline Route, White Site 2 Natural Gas Pipeline Route, White Site 1 Transmission Line, White Site 2 Transmission Line, or Rural Water Pipeline Extension.

A Farmland Conversion Impact Rating Form (Form AD-1006) was completed in coordination with the NRCS. Less than one percent of the 441,708 acres of prime and important farmlands in Brookings County would be impacted.

4.2.3 Cumulative Effects

Past, present, and reasonably foreseeable future actions that have the potential to cumulatively impact the geological and soil resources found in the Big Sioux Basin and Prairie Coteau include past sod-busting and gravel mining, as well as past and present wind farm construction to the east and west of White Site 1 and 2. However, wind farm construction does not generally remove farmland from production, and the construction of the plant site, when added to the area of other proposed activities, would remove a tiny fraction (much less than one percent) of farmland from production in the area. There is little suburbanization or other pressure to convert farmland to non-farm usage in the area. No unique geologic, soil, or mineral resources would be affected by the proposed Project. Thus, on an individual or cumulative basis, the proposed Project would not significantly affect soil or geological resources.

4.3 WATER QUALITY, FLOODPLAIN, AND GROUNDWATER RESOURCES

4.3.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no water quality, floodplain, or groundwater impacts associated with the No Action Alternative.

4.3.2 Proposed Project

Construction of the proposed Project at either White Site 1 or White Site 2 would have similar impacts to water resources, although the construction of a facility at White Site 1 would involve a water supply well and water pipeline, while construction at White Site 2 would involve a water tap and pipeline to connect to an existing municipal water supply service. Impacts to water resources would be considered significant if:

- The Proposed Project would cause an increase in susceptibility to on- or off-site flooding due to altered surface drainage patterns or stream channel morphology
- Withdrawal levels would cause established users to curtail operations
- Erosion would result in long-term impacts to water quality
- The proposed Project would violate the terms and conditions of the SWPPP, SDDENR section 401 CWA certification, section 404 CWA permit provisions, or the Brookings or Deuel County Erosion and Sediment Control Plans
- Groundwater withdrawal from construction dewatering or wells would affect current users of designated Well Head Protection Areas or stream water levels near the water supply well site

4.3.2.1 White Site 1

The construction and operation of various proposed Project components at White Site 1 would potentially result in both construction- and operation-related impacts to water resources. This includes construction of the power generation facility, access roads, and transmission line construction. In addition, well water used in plant processes would be tested to ensure that it meets water quality standards and discharged into a tributary to Deer Creek. On-site collected stormwater would also be discharged into a Deer Creek tributary. There would not be a water intake, as the cooling water would come from groundwater wells.

4.3.2.1.1 Surface Water

The excavation and exposure of soil on White Site 1 could cause sediment runoff during rain events. It is unlikely that construction within cultivated fields would contribute to additional sediment runoff because such areas periodically consist of exposed soils. Thus, impacts from the proposed Project would primarily be limited to areas that are currently uncultivated. In all disturbance areas, BMPs would be used to prevent sediment from leaving the construction site. The operating area of the proposed Project would be graded so that stormwater would be directed to drainage ditches and swales and then to an on-site stormwater detention pond. The plant site would consist of paved areas, aggregate covered areas, and mowed grass. The water would meet the water quality discharge criteria established in the NPDES permit issued by the SDDENR. The pond would only be discharged after the collection water met the water quality limits imposed by the FPDES permit issued by SDDENR. The water treatment reject water would flow off site in the same system of drainages as the stormwater pond discharge.

Water quality would be affected by the acreage of disturbance and its location during construction and operation of the proposed Project. BMPs such as silt fences, erosion control blankets, and straw waddles would be installed to ensure that sediment or fill material does not impact nearby waterways. Proper implementation of a SWPPP and adherence to local and State regulations involving sediment-laden runoff would ensure that construction activities that remove vegetation and disturb soils would not have a significant impact to water quality. Once construction ceases the site would be stabilized by grass or aggregate surfaces before any erosion and sediment controls are removed.

Other impacts to surface water are possible if spills of chemicals were to occur during construction activities. In order to mitigate the impact of possible chemical spills, spill prevention and control would be required, and specific measures described in the SWPPP. Spill plan measures would include spill containment materials at all construction sites and site crews trained in spill response and clean up. The proposed Project would adhere to regulations and permits governing storm-water pollution prevention for sediment control, including those governed by the NPDES.

There is a receiving stream on the White Site 1 property that could potentially receive runoff. This stream is a tributary of Deer Creek. With effective use of BMPs, minimal impacts to water quality are expected. A silt fence and sediment barriers would be placed where disturbance takes place and vegetation would be established before any erosion control measures are removed. A vegetated barrier with a buffer zone of 25 feet would be in place to help catch and treat any runoff that takes place in close proximity to the stream.

4.3.2.1.2 Floodplains

According to FEMA's 100-year flood zone maps, there are no 100-year flood zones in the White Site 1 property.

4.3.2.1.3 Groundwater

White Site 1 does not overlie Brookings County Well Head Protection Areas. However, groundwater impacts are possible if there is construction dewatering. This may be needed if localized pockets of saturated subsurface soils or groundwater are encountered during construction. A Dewatering Permit from the SDDENR would be required before construction dewatering can occur. During dewatering operations, any water extracted would be dealt with appropriately to protect water quality. Any impacts or effects to groundwater would be small, and localized water table depressions would not remain after completion of construction. The impacts to groundwater are thus expected to be temporary and unlikely to affect water wells.

4.3.2.2 Water Well Supply Site B and Water Pipeline

4.3.2.2.1 Surface Water

Deer Creek flows through the Water Well Supply Site B property and could potentially receive sediment-laden runoff. Silt fence and sediment barriers would be placed along the water pipeline route where disturbance would take place and vegetation would be re-established before any erosion control measures are removed. A vegetated barrier with a buffer zone would be in place to help catch and treat any runoff that takes place in close proximity to the stream that parallels 484th Avenue between 207th Street and White Site 1. With the use of BMPs, minimal impacts to water quality from the well drilling activity would be expected.

Also, a bridge over Deer Creek on 484th Avenue adjacent to Water Well Supply Site B would be improved for use by heavy loads by placement of a jumper bridge over the existing bridge. No work in streams would be required; however, BMPs would be used to avoid runoff impacts to waterways.

4.3.2.2.2 Floodplains

According to FEMA's 100-year flood zone maps, the floodplain of Deer Creek includes the southern portion of Water Well Supply Site B. Approximately 45.5 acres of the 160-acre site, or about 30 percent, is within the limits of the 100-year floodplain. A production test water well site with adequate aquifer recharge has been located immediately to the west of 484th Avenue just to the south of 207th Street. It is within the 100-year floodplain of Deer Creek. Total impacts to the floodplain would include an approximately 200-foot-by-200-foot area for two individual wellheads, a monitoring well, and an 8-foot by 10 foot control building. The access road, wells, and control building would be contoured to an elevation one foot above the 100-year flood elevation. Consistent with the requirements of the National Flood Insurance Program, the building would be watertight and utilities would be made capable of resisting flood damage. Because all other available water well supply sites are located within the Deer Creek floodplain, there is no practicable alternative to locating this facility within the floodplain if White Site 1 is chosen for implementation.

4.3.2.2.3 Groundwater

Zone A areas protect public water supply wells. Zone B areas delineate aquifers that are potential sources of future groundwater development. Water Well Supply Site B is in zone "B" of the Brookings County Well Head Protection Area and is not in a public water supply Zone A area. A water well would be a permitted use in the Zone B area.

Groundwater pumping in a designated Zone B area would occur for the two production wells needed for the power plant. Each well would be capable of pumping 125 gallons per minute (gpm) through a 10-inch diameter casing. Each well is capable of meeting the water use requirements of the proposed Project. Only one well would be in service at a time. The second well is needed to provide an alternative water supply when a well is out of service for maintenance. For the Big Sioux Aquifer, the cone of influence based on this pumping rate is estimated to vary between 21 and 135 feet. The estimated annual average use is estimated to be six million gallons or 18 acre-feet. The wells would be installed approximately 280 feet from Deer Creek but in the Deer Creek floodplain. The wells would be located within the 200-foot-by-200-foot well site area. A total of five monitoring wells would be installed on a temporary basis to confirm impacts to the aquifer. One monitoring well would be installed within 50 feet of each of the two production wells to determine the effects of the pumping on the nearby aquifer. In addition, three additional monitoring wells would be installed to monitor the impacts of the production wells on Deer Creek. One well would be installed across the road between the production well and Deer Creek. The other two temporary monitoring wells would be installed south of the production wells, between the wells and Deer Creek. The temporary wells would be removed if monitoring shows that the temporary wells are not within the production well's cone of influence.

Pump tests indicate an abundant water supply for power plant consumptive uses (emission control and cooling water), and the productive nature of the wells indicates a low potential to affect nearby groundwater resources. Basin Electric performed a site-specific aquifer hydrologic assessment study to identify the aquifer characteristics. The aquifer thickness at the drilling site was found to be 43 feet. The aquifer was pumped at 30 gallons per minute for six consecutive hours, during which the water elevation decreased by two feet. Within two minutes of the end of pumping, the water elevation had returned to its original level (Banner Associates 2009). There are no current competing users for the groundwater resource in the immediate vicinity of White Site 1.

4.3.2.3 White Site 2

The construction and operation of various proposed Project components at White Site 2 would potentially result in both construction- and operation-related impacts to water resources. This includes construction of the power generation facility, access roads, Rural Water Supply Line, and White Site 2 Transmission Line construction. In addition, there would be a water discharge point on a tributary to Deer Creek for process water. The water would be tested and treated prior to discharge to ensure that it meets water quality standards. There would not be a water intake, as the cooling water would come from the rural water supply.

4.3.2.3.1 Surface Water

Within the White Site 2 site, there is a stream that could potentially receive runoff. Because sediment and erosion control measures would be required, only minimal impacts to water quality would be expected. Silt fence and sediment barriers would be placed along the route where disturbance takes place and vegetation would be established before any erosion control measures are removed. A vegetated barrier of 25 feet with a buffer zone would be in place to treat any runoff that takes place in close proximity to the stream. White Site 2 would have a larger amount of permanent surface changes and potential surface runoff than White Site 1 due to the additional construction of the necessary substation. Along the White Site 2 Transmission Line, impacts would be minimal with the proper placement of BMPs along the route. Along the Rural Water Pipeline Extension west to 481st Avenue, impacts would be minimal with the proper placement of BMPs.

4.3.2.3.2 Floodplains

According to FEMA’s 100-year flood zone maps, there are no 100-year flood zones within White Site 2, the Rural Water Pipeline Extension, or White Site 2 Transmission Corridor.

4.3.2.3.3 Groundwater

White Site 2 does not overlie established Brookings County Well Head Protection Areas. Use of rural water supply would not result in new groundwater impacts; however, there could be water withdrawal impacts at the source of the water.

Groundwater impacts are also possible if there is construction dewatering. This may be needed if localized pockets of saturated subsurface soils or groundwater are encountered during construction. A Dewatering Permit from the SDDENR is required before construction dewatering can occur.

During dewatering operations, any water extracted would be dealt with appropriately to protect water quality. Any impacts or effects to groundwater would be small, and localized water table depressions would not remain after completion of construction. The impacts to groundwater are thus expected to be temporary and unlikely to affect water wells.

4.3.2.4 White Site 1 Natural Gas Pipeline

4.3.2.4.1 Surface Water

Within the White Site 1 Natural Gas Pipeline Route, the pipeline would be trenched except where wetlands over 0.5 acres occur. In the case of these larger wetlands, the pipeline would be directionally drilled. Every effort would be taken to minimize the potential for sediment-laden runoff to enter streams or roadside ditches. With appropriate use of BMPs, minimal impacts are expected. Silt fence and sediment barriers would be placed along the route where disturbance takes place and vegetation would be established before any erosion control measures are removed (70 percent native perennial vegetative cover). In addition, construction would take place in the fall when conditions are likely to be driest; potential runoff would be less during re-contouring and seeding. Construction work would take place adjacent to county and township roads, thus limiting disturbance of additional property in accessing the project site.

4.3.2.4.2 Floodplains

According to FEMA's 100-year flood zone maps, the White Site 1 Natural Gas Pipeline Route crosses and runs parallel to 100-year flood zones at several locations. The pipeline makes eight crossings of 100-year flood zones. The central region of the pipeline route crosses an extensive section of floodplain because it runs parallel to Deer Creek and the Lac Qui Parle River along 485th Avenue to the south of Lake Hendricks. The approximate lengths (in feet) of each floodplain crossing are listed in order from north to south in table 4-6. The White Site 1 Natural Gas Pipeline Route crosses a total of approximately 4,607 linear feet of 100-year flood zone areas.

Table 4-6: Gas Pipeline FEMA Floodplain Crossings

Floodplain Name	Approximate Linear Feet of Pipeline Crossing
White Site 1 Natural Gas Pipeline Route	
Crossing 1	275
Crossing 2	395
Crossing 3	396
Crossing 4	134
Crossing 5	169
Crossing 6	378
Crossing 7	638
Crossing 8	2,222
Total Linear Feet Crossed	**4,607**
White Site 2 Natural Gas Pipeline Route	
Crossing 9	377
Crossing 10	436
Crossing 11	644
Total Linear Feet Crossed	**1,457**

The location of the White Site 1 Natural Gas Pipeline Route in relation to floodplains is indicated in figure 4-1. The pipeline would be buried and would not create permanent floodplain obstructions. Accordingly, natural and beneficial floodplain values would only be affected during a brief construction period and periodically during the operation period when repairs or maintenance activities are needed. BMPs would be used to prevent sediment-laden runoff during the construction period, and disturbed areas would revegetate quickly. The White Site 1 Natural Gas Pipeline Route follows roadways in order to minimize the potential for impacts to environmental resources. The crossings of floodplains, with the exception of a section paralleling Deer Creek along 485th Avenue, are perpendicular to the streams, thus minimizing disturbance within the floodplain. In order for a pipeline to be routed to White Site 1, floodplain crossings are necessary (table 4-6). There are no pipeline routes that would completely avoid floodplains, given the locations that existing pipelines would need to be tapped, the alternative site locations, and the drainage patterns in the region. As a result of these considerations, there is no practicable alternative to construction of a natural gas pipeline in the floodplain crossings.

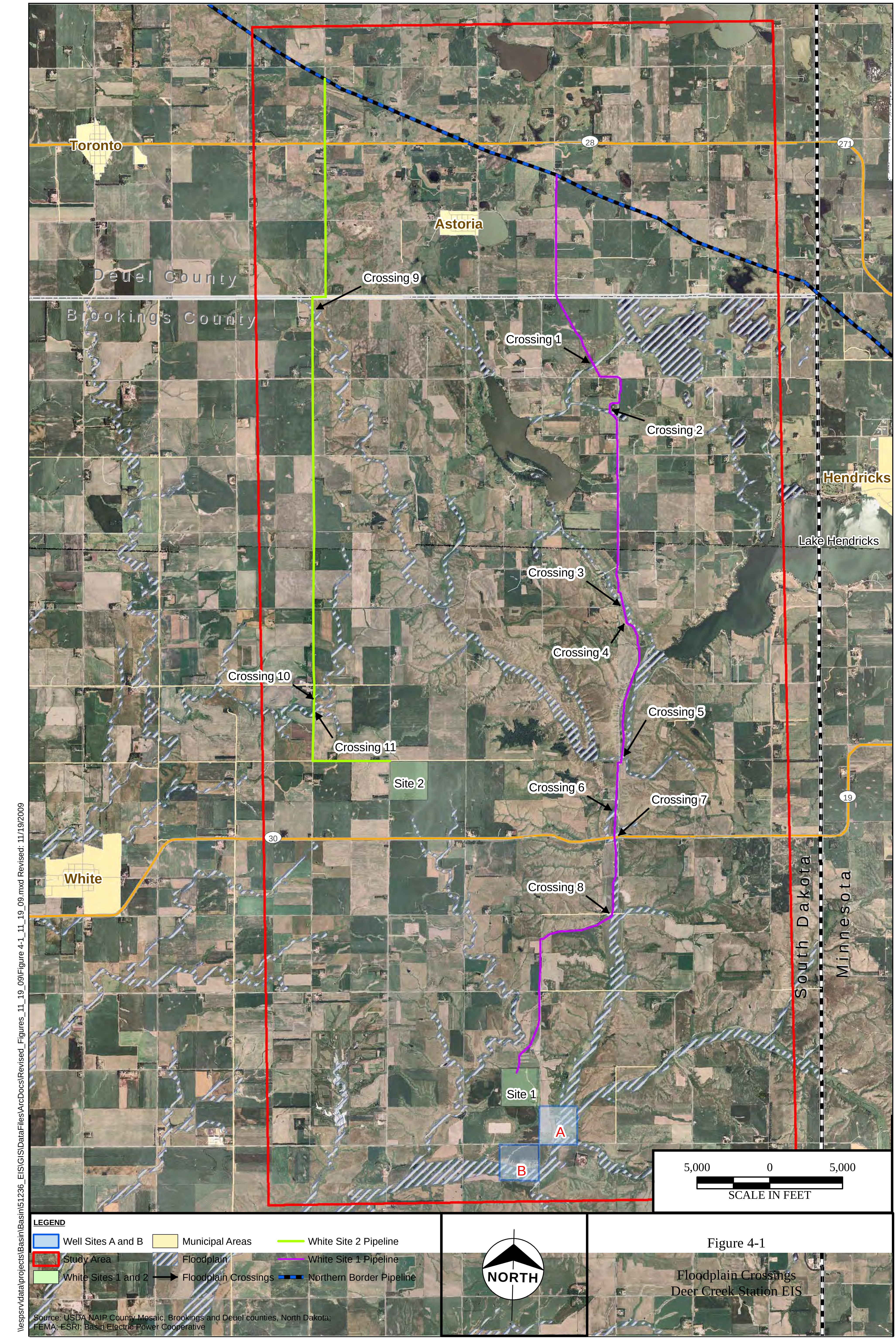


Figure 4-1

Floodplain Crossings
Deer Creek Station EIS

Underground lines would be buried at depths adequate enough to avoid future erosion that could expose them. There would be no increased flooding from construction and operation of the White Site 1 Natural Gas Pipeline.

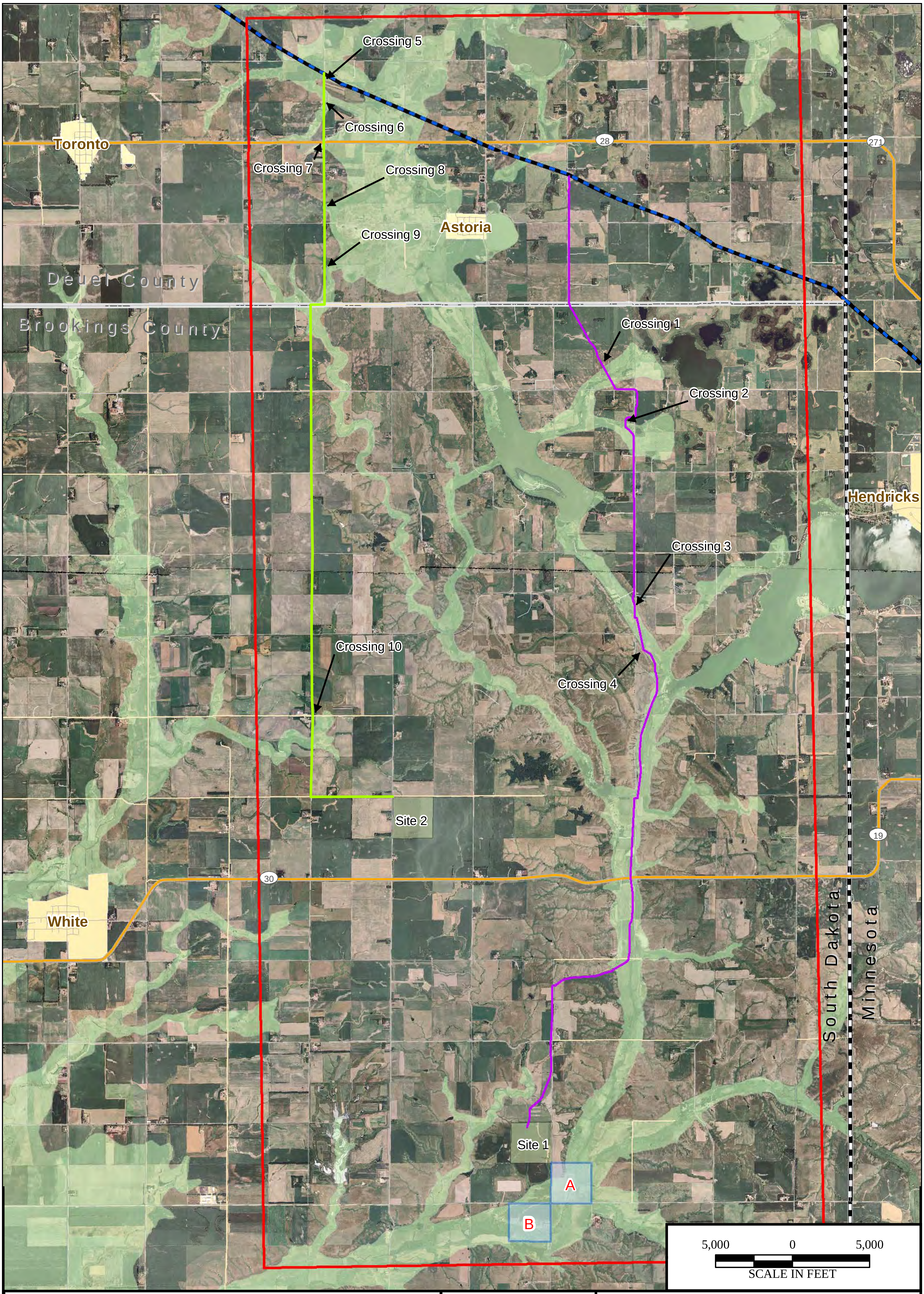
4.3.2.4.3 Groundwater

The White Site 1 Natural Gas Pipeline Route makes four crossings above Well Head Protection Areas. The approximate lengths (in feet) of each crossing, listed in order from north to south, and the approximate total length crossed, are presented in table 4-7. The crossings total 29,262 linear feet. Most of this distance (70 percent) is in the extensive valley from Lake Hendricks south to White Site 1 along 485th Avenue (figure 4-2). All crossings of the White Site 1 Natural Gas Pipeline Route are of the Zone B Well Head Protection Area. Necessary utilities such as a natural gas pipeline are allowed in Zone B areas.

Table 4-7: Gas Pipeline Well Head Protection Area Crossings in Approximate Linear Feet

Crossing Number	Approximate Linear Feet of Pipeline Crossing
White Site 1 Natural Gas Pipeline Route	
Crossing 1	1,343
Crossing 2	2,462
Crossing 3	4,827
Crossing 4	20,630
Total Linear Feet Crossed	**29,262**
White Site 2 Natural Gas Pipeline Route	
Crossing 5	410
Crossing 6	1,908
Crossing 7	576
Crossing 8	356
Crossing 9	4,200
Crossing 10	1,388
Total Linear Feet Crossed	**8,838**

(THIS PAGE INTENTIONALLY LEFT BLANK)



LEGEND

- White Site 1 Pipeline
- White Site 2 Pipeline
- Study Area
- Well Sites A and B
- Aquifer
- Aquifer Crossings
- White Site 1 and 2 Boundaries
- Northern Border Pipeline
- State Boundary
- County Boundary

Source: USDA NAIP County Mosaic, Brookings and Deuel counties, North Dakota; FEMA; ESRI; Basin Electric Power Cooperative

Figure 4-2

Well Head Protection Area Crossings
Deer Creek Station EIS

\\espsrv\data\projects\Basin\Basin\51236_EIS\GIS\DataFiles\ArcDocs\Revised_Figures_11_19_09\Figure 4-2_11_19_09.mxd Revised: 11/19/2009

Other impacts to groundwater are possible if chemical spills occur during construction activities. Two previous chemical spills are known to have occurred along the White Site 1 Natural Gas Pipeline Route in Brookings County. In 2003, a spill of atrazine occurred at 485th Avenue and 198th Street; and in 1999, an acid cleaner spill occurred at 484th Avenue and 197th Street. According to the SDDENR (2009), both spills have been remediated and the cases closed. The equipment and materials used for pipeline construction would include very few chemicals of concern, and in small quantities. Fuel, oil, and hydraulic fluid would be the most common, and spills of these materials are easily remediated by on-site crews and clean-up materials. In order to mitigate the impact of possible chemical spills, spill prevention and control would be required. Spill plan measures would include spill containment materials at all construction sites and site crews trained in spill response and clean up.

4.3.2.5 White Site 2 Natural Gas Pipeline

4.3.2.5.1 Surface Water

Within the White Site 2 Natural Gas Pipeline Route, the pipeline would be trenched. If stream crossings involve wetlands of more than 0.5 acre, the pipeline would be directionally drilled to go under and avoid disturbing streams. BMPs would be used to minimize any sediment-laden runoff from entering any streams or roadside ditches. With appropriate use of BMPs, minimal impacts would be expected. Silt fence and sediment barriers would be placed along the route where disturbance takes place and vegetation would be established before any erosion control measures are removed (70 percent native perennial vegetative cover).

4.3.2.5.2 Floodplains

According to FEMA's 100-year flood zone maps, the White Site 2 Natural Gas Pipeline Route crosses or runs parallel to 100-year flood zones. The White Site 2 Natural Gas Pipeline Route makes four crossings of 100-year flood zones. The approximate lengths (in feet) of each crossing, listed in order from north to south, are presented in table 4-5. The White Site 2 Natural Gas Pipeline Route crosses a total of approximately 1,457 linear feet of 100-year flood zone areas.

The location of the White Site 2 Natural Gas Pipeline Route in relation to floodplains is indicated in figure 4-1. The pipeline would be buried and would not create permanent floodplain obstructions. Accordingly, natural and beneficial floodplain values would only be affected during a brief construction period and periodically during the operation period when repairs or maintenance activities are needed. The White Site 2 Natural Gas Pipeline Route follows roadways in order to minimize the potential for impacts to environmental resources. The crossings of floodplains are perpendicular to the streams, thus minimizing disturbance within the floodplain. In order for a pipeline to be routed to White Site 2, floodplain crossings are necessary (table 4-6). There are no pipeline routes that would completely avoid floodplains, given the locations that existing pipelines would need to be tapped, the alternative site locations, and the drainage patterns in the region. As a result of these considerations, there is no practicable alternative to construction of a natural gas pipeline in the floodplain crossings.

4.3.2.5.3 Groundwater

The White Site 2 Natural Gas Pipeline Route makes six crossings above the local Well Head Protection Area. The approximate lengths (in feet) of each crossing, listed in order from north to south, and the approximate total length crossed are listed in table 4-7. The location of the aquifer crossings are indicated in figure 4-2. The White Site 2 Natural Gas Pipeline Route overlies a total of approximately 8,838 feet of established Well Head Protection Area. The White Site 2 Natural Gas Pipeline Route makes two crossings over a Zone A Well Protection Area in the northwest region of the proposed Project area. This is the Astoria water well supply area. The crossings are approximately 447 and 358 feet, for a total of approximately 805 feet crossed. These crossings are on the very western edge of the Zone A area. Zone A areas are highly protected from potential contaminants; thus, extra measures of protection must be in place during construction and operation of the pipeline. The SDDENR recommends avoiding the crossing of established "A" Zones; however, the potential for a buried natural gas pipeline to cause groundwater impacts is minimal, and the pipeline has been routed to minimize impacts by choosing a route that only minimally affects two small areas on the edge of the Wellhead Protection area. Public utilities designed to prevent contamination from ground water are permitted in Zone A areas. The primary potential for impact would be from inadvertent chemical spills. Should White Site 2 be chosen and this pipeline route implemented, adherence to BMPs and SPCC plans would be required.

Other impacts to groundwater would be possible if spills of chemicals occur during construction activities. The equipment and materials used for pipeline construction would include very few chemicals of concern, and in small quantities. Fuel, oil, and hydraulic fluid spills have the potential to occur, however these materials are easily remediated by on-site crews and ready clean-up materials. In order to mitigate the impact of possible chemical spills, spill prevention and control would be required. Spill plan measures would include spill containment materials at all construction sites and site crews trained in spill response and clean up.

4.3.3 Cumulative Effects

Other past, present, and reasonably foreseeable future actions have affected water quality and floodplains in the Big Sioux and Lac Qui Parle watersheds. These include cropland erosion and agricultural nutrients from fertilizer and livestock waste. Of special concern for cumulative impacts is the Lake Hendricks watershed, along the White Site 1 Natural Gas Pipeline Route. Although pipeline construction would not by itself generate additional nutrient loading for the watershed, the addition of sediment would worsen the impaired status of the reservoir. Accordingly, adherence to construction BMPs would be required for pipeline construction. Appropriate use of BMPs during construction would adequately mitigate for potential erosion and sediment problems and ensure that this proposed Project does not cumulatively contribute to the impairment of Lake Hendricks. Construction of the White Wind Farm and the wind farm to the south of Deer Creek, together with past agricultural development, has the potential to cumulatively affect Deer Creek. In this watershed, use of appropriate BMPs during construction would mitigate for potential erosion and sediment problems and ensure that the proposed Project does not cumulatively contribute to erosion and sedimentation in this watershed.

Past road construction and culverts have cumulatively affected floodplains in the proposed Project area. Although natural and beneficial floodplain values have likely been impacted by cultivated cropland, no important levees, large dams, or stream channelization activities have been constructed in floodplains. However, agricultural improvements such as small stock watering dams have likely contributed to cumulative effects on floodplains. Additional impacts to floodplains from the proposed Project would be temporary. No permanent obstructions, other than the building in Water Well Supply Site B, would be placed in floodplains.

Water Well Supply Site B along Deer Creek is in an aquifer recharged by rainfall and Deer Creek; it is associated with the Big Sioux aquifer and is in an established Well Head Protection Area. However, the well is far enough away from other domestic wells and city water sources that it would not create a cone of influence that would impact other domestic or municipal water supplies. There are no other known efforts to withdraw water from the aquifer along Deer Creek in the vicinity of the proposed Project. Accordingly, the potential for adverse cumulative effects due to groundwater pumping is low. Monitoring wells would be installed to confirm if there are any groundwater pumping impacts and action taken to reduce or mitigate impacts if they occurred.

4.4 WETLANDS AND STREAMS

4.4.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no wetland or stream impacts associated with the No Action Alternative.

4.4.2 Proposed Project

Based on NWI information, the potential wetland impacts of the proposed Project at White Site 1 and White Site 2 are provided in Table 4-8 below. The acreage of wetlands shown on the NWI maps and wetlands actually delineated are not the same; however, the NWI acreage comparison provides a preliminary assessment of impacts between White Site 1 and White Site 2.

Table 4-8. Approximate Wetland Impacts Based in NWI Information

Project Location	White Site 1 (acres)	White Site 2 (acres)	No Action Alternative
Facility Layout Impacts	0.0	0.02	0.0
Substation Impacts	NA	0.21	0.0
Transmission Line Corridor Impacts*	0.0	1.70	0.0
Natural Gas Pipeline Corridor (75’ ROW)*	1.75	0.61	0.0
Water Well Supply Site/Water Pipeline (60’ ROW)*	0.0	0.05	0.0
Total Potential Impacts	**1.75**	**2.59**	**0.0**

* Temporary Impacts

Actual wetland delineation data is more accurate, and is provided for the Applicant’s preferred site and associated facilities. Wetlands and surface waters associated with the preferred site were delineated from October 29 through November 6, 2008, and from May 4 through 8, 2009, (EDAW 2009a, EDAW 2009b, EDAW 2009c; EDAW 2008). Based on the wetlands delineated for the preferred site and associated facilities, the NWI data understate the actual amount of wetlands present.

It is likely that many of the wetlands and surface waters found in the proposed Project area would be considered by USACE as jurisdictional under section 404 of the Clean Water Act. Isolated wetlands, those without a significant nexus to a water of the United States, may be considered non-jurisdictional by the USACE. However, impacts to isolated wetlands are still considered in this EIS. EO 11990 requires Federal agencies to avoid direct or indirect support of new construction in wetlands, whether jurisdictional or isolated, wherever there is a practicable alternative. EO 11990 would apply for the proposed Project. Impacts to wetlands would be considered significant if:

- The proposed Project would cause a permanent loss or degradation of wetlands or streams in violation of the terms and conditions of a Nationwide or Individual USACE section 404 permit

- The proposed Project would create long-term adverse unmitigated impacts associated with wetland modification or destruction
- Stream channel morphology or surface drainage patterns are altered to the extent that existing vegetation communities and habitats are degraded or productivity is reduced

The proposed Project is located in the watersheds of the Big Sioux and Lac Qui Parle rivers. The surface waters associated with the proposed Project include Deer Creek, multiple unnamed tributaries to Deer Creek and the Lac Qui Parle River, Oak Lake, Lake Hendricks, and Black Slough. The majority of wetlands found in the proposed Project area are associated with these water features. A jurisdictional wetland exhibits a predominance of hydrophytic vegetation, wetland hydrology, hydric soil, and connectivity to a water of the United States. A jurisdictional stream is defined as a waterway with an ordinary high water mark (OHWM). A few OHWM indicators include a bed and bank, a change in plant community, shelving, and water staining. A section 404 permit from the USACE is required prior to the start of any activity which would physically alter or discharge dredged or fill materials into a jurisdictional water of the United States, including wetlands. Wetlands could be temporarily impacted by placement of the pipeline by trench construction. However, larger wetlands would be directionally drilled underneath, resulting in no impacts. It is likely that all wetland impacts from pipeline construction would qualify for NWP 12 for utility lines. The wetlands in the pipeline corridor are generally in good condition, although impacted by agriculture and grazing. The majority of wetlands are classified as palustrine emergent and contain reed canarygrass, prairie cordgrass, yellow bristlegrass, and sedge species. Most reed canarygrass varieties are considered naturalized in the U.S. and are considered invasive.

Directional boring and open-cut trenching techniques would be employed where natural gas pipelines and water pipelines require a stream or wetland crossing. Directional boring would be the preferred construction method for large wetland complexes. Open-cut trenching methods may be used in other areas and in areas that are dry at the time of construction. Decisions on which method to use at each location would be made based on the conditions present at the time of construction, and would be made in consultation with the USFWS and USACE. During construction, buffers of 25 feet in width would be established around surface waters and wetlands to minimize sedimentation and runoff or spill of petroleum products. Wetlands that are temporarily impacted during construction would be restored to pre-construction conditions upon completion of construction activities. The final layout of the proposed Project would be designed to minimize impacts to identified wetlands and streams, but given the numerous wetlands in the proposed Project area, it is not possible to avoid all of them. It is not anticipated that impacts from the proposed Project would require habitat creation or restoration.

4.4.2.1 White Site 1 Alternative

Based on the NWI, no wetlands were associated with White Site 1; however, the actual delineation found wetlands at White Site 1 associated with an intermittent drainage. Four palustrine emergent (PEM) wetlands were delineated within this drainage along the eastern portion of White Site 1. The total area of these wetlands is approximately 3.24 acres, of which 0.04 acres would be impacted by proposed Project facilities. Deer Creek is a tributary to the Big Sioux River, which is classified by the USACE as a traditional navigable water. Because the four PEM wetlands are associated with an unnamed drainage which empties downstream into Deer Creek, these wetlands are likely jurisdictional waters. Vegetation is dominated by reed canarygrass, yellow bristlegrass, barnyardgrass, and prairie cordgrass. This is common wetland vegetation for the area, and the wetlands are not considered high quality. This PEM swale is located on the eastern half of the site and would be impacted by the construction of a permanent access road and site infrastructure. A narrow PEM swale, containing concentrated storm water, crosses the south end of the White Site 1 transmission corridor. Potential temporary impacts within this transmission line corridor are 0.22 acres. These wetlands are dominated by reed canarygrass, prairie cordgrass, yellow bristlegrass, and sedge species. This swale would be avoided by placement of transmission structures outside of the wetland. White Site 1 road improvements along 484th Avenue have the potential to cause temporary impacts to Deer Creek. A bridge over Deer Creek on 484th Avenue would be temporarily improved for use by heavy loads. The paving work on 484th Avenue north of 207th Street would be 20 feet from a wetland. No work in streams or wetlands would be required; however, BMPs would be used to avoid runoff impacts such as sedimentation. Gravel surfaces at approaches to intersections along the designated access routes would be considered for paving for a minimum distance of 300 feet to eliminate wash boarding and rutting that occur from deceleration, acceleration, and turning movements. The intersection segments would be paved to the extent necessary to provide the adequate tapers and radii for semi-trailer movements, which may require local ditch grading and location adjustment. Any additional grading outside of existing ditches would require biological surveys. If construction in wetlands is necessary, potential impacts may include soil compaction and erosion, hydrophytic vegetation removal and trampling, and the alteration of hydrologic regimes, including reduced floodwater absorption. These impacts would be avoided by minimizing the construction footprint, use of pads for heavy equipment, and restoration to pre-construction contours.

4.4.2.1.1 Water Well Supply Site B and Water Pipeline

The proposed groundwater well installation is located in a crop field to the west of 484th Avenue and would not directly impact wetland communities. The construction areas surrounding the wells would be restored to pre-existing conditions upon completion. Water Well Supply Site B is located 100 feet from a wetland complex associated with Deer Creek. A total of 26.60 acres of PEM wetlands are located on the Water Well Supply Site property; however, none of the wetlands would be directly impacted by the proposed Project. Wetland vegetation includes bog yellowcress, creeping foxtail, barnyardgrass, and reed canarygrass. This is a higher quality wetland than found on White Site 1. Consistently withdrawing water from a groundwater-sourced aquifer near surface water features has the potential for temporary and permanent impacts to the wetlands. However, testing indicated that this well is a productive source, thus minimizing the potential for a large cone of depression affecting nearby surface water features. During well installation and commissioning, monitoring wells adjacent to wetlands and waterways would be monitored to address any surface hydrology issues as a result of groundwater pumping. If issues were found to exist, an alternate water source would be investigated and developed. Drawdown of Deer Creek or adjacent wetlands as a result of groundwater pumping would be avoided.

Construction within the proposed water pipeline corridor that extends from the Water Well Supply Site B to White Site 1 would cross one PEM wetland, located southeast of White Site 1. The potential temporary impacts are 2.49 acres. In addition, the water pipeline would cross the PEM swale at White Site 1 described in section 4.4.2.1 above. Both wetland complexes would be temporarily impacted by the construction of this site infrastructure. Additionally, trench blocks would be installed adjacent to areas where the pipeline enters and exits a wetland to prevent hydrology and wetland morphology from changing as a result of pipeline installation. The pipeline area would be restored to pre-construction contours and the top 6 to 12 inches of the trench would be refilled with topsoil, in accordance with the stipulations of NWP 12. The pipeline has been routed to minimize construction beneath wetlands and other surface drainageways wherever feasible.

4.4.2.2 White Site 2 Alternative

According to NWI data, approximately 0.23 acres of permanent wetland impacts would occur due to facility construction and substation construction. An additional 1.7 acres of temporary impacts would occur within the White Site 2 Transmission Line corridor and 0.05 acres of temporary impacts would occur due to construction along the Rural Water Pipeline Extension corridor. Based on the ratio of delineated wetlands versus NWI wetlands noted for White Site 1, likely wetland impacts would be greater than indicated by NWI data. The layout of White Site 2 has been completed in conceptual design only. The PEM wetlands are mostly under cultivation, lack vegetation, and would be considered prairie potholes. However, the scattered nature of wetlands on the site makes it probable that some wetlands may be impacted if construction were to occur at this site. If construction in uncultivated wetlands cannot be avoided, potential impacts may include soil compaction and erosion, hydrophytic vegetation removal and trampling, and the alteration of hydrologic regimes, including reduced floodwater absorption. These impacts would be avoided by minimizing the construction footprint, use of pads for heavy equipment, and restoration to pre-construction contours.

4.4.2.3 White Site 1 Natural Gas Pipeline Route

According to NWI data, construction on the White Site 1 Natural Gas Pipeline Route would temporarily impact 1.75 acres of wetlands. However, more detailed field delineation indicates that approximately 6.60 acres of PEM, palustrine forested (PFO), and palustrine unconsolidated bottom (PUB) wetlands would be temporarily impacted within the White Site 1 Natural Gas Pipeline Route. Of this, 94 percent of the impacts would be to the PEM type. Major areas of wetland crossing are along two tributaries to Oak Lake, north and west of Lake Hendricks, and south of the 197th Street and 485th Avenue intersection (appendix B). These large wetlands would be considered high quality. Larger wetland complexes, such as those found south of 197th Street and west of 485th Avenue (NW ¼ Section 7, T112N R47W), would be directionally bored. This construction technique would minimize impacts to wetlands and waterways located within the White Site 1 Natural Gas Pipeline Route. Surface waters and wetlands without flowing or standing water at the time construction is initiated would be constructed using open-cut trenching. Additionally, trench blocks would be installed adjacent to areas where the pipeline enters and exits a wetland to prevent hydrology and wetland morphology from changing as a result of pipeline installation. At the wetland boundaries, the pipeline would be surrounded by clay or other low permeability material to stop the flow of any water that may have become channelized along the pipeline. During the routing process, the presence of wetlands and surface waters was considered in order to avoid these sensitive resources to the greatest extent feasible. Trenching would be done in the fall when it is the driest. Also, construction next to the roads should restrict any disturbance to the margins of wetlands crossed, and allows access and work from the raised roadbed.

4.4.2.4 White Site 2 Natural Gas Pipeline Route

NWI data indicates the presence of numerous small isolated PEM wetlands along stream channels within the White Site 2 Natural Gas Pipeline Route. According to NWI data, approximately 0.59 acres of PEM wetlands and 0.02 acres of PUB wetlands would be temporarily impacted within a 75-foot corridor within the White Site 2 Natural Gas Pipeline Route. Based on the ratio of delineated wetlands noted for White Site 1, it is likely that wetland impacts would be greater than indicated by NWI data. There are eight surface water drainages in the potential ROW. The northern portions of the pipeline corridor contain several prairie potholes that have not been cultivated; these would be considered high-quality wetlands. Wetlands were not delineated and actual acreage was not calculated. The pipeline would be installed via open-cut trenching in most cases, but directional boring would be used in the case of extensive wetlands. Open-cut construction would be used in areas without flowing or standing water at the time construction is initiated. Any wetlands or surface waters that are temporarily impacted during project construction would be restored to pre-construction condition. Construction would abide by the stipulations in NWP 12, Utility Line Activities.

4.4.3 Cumulative Effects

Other past, present, and reasonably foreseeable future activities in the proposed Project area with potential to affect wetlands in the Big Sioux ecoregion are ongoing farming operations, including past sod busting, the White Wind Farm to the north, the MinnDakota and Buffalo Ridge wind farms to the south, and a proposed wind farm to the west of the proposed Project site. The wind farms have been designed to minimize impacts to wetlands and streams. For example, the White Wind Farm has projected permanent wetland impacts of only 0.075 acres. In addition, there are fewer “prairie pothole” type wetlands in the Big Sioux ecoregion as compared to the Prairie Coteau ecoregion traversed by the gas pipeline route. Construction of the gas pipeline would result in temporary impacts to some wetland communities. The disturbed pipeline area would be restored upon completion of construction and no long-term loss or degradation of wetlands and surface waters would occur. Existing wetland and stream vegetation communities would not be degraded or productivity reduced. No unique or unusual wetland communities were identified on White Site 1 or 2 or on Water Well Supply Site B. The proposed Project is not expected to result in significant cumulative impacts to wetland or stream resources.

4.5 BIOLOGICAL RESOURCES

4.5.1 Vegetation

4.5.1.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no vegetation impacts associated with the No Action Alternative.

4.5.1.2 Proposed Project

Impacts to vegetation would be considered significant if:

- The proposed Project results in long-term loss of unique native vegetation communities, such as native prairie

- The proposed Project results in the long-term loss of riparian vegetation outside of the ROW corridor of the natural gas and water pipelines
- The proposed Project results in a permanent expansion of noxious weeds to a new location, covering more than one acre, or noxious weeds would expand to the degree that it would adversely affect the health and populations of native vegetation communities

Construction, operation, and maintenance of various proposed Project components including the plant site, groundwater well site, access roads, water pipeline, transmission corridor, and natural gas pipeline would result in impacts to both vegetation communities and noxious weeds. Construction of access roads and staging areas would result in both permanent and temporary loss of vegetation. Cleared areas through shelterbelts would be approximately 50 feet in width for pipeline or waterline construction and 100 feet in width for a road crossing. Construction activities generally result in vegetation removal, increased trampling of vegetation, erosion, soil compaction, and sedimentation. any of which could result in adverse effects to vegetation communities. Compacted soils can inhibit germination and root growth for native plant species. If soil compaction is severe on areas where there were formerly native plants, desired native plants may have difficulty becoming reestablished and could be replaced by new or weedy plant species. Ground disturbance may also result in propagation of noxious weeds, particularly in areas that have existing weed infestations.

Noxious weeds can be spread from unwashed construction equipment, vehicles transporting noxious weed-inoculated soil or plant materials into un-infested areas, or from transfer of topsoil inoculated with noxious weeds. Ground disturbance can also allow invasives to become established, as seeds may blow in from nearby infested areas. Noxious weeds typically are fast growing and can displace native species or inhibit reestablishment of native grasses, forbs, and shrubs. Mitigation measures to avoid the introduction or spread of noxious weeds would include requiring that construction equipment and vehicles are washed and free of soil and debris before entering the construction area. Additionally, a vegetation restoration plan and an integrated weed management plan would be implemented post-construction to mitigate impacts to vegetation communities in all portions of the proposed Project.

Alteration of existing drainages and drainage patterns pre- and post-construction may alter water availability for vegetation communities including wetlands. Species that are considered noxious and invasive weeds require less water and take advantage of disturbed bare ground. Proposed Project operations would require workers to travel to and within the general area, increasing the opportunity for the spread of noxious weeds.

White Site 1 Alternative

Construction of the plant would permanently impact approximately 40 acres of cultivated cropland at White Site 1. Temporary impacts to vegetation from construction may occur within the 100-acre site. Since the site is predominantly cultivated cropland (90 percent), impacts to native grassland and woodland communities are expected to be minor. Woodland and wetland habitats would be avoided to the greatest extent feasible during construction. A five-acre forested shelterbelt is located on the east edge of the proposed Project site. The 100-foot wide corridor containing temporary and permanent impacts resulting from the installation of the waterline and access road infrastructure at White Site 1 would impact less than one acre of the forested shelterbelt, equaling 20 percent of the shelterbelt. There is no native prairie on the site.

Within the 0.75 mile, 13.6-acre transmission corridor to the White substation, 40 percent of the vegetation is cultivated cropland, 55 percent is pastureland, and 5 percent is developed land. Temporary impacts would result from construction of any necessary access roads needed to build the transmission line. Permanent impacts to vegetation would be limited to the footprint of transmission structure, and the footprint of access roads, if needed. The transmission ROW (except for cropland) would be revegetated to pre-existing conditions once construction is complete. A noxious weed management plan would be implemented to minimize the spread of noxious weeds within the ROW and adjacent properties. White Site 1 road improvements along 484th Avenue would take place within the existing road ROW and would have only occasional and temporary impacts to mowed grass along the roadway from equipment usage.

Water Well Supply Site B and Water Pipeline

Approximately 40 percent of Water Well Supply Site B is cultivated cropland and 15 percent is used for pastureland. Wetlands and waterways are found throughout the southern half of the site. These areas will be avoided during the final site layout process. Construction of the well facilities would result in the permanent impact of an approximate 200-foot-by-200-foot vegetated area that is entirely cultivated cropland. Wetland communities and other vegetation communities outside of the 200-foot-by-200-foot well facilities may be temporarily or permanently impacted by groundwater pumping. Woodland and wetland habitats would be avoided during construction. Temporary impacts would occur along the approximate 1.25 mile water supply pipeline along 484th Avenue. The water supply pipeline would be located off the County Road ROW in private land that is predominantly pasture.

White Site 2 Alternative

Approximately 90 percent of White Site 2 is cultivated cropland with the remainder being woodland. Approximately 46 acres would be permanently impacted by construction. Temporary impacts may also occur within the 100-acre site. The facility footprint, including the future substation, would be sited to avoid impacts to the woodland on the site.

Within the transmission corridor, 90 percent of the vegetation is cultivated cropland. Temporary impacts would result from construction of any necessary access roads needed to build the transmission line. Permanent impacts to vegetation would be limited to the transmission structure footprints and maintenance access roads, if needed. The transmission ROW that is not to be returned to cultivation would be revegetated using a seed mix approved by NRCS and Western once construction is complete. A noxious weed management plan would be implemented to minimize the spread of noxious weeds within the ROW and adjacent properties. Final siting of the transmission line would seek to minimize placing structures through shelterbelts, in wetland habitats, and in native prairie habitat. Construction of the Rural Water Pipeline Extension would be within or adjacent to the road ROW and would have similar temporary vegetation impacts.

White Site 1 Natural Gas Pipeline Route

Impacts within the estimated 387-acre Natural Gas Pipeline Route construction ROW would be temporary. Approximately 184 acres of cultivated cropland (47 percent) and 130 acres of pastureland (34 percent) are the primary vegetation types that would be temporarily impacted during construction. Additional vegetation communities in the ROW that would be impacted include 12 acres of forested areas or shelterbelts (3 percent), 9 acres of native prairie communities (2 percent), 17 acres of mixed grassed prairie (native and non-native) (4 percent) , and 35 acres of wetlands (10 percent). Native prairie communities are located in isolated areas along the ROW, including near 204th Street and along 485th Avenue north of Lake Hendricks. These areas would be reseeded with native prairie seed. Two locations to be crossed by the White Site 1 Natural Gas Pipeline Route were determined to contain native prairie forb and native warm season grass communities. These include one hillside on the south side of 204th Avenue (NE ¼ Section 18, T111N, R47W) as well as one hillside on the east side of 485th Avenue, immediately northwest of Lake Hendricks (NW ¼ Section 29, T112N, R47W). Both locations of native prairie to be crossed are where the pipeline route leaves the road ROW and proceeds cross-country. Estimated distance of the pipeline through the native prairie at 204th Street would be 578 feet, and distance through the prairie near Lake Hendricks would be 2,042 feet. The natural gas pipeline ROW would be revegetated once construction is complete. Within the small areas of native prairie, the existing topsoil with its bank of native seed would be carefully salvaged and replaced in a timely manner, and augmented with native grass seed to minimize invasion of noxious or undesirable weed species. A noxious weed management plan would be implemented to minimize the spread of noxious weeds within the ROW and adjacent properties.

White Site 2 Natural Gas Pipeline Route

Within the White Site 2 Natural Gas Pipeline Route, 40 percent of the vegetation is cultivated cropland and 55 percent is pastureland. These combined areas would be temporarily impacted within the construction ROW. Forested shelterbelts are also present but only comprise five percent of the alternative gas construction ROW. The cleared area through shelterbelts would be a maximum of 75 feet in width. The White Site 2 Natural Gas Pipeline construction ROW outside of cultivated areas would be revegetated with grass once construction is complete. A noxious weed management plan would be implemented to minimize the spread of noxious weeds within the ROW and adjacent properties.

4.5.1.3 Cumulative Effects

Past, present, and reasonably foreseeable future actions that have affected vegetation in the area are the ongoing agricultural development and past sod busting in the Big Sioux and Prairie Coteau ecoregions, as well as the wind farm developments in the area, the White Wind Farm to the north, the MinnDakota and Buffalo Ridge wind farms to the south, and the proposed wind project to the west. The footprint of the proposed Project is small in comparison to these developments. The impacts to native prairie along the gas pipeline ROW would be temporary and would be restored. Therefore, the proposed Project would not result in the long-term loss of unique natural communities. Riparian vegetation would be preserved during construction and operation of the natural gas pipeline. The potential for noxious weed expansion would be reduced by revegetation with native species seed mixes. As a result, the individual and cumulative impacts of the proposed Project on vegetation would not be significant.

4.5.2 Wildlife

4.5.2.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no wildlife impacts associated with the No Action Alternative.

4.5.2.2 Proposed Project

The mix of wetland, riparian, prairie, and woodland areas, along with agricultural land uses, provides a wide range of habitats for the numerous wildlife species that occur within the proposed Project area. The wildlife species discussed within this section are those not listed under a State or Federal designation for protection. Impacts to wildlife resources would be considered significant if the proposed Project would have a negative impact on the biological viability of a local, regional, or national population of wildlife species. Some general impacts to wildlife resulting from the construction and operation of a generation facility and associated infrastructure are discussed below. Impacts to wildlife can be direct, indirect, permanent or temporary and may be separated, when necessary, into construction and operation impacts.

Terrestrial habitats include tall grass prairie, mixed-grass prairie, cool-seasonal and invasive grass areas, cultivated cropland, pastureland, woodland areas, and wetlands. The proposed Project area is located in areas of mostly open, rolling hills with limited forest cover in the form of shelterbelts; therefore, minimal fragmentation of woodland shelterbelt areas would result. The power plant, water well site, and transmission line cross mostly cultivated cropland. Wildlife species would temporarily avoid areas during construction, which would result in the temporary or permanent alteration of movement patterns, depending on the species and project feature.

Construction activities that remove vegetation and disturb soil could cause the mortality of small, less-mobile, ground-dwelling wildlife species such as the thirteen-lined ground squirrel, prairie vole, eastern cottontail, and amphibians and reptiles. These species would also be temporarily displaced during construction activities, but would likely return upon completion of construction and restoration of disturbed habitats. Other mobile species, such as ring-necked pheasant, some migratory bird species, raccoon, coyote, and whitetail deer may leave and avoid the construction areas, but would be expected to return within a year with the restoration of suitable habitat to areas such as the natural gas pipelines, water pipelines, and transmission ROWs. Some wildlife would likely avoid the permanently disturbed areas, depending on the nature of the facility and the amount of human activity in the area. Due to the abundance and diversity of available habitat for wildlife in the area, construction and operation of the proposed Project would not be expected to have permanent impacts on local or regional species populations.

Open cut trenching to install the pipelines may be used at streams and wetland areas that do not have suitable habitat for listed species. Trenching would produce temporary impacts to aquatic life. The areas within the immediate drainage of the streams would only be subjected to minimal temporary impacts during construction and there would be no permanent impacts. As a result, wildlife inhabiting the aquatic and adjacent habitats would be minimally impacted during construction and operation. Directional drilling would be utilized in wetland areas whose areal extent is great or where other physical constraints exist to placement of the pipeline by trenching methods. Riparian and wetland areas as well as shelterbelts would be preserved whenever possible because they provide crucial nesting and roosting habitat for avian species, as well as cover and forage for big game, upland game birds, and a variety of other wildlife species in the area. If construction occurs between March 15 and July 15, avian nesting surveys would be conducted by a qualified specialist in order to avoid bird nests. If special status or migratory species were found nesting, USFWS would be consulted to identify measures, such as avoidance buffers, to minimize impacts and avoid the take of breeding birds.

Waterfowl nesting areas would be subjected to temporary impacts during pipeline installation in wetland areas as well as through activities near streams and associated riparian areas. There are areas of suitable nesting habitat for migratory and resident raptors within or in proximity to the proposed Project area. In general, disturbance of birds would be greatest during the spring-to-early summer breeding season as well as spring and fall migrations. Most facility construction would occur during the fall to take advantage of dry conditions and to avoid impacts to nesting species; however, if construction were to occur during the avian breeding season, nesting bird surveys would be conducted prior to any ground-disturbing activities. The USFWS would be consulted to identify measures to minimize impacts and avoid, minimize, or mitigate disturbance or take of nesting avian species at locations with suitable habitat within the proposed Project area. The majority of the avian species found within the proposed Project area are protected under the MBTA.

Sedimentation in aquatic ecosystems can adversely impact feeding, resting, and breeding habitats. For pipeline construction, directional boring would be used beneath extensive wetland complexes. Open-cut trenching methods may be used in other areas and in areas that are dry at the time of construction. Decisions about which method to use at each location would be based on site conditions at the time of construction. In anticipation of trenching, the appropriate permits under section 404 would be acquired, such as NWP 12. Streams that are temporarily impacted during construction would be restored to pre-construction contours upon completion of construction activities. These techniques would minimize or avoid impacts to environmentally sensitive areas. Impacts to the existing invertebrate, fish, amphibian, and reptile species would be temporary and are anticipated to be negligible as a direct result of planned construction or operation of the proposed Project. Potential temporary or permanent impacts to the aquatic communities may occur as a result of unforeseen environmental events (e.g., flooding, tornadoes, or excessive snowmelts). Unforeseen events could exceed the effective capabilities of recommended BMPs, or equipment could malfunction and fail during the construction process. During construction that is near surface waters and wetlands but does not involve trenching or boring, 25-foot buffers would be established around surface waters and wetlands to minimize potential sedimentation and runoff and protect against spill of petroleum products. Buffers would be marked by the installation of silt fence. Areas of permanent impact, including paved roads, graveled parking lots, and other operational areas, would enable increased precipitation runoff that may carry higher concentrations of total dissolved solids and hydrocarbons. Areas within the proposed Project site would be engineered to reduce indirect effects from storm water runoff to aquatic habitats near the site. The operating area of the proposed Project would be graded so that stormwater would be directed to drainage ditches and swales and then to an on-site stormwater detention pond. Operation of the proposed Project may result in temporary impacts to surface water, groundwater, or wetlands through unforeseen equipment malfunctions leading to amplification in the impacts of runoff. These potential impacts would be minimized through proper design of facilities, use of BMPs, and good housekeeping practices in chemical usage.

White Site 1 Alternative

Wildlife species such as small birds and mammals that may forage in the agricultural portion of this area would relocate to other nearby agriculture fields during construction and operation. However, impacts to these species would be minimal as there is abundant similar habitat nearby. Plant construction may result in the loss of some areas that are not currently cultivated cropland. These areas are of greater value to wildlife as habitat and include a forested shelterbelt that comprises five percent of the acreage of White Site 1. This is located on the east side of the proposed Project site. The temporary and permanent impacts resulting from the installation of the waterline and access road infrastructure at White Site 1 (about a 100-foot wide corridor) would impact less than one acre of the forested shelterbelt. Avian species that may use the woodland areas for nesting, foraging, or stopover habitat as well as ground-dwelling mammals would be minimally impacted as a result of this portion of the proposed Project construction. Of the 3.2 acres of PEM wetlands on White Site 1, a portion would be affected by access road and water pipeline construction; impacts would be less than the one-half acre NWP thresholds for road crossings or utility line crossings. The PEM swale is located on the eastern half of the site and would be impacted by the construction of a permanent access road and site infrastructure. The PEM swale was previously periodically maintained by mowing for agricultural purposes and provides very little wildlife habitat.

One inactive raptor nest was located in 2009 in the southeast corner of White Site 1, on the southern end of the forested shelterbelt, outside of the area to be impacted by construction. One great horned owl nest was located in 2009 approximately 0.35 miles east of White Site 1 in a narrow forested shelterbelt surrounded by an abandoned farmstead. SDGFP would be consulted if any active raptor nests were discovered within 0.25 miles of any of the proposed Project facilities during construction. Because only two nests may potentially be impacted, the biological viability of raptors or owls would not be affected by activities at White Site 1.

Impacts to wildlife other than birds during construction on White Site 1 are also expected to be minimal, because the cropland, pastureland, and shelterbelt habitats within disturbance areas crossed are common; no long-term impacts to local, State, or national populations are likely. Operation of the generation facility may cause some species of wildlife to avoid the facility site due to increased human activity and noise associated with the facility. All of the species disturbed are likely to be common and would relocate in abundant suitable habitat elsewhere.

Water Well Supply Site B and Water Pipeline

Construction on Water Well Supply Site B would permanently impact a portion of the cultivated cropland in the area necessary for the footprint of the pumping structure and construction and maintenance of the access road to the location. An estimated 200-foot-by-200-foot area would be required for construction and operation. Wildlife habitat in these locations is minimal due to the current land use as cultivated cropland and small total acreage required. Construction of the water supply line to the generation facility is anticipated to parallel the county road along 484th Avenue. The pipeline ROW would predominantly be across pastureland that provides marginal wildlife habitat. The construction of the water supply line would cause temporary disturbance to soil and vegetation and displacement of wildlife species using this area. Temporary impacts would occur within the well construction area; these impacts would all be within a cultivated field.

Water Well Supply Site B is located near a wetland complex associated with Deer Creek, as well as Deer Creek itself. Consistently withdrawing water from a groundwater-sourced aquifer near surface water features has the potential for temporary and permanent impacts to the hydrological dynamics of the immediate area and therefore the aquatic habitat, aquatic species, ecologically connected terrestrial habitat, and terrestrial wildlife that use these habitats throughout the year. However, testing indicated that this well is a productive source, thus minimizing the potential for a large cone of depression affecting nearby surface water features (Banner Associates 2009). As a precaution, temporary monitoring wells would be located between the two production wells and Deer Creek. If the cone of influence does not extend to these monitoring wells, it would be assumed that there is no impact to Deer Creek. If impacts were noted at the monitoring wells, Basin Electric would develop a mitigation plan for any hydrologic and biological impacts to Deer Creek.

White Site 2 Alternative

Approximately 90 percent of the land use within the White Site 2 area is cultivated cropland. Additionally, an estimated 90 percent of the land use within the White Site 2 Transmission Corridor is cultivated cropland. About 10 percent of the land within White Site 2 is a forested shelterbelt, which would be avoided by power plant and substation construction. Wildlife habitats found at White Site 2 include those described for White Site 1 in regard to the cultivated cropland areas. The total area impacted and potential impacts for White Site 2 are similar to the cultivated cropland areas for White Site 1. However, White Site 2 would have a larger total percentage of permanent surface changes and subsequent potential surface runoff due to the additional construction of the necessary substation. Potential temporary impacts to wildlife and wildlife habitat are expected to be similar to those discussed above for White Site 1. However, the addition of the substation would result in six acres of additional permanent impacts. The construction of the Rural Water Pipeline Extension planned for White Site 2 would require the temporary removal of approximately 0.05 acres (according to analysis of NWI data) of wetland vegetation and, depending on the final routing, permanent removal of less than one acre of woody areas along the pipeline corridor. These activities would cause temporary disturbance or displacement of wildlife species during construction as well as permanent displacement of some species during operation. Some mortality of small, ground-dwelling animals may occur during construction, but impacts are not expected to affect local or regional species populations. As a result, wildlife inhabiting the aquatic, semi-aquatic, and wetland habitats would be minimally impacted during construction and operation.

White Site 1 and White Site 2 Transmission Corridor

The proposed Project area occurs at the border between the Central and Mississippi flyways; some of the waterfowl species that may occur in the proposed Project area are listed in appendix C. The presence of overhead transmission lines may increase the collision and electrocution risks for avian species and bats, especially near wetlands and riparian areas (APLIC 2006). The proposed Project would be built following USFWS and Avian Power Line Interaction Committee (APLIC) guidelines to minimize bird risks. The transmission line, including structures, would be placed outside of wetland and riparian habitat to minimize habitat loss and the displacement of amphibians, reptiles, small mammal, and avian species that may use the transmission ROW.

Construction and operation of the 0.75-mile long transmission line for White Site 1 would be primarily within cultivated cropland (40 percent), pastureland (55 percent), and developed land (five percent). The 0.50-mile long transmission line for White Site 2 would cross cultivated cropland for its entire length. Habitat loss to species in the area would be minimal due to the current land uses. The potential for localized, permanent habitat loss and possibly the direct mortality of less mobile ground-dwelling species within the corridor exist in locations where transmission structures are located in areas not used for cultivated cropland. Foraging and resting areas in pastureland would be temporarily altered by access roads and human disturbance during construction and operation. The area affected would be little more than the width of a vehicle track and would most likely occur in the fall, during non-nesting and dry weather. Permanent impacts from transmission lines associated with the proposed Project are not expected to be significant to local, regional, or national species populations.

White Site 1 Natural Gas Pipeline Route

Approximately 35,800 linear feet (6.8 miles) of the White Site 1 Natural Gas Pipeline would be constructed parallel to existing local roadways, and 33,500 linear feet (6.4 miles) would be constructed cross-country. Although construction is adjacent to existing road ROW, the pipeline would require new easements immediately adjacent to the road easements. Because the pipeline is adjacent to habitat that has already been fragmented by roadways, the impacts to wildlife habitat would be less than for those portions routed cross-country. Native vegetation has been previously disturbed along most of the proposed ROW length through cultivation, introduction of livestock, and encroachment of non-native grass species. Two locations to be crossed by the White Site 1 Natural Gas Pipeline Route were determined to contain native prairie forb and native warm season grass communities. These include one hillside on the south side of 204th Avenue (NE ¼ Section 18, T111N, R47W) as well as one hillside on the east side of 485th Avenue, immediately northwest of Lake Hendricks (NW ¼ Section 29, T112N, R47W). Both locations of native prairie to be crossed are where the pipeline route leaves the road ROW and proceeds cross-country. Impacts in these areas are expected to be temporary, with direct impacts to small mammals and avian species including loss of habitat and noise disturbance during construction. Mammals, amphibians, reptiles, and bird species may also experience temporary impacts as a result of trenching during construction. Trenching activities may result in localized permanent impacts to individual small, ground-dwelling wildlife species that may occur in the area. Following construction activities, the area would be revegetated following an approved protocol and wildlife would move back into the area.

One inactive raptor nest of an unknown species was located in 2009 approximately 0.47 mile southwest of the proposed construction ROW in a shelterbelt just east of 484th Avenue and north of 197th Street (EDAW 2009b). If construction were to occur during the avian breeding season, loss of habitat and human disturbance could result in temporary or permanent impacts to individuals and populations of avian species. Most facility construction would occur during the fall to avoid impacts to nesting species; however, if construction were to occur during the avian breeding season, pre-construction surveys would be conducted prior to any ground-disturbing activities. Basin Electric, Western, and RUS would consult with the USFWS prior to construction during this time period to determine measures to avoid impacts to migratory bird species. Some segments of the pipeline would be constructed using directional boring, also resulting in minimized impacts to associated common wildlife and aquatic habitat. Aquatic, wetland,

and terrestrial habitats that would be open-cut trenched would be restored to pre-construction conditions to mitigate long-term impacts to habitats and wildlife species found in these areas. Because only one nest would be involved, the biological viability of raptors protected under the MBTA would not be affected by activities along the White Site 1 Natural Gas Pipeline Route.

Impacts to wildlife other than birds during construction along the White Site 1 Natural Gas Pipeline Route are also expected to be minimal, because the cropland, pastureland, and shelterbelt habitats crossed are common, with no long-term impacts to local, State, or national populations. The native prairie habitat crossed in two locations would only be temporarily impacted. Species utilizing this habitat would likely temporarily relocate and return as restoration progresses. As a result of these considerations, the construction and operation of the White Site 1 Natural Gas Pipeline would not likely have permanent significant impacts on the terrestrial or aquatic wildlife populations along the proposed route.

White Site 2 Natural Gas Pipeline

Habitats found within the alternate gas pipeline corridor are similar to those found within the proposed corridor; therefore, construction and operation of the White Site 2 Natural Gas Pipeline, although shorter than the proposed pipeline, is expected to have similar impacts on wildlife populations.

4.5.2.3 Cumulative Impacts

Past, present, and reasonably foreseeable future actions that have affected wildlife populations in the area include the extensive agricultural development of the past, and the more recent wind farm developments. More recent developments such as the wind farms have sought to minimize impacts to wetlands, native prairie, and woodland habitats. Most of the permanent impacts of the proposed Project would take place on existing agricultural lands with minimal potential for adverse cumulative impacts to wildlife. Because of the avoidance measures and construction methods that have been incorporated into the proposed Project, only temporary impacts are expected to wetlands or native prairie. Minor impacts to shelterbelts would occur where they are adjacent to existing ROWs. Construction at either White Site 1 or White Site 2 would not affect the biological viability of wildlife species. Construction and operation of White Site 2 would result in fewer impacts to wildlife and fisheries resources compared to White Site 1. However, regardless of the site chosen, the proposed Project would not contribute to significant adverse cumulative wildlife impacts.

4.5.3 Special Status Species

Species that have special State or Federal status are discussed in this section, including species listed as endangered or threatened under the ESA, species that are candidates for Federal listing, species listed as endangered or threatened on State endangered species lists, and species protected by the BGEPA.

4.5.3.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no special status species impacts associated with the No Action Alternative.

4.5.3.2 Proposed Project

Impacts to species with State or Federal status or their designated critical habitat would be considered significant if:

- The proposed Project would cause or be likely to cause an adverse affect on a federally-listed threatened or endangered species, designated critical habitat, or candidate species for Federal-listing
- The proposed Project would affect the biological viability of a State-listed threatened or endangered species
- The proposed Project would affect the biological viability of a species protected under the MBTA or the BGEPA.

4.5.3.2.1 Federal Species

For compliance with section 7 of the ESA, a separate Biological Assessment is being developed. The following is a summary of impacts to federally listed species, as well as impacts to the bald eagle, which is protected under other laws.

According to the USFWS letter of April 7, 2009, species with Federal status that have the potential to occur in the proposed Project area include the federally-endangered American burying beetle and Topeka shiner, the federally-threatened western prairie fringed orchid; and the Dakota skipper, a candidate for Federal listing. USFWS also stated that the proposed Project is “east of the migration corridor where 95 percent of whooping cranes have been documented; thus, the likelihood of occurrence at the proposed Project site is very low. Only rarely have individuals been pushed off-course by weather events and occurred in habitats near, or even further east than, the proposed Project site." The USFWS county list also does not list the whooping crane as occurring in Brookings or Deuel counties (USFWS 2009).

The Topeka shiner has been documented in Deer Creek and associated tributaries that are found in the Project area. The American burying beetle and western prairie fringed orchid have not been known to occur in eastern South Dakota in recent decades. However, the western prairie fringed orchid is known to occur in southwest Minnesota (section 3.4.4). Representatives of Basin Electric, USACE, SDGFP, USFWS, and Western met on May 5, 2009, to discuss biological resource issues and permitting for the proposed Project. It was determined through this informal consultation that suitable habitat for the American burying beetle does not occur in the proposed Project area and that surveys for the species are not required (Schriner 2009). It was determined that federally listed species with the potential to be impacted by the construction and operation of the proposed Project are the Topeka shiner and western prairie fringed orchid, and also that the candidate species Dakota skipper has the potential to be impacted.

Topeka shiner habitat surveys were completed in September 2009. The only streams determined to have potential habitat were three locations along Deer Creek and one tributary. However, no project facilities are proposed that would involve pipeline construction through or under Deer Creek. Standard BMPs would prevent any substantive impacts to the waterways and there would be no significant impacts as a result of construction and operation. Water Well Supply Site B, which would provide process water for the proposed Project, is located in the floodplain to the north of Deer Creek. A test well has been installed and pump test results suggest that there would be no impact to Deer Creek at the water withdrawal levels to be used by the proposed Project. However, monitoring wells would be placed between the water well and Deer Creek to monitor the cone of influence for groundwater withdrawal and ensure that no impacts to water levels in Deer Creek occur. If it is determined that hydrological impacts to Deer Creek are occurring, additional consultation would be initiated with USFWS.

Habitat evaluations of the vegetation communities within the Project area were completed in July 2009 to determine if suitable habitat was present to support populations of the western prairie fringed orchid. No suitable habitat capable of supporting populations of the western prairie fringed orchid was located within the proposed Project area (Larson 2009). Construction and operational activities would result in no temporary or permanent impacts to this species on a local or regional level. The proposed Project would have no effect on the western prairie fringed orchid.

Habitat evaluations within the proposed Project area were conducted in June 2009 to determine if suitable habitat was present for the Dakota skipper. Three locations in the vicinity of the proposed

Project were determined to contain prairie forb and native warm season grass communities capable of supporting Dakota skipper populations. One location was to the southeast of White Site 1 near 207th Street (SW ¼ Section 30, T111N, R47W) and in an area that would not be impacted by construction or operation of the Project. The remaining two locations are along the White Site 1 Natural Gas Pipeline Route and include a north- and east-facing hillside on the south side of 204th Street (NE ¼ Section 18, T111N, R47W) as well as a west-, south-, and east-facing hill on the east side of 485th Avenue, immediately northwest of Lake Hendricks (NW ¼ Section 29, T112N, R47W). The White Site 1 Natural Gas Pipeline Route traverses 578 feet of native prairie at 204th Street and 2,042 feet of native prairie at 485th Avenue. Presence/absence surveys for Dakota skippers were completed during the short flight period of this species during summer 2009. Dakota skippers were found at the location southeast of White Site 1 but not at either location along the pipeline corridor (Skadsen 2009). Dakota skipper habitat is uncommon in the general area of the proposed Project and natural gas pipeline corridors.

Construction and operation of the power plant, transmission corridor, or proposed water well supply location would not directly impact known Dakota skipper populations. Although the Dakota skipper was not observed within the White Site 1 Natural Gas Pipeline Route, suitable habitat for this species exists in two locations along the ROW. Therefore, it is possible that the Dakota skipper and its habitat could be impacted during project construction. The current proposed Project layout would result in temporary impacts to suitable habitat within the pipeline ROW. These impacts would be minimized through the implementation of BMPs during and after construction, the restoration of native prairie communities within the ROW, and the implementation of a noxious weed management plan. To ensure that impacts are avoided, pipeline construction would not take place in the two locations of Dakota skipper suitable habitat during the growth and blooming period for the nectar source of the adult butterfly (May-July), which includes the summer breeding period of the butterfly.

The bald eagle is federally protected under the MBTA and BGEPA. One bald eagle was observed in October 2008 near the Lac Qui Parle River, which feeds into Lake Hendricks. Although bald eagles are found in the general area, no bald eagle nests have been identified near proposed Project facilities (EDAW 2009a). Therefore, no adverse impacts to the bald eagle would be expected. Other migratory birds in the area would be temporarily affected during construction, but because large-scale habitat changes are not part of the proposed Project, minimal habitat impacts are anticipated. In addition, construction of gas pipelines would be scheduled during the late summer and fall, after nesting season.

4.5.3.2.2 State-listed Species

State-listed species with the potential to occur in the Project area include the northern redbelly dace, banded killifish, blacknose shiner, sturgeon chub, osprey, eastern hognose snake, lined snake, and northern red-bellied snake. The eastern hognose snake and lined snake could potentially occur at White Site 1 around the shelterbelts on the eastern side of the site and could feed in the wetland and surface waters of the proposed Project site. Construction would be designed to avoid these areas. If present on site, some individuals could be temporarily affected if construction activities disturbed these areas, but they would more likely relocate to nearby areas during the construction period. Permanent impacts to the state-listed northern redbelly dace, banded killifish, blacknose shiner, sturgeon chub, and northern redbellied snake would be avoided by use of BMPs where construction would take place in the Deer Creek watershed.

4.5.3.3 Cumulative Impacts

Past, present, and reasonably foreseeable future actions with the potential to cumulatively affect aquatic species include agricultural development along with soil and nutrient enrichment of the watersheds, county road construction, especially involving bridges and culverts, and wind farm construction, which involves access road culverts. Because no permanent stream or wetland impacts are anticipated due to the use of BMPs and directional drilling where necessary, the Deer Creek Station Project, when combined with other actions also affecting aquatic resources, would not cumulatively contribute to impacts on the Topeka shiner or other aquatic species in the area.

Past, present, and reasonably foreseeable future actions with the potential to affect terrestrial species like the western prairie fringed orchid and Dakota skipper include agricultural development of prairie habitats, county road maintenance, and wind farm development. These past actions have tended to fragment prairie habitat and are responsible for the remaining habitat “islands” in the area. Impacts to native prairie and prairie forb habitats would be mitigated by the Deer Creek Station Project and associated facilities, so the proposed Project would not cumulatively contribute to impacts on terrestrial species.

Bird species protected under the MBTA or BGEPA would be minimally affected by construction and operation activities of the proposed Project. Because no major habitat changes would be caused by the project, the project would not contribute to significant adverse cumulative effects on any bird species.

4.6 SOCIOECONOMIC RESOURCES

4.6.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no socioeconomic impacts associated with the No Action Alternative.

4.6.2 Proposed Project

Under the proposed Project, socio-economic impacts would be considered significant if:

- In-migration of the proposed Project work force would induce population growth that would strain government and community facilities and services
- In-migration of the proposed Project work force would result in insufficient existing housing within the study area for both workers and their families
- In-migration of the proposed Project work force would change the economic base of the study area

Potential socioeconomic impacts could come from population growth associated with the construction of the power generation station. This growth could affect the local economy, the regional housing supply, and local government services. It is estimated that the proposed Project would require 360 workers at the peak of construction and 30 permanent employees once the plant has been completed. Since it is not uncommon for workers in the region to commute an hour or more to work, it can generally be assumed that workers would be spread out over the region (First District Association of Local Governments 2009).

There would be short-term impacts on local housing, but they would be minimal. Of the estimated 360 workers needed during the construction phase, 252 are expected to come from out-of-state based on an area labor study. While these workers have the potential to strain the available affordable rental housing in the region, the First District Association of Local Governments (2009) found that there are 740 affordable rental units, units with rent below $500 a month, within the counties from which workers in Brookings County typically commute. In addition to affordable rental housing, there are also 500 available camper sites within the region. Many workers may decide to use these camper sites as a housing option. The 30 permanent employees needed in the operation and maintenance of the plant once it is completed would also find sufficient available housing and their presence would have no long-term housing impacts on the region.

Since it is possible that about 252 construction workers would be coming from outside the immediate area, it is likely that there will be short-term positive economic impacts. Lodging, food, retail and other services would likely benefit from the construction of the proposed Project. In addition to services directly related to the workers, services related to the construction of the proposed Project would also benefit. Local material suppliers, mechanics, and business support services would benefit the most from construction.

Local governments could also have both short- and long- term benefits from tax revenue collected during construction and operation. Taxes collected from retail sales and property taxes are especially important since South Dakota has no corporate income tax, personal income tax, personal property tax, business inventory tax, or inheritance tax. The retail and lodging needs of the construction workers would produce a temporary increase in taxes collected. Once the proposed Project is completed, property taxes collected from the plant would benefit local and State governments. Property owners would also benefit from payments for ROW easements associated with the proposed Project natural gas pipelines and transmission lines.

Since construction workers would only be on site from July 2010 to August 2012, it is unlikely that the proposed Project would have any long-term negative impacts on local government services. During construction, government resources such as educational resources, law enforcement, fire protection, and health services would be needed by the workers and their families.

During construction, there would be no significant impact to the education resources within the proposed Project area. At the peak of construction, with 360 workers on site, it has been estimated that there would be 72 worker-related students based on the national average of 0.2 children per household. The three school districts in the proposed Project area can absorb 277 new students before they reach peak enrollment. The educational resources would be sufficient to meet the needs of the workers and their families during construction, and would be sufficient to meet the needs of the 30 permanent employees once the plant is completed.

At the present time, Brookings County has 14 law enforcement officers and 17 retired volunteers that make up the senior patrol. Fire protection in the study area is primarily provided by volunteer departments with 131 volunteer fire fighters. The City of Brookings has a paid fire chief, assistant, and secretary. Surveys collected from both law enforcement and fire services in the study area for the First

District report indicated that the law enforcement and fire protection services in the proposed Project area would be adequate to handle the temporary influx of workers.

There are five major health providers in the proposed Project area. These are Brookings Avera Clinic, Brookings Sanford Clinic, Brookings Health System, White Family Clinic, and Elkton/Avera Clinic. In addition to these, there are a number of clinics and other health services in the region to handle health needs. Ambulance and emergency services are provided by the cities of Brookings, Elkton, White, and Aurora. Surveys collected from health officials in the study area for the First District report indicated that the health services in the proposed Project area would be adequate to handle the temporary influx on workers.

4.6.3 Cumulative Effects

The development of wind farms, together with the development of Deer Creek Station, would yield additional employment opportunities in the local project vicinity. These employment opportunities would affect housing demand and would contribute positively to the economy of the area. For every 20 wind turbines, about five construction jobs and three permanent operation and maintenance jobs are created. These low numbers suggest that the cumulative effects of the wind farms and the Deer Creek Station Project would not strain local government services and would generally be a positive impact from a socioeconomic standpoint.

4.7 ENVIRONMENTAL JUSTICE

Environmental justice impacts would be considered significant if the proposed Project had a disproportionate impact on minority or low-income residents. Minority or low-income communities are not present in the proposed Project area, and under the No Action Alternative as well as the proposed Project, no minority or low income communities would be disproportionately affected.

4.8 LAND USE

4.8.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no land use impacts associated with the No Action Alternative.

4.8.2 Proposed Project

Impacts to land use under the action alternatives would be considered significant if:

- The proposed Project would conflict with applicable land use plans or regulations that were not resolved with the regulatory agency
- The proposed Project would conflict with existing land uses in the study area to the point where other land uses could not continue
- The loss of agricultural farmland would affect the overall agricultural production in the county

The proposed Project would involve the fencing of 100 acres of land currently used for crop production for the utility facilities. Of this, 40 acres would contain long-term facilities, and the remainder would be maintained as part of the plant site and would not be used for crop production. Similarly, 100 acres of agricultural land would be fenced for utility facilities at White Site 2. Of this, 46 acres would contain long-term facilities, and the remainder of the fenced portion would be maintained as part of the plant site. Coordination with Brookings County and Deuel County is ongoing to ensure that the proposed Project does not conflict with land use plans identified in the Comprehensive Land Use Plan for Brookings County (BCPC 2000) or the Comprehensive Land Use Plan for Deuel County (DCPC 2004a). The proposed Project would be permitted, constructed, and operated in accordance with all applicable land use regulations, including the Brookings County Zoning Regulation and the Deuel County Zoning Ordinance.

Land use impacts would include both permanent land use changes as well as temporary land use disturbances during construction. The primary land use impact would be the conversion of agricultural land to utility-related uses. Because of the large amount of acreage of agricultural land in the area, these impacts are not expected to be significant. In addition to agricultural land, there are also several existing utility-related land uses in and around the study area, including a substation, transmission lines and several existing and planned wind farms. Construction of the proposed Project would be compatible with these existing land uses.

Impacts to agriculture as a result of the proposed Project would include the removal of farmland, primarily for plant construction at either White Site 1 or 2. Permanently converted acreage of 100 acres at either site would represent a very small percentage (0.02 percent) of the total farmland in Brookings or Deuel County. This loss of farmland would not significantly affect the overall agricultural production in the county. The total value of agricultural products sold in 2007 was $186.7 million in Brookings County and $105.1 million in Deuel County. The loss in agricultural revenue in Brookings County as a result of the proposed Project would likely be immeasurable and would comprise a very small percentage of total county agricultural revenue values. These losses would be offset by revenue from about 30 new permanent jobs associated with power generation.

Temporary land use disturbances during construction could potentially impact cultivated cropland, native prairie, or pastureland. Any crop damage or loss to landowners during construction would be compensated by Basin Electric. Disturbed areas that contain grassland or pastureland would be restored and reseeded following established BMPs. The following impacts would be anticipated for each component of the proposed Project.

4.8.2.1 White Site 1 Alternative

Approximately 100 acres of existing agricultural land would be fenced for plant construction at White Site 1, which would include the plant site and an access road from 484th Avenue. Of this, 60 acres of the property would be temporarily disturbed during construction but returned to agricultural uses after construction is complete. A transmission line of 0.75 miles in length would include about 13.6 acres within a 150-foot ROW. Only a very small area of land immediately around the transmission line structures would be permanently impacted. In addition, maintenance access roads for the transmission lines would be a permanent impact. The ROW of the gas and water pipelines and the transmission lines would be available to the underlying land owner for nearly all uses, which greatly limits the level of potential impacts to land use. Some restrictions on permanent structures would be associated with the transmission lines, and the structure locations would take land permanently out of its existing use.

4.8.2.2 Water Well Supply Site B and Water Pipeline

Most of the land use impacts at Water Well Supply Site B would be temporary disturbances during construction. These temporary impacts would include disturbance of the area around two production well sites (a 200-foot by 200-foot area), as well as the area where the water pipeline would be buried. The water pipeline would be buried adjacent to 484th Avenue for a distance of 1.25 miles. Permanent impacts would result from construction of the well site and access road on cultivated cropland. In addition, two temporary and three permanent monitoring wells would be placed between the two production wells and Deer Creek.

4.8.2.3 White Site 2 Alternative

Permanent land use impacts for the power generation facility at White Site 2 would be similar for White Site 1. However, the total permanent land use impacts for this alternative are anticipated to be greater as compared to White Site 1, because the facility would require the construction of a substation about six acres in size in addition to the plant. Construction of the plant at White Site 2 would also require a Rural

Water Pipeline Extension of 6,000 linear feet from 481st Avenue to White Site 2. The pipeline would be constructed along an unimproved roadway, resulting in a new permanent ROW of about 14 acres. Potential impacts to adjacent agricultural land would be temporary during construction. A transmission line of 0.5 miles in length with a 150-foot ROW of 9.1 acres would also be constructed in association with White Site 2, resulting in temporary land use disturbances during construction and small areas of permanent impacts around the structures. The Rural Water Pipeline Extension would not affect land use.

4.8.2.4 White Site 1 Natural Gas Pipeline Route

The 13.2-mile long White Site 1 Natural Gas Pipeline would be constructed parallel to improved roadways for approximately 6.8 miles, and along new alignments not near existing roadway for 6.4 miles. Land use impacts along the route would include new permanent 75-foot wide ROW of 120 acres of mostly agricultural land during construction. For about half its length, the White Site 1 Natural Gas Pipeline would deviate from the road due to environmental constraints, property access issues, or other construction parameters. In these areas, the pipeline would have temporary impacts on agricultural land. At the point where the proposed pipeline would connect to the Northern Border pipeline, a branch would be made into the existing pipeline. The interconnection site would consist of valves, metering equipment, and instrumentation within a fenced secure area that would be approximately 50 feet by 70 feet. Additional pressure regulators and pipeline connection features would be situated immediately adjacent to the interconnection site in a separate fenced secure area that would be approximately 50 feet by 70 feet. The proposed Project would not impact any of the USFWS administered easements identified within the study area.

4.8.2.5 White Site 2 Natural Gas Pipeline Route

The White Site 2 Natural Gas Pipeline Route would be approximately 10 miles in length and would require a 75-foot ROW; the total disturbance area would be approximately 90 acres. The ROW would be constructed adjacent to improved roadways in an agricultural setting. Land use impacts include temporary disturbances to agricultural land during construction.

4.8.3 Cumulative Effects

Other past, present, and reasonably foreseeable future actions in the region that have affected land use include wind farm developments. There has been little recent development in new residences or roads. The predominantly agricultural landscape of the area has undergone changes in recent years as wind farms have been constructed. However, wind farms allow agricultural activity to continue with minimal reduction in cultivated land area. The proposed Project would have a similarly small impact to the predominantly agricultural land uses and would not contribute to a major shift in land use or loss of agricultural productivity in the area. As a result, the proposed Project is not expected to create significant adverse land use impacts, on an individual or cumulative basis.

4.9 TRANSPORTATION

4.9.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no transportation impacts associated with the No Action Alternative.

4.9.2 Proposed Project

Impacts to transportation under the action alternatives would be considered significant if:

- Congestion occurs at intersections in the proposed Project area that increases traffic delays to unacceptable levels (Level of Service D or E as defined in the *Transportation Research Board, 2000*)
- Existing roads are damaged and not restored to original condition or better
- Dust from traffic on gravel roads becomes a nuisance to local residents

Construction and operation of the proposed Project would temporarily introduce construction traffic, delivery trucks, and special heavy truck deliveries to rural county and township roads. Construction traffic would originate from I-29 to the west and use US 14 or (SD 30 to within a few miles of White Site 1. Traffic from I-29 would pass just to the south of the town of White on SD 30 and just to the north of the city of Brookings on US 14.

4.9.2.1 White Site 1

Access to White Site 1 requires travel of six or more miles on county or township roads. The primary construction traffic route from SD 30 would be south on 478th Avenue at the town of White for three miles, then east on 207th Street for six miles, then north on 484th Avenue for less than one mile to the plant site. The roadway designated as 207th Street is gravel for its entire length in the proposed Project area, as is 484th Avenue.

Construction traffic routes from US 14 could involve heading north six miles on 484th Avenue. However, since 484th Avenue is gravel for its entire length, construction traffic from US 14 would be routed on an alternate paved road to the west, 482nd Avenue.

Because of the amount of construction that would occur during both construction and normal operation, 484th Avenue from north of 207th Street to the plant entrance would be paved. The total roadway to be paved by Basin Electric is 0.75 mile. The paved roadway section would consist of four inches asphalt surface course on a minimum of six inches of aggregate base underlain by reinforcement fabric. Gravel surfaces at approaches to intersections along the designated primary access routes would be paved for a minimum distance of 300 feet to eliminate wash boarding and rutting that occur from deceleration, acceleration, and turning movements. The existing gravel surfaces to be paved would be cored to ascertain if additional base would be required. If necessary, the gravel areas may be over-excavated to accommodate the minimum base requirements. Other county and township roads would be monitored and any damage from construction traffic would be repaired and restored to original condition or better. A dust control treatment program would be implemented in areas that have residences nearby.

4.9.2.2 White Site 2

White Site 2 is located on 482nd Avenue just to the north of SD 30 and construction of a facility at the site would have the smallest impact on county and township roads, requiring just one mile of driving for construction traffic from SD 30. If White Site 2 were chosen, it is likely that wetting agents would be used to control construction traffic dust. Construction traffic for the Rural Water Pipeline Extension would use the adjacent roadways. The condition of county and township roads would be monitored and any damage from construction traffic repaired and restored to original condition or better.

4.9.2.3 Natural Gas Pipeline and Transmission Line Construction

Natural gas pipeline and transmission line construction traffic would utilize I-29, SD 30, and SD 28 to reach the vicinity of construction, and then use county or township roads adjacent to the construction corridor. The White Site 1 Natural Gas Pipeline Route would primarily use 485th Avenue in Brookings County and 484th Avenue in Deuel County. The White Site 2 Natural Gas Pipeline Route would use 481st Avenue in Brookings County and 481st Avenue in Deuel County. While pipeline construction is underway, roads would be closed for short time periods while construction equipment is being loaded or unloaded or equipment crosses roadways. Construction would occur mainly on the pipeline ROW and not obstruct roads.

4.9.3 Construction Traffic Generation and Distribution

The proposed Project is expected to require up to 360 workers on site at the peak of construction. The majority of the workers are expected to originate from Brookings with others to be in adjacent communities. The distribution of the 360 project-generated trips is tabulated below, based upon the assumption that 250 workers will live within the 12-mile study area defined by the Public Utility

Commission (PUC). The other 110 workers are anticipated to originate from outside of the study area. Worker distribution estimates were made based upon the existing available housing stock within each municipality (table 4-8) and assume that no car-pooling occurs. This would be a worst-case scenario, since most construction companies encourage car-pooling arrangements and some provide vehicles.

Table 4-8: Geographic Distribution of Construction Work Force

City/Town	Workers
***Astoria**	3
***Aurora**	9
***Brookings**	218
***Bushnell**	1
***Elkton**	12
***White**	7
Clear Lake	1
DeSmet	2
Flandreau	3
Lake Benton, MN	1
Lake Norden	1
Madison	4
Pipestone, MN	6
Sioux Falls	64
Watertown	28
Total	**360**

* Municipality within the PUC 12-mile defined study area

Based on the assumed geographic distribution of the construction work force, temporary traffic is conservatively estimated to increase on the regional roadway network (table 4-9). These values are based on single vehicular occupancy for all workers, and no consideration for regular absenteeism. This provides a worst-case scenario for traffic flow on local roads. As noted in section 4.9.6 of this EIS, even with the addition of the construction traffic all intersections will remain in good operating condition.

Table 4-9: Projected Roadway Assignment of Construction Traffic

Route	Traffic Increase (One-Way Trips)
I-29 north of Brookings	29
I-29 south of Brookings	71
US Highway 14 east of I-29	221
US Highway 14 east of 484th Avenue	19
US Highway 14 at Aurora	9
SD Highway 30 from I-29 east	11
Total	**360**

4.9.4 Equipment and Materials Shipment

Construction materials and equipment would be shipped and delivered to the site by either rail or truck. Rail shipments would be offloaded in Aurora and trucked over the roadway network to the proposed Project site. Shipments trucked directly would travel on Interstate I-29, US 14, and the local road network. Shipments coming from both north and south would likely travel over I-29 prior to leaving the interstate at Exit 132 to travel east on US 14 prior to entering the local road network.

4.9.5 Heavy Haul

Construction of the proposed Project is expected to require between 20-to-25 heavy haul loads delivered to the site, which would require transportation equipment of gross weights and dimensional characteristics in excess of standard over-the-road units. Basin Electric has initiated discussion of the heavy equipment deliveries with a specialty-hauling firm to ascertain the loads and potential routes to the site. The firm has delivered transformers to proximate facilities using 483rd Avenue and turning onto 207th Street. However, the firm expressed their preference for not using this route due to the turn and grades. Instead, the heavy equipment company would likely use 484th Avenue directly from US 14 and place a temporary 'jumper' bridge over the Deer Creek bridge structure, which may require some minor grading at the approaches. This would require closure of 484th Avenue for the period of grading and installation of the temporary bridge. This closure would be expected to last for approximately one day. The jumper bridge would be in place until all heavy haul loads are delivered.

4.9.6 Capacity Analysis

Capacity as defined in the *Highway Capacity Manual* (HCM) (Transportation Research Board 2000) is the maximum rate of flow for a roadway segment or intersection under prevailing conditions. A volume to capacity ratio (v/c) greater than 1.0 is an indication of congestion and increased potential accident rates at the location in question. By observation, the local roadway grid network provides adequate capacity to meet current and projected traffic demands that would result from the proposed Project.

Approximately 90 percent of the work force is expected to access the site from US 14 to 482nd Avenue. Capacity at this intersection was evaluated under current base conditions, and with projected peak construction traffic. Base condition peak hour traffic on US 14 in proximity to the intersection was developed from the 2008 South Dakota traffic flow maps. Additional construction traffic was then added based on the volume and geographic distribution as previously discussed.

Intersection traffic operations are evaluated using levels of service (LOS), which are ranges of average delay per vehicle entering the intersection within a 15-minute analysis period (Transportation Research

Board 2000). Under the HCM methodology, the average delay for each vehicle approaching the intersection is calculated based on available gaps in conflicting traffic streams. The range in delay, in terms of seconds per vehicle for each LOS, is listed in table 4-10 below:

Table 4-10: LOS Criteria for Stop Controlled Intersections

LOS	Average Delay (sec/veh)
A	< 10
B	10 - 20
C	20 - 35
D	35 - 55
E	55 - 80
F	> 80

Overall delay is calculated as the weighted average for each approach based on the ratio of approach volumes to the total traffic volume at the intersection. Under No Action, the HCM calculates the average delay at the U.S. 14-482nd Avenue intersection would be 0.9 seconds during the morning peak period. Under the proposed Project with an estimated 331 additional vehicles entering the intersection during the peak construction period, the average delay would be an estimated 6.1 seconds. Both of these delay values translate to acceptable LOS A based on the HCM criteria listed above. In the evening peak hour, the average delay would be 0.4 seconds under No Action and 7.4 seconds under the proposed Project, which also translates into LOS A.

4.9.7 Traffic Assignment and Routing

The vast majority of the traffic increase would be noticed on US 14 from I-29 east to the proposed Project site turnoff road. An estimated 331 construction workers would travel to the proposed Project site on US 14 east of Brookings, 19 would come from Elkton and points east in Minnesota, and 11 would come from the north over SD 30.

Construction traffic would be routed to the site via signage from US Highway 14 south of the site and SD Highway 30 to the north. From the east and west along US Highway 14, traffic would be routed north along 482nd Avenue to 207th Street, then east on 207th Street, and then north on 484th Avenue to the site. This would keep north-south traffic on the 482nd Avenue paved surface, and minimize traffic on the load-posted Deer Creek bridges on 207th Street east of 484th Avenue. Where traffic turns northbound onto 484th Avenue from eastbound 207th Street, there is a "Y" intersection where westbound traffic on 207th turns northbound on 484th by cutting the corner. Those entering onto northbound 484th from westbound 207th currently have the priority movement, as the northbound traffic on 484th has a stop sign. During construction at White Site 1, it would be advisable to place a yield sign for the traffic moving from westbound 207th onto northbound 484th and remove the stop sign on 484th. This would be a new traffic control situation at this intersection, so the following actions would need to occur:

- Remove the stop sign on northbound 484th Avenue at the 207th Street intersection
- Install a yield sign for westbound 207th Street traffic at 484th Avenue
- Install a changeable message board on westbound 207th Street approximately 100 yards prior to 484th Avenue intersection for a period of 60 days to advise motorists of the new intersection traffic controls
- Install a new construction traffic warning sign along westbound 207th at the intersection with 484th Street

From the north, along SD 30, traffic would be routed down 478th Avenue to 207th Street east to 484th Avenue, and north to the site. These changes would be implemented in cooperation with county and township road departments.

In addition to daily construction traffic, the proposed Project is expected to receive approximately 1,000 truck deliveries during the life of the proposed Project, which may include semi-trailer combinations. Delivery traffic would be routed similarly to regular construction traffic, to minimize traffic on the gravel surface of 484th Avenue south of 207th Street and over the Deer Creek bridges on 207th Street and 484th Avenue.

In addition to construction of the energy conversion facility there would be a crew working to build the necessary gas pipeline between White Site 1 and north of SD 30, primarily along 485th Avenue. The gas pipeline would be built between late July and September 2010 (to avoid impacts to Dakota skipper habitat and minimize impact to aquatic and wetland habitat) and the construction crew would consist of an estimated 70 workers. These workers would be in the area for approximately three months and should finish construction of the gas pipeline several months prior to peak construction of the power plant. It is reasonable to assume that all 70 of these workers would travel to the proposed Project site from the north via SD 30 beginning at I-29 exit 140, as the existing gas line is 13.2 miles north of the proposed Project site.

4.9.8 Mitigation

Gravel surfaces at approaches to intersections along the designated primary access routes would be paved for a minimum distance of 300 feet to eliminate wash boarding and rutting that occur from deceleration, acceleration, and turning movements. The intersection segments would be paved to the extent necessary to provide the adequate tapers and radii for semi-trailer movements, which may require local ditch grading and location adjustment. Any additional grading outside of areas not previously surveyed or outside of existing ditches would require biological and cultural surveys. The 0.75-mile segment of 484th Avenue from 207th Street north to the project entrance is recommended to be paved, as this roadway will serve not only all construction traffic, but also the traffic generated by regular operations of the plant following its completion. In an effort to control dust along the gravel section of 207th Street, an appropriate treatment program would be developed in coordination with the county and township.

The recommended improved paved roadway section would consist of four inches of asphalt surface course on a minimum of six inches of aggregate base underlain by a reinforcement fabric separator. The existing gravel surface could be used as the aggregate base course, but should be inspected and measured to assure the minimum six inches is available. If necessary, the gravel areas may be over-excavated to accommodate the minimum base requirements prior to placement of the reinforcement fabric. In addition to its primary function as a separator, the fabric also provides strength if placed properly.

Since the local roadways and bridge structures that would be used fall under several different jurisdictions (Brookings County, Alton Township, Sherman Township, and Richland Township), a multi-party agreement would be developed which clearly defines limits of maintenance responsibility throughout the proposed Project. The condition of county and township roads would be monitored and any damage from construction traffic repaired and restored to original condition or better.

4.9.9 Cumulative Effects

The primary transportation and traffic impacts associated with the proposed Project would be associated with construction activity over a period of three years, 2010 – 2012. There is a proposal to construct 105 wind turbines in an area of approximately 35,000 acres to the north and west of the proposed Project site. This activity is likely to occur within the next few years as the economy improves and funding can be obtained. This would bring additional construction traffic to US 14 and SD 30 and the connecting local roads in the region. The 105 wind turbine sites are spread out over a large area and there would not be a continuous stream of construction traffic going to one site. This means that the traffic on local roads will vary over the construction period of approximately eight months. No other major construction activities have been identified for that time period. Because of the dispersed nature of the wind turbine construction, there would not likely be cumulatively significant traffic increases on any one road segment and, if there were, it would be a very temporary situation.

On an individual or cumulative basis, the proposed Project would not cause traffic delays to unacceptable levels D or E. Existing roads would be improved within the area to accommodate the proposed Project and wind turbine development. Road improvements would decrease the potential for nuisance dust; however, dust would be monitored and suppression measures incorporated into the proposed Project construction and operation plans. As a result of these measures, no significant adverse transportation impacts would occur.

4.10 VISUAL RESOURCES

4.10.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no visual impacts associated with the No Action Alternative.

4.10.2 Proposed Project

Potential thresholds for scenic quality would include visibility from designated scenic roadways, or scenic overlays designated in zoning ordinances. The following criteria were used to identify potentially significant changes to the scenic integrity of the landscape as viewed from sensitive viewpoints, such as transportation routes or residential areas:

- A high visual contrast with the surrounding landscape is introduced
- Creation of a new source of substantial light or glare, which would adversely affect day or nighttime views in the area

4.10.2.1 Impacts Common to Both Site Alternatives

The proposed Project would introduce new or different elements into the predominantly gently rolling terrain of eastern South Dakota and would alter the existing forms, lines, colors and texture that characterize the existing landscape. The proposed Project’s components were categorized as low (or level with the horizon line), moderate (less than 100 vertical feet), and tall (over 100 vertical feet) to aid in assessing visual impacts. In this area, the proposed Project could generally be seen from four miles, and the visual impact assessment area includes this distance. However, lights would generally be noticeable from a one-mile radius, and that radius is used for assessment of impacts from lighting.

Temporary impacts to the visual resources of the proposed Project area would include increased off-site vehicular traffic from maintenance and employee vehicles along major roads in and around the area during the construction phase. Site clearing and associated dust, borrow pit excavation, commissioning (steam blowout), and well drilling would also contribute to the visual impacts on the existing landscape. The presence of one or more large cranes would represent the most visible equipment or facilities used during the construction phase. In general, construction activities would create high visual contrasts during a short period of time in areas within four miles of the site, depending on the phase of construction and the location of the viewer. However, in many cases, construction projects become a focal point of interest of local residents. This high interest in the proposed Project may offset temporary visual impacts during the construction phase.

Most of the proposed Project's components would lie level with or slightly above the horizon once constructed. These components, whose blocky, angular forms and smooth-textured, engineered appearance contrast with the forms, lines, colors, and textures of the existing landscape character, include the following:

- Internal paved roads
- Local road modifications and primary access points
- Stormwater channels
- Onsite parking
- Water and natural gas supply system, including underground pipelines
- Evaporation pond
- Security fencing
- Water well control building and associated transformer
- Pitless water well unit
- Off- and on-site signage

Contrasting components with moderate height include the following:

- Air-cooled condenser (100 feet)
- Turbine building (93 feet)
- Administration building (22 feet)
- Ammonia storage tanks (18 feet)
- Water and wastewater treatment buildings (34 feet)
- Transformers (10 feet)
- Switchyard (75 feet)
- Water storage tanks (48 feet)

The tallest structures and equipment associated with the generation site include the following:

- Exhaust stack (150 feet)
- Transmission line structures (85 feet)

Most buildings on the generation facility site would feature light blue or white metal siding and a blue or white metal roof. Most storage tanks would be painted white. The HRSG and associated structures would be constructed with a light gray/silver metal. The transmission structures and associated switchyard equipment would be constructed using light gray/blue galvanized steel.

Several effects to visual resources would result from the introduction of the generation facility once constructed. The transmission structures and HRSG equipment would introduce prominent vertical lines perpendicular to the landscape that would create a moderate to strong contrast with the horizontal to generally horizontal plane of the surrounding landscape. The air-cooled condenser and turbine building would introduce large, angular block forms to the horizontal landscape. The light blue metal siding of the majority of buildings would introduce a color contrast to the landscape, because there may be a glare from the buildings when sunlight is reflected off the metal siding.

The FAA does not require notification for the construction of facilities that are less than 200 feet in height, so it is not anticipated that FAA would require fitting of either daytime or nighttime indicator lights for the Deer Creek Station. However, there would be some general facility lighting that would be installed to provide safe and effective operation of the facility at all hours.

General facility lighting would introduce a new visual element to the landscape. During daylight hours, the lights may be visible, but they would not be intrusive to viewers in the proposed Project area and are unlikely to create a high visual impact. The lights would be most noticeable during nighttime hours from residential properties within one mile of the generation site. There is one occupied residence about one mile away from White Site 1 and one occupied residence within 0.5 miles of White Site 2. These residences would likely be able to see the facility, although the residence at White Site 2 would be closer and not as screened by topography and vegetation. Although visual resources from some vantage points would be affected because of the facility lighting, impacts at the community level are expected to be insignificant because it is a sparsely populated rural area. No designated natural areas, parks, or historic sites are nearby, and therefore lights would not have the potential to affect the character of any scenic resources. Lights would be designed with shielding or cutoff optics to avoid unnecessary lighting of the surrounding area.

The degree of contrast between the generation facility and the surrounding landscape would depend on the distance of the facility from an individual viewpoint. The strong vertical lines of the transmission structures and the HRSG, together with the angular block forms of the air cooled condenser and turbine building, would dominate the landscape in the immediate foreground (up to 0.5 mile) of unobstructed views from individual viewpoints located on county and township roads and residences. As indicated above, this would affect one residence at each site and only casual viewers on rural roadways. The most potential drive-by viewers would be traffic on SD 30. The contrasts would be moderate in middle-ground views up to four miles, because the tallest structures would still be visible, but these structures would not be the dominant features on the landscape. Some structures of moderate height and most structures of low height would be screened by rolling topography and standing crops from some views. The textures of most structures on the generation site would be indiscernible from distances of more than four miles. However, the form and color of the largest structures (transmission structures, HRSG, air-cooled condenser, turbine building) may still be visible depending on atmospheric conditions, and may create a low to moderate contrast with the surrounding landscape.

4.10.2.2 Impacts Unique to Each Site Alternative

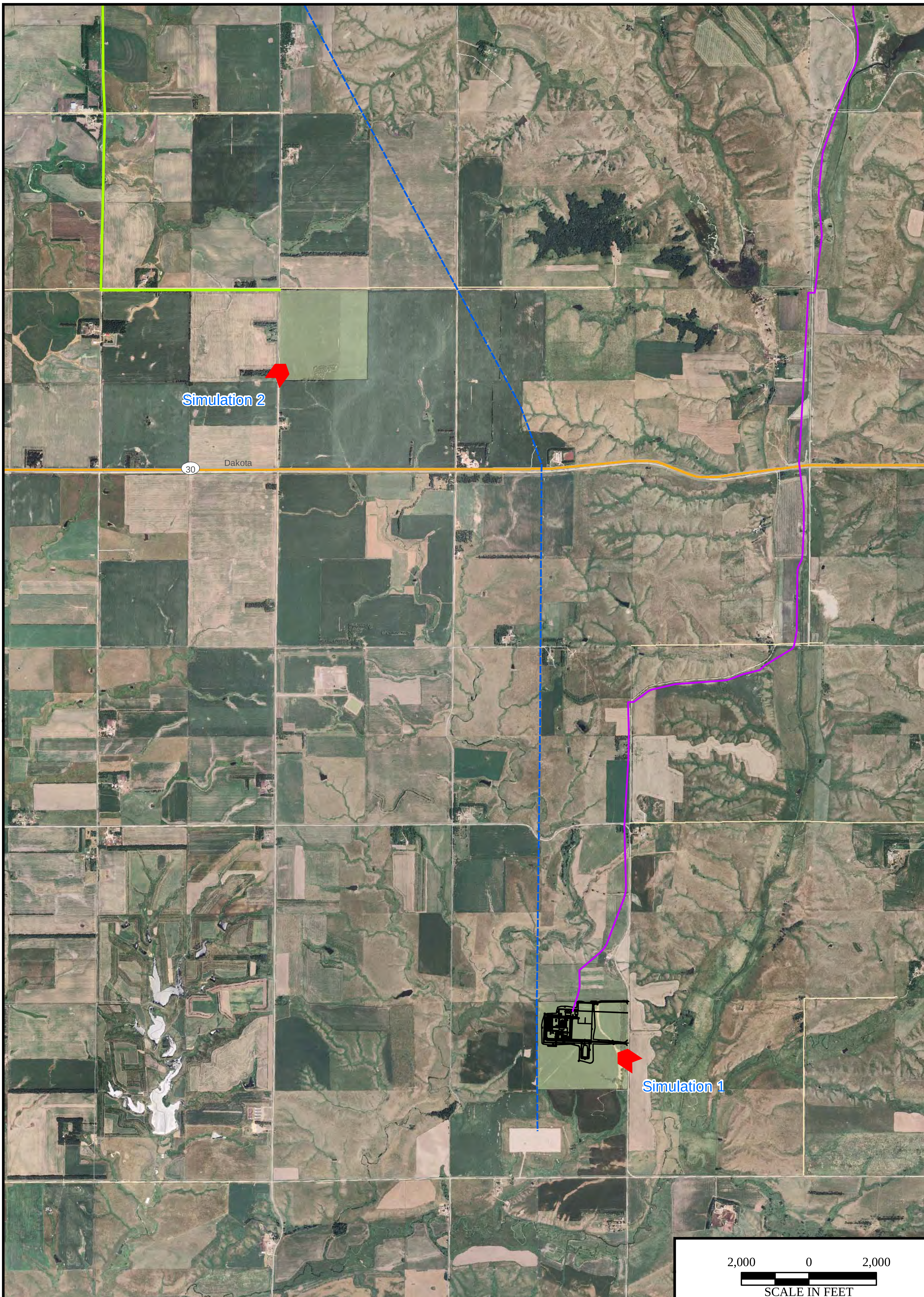
Impacts on visual resources for each site alternative were determined by considering photo simulations of post-construction views from select key observation points (KOPs) in the proposed Project area (EDAW 2009d). Figure 4-3 shows a map of where the photos for the simulations were taken.

4.10.2.3 White Site 1

The turbine building, transmission structures, and HRSG would be highly visible in views to the north, west, and south from the county and township roads near the generation facility site (figure 4-4). These tall, vertical structures would create a high degree of contrast with the surrounding landscape. The existing 345-kV transmission line can be clearly seen on the horizon.

In addition to the visual impacts of the generation facility, another new visual feature introduced to the landscape would be a transmission line. However, this would be adjacent to other nearby transmission lines already existing in the area and connecting to White Substation. The additional visual contrast would be minimal.

(THIS PAGE INTENTIONALLY LEFT BLANK)



LEGEND

White Site 1 Pipeline

White Site 2 Pipeline

White Site 1 Plant Layout

White Site 1 and 2 Boundaries

Photo Simulation Point

345-kV Transmission Line

Source: USDA NAIP County Mosaic, Brookings and Deuel counties, North Dakota;
ESRI; Basin Electric Power Cooperative

Figure 4-3

Locations of Photo Simulations
Deer Creek Station EIS

\\espsrv\data\projects\Basin\Basin\51236_EIS\GIS\DataFiles\ArcDocs\Revised_Figures_11_19_09\Figure 4-3_11_19_09.mxd Revised: 11/19/2009

Figure 4-4 Photo Simulations: White Site I (Simulation 1)

When viewed from longer distances of up to four miles, the visual impacts of the generation site would be further reduced from moderate to low, due to dozens of turbines from the existing wind farm southeast of the site. The turbines would appear almost twice as tall as the HRSG on the generation site when viewed from distances of more than four miles, creating a situation where the visual impacts of the generation site would be insignificant. The White Site 1 Natural Gas Pipeline and the water well supply site and pipeline would not be visible except during construction. Small markers indicating the presence of the pipeline facilities would be placed at road crossings. The pipelines would not have long-term visual impacts. The visual impacts from White Site 1 would affect few people based on the distance of White Site 1 to SD 30 (approximately 3.5 miles to the north) and the sparsely populated area surrounding the site. During the period of plant operation, the shelterbelt along the eastern side of the plant site would be maintained to provide visual screening.

4.10.2.4 White Site 2

White Site 2 is approximately 0.5 mile north of SD 30 and would therefore be seen by more travelers and residents of the area than would see White Site 1. The ADT on SD 30 is approximately 700 vehicles. Unlike White Site 1, White Site 2 would require an on-site substation to be constructed (figure 4-5). This substation, the turbine building, and the HRSG create a high degree of visual contrast with the surrounding landscape. In views toward the north and east from the county and township roads adjacent to the site, the existing 345-kV transmission line and existing wind turbines are not visually dominant features on the landscape and the visual impacts created by the structures of the generation facility would not be lessened. However, given the site's close proximity to SD 30, a greater number of viewers would see the generation site if White Site 2 were selected.

In addition to the visual impacts of the generation facility, another new visual feature introduced to the landscape would be a transmission line and substation. The substation would be to the south of the generation facility and would likely be perceived by viewers as part of the same industrial facility. In addition, the White Site 2 transmission line would be adjacent to other nearby transmission lines already existing in the area. The additional visual contrast would be minimal.

The White Site 2 Natural Gas Pipeline and the Rural Water Transmission Line would not be visible except during construction. Natural gas pipeline markers would be installed and maintained over the buried pipeline at road crossings and other locations to reduce the risk of inadvertent damage or interference. The markers would identify the owner of the pipeline and convey emergency information in accordance with applicable regulations, including 49 CFR Part 195 safety requirements. The pipelines would not have long-term visual impacts.

(THIS PAGE INTENTIONALLY LEFT BLANK)

Figure 4-5 Photo Simulations: White Site II (Simulation 2)

4.10.3 Cumulative Effects

Cumulative visual impacts at White Site 1 would be created by the addition of several turbines of the White Wind Farm, which would be visible in the view in the future. These turbines would be the tallest and most visible objects on the landscape, with a ground-to-nacelle height of approximately 300 feet. The presence of the 345-kV transmission line, together with the future presence of the wind turbines of the White Wind Farm, create a situation where the visual impacts of White Site 1 would be reduced from a high degree of contrast to a moderate degree of contrast. The angular block form and light blue color of the turbine building would create some degree of visual contrast, but its impacts would be lessened when compared to a site that was completely free from industrial or utility development.

Cumulative visual impacts at White Site 2 would be created by several proposed turbines from the White Wind Farm to the west and south from SD 30. The presence of these turbines would lessen the visual contrast and thus lessen the visual impacts of the structures on the generation site.

On an individual or cumulative basis, the proposed Project would not significantly affect scenic roadways or scenic resources of the area. Both White Site 1 and White Site 2 would introduce adverse visual impacts once constructed, especially when viewed from distances within 0.5 mile. White Site 2 would be seen by a greater number of viewers along SD 30 and would introduce an on-site substation to the proposed Project site. Both sites would be equipped with lights for nighttime operation, but the lights from White Site 2 would affect a greater number of viewers along SD 30. Overall, White Site 1 would introduce fewer structures on the existing landscape, would be located in an area with existing (or soon to be existing) visual disturbances, would affect fewer people, and would therefore have less of a visual impact on the landscape. Wind farm construction in the area has reduced the potential cumulative visual impacts of the proposed Project.

4.11 NOISE

4.11.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no noise impacts associated with the No Action Alternative.

4.11.2 Proposed Project

The land in the vicinity of the proposed Project is generally used for agricultural and residential purposes. Because the area is windy, background noise levels are high, ranging from 54 to 70 dBA. Wind is a pervasive component of noise in the area. There are minimal human-generated noise sources in the area, with vehicular traffic and farming equipment being the primary sources of human-generated noise in the surrounding area. Background noise levels vary by time of day. Implementation of the proposed Project may have a significant noise impact if it would result in any of the following:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies
- A permanent increase of more than 6 dBA measured at the property line of a sensitive receiver; a 6 dBA noise level increase is considered clearly noticeable, while a 10 dBA increase is a doubling of the sound level
- A substantial temporary or periodic increase in ambient noise levels in the proposed Project vicinity above levels existing without the proposed Project over the long term

Potential noise impacts resulting from implementation of the proposed Project include increased noise levels near sensitive noise receivers such as residences. An analysis was completed to ensure that the proposed Project is located and designed appropriately from a noise perspective and to evaluate the noise impact on the surrounding community. The analysis focused on the nature and magnitude of the change in the noise environment associated with implementation of the proposed Project.

4.11.2.1 Construction Noise

The proposed Project has the potential to cause a localized and temporary increase in ambient noise levels near roadways used for transporting equipment and materials; and around the construction of pipelines, transmission lines, and the electrical generating facility. There would also be an increase in traffic in the area during the construction of the facility, pipeline and transmission line, which would also temporarily increase noise levels in the area. The actual noise levels generated by construction would vary on a daily and hourly basis, depending on the activity that is occurring, and the types and number of pieces of equipment that are operating. The U.S. EPA has compiled data regarding the noise generating characteristics of specific types of construction equipment and typical construction activities. This data is presented in table 4-11 and table 4-12.

Table 4-11: Noise Ranges of Typical Construction Equipment

Equipment	Noise Levels (Leq, dBA) at 50 feet[1]
Back Hoe	73-95
Compressors	75-87
Concrete Mixers	75-88
Concrete Pumps	81-85
Cranes (moveable)	75-88
Cranes (derrick)	86-89
Front Loader	73-86
Generators	71-83
Jackhammers	81-98
Paver	85-88
Pile Driving (peaks)	95-107
Pneumatic Impact Equipment	83-88
Pumps	68-72
Saws	72-82
Scraper/Grader	80-93
Tractor	77-98
Trucks	82-95
Vibrator	68-82

[1]Machinery equipped with noise control devices or other noise-reducing design features do not generate the same level of noise emissions as shown in this table.
Source: Bolt, Beranek, and Newman 1971

Table 4-12: Typical Outdoor Construction Noise Levels

Construction Phase	Noise Level at 50 feet (L_{eq}, dBA)	Noise Level at 50 feet with Mufflers (L_{eq}, dBA)
Ground Clearing	84	82
Excavation, Grading	89	86
Foundations	78	77
Structural	85	83
External Finishing	89	86

Source: Bolt, Beranek, and Newman 1971

It is generally accepted that the noise levels diminish rapidly with distance from the construction site at a rate of approximately six dBA per doubling of distance. For example, a noise level of 84 dBA measured at 50 feet from the noise source to the receptor would reduce to 78 dBA at 100 feet from the source to the receptor, and reduce to 72 dBA at 200 feet from the source to the receptor.

Once construction is near completion, a short-term occurrence of loud steam blows would impact nearby neighbors. The steam blows would be necessary to remove debris in the steam turbine prior to initial startup of the units. The steam blows would occur during the daytime for approximately two to four weeks depending on the number of blows that are required to meet the cleanliness requirements of the steam turbine vendor. The typical sequence time is five minutes per blow and 30 - 60 minutes between blows to re-fill the drums, heat the water and repressurize. The steam blows would be expected to generate a noise level near 115 dBA at three feet from the steam vents. This noise level would be approximately 55 dBA at the nearest residence when it occurs. Because this is a short-term event, this noise level would not significantly impact the nearby residences.

Traffic noise would be expected during construction, and may be most noticeable to residences during early morning and late afternoon. However, this would be short-term in duration.

4.11.3 Operational Noise

In order to evaluate expected noise levels from the operation of the proposed Project, noise generation from individual sources (such as the combustion turbines, steam turbines, cooling systems, and various other lesser sources) was modeled. The industry-accepted noise modeling software, Computer Aided Design for Noise Abatement (CadnaA), was used during modeling. Equipment sound power levels are used in the model to predict sound pressure levels at nearby locations. Even though all equipment may not be operating at the same time (i.e. – some equipment may only operate during start-up) all equipment that emits sound was included in the model and assumed to operate at the same time. This provides a conservative estimate of the noise from the proposed Project. Table 4-13 displays the noise-emitting sources that were modeled and their corresponding sound power levels.

In the model, attenuation was included for sound propagation over vegetation, terrain, barriers, and shielding. The atmospheric conditions were assumed to be calm and the temperature and relative humidity were set to 50 degrees Fahrenheit and 70 percent, respectively (based on program defaults).

Table 4-13: Modeled Overall Sound Power Levels

Unit	Overall Sound Power Level, dBA
CT Inlet Ducting	86.5
CT Inlet Filter Face	98.7
CT Accessories	103.4
CT Inlet Plenum	102.2
CT Turbine Compartment	110.2
CT Exhaust Diffuser	110.2
CT Load Compartment	104.4
CT Generator	107
CT Compt Vent Fans	103.8
CT Exhaust Enclosure Vent Fans	102.2
CT Exhaust Expansion Joint (inside gas)	145.3
Step-Up Transformer	93.7
Auxiliary Transformer	87.5
Steam Turbine Generator	92.4
Steam Turbine	92.5
STG Building Fans	81.9
ST Generator Slip Ring House	92.5
Steam Trunk Main Start Up	103.1
Steam Trunk Duct 2a Start Up	101.1
Steam Trunk Duct 2b Start Up	100.1
Steam Trunk Duct 3 Start Up	96.2
Steam Trunk Duct 4 Start Up	93.1
H1 HRSG Inlet Duct	111.2
H2 HRSG Module 1-3	102.2
H3 HRSG Module 4-7	97.2
Stack Exit	110.0
Boiler Feedwater Pump	109.9
Air Cooled Condenser (total fan assembly)	99.8
FIN FAN Cooler	98.5

Receptors were placed in the model at locations that correspond to the locations where ambient measurements were taken, including at the closest sensitive noise receivers. Modeled plant operational noise levels, associated solely with the operation of the proposed Project, were logarithmically added to minimum noise levels for each measurement point. The predicted and overall operational sound levels for the modeled receptors are shown in table 4-14.

Table 4-14: Estimated Operational Noise Levels

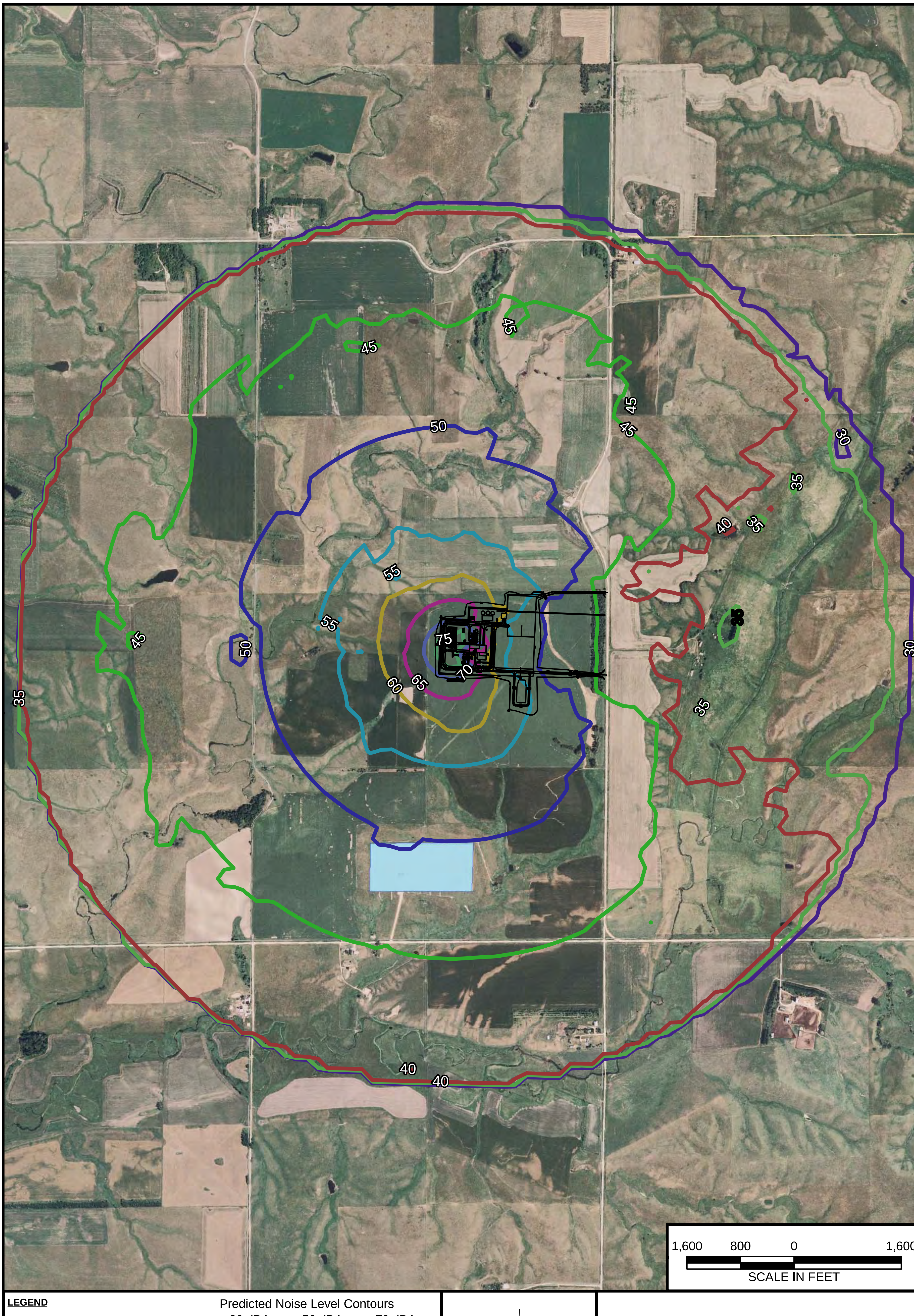
Measurement Point	Minimum Measured Noise Level (L_{eq}, dBA)	Modeled Plant Noise Level (L_{eq}, dBA)	Estimated Total Operational Noise Level (L_{eq}, dBA)
MP1*	43	45	47
MP2	48	51	53
MP3*	52	41	52
MP4*	42	43	45
MP5*	49	45	50
MP6*	39	44	45
MP7	42	54	54

*Represents sensitive noise receiver (residence)

Figure 4-6 displays the sound contour levels in 5-dBA increments for the area surrounding White Site 1.

The maximum increase in noise levels at the sensitive noise receivers is projected to increase by no more than six dBA over the background noise levels. This noise level is considered noticeable, but is not considered a significant increase in the sound level at the receiver.

The Department of Housing and Urban Development (HUD) has development guideline noise levels for HUD housing. This level is 65 dBA L_{dn}, where L_{dn} is a day-night average noise level in which a 10 dB penalty is applied to the nighttime noise levels. Essentially, the nighttime noise level should be below 55 dBA and the daytime noise level should be below 65 dBA. Since the greatest contribution to noise levels in the area at any residence is modeled to be at 45 dBA, the proposed Project would be within the HUD guideline noise levels. Because distances between residences and the White Site 2 Alternative are closer than the White Site 1 Alternative, noise impacts to residences from White Site 2 would be slightly higher than for White Site 1, but still predicted to be within HUD guidelines.



LEGEND

White Site 1 plant Layout

White Substation

Predicted Noise Level Contours

30 dBA, 35 dBA, 40 dBA, 45 dBA, 50 dBA, 55 dBA, 60 dBA, 65 dBA, 70 dBA, 75 dBA

NORTH

Source: USDA NAIP County Mosaic, Brookings and Deuel counties, North Dakota; FEMA; ESRI; Basin Electric Power Cooperative

Figure 4-6

Sound Contour Levels
White Site 1
Deer Creek Station EIS

\\espsrv\data\projects\Basin\Basin\51236_EIS\GIS\DataFiles\ArcDocs\Revised_Figures_11_19_09\Figure 4-6_11_19_09.mxd Revised: 11/19/2009

4.11.4 Cumulative Effects

The White Substation and the Xcel Energy Brookings County substation just to the east will contribute to ambient noise in the vicinity of White Site 1, especially to the residences located within one mile of White Site 1 to the south. Due to the unique sound profile of transformers, the substations may be audible under certain meteorological conditions. However, cumulative noise levels associated with the substations and the proposed Project are expected to be similar to the already predicted noise levels.

Given the high background noise in the area, these sources would not likely be noticeable on most days. Additionally, an existing wind farm is located approximately three miles east of the proposed Project site and a proposed wind farm may be constructed approximately 0.5 mile to the west of the proposed Project. Noise associated with the existing wind farm is not expected to contribute to ambient noise near the proposed site; however, noise associated with the proposed wind farm may contribute to the ambient noise near the proposed site. Temporary cumulative noise impacts are possible from the construction of wind farms in the area. The current noise standard for the White Wind Farm is 50 dBA at the property line of existing residences, businesses, and public buildings. Noise from wind farms is a swishing or lashing noise and is different in character from those generated by a combustion turbine. Multiple wind turbines operating at the same time would create the swishing sound at different times. These non-synchronized sounds would blend together to create a more constant sound to an observer at most distances from the wind turbines. It is expected that the hum of the White Wind Farm and either White Site 1 or White Site 2 would blend in with the existing ambient noise and should not affect the aforementioned noise impacts. The proposed Project, on an individual or cumulative basis, would not exceed noise standards, cause a permanent increase of noise at the property line, or cause noise levels to substantially increase above current levels. Significant noise impacts would not be a result of the proposed Project.

4.12 PUBLIC HEALTH AND SAFETY

4.12.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no public health and safety impacts associated with the No Action Alternative.

4.12.2 Proposed Project

Public services in the area are designed to handle current issues. A significant impact to public health and safety would occur if the proposed Project resulted in:

- Violation of local, State, or Federal regulations regarding the handling, transport, containment, or disposal of regulated and hazardous materials
- Interference with emergency response capabilities or resources
- Violation of OSHA standards and failure to secure the site against unauthorized public access

4.12.2.1 Construction and Operational Personnel

Potential health and safety hazards are generally greater during the construction phase of the proposed Project. These risks are due to heavy equipment operation, overhead materials and cranes, and use of construction tools. Construction personnel are at a higher risk than the general public during this phase of the proposed Project, but the risk is temporary. Construction-related hazards can be effectively mitigated by complying with all applicable Federal and State occupational safety and health standards. Adherence to these standards, and applicable National Electrical Safety Code regulations and utility design and safety standards, would protect construction workers from unacceptable risks.

Basin Electric would develop a Health and Safety Plan to address public and worker safety during the construction and operation of the proposed Project. The Health and Safety Plan would identify requirements for minimum construction or operation distances from residences or businesses, as well as requirements for temporary fencing around staging, excavation, and laydown areas during construction. The Health and Safety Plan would identify measures to be taken during operation to limit public access to proposed Project facilities (i.e. permanent fencing around the generation facility, locked gates at access road entrances). Potential safety risks would be greater during the construction phase of the proposed Project. The Applicant’s Health and Safety Plan would include provisions for worker protection as is required under OSHA with emphasis on CFR 1926 – *Safety and Health Regulations for Construction.*

All construction sites would be managed to prevent harm to the general public. During construction, all employees, contractors, and sub-contractors would be required to conform to OSHA safety procedures. Adequate training would be mandatory for all construction workers on site. Heavy equipment would be in compliance with OSHA requirements for safety devices such as back-up warnings, seat belts, and rollover protection. Personal safety equipment such as hard hats, ear and eye protection, and safety boots would be required for all workers on site. Accidents and injuries would be reported to the designated safety officer at each site.

There would be a risk of accidental fire during construction and operation of the proposed Project. Risk of accidental fire during construction would occur from human activities such as refueling, cigarette smoking, and use of vehicles and construction equipment in dry, grassy areas. The health and safety plan would address these risks, and the risks would be reduced to acceptable levels by restrictions or procedures regarding these activities. A risk of fire would be present during operation of the generating facility due to the use of natural gas and the storage of chemicals within the facility. Implementation of industry-approved design measures for all facility components would ensure that the risk of an incident causing injury or property damage would remain acceptably low. The proposed Project would have a built-in fire suppression system. However, if needed, fire services would be provided by the local volunteer fire department. The closest volunteer fire service is located in White. Other fire services are available in Brookings, Volga, Estelline, and Aurora, South Dakota.

Construction and operation of the proposed Project would involve the use and storage of regulated and hazardous materials. During construction, diesel fuel, gasoline, and lubricating oils from heavy equipment and vehicles could be accidentally leaked or spilled. Hydraulic fluid, paints, and solvents would likely be used during the construction phase as well. To reduce the potential for a release of regulated or hazardous materials during the construction phase of the proposed Project, work would be planned and performed in accordance with OSHA standards and protocols addressing the use of potentially hazardous materials and applicable Federal and State environmental regulations. If a hazardous release occurred, cleanup, management, and disposal of contaminated soils would be conducted according to EPA and State standards. Conformance to these standards and procedures should reduce the potential for significant impacts resulting from the release of hazardous materials during the construction phase. Personnel would be trained in spill containment, and would have clean-up materials immediately available for use. Natural gas, a flammable fuel source, would be used during operation of the generating facility. Diesel fuel and ammonia tanks would also be stored on-site. These materials could be directly harmful to wildlife if they are leaked or spilled, and could affect aquatic habitat if water sources are contaminated. These materials are also flammable and present a fire hazard if not properly stored. Storage for these materials would be designed to code and accepted practice, thus reducing the risk from having these materials on site.

Typical hazardous substances that would exist on-site are listed in table 4-15.

Table 4-15: Potentially Hazardous Chemicals to Be Used at Deer Creek Station

Equipment	Purpose	Product	Storage Vessel	Storage Volume	Use Rate	Estimated Annual Use Rate
SCR	NO_x Control (Main Stack)	Anhydrous Ammonia	Metal Tank	2000 Gallon, 1700 of useable space	40 lb/hr	15,000 gal
Emergency Diesel Generator	Emergency Electrical Generation	Low Sulfur Diesel	Metal Tank	3000 Gallon, 2500 useable Gallon	105 gal/hr	52,500 gal
Emergency Diesel Fire Pump	Emergency Fire Protection	Low Sulfur Diesel	Metal Tank	700 Gallon	29 gal/hr	14,500 gal
Condensate and Boiler Feedwater Treatment	pH Adjustment	Aqueous Ammonia	Totes	300 Gallon	1.25 gal/hr	3700 gal
Condensate and Boiler Feedwater Treatment	Oxygen Scavenging	Carbohydrazide	Drums	55 Gallon	0.15 gal/hr	450 gal
Condensate and Boiler Feedwater Treatment	Boiler pH Control and Buffering	Phosphate	Pails	25 lb	0.05 lb/hr	150 gal
Makeup Water Treatment		Sulfuric Acid	Totes			
Makeup Water Treatment		Caustic	Totes			
Makeup Water Treatment		Sodium Hypoclorite	Totes			
Makeup Water Treatment	Anti-Scalant	GE Betz Hypersperse or equal	Totes			
Makeup Water Treatment	Softener	Sodium Bisulfite Sodium Chloride				
Makeup Water Treatment	RO Cleaning Agent	Citric Acid				
HRSG	HRSG blanketing	Nitrogen	330 cubic foot cylinder(s) or 40,000 cubic foot tube trailer	11,880 cubic ft (three 12-packs of cylinders) to 40,000 cubic ft	Normal is zero.	10,000 cubic ft (one complete HRSG fill)
Gas Turbine	Gas Turbine Generator Purge	CO_2	330 cubic foot cylinder(s)	11,880 cubic ft (three 12-packs of cylinders)	Normal is zero	8,000 cubic ft (one complete generator purge)
Gas Turbine	Gas Turbine Fire Protection	CO_2	Metal tank	104,000 cubic ft	Normal is zero	Normal is zero
Gas Turbine	Gas Turbine Generator Cooling	Hydrogen	330 cubic foot cylinder(s) or 40,000 cubic foot tube trailer	11,880 cubic ft (three 12-packs of cylinders) to 40,000 cubic ft	300 cubic ft/day	118000 cubic ft (one complete generator fill plus daily use)

Source: Basin Electric Power Cooperative

4.12.2.2 General Public

The general public would not be allowed to enter any construction areas associated with the proposed Project. The major risk to the general public would be from increased traffic volume on the roadways in the proposed Project area as a result of commuting construction workers and transportation of equipment and materials. Additionally, local gravel roads and bridges would need to be upgraded by improving the roadway gravel thickness and leveling to accommodate the increased volume and loads associated with construction. A bridge on 484th Avenue would be spanned with a temporary bridge structure to accommodate the heavy haul loads. The temporary bridge structure span would be removed after the heavy haul loads are delivered (section 4.9). During upgrades, short-term road closures may be necessary, which could interfere with emergency equipment. The Applicant would develop and implement appropriate traffic management and road improvement plans as needed during construction. All oversized and heavy equipment vehicle operators would be required to observe all applicable rules and regulations for safe transport of oversize loads on public highways and local roadways.

The proposed Project involves the construction of a short transmission line to connect the generation facility with a nearby substation. The proposed transmission line for White Site 1 would be 0.75 mile in length, and the proposed transmission line for White Site 2 would be 0.5 mile in length. Electromagnetic fields (EMF) are often raised as a public concern with electric transmission lines and substations. EMF exists around all electrical devices, and most of the exposure to EMF comes from common household appliances. Levels of EMF from the proposed transmission lines would be low and would fall off rapidly with distance from the line. A large number of scientific studies involving physics, epidemiology, and cell biology have studied the potential for human health risks for over 30 years, with inconclusive results. There are no Federal standards for EMF exposure from transmission lines; however, some states, including Minnesota, have standards. The Minnesota standard is eight kV/m for electric fields, but there is no standard for magnetic fields. Magnetic field limits for states with standards such as Florida and New York are in the 200 milligauss range. A typical electric field from a high-voltage transmission line (such as 500 kV lines) at maximum load would be about one kV/m at 100 feet. Magnetic fields from 500 kV lines are typically less than 13 milligauss at 100 feet (NIEHS 2002). Levels from 345-kV lines, such as would be used in the proposed Project, are lower than levels from 500-kV lines. EMF fields from substations are rarely measurable above background levels when measured beyond the substation fence. These levels suggest that there is no potential for an exposure level from the proposed Project that would have effects to public health.

Because conformance to OSHA, EPA, and State regulations would be required, facility operation and maintenance procedures, as well as contingency planning, would be established to prevent or mitigate impacts from possible release of regulated or hazardous materials during operation of the proposed Project. The facility would develop and implement release prevention and emergency response plans and would train all personnel on the plans. Conformance to Federal and State regulations, as well as prevention and emergency response plans, should reduce the potential for significant impacts resulting from the release of regulated or hazardous materials during the operational phase of the proposed Project.

4.12.3 Cumulative Effects

Past, present, and reasonably foreseeable future actions in the area with public safety implications are the use of agricultural chemicals, the presence of electric transmission systems in the area, and wind turbine construction and operation. The proposed Project would not add to risks from use of agricultural chemicals. The proposed Project would add to risks from electric utility development in the area, although the amount of risk would only be from a new 0.5 to 0.75-mile transmission line. The new transmission line, as well as the new wind turbines, would be expected to be in compliance with Federal, State, and local regulations for regulated and hazardous materials usage. The proposed Project would create a small potential for increase in accident rates for transportation facilities. The proposed Project, together with the existing and proposed wind farm developments, would comply with all Federal, State, and local regulations for construction and operation safety and the public would not be allowed in active construction areas. Therefore, the construction of the proposed Project would not be expected to significantly increase cumulative public health and safety risks.

4.13 INTENTIONAL DESTRUCTION

Security measures summarized in this section are in accordance with Security Guidelines (www.esisac.com) published by the North American Electric Reliability Corporation (NERC 2001).

4.13.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no security impacts associated with the No Action Alternative.

4.13.2 Proposed Project

The proposed Project, which would be located adjacent to the existing White Substation, is a combined-cycle power generation facility designed to nominally produce 300 MW of electricity. Its small physical size, use of natural gas as fuel, and remote location make it a relatively undesirable target for aggressors, and the threat of damage from terrorists or activists is considered negligible. The loss of 300 MW supply to the regional grid could be tolerated by the system, resulting in little to no loss of power service to customers. Few residents or population concentrations are located within close proximity of the proposed site. Theft of recyclable metals and equipment, and random vandalism, are likely to pose the most serious security issues. Since the generation plant would be manned, theft issues should be minimal. Materials thefts are more common at unmanned substations, and vandalism often takes the form of shooting insulators on transmission lines.

Fences, gates, or barriers, coupled with the use of keying systems, access card systems, or security personnel at entry points, would restrict access to the facility at White Site 1, White Site 2, and Water Well Supply Site B. Use of these physical obstructions and warning signage effectively deter and delay intruders. Personnel identification and control measures such as photo IDs, visitor passes, and contractor IDs help quickly identify unauthorized persons within the facility.

In addition to physical security, the proposed Project would be protected against cyber threats (i.e. hackers attacking computer control systems and information). Access to control systems would be managed to protect critical assets and information as well as maintain the reliability of the electric infrastructure. This includes logical access (user password protection) to computers and networks and physical access to computer rooms. Policies and procedures would be established to manage authorization and authentication as well as monitor both logical and physical access. Firewalls would be implemented and proactively maintained. Intrusion detection systems would be implemented and cyber risks regularly evaluated.

4.14 CULTURAL RESOURCES

Existing information on cultural resources was collected within a one-mile radius of an area bordered by the NBPL on the north, the White Site 1 Natural Gas Pipeline Route on the east, the White Site 2 Natural Gas Pipeline Route on the west, and 205th Street on the south. This includes the area of all proposed facilities including the two alternative sites, road improvements, gas pipelines, water pipelines, water well sites, and transmission lines. Gravel surfaces at approaches to intersections would be paved to the extent necessary to provide the adequate tapers and radii for semi-trailer movements, which may require local ditch grading and location adjustment. Any additional grading outside of existing ditches would require cultural surveys. Surveys in the study area for wind farms and other area and linear projects have recorded 53 archaeological sites, of which 50 are prehistoric sites, two are Euro-American sites, and one site is listed as a faunal site which is likely prehistoric but could be Euro-American. The areas covered by these previous surveys appear to indicate that the study area for this proposed Project has a moderate to high potential for containing additional cultural resources.

Out of the 53 prehistoric sites, five have been recommended as eligible for the NRHP, 34 have been determined not eligible for the NRHP and the remaining 14 sites are considered unevaluated.

4.14.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no cultural resources impacts associated with the No Action Alternative.

4.14.2 Criteria for Determining Effect

A project results in an impact on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association. All qualifying characteristics need to be considered, even those that may have been identified subsequent to the original evaluation of the property’s eligibility for the NRHP. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative as described in 36 CFR section 800.9(b) (1). For example, an adverse effect can result from the introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's historic features as described in 36 CFR section 800.9(b) (2), or result in isolation of the property from or alternation of the character of the property's setting when that character contributes to the property's qualifications for the NRHP. Adverse effects to cultural resources are minimized through application of the section 106 process.

Impacts to historic properties can be indirect such as increased human activity associated with construction related to the proposed Project. Constraints on construction zones and staging areas would mitigate potential disturbance of known and unknown cultural resources.

4.14.3 Proposed Project

White Site 1, Water Well Supply Site B, the White Site 1 Natural Gas Pipeline Route, White Site 1 transmission line corridor, and White Site 1 Water Pipeline were further evaluated for cultural resources through two pedestrian surveys. Representatives from the Sisseton, Lower Sioux, and Wahpekute tribes were present for the pedestrian surveys and they focused on identifying Traditional Cultural Properties (TCPs). No cultural resources were identified on White Site 1 or Water Well Supply Site B (Ferry and Peterson 2009). Sites investigated along the White Site 1 Natural Gas Pipeline Route were abandoned farmsteads and prehistoric artifact scatters. No NRHP-eligible sites were found on the property to be used for White Site 1, Water Well Supply Site B, the White Site 1 Natural Gas Pipeline or the White Site 1 transmission line (Thomas 2009).

Based on files research, no sites are known to exist on White Site 2, the White Site 2 Transmission Line, or Rural Water Pipeline Extension. However, six sites would be potentially impacted by the White Site 2 Natural Gas Pipeline Route. Should the White Site 2 Natural Gas Pipeline Route be selected, these sites would be evaluated for NRHP eligibility and further coordination with consulting parties would occur.

4.14.4 Cumulative Effects

The proposed Project would not affect any NRHP-eligible cultural resources and therefore would not have the potential to contribute to any past, present, or reasonably foreseeable future effects on cultural resources.

4.15 RECREATION

4.15.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no recreation impacts associated with the No Action Alternative.

4.15.2 Proposed Project

Impacts to recreational resources would be considered significant if:

- The proposed Project would directly impact acres normally used for recreational opportunities (i.e. WIAs, WPAs, or GPAs)
- The proposed Project would directly impact State parks or natural areas

4.15.2.1 White Site 1

The only recreational activity potentially affected is use of private lands in the area for activities such as hunting. Neighboring parcels of land might experience temporary effects in the movement or numbers of game species on these lands during construction of the facility, but it is expected that game species will return upon completion of facility construction. Game populations are not expected to be affected by the construction and operation of the facility. Construction and operation of White Site 1 will not affect recreational opportunities such as fishing or boating. Overhead transmission is already present to the west and south of the site, and a new line is not expected to significantly affect game species populations. Fishing, boating, and other recreational opportunities within the proposed Project area will be unaffected by the construction and operation of a new transmission line at White Site 1.

4.15.2.2 Water Well Supply Site B and Water Pipeline

Construction and operation of a water supply well and associated supply line on private land would potentially affect use of private lands for recreation such as hunting. Neighboring parcels of land might experience temporary effects in the movement or numbers of game species on these lands during construction of the facility, but it is expected that game species will return upon completion of facility construction. Game populations are not expected to be affected by the construction and operation of the facility.

4.15.2.3 White Site 2

The construction of a generation facility and overhead transmission line at White Site 2 would have similar impacts to recreation as White Site 1 and is not expected to affect recreational opportunities in the area. The on-site substation required for White Site 2 would have no impact on recreational opportunities in the proposed Project area. Fishing, boating, and other recreational opportunities within the proposed Project area will be unaffected by the construction and operation of the White Site 2 Transmission Line. Construction of the Rural Water Pipeline Extension would cause temporary disturbance to soil and vegetation in the immediate area. Some game species may temporarily leave the area during construction, but would be expected to return upon completion and reseeding.

4.15.2.4 White Site 1 Natural Gas Pipeline Route

There is one WIA along the White Site 1 Natural Gas Pipeline Route north of White Site 1. WIAs are primarily designed to give the public access to private land for hunting purposes. Construction of the preferred gas pipeline may temporarily impede access to the WIA since the pipeline would be constructed along the road. Operation of the preferred gas pipeline is not expected to permanently impact the WIA, or any game species populations living on or near this property. About half of the Natural Gas Pipeline Route would be parallel and adjacent to nearby roadways, and about half would be cross-country construction. Areas along local roadways have been previously disturbed, and impacts to recreational opportunities are not expected. In areas where the gas pipeline crosses open pastureland or cultivated cropland, only temporary impacts are expected during construction.

4.15.2.5 White Site 2 Natural Gas Pipeline Route

There are no WIAs or public lands along the White Site 2 Natural Gas Pipeline Route. Therefore, impacts to private properties would be similar to those with the White Site 1 Natural Gas Pipeline Route.

4.15.3 Cumulative Effects

There are no known past actions that have adversely affected recreation in the area. Reasonably foreseeable future actions that could affect recreation include the ongoing wind farm development in the area. None of these facilities are directly affecting recreation lands. The proposed Project, in conjunction with wind farm development, would not individually or cumulatively cause significant effects on recreation.

4.16 GLOBAL CHANGE IMPACTS ON THE REGION

Impacts of the proposed Project on GHG emissions are described in section 4.1. This section considers impacts of global change on the northern Great Plains region and the proposed Project itself. The Great Plains is characterized by strong seasonal climate variations. In the last few decades, average temperatures have increased throughout the region, with the largest changes occurring in the winter months and over the northern states. Relatively cold days are becoming less frequent and relatively hot days more frequent. Precipitation has also increased over much of the area.

In the future, the U.S. Global Change Research Program projects that temperatures will continue to increase. Summer changes are projected to be greater than those in winter. Conditions are anticipated to become wetter in the northern Great Plains, including more frequent heavy downpours resulting in more flooding, rising temperatures and more frequent heat waves, longer growing seasons, and shifts in vegetation hardiness zones. Ecosystem disruptions causing changes in habitat, water, and food supply would cause some species to decline, cause shifts in the range of native species, or encourage invasions of non-native species. Some species would be better adapted to a warmer climate. A warmer climate would affect air quality, and would generally mean more ground level O_3, causing more respiratory problems. Because of increased wetness, aquifers may be under less stress in the eastern South Dakota area than further to the south and west. Strong storms are projected to be more frequent in the northern Great Plains. Farming practices in the eastern South Dakota region will likely need to emphasize increasing the amount of crop residue left on the soil for erosion protection (USGCRP 2009). These future climate conditions may result in changes to the population and agricultural practices of eastern South Dakota, but are not likely to affect the operation of the Deer Creek Station, nor would these changes significantly affect the regional power demands which it is designed to serve.

4.17 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

NEPA requires that an EIS describe “any adverse environmental effects which cannot be avoided should the proposal be implemented.” Unavoidable impacts are those that would remain after implementation of mitigation measures. Construction and operation of the proposed Project at White Site 1 would unavoidably convert 40 acres of land from agricultural uses to utility uses. Construction and operation of the proposed Project at White Site 2 would unavoidably convert 46 acres of land from agricultural uses to utility uses. This permanently converted acreage would represent an insignificant portion (much less than 1 percent) of the 418,115 acres of cropland in Brookings County. The introduction of a new industrial facility, along with transmission lines, would permanently change the visual landscape of the county. Wind farm construction in the area has already introduced visual contrast to the natural landscape, and the introduction of a power plant facility would likely be less noticeable because of the existing visual intrusions. Other unavoidable impacts would occur due to air emissions from natural gas combustion, and increased traffic from construction and operational personnel. As indicated in the air emission and transportation analyses, these impacts would be minor and would not significantly affect the environmental quality of the area. There would be unavoidable impacts from groundwater pumping should White Site 1 be chosen. However, indications are that this would be a productive well site subject to quick recharge from surrounding aquifers. Other environmental impacts of the proposed Project, such as water and natural gas pipeline construction, would produce impacts that are temporary in nature, and restoration of the natural landscape would occur following these temporary impacts. These relatively minor impacts to environmental resources would be offset by the societal benefit of a new source of electricity. It is not possible to quantify this benefit, as individuals would weigh the tradeoffs differently, and assign widely variable values to each resource.

4.18 SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

NEPA legislation requires that an EIS describe “the relationship between local short-term uses of man’s environment and the maintenance and enhancement of long-term productivity.” Short-term uses include the life span of the power plant and its associated facilities. As indicated in the discussion under the individual resources, the small footprint of the power plant and the limited emissions indicate that operation of the facility would not likely affect regional natural resources to any significant degree. However, the proposed Project would require short-term development of 40 or 46 acres of land, depending on the plant site, for the footprint of the power plant. Additional land would be needed for transmission lines, roadways, a water well site, and a natural gas pipeline for White Site 1; and transmission lines, roadways, a water pipeline, and a natural gas pipeline for White Site 2. Human communities would be positively affected by new jobs and income in the short term, and there would likely be few negative effects on public services or infrastructure.

Long-term uses refer to the time period following restoration and rehabilitation, during which the environment continues to be impacted. If the facility were re-used after its life as a power facility, development of the industrial facilities at the power plant footprint would be permanent, and topsoil would be lost at the building footprint and within the paved road footprint. If the facility was decommissioned and all facilities removed, natural resources in the vicinity, such as wildlife and groundwater, would be expected to recover quickly. It is unlikely that the natural resources or human communities in Brookings and Deuel Counties would be adversely affected in the long-term by the construction and operation of the proposed Project.

4.19 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

NEPA legislation requires that an EIS describe "any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented." Irreversible resource commitments involve damage to a resource that is not recoverable for use by future generations. The small size of the facility and its small emissions levels means that there would be minimal irreversible damage to regional natural resources. This would primarily involve the soil and agricultural property taken for the plant itself, and restoration after the life of the power plant would reduce these potential irreversible impacts. Irretrievable resource commitments are permanent losses of nonrenewable resources such as fossil fuels. Natural gas, energy, and non-recyclable materials used in construction and operation would represent irretrievable commitments of non-renewable resources that would not be available for use in other projects.

* * * * *

(THIS PAGE INTENTIONALLY LEFT BLANK)

5.0 LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM NOTIFICATION OF AVAILABILITY OR COPIES OF THE DEIS WILL BE SENT

Federal Agencies

U.S. Army Corps of Engineers	Jon Christensen	St. Paul	MN
U.S. Department of Agriculture Farm Service Agency	Patricia Klintberg	Washington	DC
U.S. Department of Agriculture Natural Resources Conservation Service	Diane Guidry	Washington	DC
U.S. Department of Agriculture Rural Utilities Service	Mark Plank	Washington	DC
U.S. Department of Transportation Federal Aviation Administration	Christopher Blum	Des Plaines	IL
U.S. Department of the Interior Environmental Policy and Compliance	Willie Taylor	Washington	DC
U.S. Environmental Protection Agency Region 8	Carol Rushin	Denver	CO
U.S. Environmental Protection Agency NEPA Program	Director	Denver	CO
U.S. Fish and Wildlife Service South Dakota Field Office	Pete Gober	Pierre	SD
U.S. Fish and Wildlife Service Brookings Wildlife Habitat Office	Kurt Forman	Brookings	SD
U.S. Fish and Wildlife Service Madison Wetland Management District	Manager	Madison	SD
U.S. Geological Survey Central Region	Stanley Ponce	Denver	CO
Federal Energy Regulatory Commission Office of Energy Projects	Mark Robinson	Washington	DC
Federal Highway Administration	John Rohlf	Pierre	SD
Federal Emergency Management Agency Denver Federal Center	Lanney Holmes	Denver	CO
Advisory Council on Historic Preservation	John Fowler	Washington	DC
United States Senate	John Thune	Washington	DC
United States Senate	Tim Johnson	Washington	DC
United States House of Representatives	Stephanie H. Sandlin	Washington	DC

Regional, State, and Local Government

Brookings County Board of County Commissioners	Don Larson	Brookings	SD
Deuel County Board of County Commissioners	Darold Hunt	Clear Lake	SD
Brookings County Highway Department	Larry Jensen	Brookings	SD
Brookings County Zoning and Drainage Department	Robert Hill	Brookings	SD
South Dakota Department of Agriculture	William Even	Pierre	SD
South Dakota Department of Environment and Natural Resources	Steven Pirner	Pierre	SD
South Dakota Department of Game, Fish and Parks	Doug Backlund	Pierre	SD
South Dakota Department of Transportation	Joel Jundt	Pierre	SD
South Dakota Public Utilities Commission	Patricia Van Gerpen	Pierre	SD
South Dakota State Historic Society	Paige Olson	Pierre	SD
South Dakota State Farm Service Agency	Steven Cutler	Huron	SD
Office of the Governor, South Dakota	Mike Rounds	Pierre	SD
South Dakota House of Representatives	Tim Begalka	Clear Lake	SD
South Dakota House of Representatives	Sean O'Brien	Brookings	SD
South Dakota House of Representatives	Jim Peterson	Revillo	SD
South Dakota House of Representatives	Orville Smidt	Brookings	SD
South Dakota Senate	Arnold Brown	Brookings	SD
South Dakota Senate	Al Kurtenbach	Brookings	SD
City of Arlington	Amiel Redfish	Arlington	SD
City of Bruce	Jeff Anderson	Bruce	SD
City of Sinai	Brad Mitchell	Sinai	SD
City of Aurora	Fred Weeks	Aurora	SD
City of Bushnell	Josh Peterson	Bushnell	SD
City of Volga	Tom Pierce	Volga	SD
City of Brookings	Scott Munsterman	Brookings	SD

Regional, State, and Local Government

City of Elkton	David Landsman	Elkton	SD
City of White	Randy Brown	White	SD
City of Clear Lake	Jayme Gross	Clear Lake	SD
City of Astoria	Terry Lovre	Astoria	SD

Native American Tribes and Related Bodies

Flandreau Santee Sioux	Josh Weston	Flandreau	SD
Lower Sioux Indian Community of Minnesota	Jean Stacy	Morton	MN
Prairie Island Indian Community of Minnesota	Marlys Opsahl	Welch	MN
Santee Sioux Tribe of Nebraska	Roger Trudell	Niobrara	NE
Sisseton-Wahpeton Oyate	Mike Selvage	Agency Village	SD
Spirit Lake Tribe	Myra Pearson	Fort Totten	ND
Upper Sioux Indian Community of Minnesota	Kevin Jensvold	Granite Falls	MN
Yankton Sioux Tribe	Robert Cournoyer	Marty	SD

News Media and Libraries

Brookings Public Library	Elvita Landau	Brookings	SD
SDSU – Hilton M. Briggs Library	Susan Sutthill	Brookings	SD
Deubrook Community Library	Chris Christensen	White	SD
Siverson Public Library	c/o Govt. Documents	Hendricks	MN
Elkton Community Library	Gordon Fuhr	Elkton	SD

Organizations and Institutions

South Dakota State University	Gary Larson	Brookings	SD
The Nature Conservancy Black Hills Area Ecoregion	Bob Paulson	Rapid City	SD
Northern Prairies Land Trust	Patrick Anderson	Sioux Falls	SD
South Dakota Chapter of the Sierra Club	Jim Margadant	Rapid City	SD

Organizations and Institutions

Missouri Breaks Audubon Society	Dave Johnson	Pierre	SD
Ducks Unlimited	Jeffrey Nelson	Bismarck	ND
South Dakota Clean Water Action		Sioux Falls	SD
Izaak Walton League of America South Dakota Division	Mike Williams	Watertown	SD
Pheasants Forever, Inc.	Catherine Twitero	St. Paul	MN

Individuals

Anderson, Francis	Knutsen, Duane	Patrick, Morris
Anderson, Jim & Sherry	Kruse, Roger	Pest, Marv
Bergman, Paul and Beverly	Kurtz, Bob	Peterson, Alan
Brudvig, Jeff	Lagerstrom, Matt	Reiser, Wayne
Drost, Gary C.	Landman, Rein	Rochel, Bob
Fleck, Joe	Landmark, Larry	Rogers, Mark
Folken, Dennis	Larson, Russ	Schmidt, Alvin
Gates, Ben	Lees, Robert D.	Schomp, Thad*
Haeder, Ted	Lewno, Ken	Skadsen, Dennis
Halier, Harold	Liester, Kari	Smith, Ted
Hamer, Ernest D.	Mataya, Jeff	Squires, Roger H.
Hensen, Steven	Murphy, Dale	Stanwick, Martin E.
Herrick, Roger K.	Nelson, Doug	Thasing, Jan
Hinderaker, Keith	Nelson, Toby & Ginger	Thasing, Nieemo
Hornl, Greg	Nielson, Michele	Thomssen, Will
Jarding, Lilias	Ohlsen, Bob	Warnle, Keven
Jenke, Keith	Olsen, Dale	Wilkens, Jesse
Kerzman, LeAnn	Olson, Jon	Wilts, Gen
Kidwiler, Mary	Olson, Les	
Kleiger, John	Parsley, Scott	

* email only

6.0 LIST OF PREPARERS

The DEIS was prepared under the supervision of Western. The individuals who contributed to the preparation of this document are listed below, accompanied by their organization, education, and project role.

Name	Education	Project Role
Burns & McDonnell Engineering Co., Inc. – Western's EIS Preparation Consultant		
Robynn Andracsek	B.S. Mechanical Engineering M.S. Environmental Engineering	Air Quality
Jennifer Bell	B.S. Environmental Studies M.S. Urban and Regional Planning	Land Use, Visual Resources
Craig Chatfield	B.S. Agronomy	Soils, Geological Resources
Harold Draper	D.Sc. Engineering and Policy M.S. Engineering and Policy B.S. Botany B.S. Conservation	Chapters 3 and 4; Executive Summary; NEPA Technical review
John Dunham	B.S. Fisheries and Wildlife Biology M.S.E. School Administration	Biological Resources
Bryan Gasper	B.S. Biology	Biological Resources Sensitive Species
Greg Knauer	B.A. Zoology M.S. Zoology/Aquatic Ecology	Project Manager NEPA Compliance
Ted LaBoube	B.A. Urban Affairs M.A. Urban Planning	Socioeconomics Environmental Justice
Sarah Gilstrap	B.A. Biology and Chemistry M.S. Environmental Science	Wetlands, Vegetation
Bridget Livers	B.S. Environmental Studies	Water Resources, Vegetation
Lucas McIntosh	B.S. Mechanical Engineering M.S. Mechanical Engineering M.B.A.	Intentional Acts of Destruction
Ron Schikevitz	B.S. Civil Engineering M.S. Civil Engineering	Transportation
Dan Shinn	B.A. History M.A. Anthropology/Archaeology	Cultural/Native American Resources
Mike Sigurdson	B.S. Geography/Environment and Natural Resources	GIS
Jim Terrell	B.S. Atmospheric Science	Noise Studies

Name	Education	Project Role
Greg Larsen (South Dakota State University)	Ph.D. Botany	Sensitive Species Specialist—Western prairie fringed orchid
Jesse Wilkens (Independent Environmental Consultant)	B.S. Biology	Sensitive Species Specialist—Topeka shiner
Dennis Skadsen (Independent Environmental Consultant)	Associate Degree, Architecture	Sensitive Species Specialist—Dakota skipper
Basin Electric Power Cooperative - Applicant		
Matt Ehrman	B.S. Mechanical Engineering	Mechanical Engineer
Dave Erickson	B.S. Civil Engineering	Senior Civil Engineer
Gavin McCollam	B.S. Mechanical Engineering M.S. Systems Management	Project Manager
Cris Miller	B.S. Civil Engineering	Senior Environmental Project Administrator
Curt Pearson	B.S. Business Administration M.B.A.	Project Coordination Representative
David Odens (Banner & Associates)	B.S. Civil Engineering M.S. Civil/Sanitary Engineering	Water Pipeline Engineer
EDAW/AECOM – Applicant's Environmental Studies		
Jennifer Chester	B.S. Environmental Science	GIS Review
Joe Chuita	B.S. M.S. Geography and Geographic Information Science	GIS
Tara Corbett	B.A. (Major Anthropology/Sociology, Minor Biology) M.S. Geography	Assistant Project Manager
Ashli Gornall	B.S. Natural Resource Management	Environmental Planner
Teresa Kacprowicz	B.A. French and Liberal Arts	Technical Editing/Document Production
Larry Keith	Bachelor of Landscape Architecture	Senior Review
Diana Leiker	B.S. Natural Resource Management	Biology
John MacDonald	B.S. Zoology Master of Environmental Design/Environmental Science	Project Manager
Stephanie Myers	B.A. Environmental Policy	Environmental Analyst

Name	Education	Project Role
Jared Wiedmeyer	B.S. Cartography/Geographic Information Systems	Visual Resources
Jon Alstad (AECOM Environment)	A.A. Liberal Arts B.S. Animal Science M.S. Range Science	Senior Review
Jean Decker (AECOM Environment)	B.A. Chemistry and Biology M.S. Engineering	Water Resources
Lynelle Peterson (EthnoScience, Inc.)	B.A. Psychology M.A. Anthropology	Cultural Resources
David Yexley (Montana Dakota Utilities)	B.S. Agricultural Engineering/Economics M.S. Agricultural Engineering M.B.A. Finance	Pipeline Engineer

* * * * *

(THIS PAGE INTENTIONALLY LEFT BLANK)

7.0 LITERATURE CITED

Amundson, F.D. and N.C. Koch. 1985. *Drainage Areas in the Big Sioux Basin in Eastern South Dakota*. U.S. Geological Survey Open-File Report 85-348. Map. Abstract at http://pubs.er.usgs.gov/usgspubs/ofr/ofr85348.

Avian Power Line Interaction Committee (APLIC). 2006. *Suggested Practices for Avian Protection on Power Lines*. www.aplic.org. (Accessed July 9, 2009).

Baker, K.K. 2005. *South Dakota All Bird Conservation Plan*. SDGFP-Wildlife Division Report. 2005-2009.

Banner Associates, Inc. 2009. Test Well Report, Basin Electric Deer Creek Station Near White, South Dakota. BAI No. 20953.00.00, August 2009.

Basin Electric Power Cooperative (Basin Electric). 2007. *2007 Power Supply Analysis*. Bismarck, North Dakota. November.

Bolt, Beranek, and Newman, Inc. 1971. *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*. EPA, Office of Noise Abatement and Control, Washington, DC.

Brady, N.C. and R.R. Weil. 1996. *The Nature and Properties of Soils. Eleventh Edition*. Prentice Hall Publishing.

Brookings Conservation District (BCD). 2002. Lake Hendricks Watershed Project. *Section 319 Nonpoint Pollution Control Program Watershed Project, Final Report*. State of South Dakota and US EPA. http://denr.sd.gov/dfta/wp/lkHendricksFinRpt203.pdf. (Accessed June 1, 2009).

Brookings County Planning Commission (BCPC). 2007. *Brookings County Zoning Ordinance*. Revised November 27, 2007. http://www.brookingscountysd.gov/zoning/Completed%20Zoning%20Ordinance-11-27-07_w_%202008-04update.pdf. (Accessed February 2009).

BCPC. 2000. *Comprehensive Land Use Plan for Brookings County*. Adopted July 25, 2000. http://www.brookingscountysd.gov/zoning/Brkgs_Cty_Comp_Plan.pdf. (Accessed February 2009).

Brookings, SD. 2009. Welcome to Brookings. http://www.brookingssd.com/. (Accessed February 16, 2009).

Bryce, S., J.M. Omernik, D.E. Pater, M. Ulmer, J. Schaar, J. Freeouf, R. Johnson, P. Kuck, and S.H. Azevedo. 1998. *Ecoregions of North Dakota and South Dakota.* Jamestown, ND: Northern Prairie Wildlife Research Center Online. http://www.npwrc.usgs.gov/resource/habitat/ndsdeco/index.htm (Version 03AUG2006). (Accessed February 4, 2009).

Council on Environmental Quality (CEQ). 1997. *Environmental Justice: Guidance Under the National Environmental Policy Act.* Executive Office of the President, Washington, DC.

Deuel County Planning Commission (DCPC). 2004a. Comprehensive Land Use Plan for Deuel County. Effective Date May 5, 2004. http://www.deuelcountysd.com/Zoning/default.htm. (Accessed February 2009).

DCPC. 2004b. Zoning Ordinance for Deuel County. Effective Date August 12, 2004. http://www.deuelcountysd.com/Zoning/default.htm. (Accessed February 2009).

EDAW. 2009a. *Biological Resources Report for Basin Electric's Deer Creek Project.* Prepared for Western Area Power Administration. 106 pp.

EDAW. 2009b. Biological Resources Report for Basin Electric's Deer Creek Project: Addendum Prepared for Western Area Power Administration. 58 pp.

EDAW. 2009c. *Report of a Delineation of Waters of the United States, Including Wetlands, for the Deer Creek Station Projects, Brookings/Deuel Counties, South Dakota*. Prepared for Basin Electric Power Cooperative.

EDAW. 2009d. Deer Creek Station Visual Resources Report Draft. Prepared for Basin Electric Power Cooperative.

EDAW. 2008. *Biological Resources Report for Basin Electric's Deer Creek Project*. Prepared for Western Area Power Administration.

Egan, M.D. 1988. *Architectural Acoustics*. McGraw-Hill, New York.

Energy Information Administration (EIA). 2008. *World Carbon Dioxide Emissions from the Consumption and Flaring of Fossil Fuels, 1980-2006*. http://www.eia.doe.gov/pub/international/iealf/tableh1co2.xls. (Accessed July 9, 2009).

Environmental Protection Agency (EPA). 2009a. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2007. http://www.epa.gov/climatechange/emissions/index.html (Accessed September 2009)

EPA. 2009b. *The Green Book: Nonattainment Areas for Criteria Pollutants*. http://nsdi.epa.gov/oar/oaqps/greenbk/mapnpoll.pdf. (Accessed June 12, 2009).

EPA. 2009c. Greenhouse Gas Equivalencies Calculator. http://www.epa.gov/cleanrgy/energy-resources/calculator.html. (Accessed July 9, 2009).

EPA. 2006. Global Anthropogenic Emissions of Non-CO_2 Greenhouse Gases, 1990-2020. Report 430-R-06-003. http://www.epa.gov/climatechange/economics/international.html (Accessed September 2009).

EPA. 1995. AP 42, Fifth Edition. *Compilation of Air Pollutant Emission Factors*. http://www.epa.gov/ttnchie1/ap42/. (Accessed July 9, 2009).

EPA. 1980. *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals*. December, 1980. EPA 450/2-81-078.

Ferry, J.C. and L.A. Peterson. 2009. *Cultural Resources Report for Geotechnical Investigations for Proposed White Site I Deer Creek Station Project, Section 25 of T111N R48W, Brookings County, South Dakota and Groundwater Well Investigations for Water Well Supply Sites A and B Deer Creek Station Project, Section 30 of T111N R47W and Section 36 of T111N R48W, Brookings County, South Dakota*. Prepared for EDAW, Inc. and Western Area Power Administration. 36 pp.

First District Association of Local Governments. 2009. *Deer Creek Station: Social and Economic Impact Study*.

Fischer, T.D., D.C. Backlund, K.F. Higgins, and D.E. Naugle. 1999. *Field Guide to South Dakota Amphibians*. SDAES Bulletin 733. Brookings: South Dakota State University. 52 pp.

Geo-Heat Center, Oregon Institute of Technology. 2008. *US Geothermal Projects and Resources Areas.* http://geoheat.oit.edu/dusys.htm (Accessed November 2009).

Intergovernmental Panel on Climate Change (IPCC). 2007. *Climate Change 2007: Synthesis Report, Summary for Policymakers*. http://www.ipcc.ch/. (Accessed July 9, 2009).

Johnson, R. R., K. F. Higgins, M. L. Kjellsen, and C. R. Elliott. 1997. Eastern South Dakota wetlands. Brookings: South Dakota State University. Jamestown, ND: Northern Prairie Wildlife Research Center Online. http://www.npwrc.usgs.gov/resource/wetlands/eastwet/index.htm (Version 02JUL1998).

Larson, G. 2009. Survey of the Basin Electric Deer Creek Station Project Area for Potential Western Prairie Fringed Orchid (*Platanthera praeclara*) Habitat. Prepared for Burns & McDonnell Engineering Company, Inc. and Western Area Power Administration. 3 pp.

Leibbrand, N.F. 1985. *Geochemical Survey to Determine Water-Quality Characteristics of the Big Sioux Aquifer in Eastern South Dakota*. U.S. Geological Survey Water Resource Investigations Report 85-4069.

Lincoln County Environmental Services Office (LCESO). 2009. Lincoln County Comprehensive Plan 2008. Revised March 2009. http://www.mncounties3.org/lincoln/Departments/Enviro/Comprehensive%20Land%20Use%20Plan%20%202009.pdf. (Accessed June 2009).

Martin, J. E., Sawyer, J. F., Fahrenbach, M. D., Tomhave, D. W., and Schulz, L. D. 2004. Geologic Map of South Dakota: South Dakota Geological Survey.

National Institute of Environmental Health Sciences (NIEHS). 2002. Electric and Magnetic Fields Associated with the Use of Electric Power. Questions and Answers. Prepared by the NIEHS/DOE EMF Research and Public Information Dissemination Program. http://www.niehs.nih.gov/health/docs/emf-02.pdf (Accessed October 1, 2009).

North American Electric Reliability Corporation (NERC). 2001. An Approach to Action for the Electricity Sector. Version 1.0, June, 2001. North American Electric Reliability Corporation (NERC). www.nerc.com. (Accessed April through August 2009).

Otter Tail Corporation 2009. Big Stone II Power Plant. Project proposed by Otter Tail Power Company, Central Minnesota Municipal Power Agency, Heartland Consumers Power District, and Western Minnesota Municipal Power Agency. http://www.bigstoneii.com/ (Accessed September 2009).

Ramsey, C. and H. Sleeper. 1994. *Architectural Graphic Standards*, 9th Edition. John Wiley and Sons, New York.

Rice, Les. 1994. White-tailed Deer and Mule Deer Fact Sheet. Prepared for S.D. Department of Game, Fish and Parks, Pierre, South Dakota.

Sargent & Lundy, LLC. 2009. Deer Creek Station PSD Air Quality Construction Permit Application. Prepared for Basin Electric Power Cooperative, Bismarck, North Dakota, May 29, 2009.

Schriner, M. 2009. Personal communication between Misti Schriner (Western Area Power Administration) with Natalie Gates (U.S. Fish and Wildlife Service) regarding the need to Conduct surveys for the American Burying Beetle for the Deer Creek Project. May 27, 2009.

Skadsen, D. 2009. A Field Survey for Dakota Skippers (*Hesperia dacotae*) Along the Basin Electric Deer Creek Natural Gas Pipeline and Well Supply Sites. Prepared for Burns & McDonnell Engineering Company, Inc. and Western Area Power Administration. 8 pp.

Smith, A.E. and J.B. Levenson. 1980. *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals*. EPA-450/2-81-078. EPA, Research Triangle Park, NC.

South Dakota Department of Environment and Natural Resources (SDDENR). 2009. South Dakota Environmental Events Database. http://denr.sd.gov/des/gw/Spills/SpillData.aspx. (Accessed December 28, 2009).

SDDENR. 2008a. *South Dakota Ambient Air Monitoring Annual Network Plan 2008*. http://denr.sd.gov/des/aq/aqnews/AQAnnualPlan2008final.pdf. (Accessed June 12, 2009).

SDDENR. 2008b. *The 2008 South Dakota Integrated Report for Surface Water Quality Assessment.* http://denr.sd.gov/documents/08IRFinal.pdf. (Accessed February 9, 2009).

South Dakota Department of Agriculture. 2007. Plant Protection Program. http://www.state.sd.us/doa/das/noxious.htm. (Accessed February 4, 2009).

SDDOA Division of Agricultural Services (DAS). 2009. Integrated Weed Management. http://www.state.sd.us/doa/das/IWM.html. (Accessed February 12, 2009).

South Dakota Department of Game, Fish, and Parks (SDGFP). 2009a. Glacial Lakes Region Parks. Division of Parks and Recreation. http://www.sdgfp.info/Parks/Regions/GlacialLakes/index.htm. (Accessed February 16, 2009).

SDGFP. 2009b. *South Dakota Public Hunting Areas. 2008 South Dakota Hunting Atlas.* http://www.sdgfp.info/Publications/PublicHuntingAreas.pdf. (Accessed February 16, 2009).

SDPUC. 2009a. EL09-015 - In the Matter of the Application by Basin Electric Power Cooperative, Inc. for an Energy Conversion Facility Siting Permit for the Deer Creek Station Project Combined-Cycle Natural Gas Energy Conversion Facility and Associated Infrastructure, Including a Water Supply System and Electric Transmission System. http://puc.sd.gov/Dockets/Electric/2009/el09-015.aspx (Accessed December 17, 2009).

SDPUC. 2009b. HP09-002 - In the Matter of the Application by Basin Electric Power Cooperative, Inc. for an Energy Conversion Facility Siting Permit for a Natural Gas Pipeline to Support the Deer Creek Station Project. http://www.puc.sd.gov/dockets/HydrocarbonPipeline/2009/hp09-002.aspx (Accessed December 17, 2009).

South Dakota Wildlife Diversity Program (SDNHP). 2008. Sensitive Species Dataset Provided in GIS Format.

Thomas, J.. 2009. *Report for the Deer Creek Station Project in Brookings and Deuel Counties, South Dakota.* Prepared by Ethnoscience, Inc. for Basin Electric Power Cooperative.

Tiner, R.W. 1999. *Wetland Indicators: A Guide to Wetland Identification,Delineation, Classification, and Mapping*. Boca Raton: Lewis Publishers. 392 pp.

Transportation Research Board. 2000. *Highway Capacity Manual*. National Academy Press, Washington, D.C.

U.S. Census Bureau. 2000. American Factfinder. http://factfinder.census.gov. (Accessed February 2009).

U.S.Census Bureau. 1990. American Factfinder. http://factfinder.census.gov. (Accessed February 2009).

U.S. Department of Agriculture (USDA). 2009. *2007 Census of Agriculture: South Dakota State and County Data*. http://www.agcensus.usda.gov/Publications/2007/Full_Report/Census_by_State/South_Dakota/index.asp. (Accessed February 2009).

USDA, Natural Resources Conservation Service (NRCS). 2007. http://www.nrcs.usda.gov/programs/wrp/2007_ContractInfo/2007WRPFactSheet.pdf. (Accessed February 9, 2009).

USDA, NRCS. 2006. *Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin*. U.S. Department of Agriculture Handbook. 296 pp.

USDA, NRCS. 2009. Soil Data Mart. http://soildatamart.nrcs.usda.gov/. (Accessed February 2009).

USDA, Service Center Agencies (SCA). 2009. Geospatial Data Gateway. http://datagateway.nrcs.usda.gov/. (Accessed February 2009).

U.S. Department of Energy, Western Area Power Administration (WAPA). 2006. *Draft Environmental Impact Statement, White Wind Farm Project, Brookings County, South Dakota.* DOE/EIS-0376.

U.S. Fish and Wildlife Service (USFWS). 2009. *South Dakota Field Office Endangered Species by County List*. http://www.fws.gov/southdakotafieldoffice/endsppbycounty.htm. (Accessed May 2009).

U.S. Global Change Research Program (USGCRP). 2009. *Global Climate Change Impacts in the United States*. www.globalchange.gov. (Accessed June 24, 2009).

Western Area Power Administration (Western). 2009. Record of Decision for Big Stone II Power Plant and Transmission Project Final Environmental Impact Statement (DOE/EIS-0377). *Federal Register* 74:42667-42670 (August 24, 2009).

Western. 2003. Construction Standards. Standard 13: Environmental Quality Protection. http://www.wapa.gov/transmission/pdf/APPEND1.PDF (Accessed September 29, 2009).

Wiedinmyer, Christine and Jason C. Neff. 2007. Estimates of CO_2 from Fires in the United States: Implications for Carbon Management. *Carbon Balance and Management* 2:10 http://www.cbmjournal.com/content/2/1/10 (accessed September 29, 2009)

*****

8.0 INDEX

APPENDIX A – FINAL SCOPING REPORT SUMMARY

(THIS PAGE INTENTIONALLY LEFT BLANK)

FINAL SCOPING REPORT SUMMARY

Deer Creek Station
Environmental Impact Statement

Western Area Power Administration

May 2009

(THIS PAGE INTENTIONALLY LEFT BLANK)

TABLE OF CONTENTS

Page No.

* * * * *

(THIS PAGE INTENTIONALLY LEFT BLANK)

1.0 INTRODUCTION

Basin Electric Power Cooperative (Basin Electric) is a generation and transmission cooperative headquartered in Bismarck, North Dakota. Basin Electric proposes to develop a new, 300-megawatt (MW) net intermediate natural gas combined-cycle generation facility located near the town of White in eastern South Dakota with an in-service date of mid-2012. Basin Electric's Power Supply Analysis (PSA) indicated that additional intermediate capacity will be needed in this timeframe to meet its members' growing energy demand. Based on the PSA, a 700-800 MW capacity deficit is projected in the eastern portion of Basin Electric's service area by the year 2014. Basin Electric is proposing to meet this increased demand by implementing a resource expansion plan that includes, in part, 250 MW of intermediate generation by 2012. The new generation facility has been identified as a means to meet the determined need for 250 MW of intermediate generation by 2012.

The proposed Deer Creek Station 300 MW generating project will be constructed on one of two sites. White Site 1 is located approximately 6 miles southeast of the town of White. A facility at this site would require approximately 14 miles of pipeline to supply natural gas from the Northern Border Pipeline. Approximately 1 mile of 345-kV single-circuit transmission line would be constructed to connect to the existing White Substation located adjacent to White Site 1. In addition, a groundwater supply well and connecting pipeline or connection to the Brookings-Deuel Rural Water Supply would be needed in association with the facility. White Site II is located approximately 4.5 miles northeast of the town of White. A facility at this site would require approximately 10 miles of natural gas supply pipeline from the Northern Border Pipeline. Approximately 0.5 mile of 345-kV double-circuit transmission line would be required, along with the construction of an on-site transmission substation. A generation facility at White Site II would require approximately 1 mile of pipeline to connect to the Brookings-Deuel Rural Water Supply.

The U.S. Department of Energy's Western Area Power Administration (Western) is serving as the lead agency for the environmental review process. Burns & McDonnell Engineering, Inc. was selected as Western's third-party environmental consultant for the project. The scoping process for the Deer Creek Station project began on February 6, 2009 when Western published a notice of intent (NOI) in the Federal Register to conduct a public scoping meeting and prepare an Environmental Impact Statement (EIS) for the project in accordance with the National Environmental Policy Act of 1969 (NEPA), DOE NEPA Implementing Procedures (10 CFR 1021), and the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR 1500-1508). In addition to the NOI, a letter was sent to representatives of agencies, tribes and interested parties to solicit input on the project and invite them to these meetings.

One public scoping meeting was held at the McKnight Community Center in White, South Dakota near the project area. Newspaper notices appeared in The Brookings Register and The Tri-City Star (White Edition). Radio advertisements were run on KWAT-AM (Watertown, SD) and KBRK-FM (Brookings, SD). This meeting was intended to fulfill Western's public scoping meeting requirements.

At the scoping meeting, representatives of Western, Basin Electric and Burns & McDonnell were available to discuss the project, the environmental review process, the project need and benefits, the proposed project location and to answer questions. There were 59 attendees at the scoping meeting. The period to receive written comments was open until April 7, 2009.

As a result of the scoping process, 14 comments were received from 12 agencies and two individuals.

* * * * *

2.0 AGENCY COORDINATION

2.1 AGENCY SCOPING LETTERS

Western sent agency coordination letters, dated February 13, 2009, to various local, state, and federal agencies as well as eight Native American Tribes. The letter provided a brief project description and information about the public scoping meeting as well as contact information for agency comments. A copy of the letter is included in Appendix A, along with a list of agencies that were contacted.

2.2 AGENCY COMMENTS

Agency letter responses were received from the following agencies:

FEDERAL

Advisory Council on Historic Preservation

U.S. Army, Corps of Engineers

U.S. Department of Transportation, Federal Aviation Administration

U.S. Department of Agriculture, Natural Resources Conservation Service

U.S. Department of Agriculture, Farm Service Agency

U.S. Department of Interior, Geological Survey

U.S. Department of Interior, Fish and Wildlife Service

U.S. Environmental Protection Agency

STATE

South Dakota Department of Environment & Natural Resources

South Dakota Department of Game, Fish & Parks

LOCAL

Brookings County Highway Department

Brookings County Sheriff's Office

A summary of the comments received are included in Section 5.

* * * * *

(THIS PAGE INTENTIONALLY LEFT BLANK)

3.0 PUBLIC SCOPING

The public scoping process for the project involved the following components:

- notifying people about the public scoping meeting;
- conducting the public scoping meeting; and
- collecting / reviewing public comments.

Additional public involvement has consisted of informing the public through the project website – http://www.wapa.gov/transmission/deercreek.htm, personal communications, and newspaper articles regarding the project.

3.1 GOALS AND OBJECTIVES

The goals of the public scoping process were to provide information regarding the project to the public and solicit comments from the public. The objectives of Western and Basin were to establish a clear and open dialogue with the public and provide a process to identify and define the scope of issues to be addressed in the Draft EIS.

3.2 NOTIFICATION PROCESS

A Notice of Intent (NOI) to hold a public scoping meeting and prepare an Environmental Impact Statement was published by Western in the Federal Register on February 6, 2009 (Volume 74, Number 24, pp. 6284-6286).

A public scoping meeting was conducted on February 24, 2009 at the McKnight Community Center in White, South Dakota. The public was notified of this meeting by a series of advertisements in local newspapers, and spots on local radio stations. The following papers published the legal notice of the public scoping meeting:

- The Brookings Register, published on February 6, 13, and 20, 2009
- The Tri-City Star, published on February 12 and 19, 2009

3.3 PUBLIC SCOPING MEETING

The public scoping meeting was presented in an open house format, with a series of informative display stations regarding various aspects of the proposed project. Each station was staffed by Western, Basin Electric, or Burns & McDonnell representatives, who provided information about the project and answered questions. There were 59 members of the public that attended the scoping meeting (Appendix B). Public scoping meeting comment forms were available for the attendees to complete.

3.4 PUBLIC COMMENTS

Two public comments were received during the scoping comment period that ended April 7, 2009. Concerns noted in these comments included local traffic impacts from construction and operation of the project, dust issues from heavy traffic, impacts to air quality, and economic benefits to local communities.

* * * * *

4.0 SUMMARY OF AGENCY AND PUBLIC COMMENTS

Listed below is a listing of the agency and public scoping issues based on the comments received. The issues identified in the comments will be addressed in the Draft EIS.

Agency	Comments/Concerns
Federal	
Advisory Council on Historic Preservation	- Recommends that Western Area Power Administration initiate Section 106 process and consult with the SHPO, Native American tribes, and other concerned parties with regard to protection of historic properties.
U.S. Army Corps of Engineers	- Requests that should the proposed project affect navigation and/or involve either the discharge of dredged or fill material into waters subject to Federal regulation, the proposed EIS process should incorporate an alternatives analysis that is compliant with the Section 404 (Clean Water Act) Guidelines addressing impacts to waters of the U.S.. -Requests that an application form for the Section 404 permit be submitted along with drawings, maps, wetland delineations, color photos, and ecological or environmental information available that is pertinent to the project.
U.S. Environmental Protection Agency	- Requests reasonable alternatives to avoid impacts to wetlands, and avoidance of fen wetlands. - Requests evaluation of a least damaging practicable alternative (LEDPA) for wetland impacts. - Requests mitigation plan for unavoidable wetland impacts. - Recommends discussion and analysis of potential impacts to groundwater, surface water, drinking water, and irrigation waters. -Recommends all mitigation measures be analyzed in EIS to address impacts to ground, surface, drinking, and irrigation water. - Recommends analysis to potential impacts to floodplains. - Recommends evaluation of potential contribution to near-field and far-field air quality. - Requests consideration of greenhouse gas emissions (methane and carbon dioxide). - Requests evaluation of effects of project on area ecology, vegetation and wildlife, and hunting and fishing activities. - Requests the prevention of introducing and spreading of invasive plants and noxious weeds. - Recommends a detailed plan for addressing dust suppression, inspection schedules, and documentation and accountability processes. - Requests disclosure and evaluation of any environmental justice impacts. - Recommends cumulative impact analysis for resources of concern.
U.S. Department of	- Requests notification of construction or alterations as required by

Transportation, FAA	Federal Aviation Regulations, Part 77, Objects Affecting Navigable Airspace, Paragraph 77.13. - Requests contacting FAA Technical Operations to identify possible impacts to aircraft navigation and/or communication equipment. - Requests that the design, construction, and operation of the project does not create a hazardous wildlife attractant to surrounding airports. - Requests that Brookings Municipal Airport and White Airport be given opportunity to provide input and comments.
U.S.D.A. Natural Resources Conservation Service	- Confirmed that there are no easements administered by NRCS in the project area. - Requests the completion of the Farmland Conversion Impact Rating form (attached to letter) for White Site I and White Site II to determine impacts, if any, to prime farmland.
U.S.D.A. Farm Service Agency	- Have not been advised of any sites within the project area that have FSA mortgages or CRP tracts. - Has no specific comments at this time regarding the project.
U.S. Fish and Wildlife Service	- Requests confirmation of possible impacts to grassland and wetland easements from proposed natural gas pipeline. - Concerns over possible impacts to Western prairie fringed orchid, American burying beetle, and Topeka shiner (Federally protected species). Requests that if a determination of “may adversely affect” is made for any of these species by Western, a request for formal consultation would be made to USFWS. - Recommends reviewing guidelines for Bald Eagle Protection Act. - Requests ceasing construction in the event whooping cranes are sighted in the project area during spring and fall migration. - Recommends incorporating measures to prevent line strike and electrocution mortality for avian species (primarily migratory birds and raptors) from overhead transmission lines related to the project. - Encourages Basin Electric to investigate the formulation of an Avian Protection Plan if one is not already in place.
U.S. Geological Society	- Had a question about the availability and sustainability of the ground water supply in the area near the proposed well site, and the volume of water that would be required to support the project.
State	
S.D. Department of Environment and Natural Resources S.D. DENR (Continued)	- The Department does not anticipate adverse impacts to ground water quality by the project. - Suggests that additional research regarding past petroleum and chemical releases be conducted that could affect the project area. - Requests that, should contamination be encountered during construction activities, Basin Electric report this contamination to the Department. Contaminated soil will need to be stockpiled and sampled to determine disposal requirements. - Notes that the proposed gas pipeline route passes through the “B” Zone of Brookings County’s Well Head Protection Area, and the alternative pipeline route passes through the “A” Zone of Astoria’s water supply wells in several areas. Requests that Basin Electric consider this information when choosing the pipeline routes, and

	requests that the "A" zones be avoided, and minimize the amount of pipeline that crosses any "B" zones. - Requests that Basin Electric contact Brookings County Zoning Commission and the municipality of Astoria for information pertaining to the Well Head Protection Areas and zoning ordinances. - Requests that Basin Electric contact the Department's Water Rights Program if additional wells need to be drilled to provide water to operate the proposed facility.
S.D. Department of Game, Fish and Parks	- Concerns over possible existing wetlands on White Site I and II, according to existing National Wetlands Inventory maps. - Recommends avoidance of wetland impacts whenever possible. - Requests that if avoidance of wetlands is not possible, adverse impacts to wetlands would be minimized, and any lost acres would be replaced. - Requests minimizing impacts to fish and wildlife resources by complying with Section 404 of the Clean Water Act, using best-management practices during construction to minimize impacts to wetlands and soils, avoiding woodland habitat, and controlling noxious weeds. - Recommends contacting the Natural Heritage Program to determine locations of any rare, threatened, or endangered species in the proposed project area. - Requests that if any unanticipated threatened or endangered species be encountered during construction, all ground disturbing activities would cease in the immediate area until consultation with the appropriate agency could occur.
Local	
Brookings County Highway Department	- Concern with the operating status of county bridges within the project area, and the ability of Brookings County gravel road #36 to handle heavy loads associated with construction and operation of the project. - Concern with the use of county roads during the spring load limit posting.
Brookings County Sheriff's Department	- Brookings County Sheriff's Office would be a first responder for emergencies at the project area. - The project site would be put on the county's location for Homeland Security Patrol. - Concern with safety of workers due to weather during construction.
Citizen/Landowner	
Carlton and Janet Basmajian	- Personally welcome the project, but hope road access and impact to living conditions in the area will be considered. - Concern is with traffic access and flow to the White Site I, and associated dust from the gravel road impacting their residence.
Geoff Andrews Geoff Andrews	- Would like to know economic benefits to the communities of Toronto, Astoria, and White. - Would like to know the long-term outlook for wind energy in the

(Continued)	area. - Concern over the amount of air pollution generated by the proposed project.

*****

5.0 PROJECT STATUS AND COORDINATION

Western will prepare a Draft EIS that addresses the scoping issues identified by the agencies and public. The Draft EIS will be available for agency and public review and comment after which Western will prepare a Final EIS and Record of Decision (ROD). Notices announcing the availability of the EIS and ROD will be published in the Federal Register and in local newspapers.

If you have any questions or desire additional information, please feel free to contact the following:

Mr. Matt Marsh
NEPA Document Manager
Western Area Power Administration
Upper Great Plains Customer Service Region
P.O. Box 35800
Billings, MT 59107-5800
Fax: (406) 247-7408
Email: DeerCreekStationEIS@wapa.gov.

*****

(THIS PAGE INTENTIONALLY LEFT BLANK)

APPENDIX A – AGENCY SCOPING LETTER AND MAILING LIST

(THIS PAGE INTENTIONALLY LEFT BLANK)

Department of Energy
Western Area Power Administration
Upper Great Plains Customer Service Region
P.O. Box 35800
Billings, MT 59107-5800

February 13, 2009

The Mid America Bison Family
241 Galveston Ave.
Hot Springs, SD 57747

Dear Mid America Bison Family,

This letter requests information and your comments regarding a power generation facility construction project (Project) being proposed by Basin Electric Power Cooperative (Basin Electric) that is the subject of environmental review by Western Area Power Administration (Western). Western is one of four power marketing administrations within the U.S. Department of Energy (DOE) that has jurisdiction over transmission projects and operations.

Pursuant to the National Environmental Policy Act (NEPA), Western will prepare an environmental document that evaluates the potential environmental impacts of the proposed Project and the reasonable and feasible alternatives to the proposal. Basin Electric has submitted requests to interconnect the proposed Project to Western's transmission system. Interconnection would incorporate a new generation resource into Western's power transmission system, thereby requiring Western to prepare an Environmental Impact Statement (EIS) under DOE NEPA Implementing Procedures.

Description of the Proposed Project

Basin Electric is a regional wholesale electric generation and transmission cooperative owned and controlled by the member cooperatives it serves. Basin Electric includes 120 rural electric systems and is one of the largest electric generation and transmission cooperatives in the U.S. Basin Electric serves approximately 2.5 million customers in 430,000 square miles covering portions of nine states: Colorado, Iowa, Minnesota, Montana, Nebraska, New Mexico, North Dakota, South Dakota, and Wyoming.

Basin Electric proposes to construct and own a 300-megawatt (MW) net intermediate natural gas combustion turbine generation facility and associated energy transmission facilities in eastern Brookings County, South Dakota (see Figure 1 attached). In addition to the generation facility, the proposed Project would include ancillary facilities such as a natural gas pipeline for fuel delivery, transmission facilities, water well system or delivery system from existing rural water system, wastewater processing, and construction of access roads. The purpose of the proposed Project is to construct a natural gas combined-cycle intermediate generation facility to help serve the increased demand for electrical power to member cooperatives in the eastern portion of Basin Electric's nine-state service area, and to connect this generation facility to Western's transmission grid.

<u>Agency Consultation</u>

At this time, on behalf of Western, I would like to request your comments or concerns regarding the proposed Project. Any information you can provide relating to the following issues will assist Western in its determination of what environmental issues should be addressed in the EIS:

- Local land use
- Transportation
- Air emissions and ambient air quality
- Energy use
- Water quality and wetlands
- Ambient noise levels
- Historic sites, archaeological sites, or cultural resources
- Native American tribal issues or concerns
- Socioeconomics (population, employment, growth, and development)
- Wildlife, vegetation, and fisheries
- Soils and geology

Information on any additional issues or concerns that you consider appropriate would also be appreciated. We request your response by April 7, 2009, so that we may be able to schedule any meetings, site visits, or surveys, conduct any necessary follow-up activities, and incorporate your response into the scope of the study, as appropriate.

If you have any questions, please do not hesitate to contact me at 406-247-7385. Thank you for your assistance.

Sincerely,

Matt Marsh

Matt Marsh
Environment-Project Manager
Upper Great Plains

Department of Energy
Western Area Power Administration
Upper Great Plains Customer Service Region
P.O. Box 35800
Billings, MT 59107-5800

February 19, 2009

The Mid America Bison Family
241 Galveston Ave.
Hot Springs, SD 57747

Dear Sir or Madam,

You should have recently received a letter soliciting your comments or concerns with Basin Electric Power Cooperative's Deer Creek Station Project proposal (300 MW gas turbine electric generation project) near White, SD. This is a follow-up letter to send Figure 1 detailing the location of the proposed project. I inadvertently left the figure out of the mailing. I am sorry for any confusion this may have caused you.

If you have any questions, please do not hesitate to contact me at 406-247-7385 or mmarsh@wapa.gov . Thank you for your assistance.

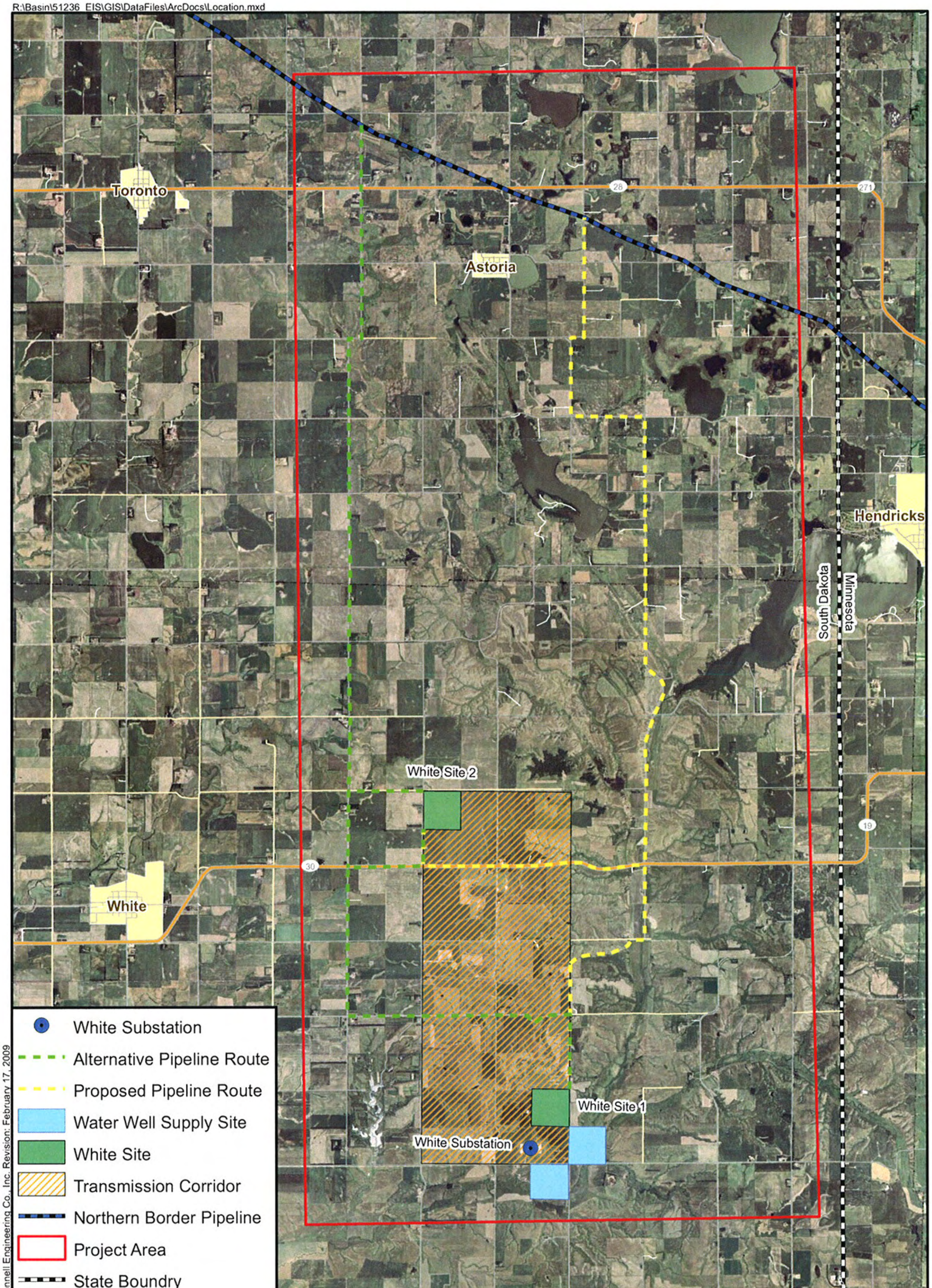
Sincerely,

Matt Marsh

Matt Marsh
Environment-Project Manager
Upper Great Plains

(THIS PAGE INTENTIONALLY LEFT BLANK)

R:\Basin\51236 EIS\GIS\DataFiles\ArcDocs\Location.mxd



Source: USDA/FSA- Aerial Photography Field Office, ESRI, Basin Electric Power Cooperative

0 1 2 4 Miles

NORTH

Burns & McDonnell
SINCE 1898

Figure 1
Deer Creek Station Project Location
Basin Electric Power Cooperative
Brookings County, SD

(THIS PAGE INTENTIONALLY LEFT BLANK)

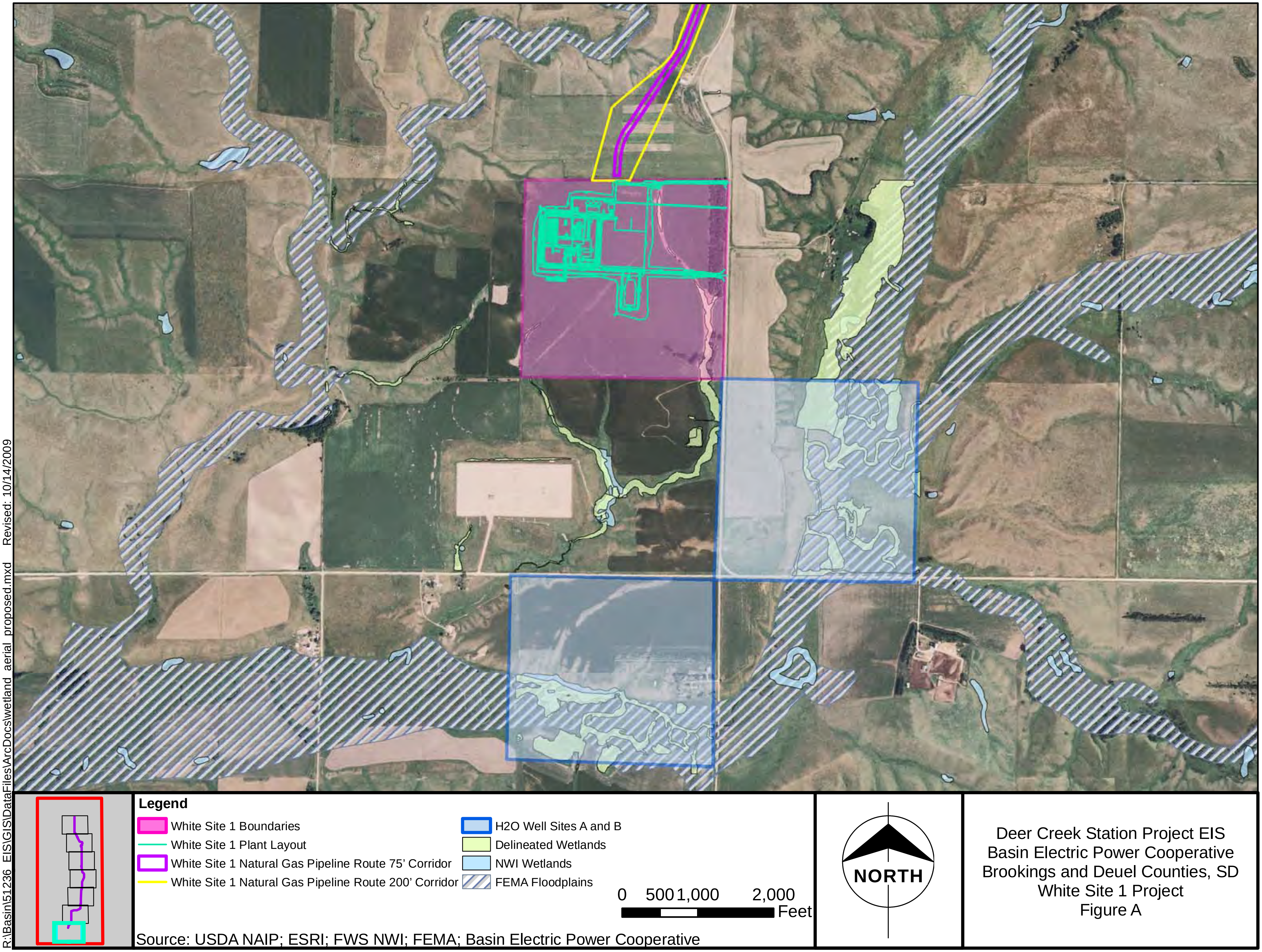
«First Name»	«Last Name»	«Job Title»	«Company/agency»	«Address 1»	«Address 2»	«City»	«State»	«Zip»
Jon	Christensen	Colonel	U.S. Army Corps of Engineers	St. Paul District	190 5th Street East, Suite 401	St. Paul	MN	55101-1638
Carol	Rushin	Acting Regional Administrator	U.S. Environmental Protection Agency, Region 8		1595 Wynkoop St., 8EPR-N Mail Code	Denver	CO	80202-1129
		Director	U.S. Environmental Protection Agency	NEPA Program	1595 Wynkoop St., 8EPR-N Mail Code	Denver	CO	80202-1129
Mr. Pete	Gober	Supervisor	U.S. Fish & Wildlife Service	South Dakota Field Office	420 S. Garfield Avenue, Suite 400	Pierre	SD	57501-5408
Mr. Kurt	Forman	Project Leader	U.S. Fish & Wildlife Service	Brookings Wildlife Habitat Office	P.O. Box 247	Brookings	SD	57006
		Manager	U.S. Fish & Wildlife Service	Madison Wetland Management District	P.O. Box 48	Madison	SD	57042
Ms. Patricia	Klintberg	Director, External Affairs	U.S. Department of Agriculture	Farm Service Agency-Public Affairs Staff	1400 Independence Ave., SW STOP 0506	Washington	DC	20250-0506
Mr. Mark	Robinson	Director	Federal Energy Regulatory Commission	Office of Energy Projects	888 First Street, NE	Washington	DC	20426
Mr. John	Fowler	Executive Director	Advisory Council on Historic Preservation	Old Post Office Building, Suite 803	1100 Pennsylvania Avenue, NW	Washington	DC	20004
Ms. Dianne	Guidry	Director, Public Affairs	U.S. Department of Agriculture	Natural Resources Conservation Service	Room 6121-S, P.O. Box 2890	Washington	DC	20013
		Environmenta & Historic Preservation	Federal Emergency Management Agency	Denver Federal Center	Building 710, Box 25267	Denver	CO	80225-0267
Mr. Mark	Plank	Director	U.S. Department of Agriculture-Rural Utilities Service	Engineering and Environmental Staff	Room 2242-S, Mail Stop 1571, 1400 Independence Ave, SW	Washington	DC	20250
Mr. Barry	Cooper	Regional Administrator	U.S. Department of Transportation	Federal Aviation Administration-Great Lakes Region	O'Hare Lake Office Center, 2300 East Devon Avenue	Des Plaines	IL	60018
Mr. Willie	Taylor	Director	U.S. Department of the Interior	Office of Environmental Policy and Compliance	1849 C. Street, NW, MS 2342	Washington	DC	20240
Mr. Stanley	Ponce	Central Regional Director	U.S. Geological Survey	Central Region	Denver Federal Center, Building 810, Mail Stop 150	Denver	CO	80225-0046
Ms. Deanna	Santema	Chairperson	Brookings County Board of County Commissioners		1621 Robin Road	Brookings	SD	57006
Mr. Larry	Jensen	Superintendent	Brookings County Highway Department		422 Western Avenue	Brookings	SD	57006
Mr. Robert	Hill	Director of Planning, Zoning, & Drainage	Brookings County Zoning and Drainage Department		1921 Building, 601 4th Street, Suite 105	Brookings	SD	57006
Mr. William	Even		South Dakota Department of Agriculture	Office of the Secretary	523 E. Capitol Avenue	Pierre	SD	57501-3182
Mr. Steven	Pirner	Secretary	South Dakota Department of Environment and Natural Resources		Joe Foss Building, 523 E. Capitol	Pierre	SD	57501
Mr. Jeff	Vonk	Secretary	South Dakota Department of Game, Fish and Parks		523 E. Capitol Avenue	Pierre	SD	57501
Mr. Joel	Jundt	Director, Division of Planning	South Dakota Department of Transportation	Becker-Hansen Building	700 E. Broadway Ave.	Pierre	SD	57501
Ms. Patricia	Van Gerpen	Executive Director	South Dakota Public Utilities Commission	Capitol Building, 1st Floor	500 E. Capitol Avenue	Pierre	SD	57501-5070
Ms. Paige	Hoskinson Olson	Review & Compliance Coordinator	South Dakota State Historic Society	State Historic Preservation Office	900 Governors Drive	Pierre	SD	57501-2217
Mr. Josh	Weston	Chairman	Flandreau Santee Sioux		P.O. Box 283	Flandreau	SD	57028-0283
Jean	Stacy	President	Lower Sioux Indian Community of Minnesota		P.O. Box 308, 39458 Res. Highway 1	Morton	MN	56270
Marlys	Opsahl	Tribal Council Administrative Assistant	Prairie Island Indian Community of Minnesota		5636 Sturgeon Lake Road	Welch	MN	55089
Mr. Roger	Trudell	Tribal Chairman	Santee Sioux Tribe of Nebraska		425 Frazier Ave. North, Suite 2	Niobrara	NE	68760
Mr. Mike	Selvage	Chairman	Sisseton-Wahpeton Oyate		P.O. Box 509	Agency Village	SD	57262-0509
Myra	Pearson	Tribal Chairperson	Spirit Lake Tribe		P.O. Box 359	Fort Totten	ND	58335
Mr. Kevin	Jensvold	Chairman	Upper Sioux Indian Community of Minnesota		P.O. Box 147	Granite Falls	MN	56241

Mr. Robert	Cournoyer	Chairman	Yankton Sioux Tribe		P.O. Box 248	Marty	SD	57361
Mr. Mike	Rounds	Governor	Office of the Governor		500 E. Capitol Avenue	Pierre	SD	57501
Mr. Robert F.	Stewart	Regional Environmental Officer	U.S. Department of the Interior	Denver Federal Center	P.O. Box 25007 (D-108)	Denver	CO	80225-0007
Mr. John	Rohlf	Division Administrator	Federal Highway Administration		116 East Dakota, Suite A	Pierre	SD	57501
Steve	Naylor	State Regulatory Program Manager	U.S. Army Corps of Engineers	28563 Powerhouse Rd., Room 118	Pierre Regulatory Office	Pierre	SD	57501-6174
Christopher	Blum	Regional Administrator	Federal Aviation Administration	2300 East Devon Avenue	O'Hare Lake Office Center	Des Plaines	IL	60018
Janet	Oertly	State Conservationist	Natural Resources Conservation Service	Federal Building, Room 203, 200 4th St. SW	South Dakota State Office	Huron	SD	57350-2475
Steven	Cutler	State Executive Director	South Dakota State Farm Service Agency	200 4th St. SW		Huron	SD	57350-2431
Billy Joe	Waara		Governor's Office of Economic Development	711 E. Wells Avenue		Pierre	SD	57501-3369
Amiel	Redfish	Mayor	City of Arlington	202 West Elm Street		Arlington	SD	57212
Jeff	Anderson	Mayor	City of Bruce	Box 255		Bruce	SD	57220
Brad	Mitchell	Mayor	City of Sinai	Box 86		Sinai	SD	57061
Fred	Weeks	Mayor	City of Aurora	Box 335		Aurora	SD	57002
Josh	Peterson	Mayor	City of Bushnell	21081 1st Avenue South		Bushnell	SD	57276
Tom	Pierce	Mayor	City of Volga	Box 217		Volga	SD	57071
Scott	Munsterman	Mayor	City of Brookings	311 3rd Avenue		Brookings	SD	57006
Doug	Freidel	Mayor	City of Elkton	Box 308		Elkton	SD	57026
Gary	Emmett	Mayor	City of White	Box 682		White	SD	57276
Jayme	Gross	Mayor	City of Clear Lake	125 Third Avenue South		Clear Lake	SD	57226
Don	Larson	Chairperson	Brookings County Commission	2533 54th St. SW		Brookings	SD	57006
Dennis	Falken	Vice-Chairperson	Brookings County Commission	1632 Overlook Ridge Road		Brookings	SD	57006
Deanna	Santema	Commissioner	Brookings County Commission	1621 Robin Road		Brookings	SD	57006
Alan	Gregg	Commissioner	Brookings County Commission	224 Front Street		Brookings	SD	57006
Mary	Negstad	Commissioner	Brookings County Commission	625 Oak Avenue		Volga	SD	57071
Darold	Hunt	Commissioner	Deuel County Commission	P.O. Box 616	408 4th St. West	Clear Lake	SD	57226
Gordon	Anderson	Commissioner	Deuel County Commission	P.O. Box 616	408 4th St. West	Clear Lake	SD	57226
Gary	Jaeger	Commissioner	Deuel County Commission	P.O. Box 616	408 4th St. West	Clear Lake	SD	57226
Don	Hanson	Commissioner	Deuel County Commission	P.O. Box 616	408 4th St. West	Clear Lake	SD	57226
Ray	Van Liere	Commissioner	Deuel County Commission	P.O. Box 616	408 4th St. West	Clear Lake	SD	57226
John	Thune	U.S. Senator	United States Senate	383 Russell Senate Office Building		Washington	D.C.	20510
Tim	Johnson	U.S. Senator	United States Senate	136 Hart Senate Office Building		Washington	D.C.	20510
Stephanie	Herseth Sandlin	U.S. Representative	United States House of Representatives	331 Cannon House Office Building		Washington	D.C.	20515
Tim	Begalka	State Representative-District 4	South Dakota House of Representatives	18254 SD Hwy 15		Clear Lake	SD	57226-5401
Sean	O'Brien	State Representative-District 7	South Dakota House of Representatives	P.O. Box 421		Brookings	SD	57006-0421
Jim	Peterson	State Representative-District 4	South Dakota House of Representatives	16952 482nd Ave		Revillo	SD	57259-5208
Orville	Smidt	State Representative-District 7	South Dakota House of Representatives	117 Fourth St.		Brookings	SD	57006-1915
Arnold	Brown	State Senator-District 7	South Dakota Senate	1718 Teton Pass		Brookings	SD	57006-3626
Al	Kurtenbach	State Senator-District 4	South Dakota Senate	47209 220th Street		Brookings	SD	57006-7112
Bob	Paulson	Program Director	The Nature Conservancy	Black Hills Area Ecoregion	8100 Sheridan Lake Road	Rapid City	SD	57702
Patrick	Anderson	Executive Director	Northern Prairies Land Trust	401 E. 8th Street, #200B		Sioux Falls	SD	57103
Jim	Margadant	Chairperson	South Dakota Chapter of the Sierra Club	P.O. Box 1624		Rapid City	SD	57709-1624
Dave	Johnson	President	Missouri Breaks Audubon Society	P.O. Box 832		Pierre	SD	57501
Jeffrey	Nelson	Director of Operations	Ducks Unlimited	Great Plains Regional Office	2525 River Road	Bismarck	ND	58593-9011
			South Dakota Clean Water Action	405 South 3rd Ave., Suite 102A		Sioux Falls	SD	57104
Mike	Williams	Division President	Izaak Walton League of America	South Dakota Division	Stoney Point 728 S. Lake Drive	Watertown	SD	57201

			Pheasants Forever, Inc.	1783 Buerkle Circle		St. Paul	MN	55110
Catherine	Twitero	President	Brookings School District 05-1	2130 - 8th St. South		Brookings	SD	57006
Tim	Bauer	President	Elkton School District 05-3	P. O. Box 190		Elkton	SD	27026-0190
Darold	Hunt	Chairman	Deuel County Commission	P. O. Box 616		Clear Lake	SD	57226-0616
Dave	Huebner	Board President	City of Bushnell	21081 - 1st Ave. South		Bushnell	SD	57276
Randall	Brown	Mayor	City of White	P. O. Box 682		White	SD	57276-0682
Bert	Rogness	President	Deubrook School District 05-6	P. O. Box 346		White	SD	57276-0346
Terry	Lovre	Mayor	City of Astoria	P. O. Box 8		Astoria	SD	57213-0008
David	Landsman	Mayor	City of Elkton	P. O. Box 308		Elkton	SD	57026-0308
Michael	Wilson	Airport Manager	Brookings Municipal Airport	509 W. 2nd St. S.		Brookings	SD	57006

APPENDIX B – WETLAND DELINEATION MAPS

(THIS PAGE INTENTIONALLY LEFT BLANK)

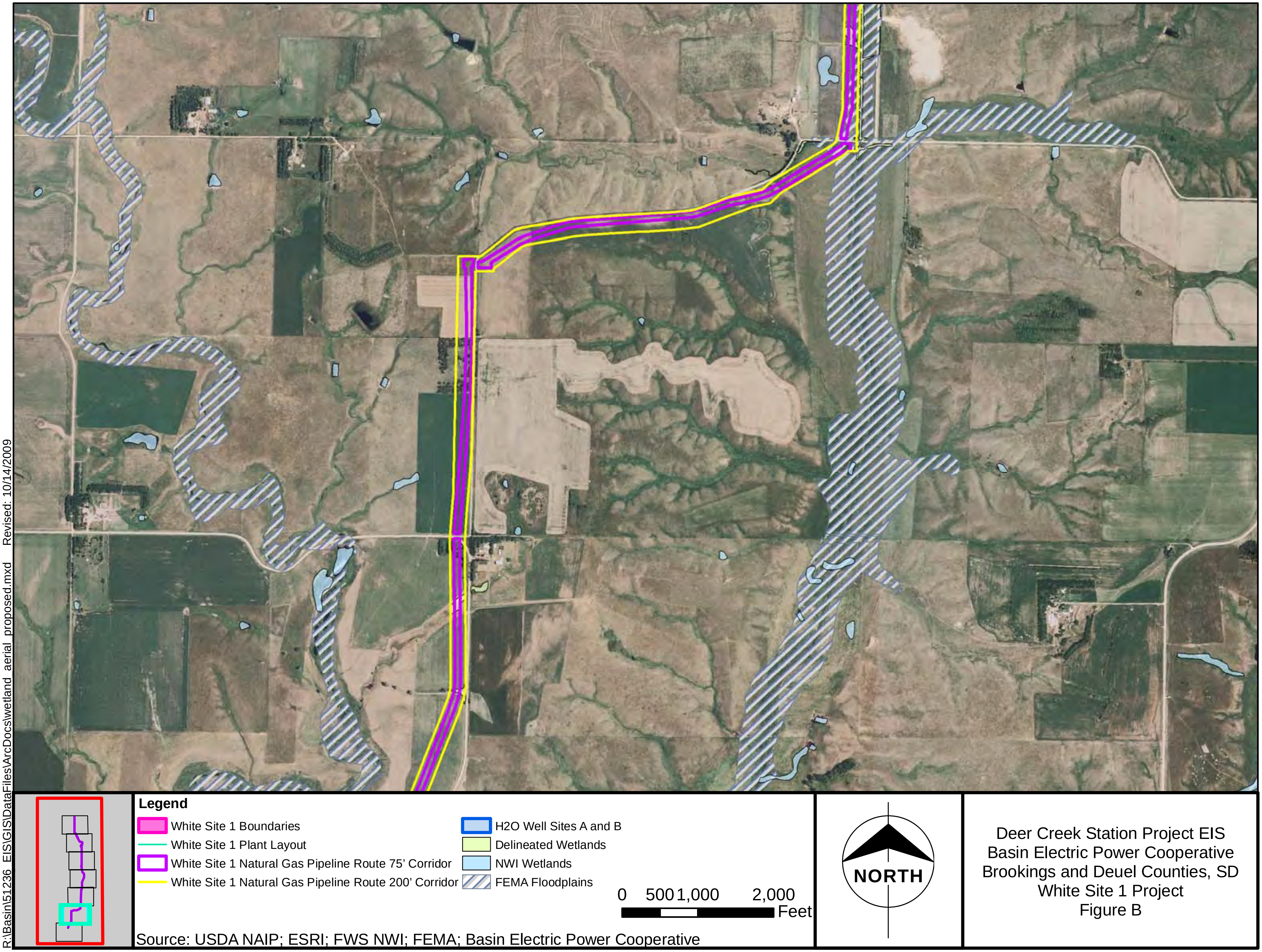


Source: USDA NAIP; ESRI; FWS NWI; FEMA; Basin Electric Power Cooperative

Deer Creek Station Project EIS
Basin Electric Power Cooperative
Brookings and Deuel Counties, SD
White Site 1 Project
Figure A

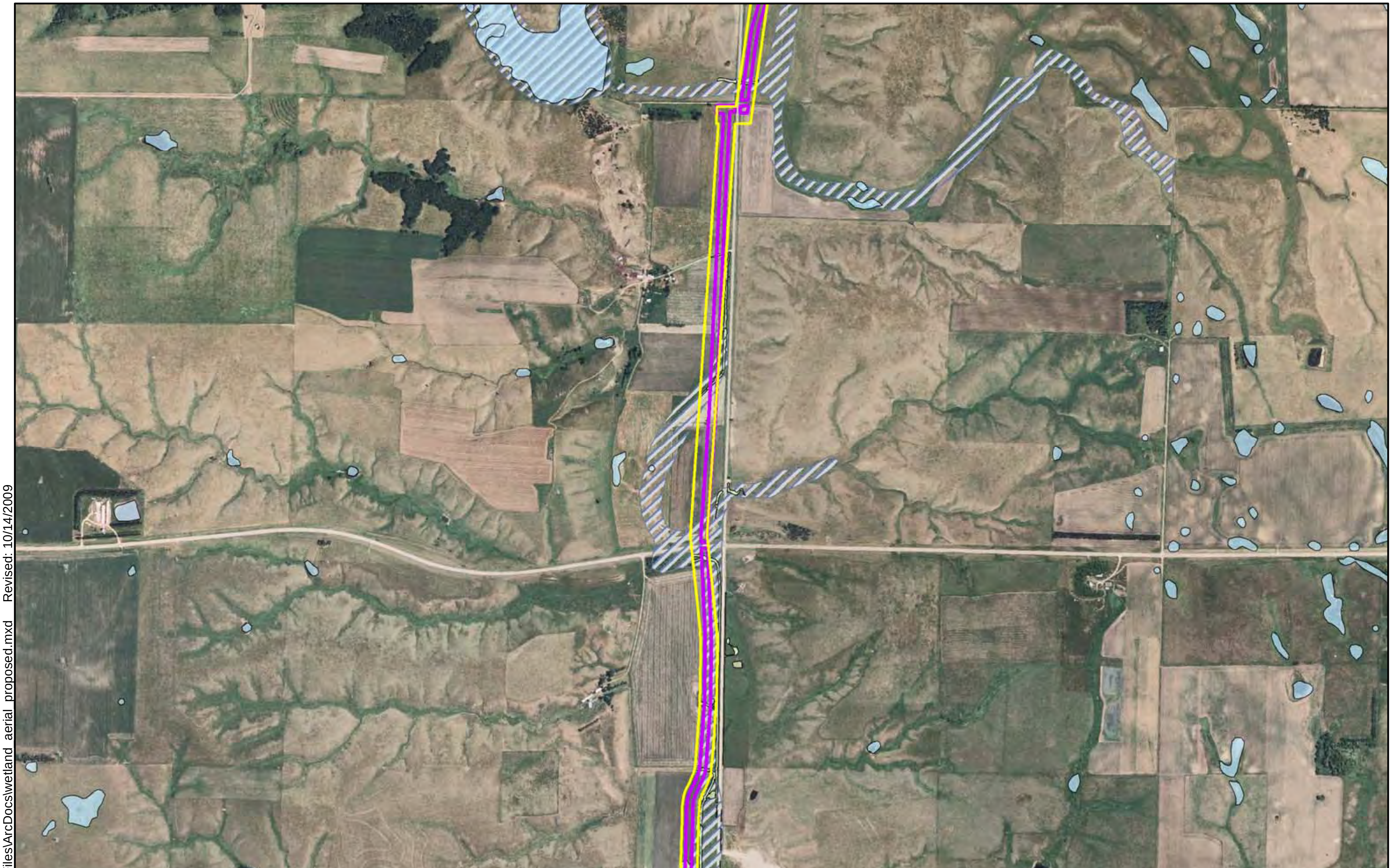
R:\Basin\51236_EIS\GIS\DataFiles\ArcDocs\wetland_aerial_proposed.mxd Revised: 10/14/2009

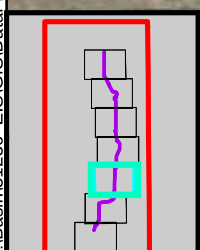
(THIS PAGE INTENTIONALLY LEFT BLANK)



R:\Basin\51236 EIS\GIS\DataFiles\ArcDocs\wetland aerial proposed.mxd Revised: 10/14/2009

(THIS PAGE INTENTIONALLY LEFT BLANK)





Legend

- White Site 1 Boundaries
- White Site 1 Plant Layout
- White Site 1 Natural Gas Pipeline Route 75' Corridor
- White Site 1 Natural Gas Pipeline Route 200' Corridor
- H2O Well Sites A and B
- Delineated Wetlands
- NWI Wetlands
- FEMA Floodplains

0 500 1,000 2,000
Feet

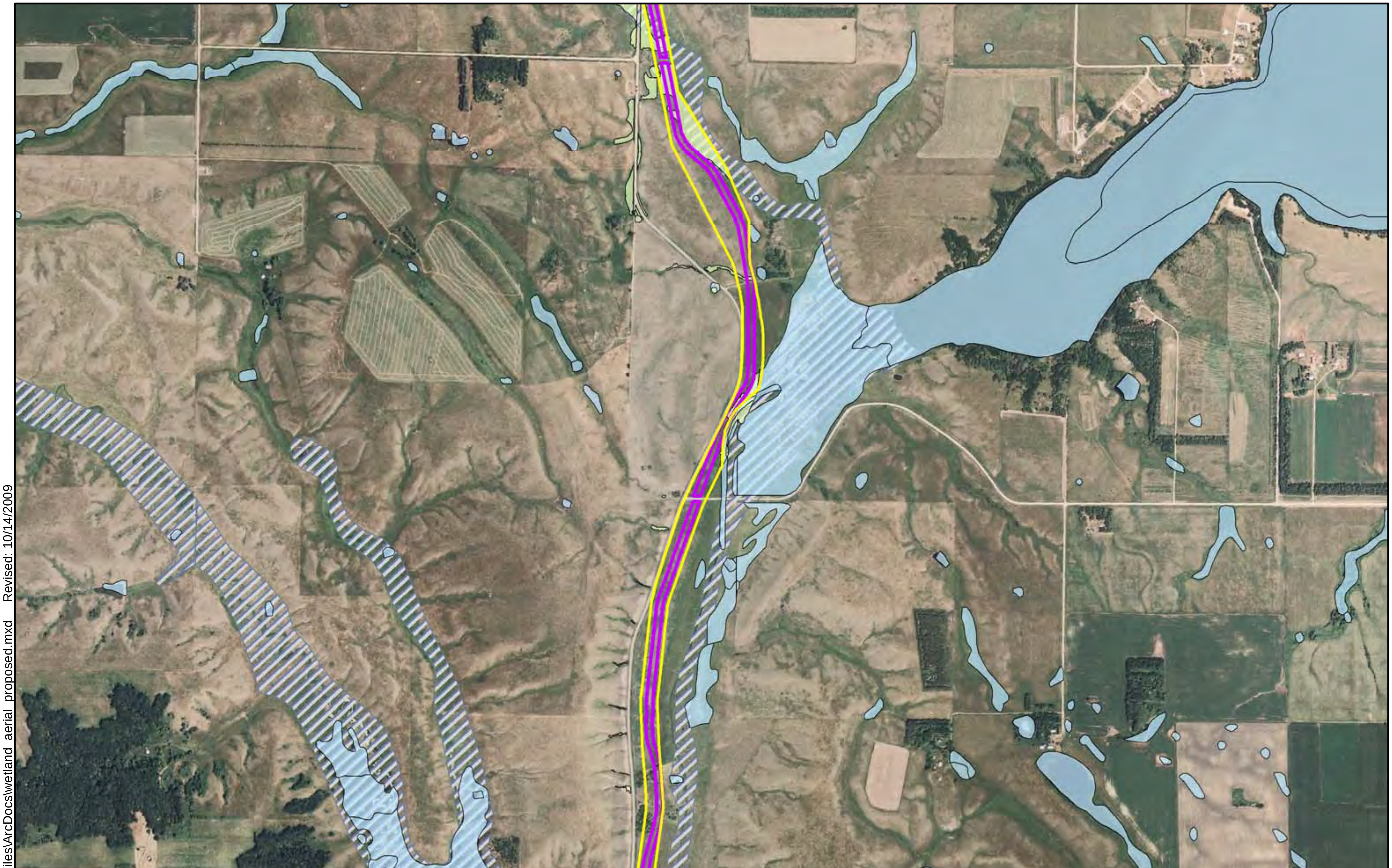
NORTH

Deer Creek Station Project EIS
Basin Electric Power Cooperative
Brookings and Deuel Counties, SD
White Site 1 Project
Figure C

Source: USDA NAIP; ESRI; FWS NWI; FEMA; Basin Electric Power Cooperative

R:\Basin\51236_EIS\GIS\DataFiles\ArcDocs\wetland_aerial_proposed.mxd Revised: 10/14/2009

(THIS PAGE INTENTIONALLY LEFT BLANK)



R:\Basin\51236 EIS\GIS\DataFiles\ArcDocs\wetland aerial proposed.mxd Revised: 10/14/2009

Legend

- White Site 1 Boundaries
- White Site 1 Plant Layout
- White Site 1 Natural Gas Pipeline Route 75' Corridor
- White Site 1 Natural Gas Pipeline Route 200' Corridor
- H2O Well Sites A and B
- Delineated Wetlands
- NWI Wetlands
- FEMA Floodplains

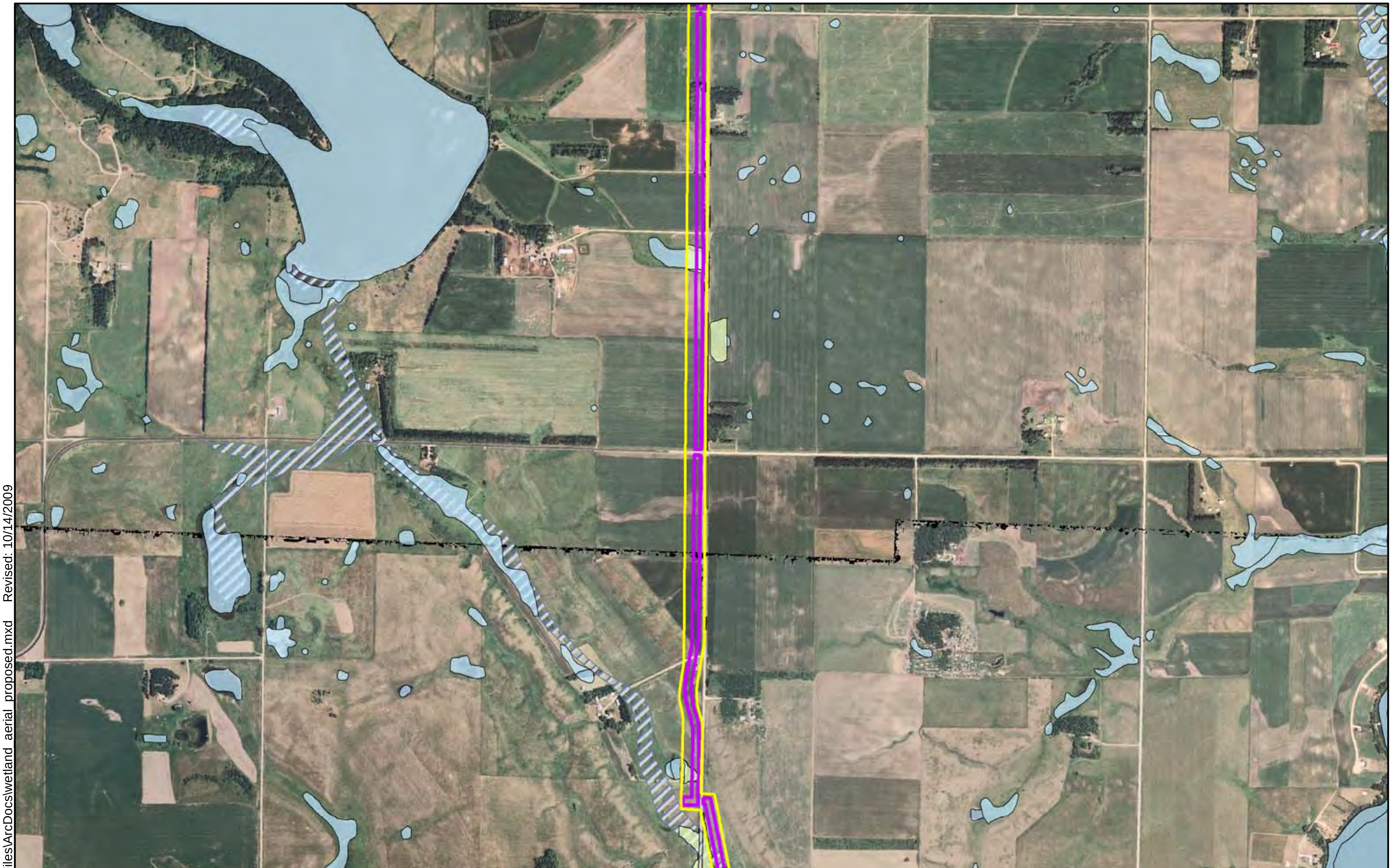
0 500 1,000 2,000 Feet

NORTH

Deer Creek Station Project EIS
Basin Electric Power Cooperative
Brookings and Deuel Counties, SD
White Site 1 Project
Figure D

Source: USDA NAIP; ESRI; FWS NWI; FEMA; Basin Electric Power Cooperative

(THIS PAGE INTENTIONALLY LEFT BLANK)



R:\Basin\51236_EIS\GIS\DataFiles\ArcDocs\wetland_aerial_proposed.mxd Revised: 10/14/2009

Legend

- White Site 1 Boundaries
- White Site 1 Plant Layout
- White Site 1 Natural Gas Pipeline Route 75' Corridor
- White Site 1 Natural Gas Pipeline Route 200' Corridor
- H2O Well Sites A and B
- Delineated Wetlands
- NWI Wetlands
- FEMA Floodplains

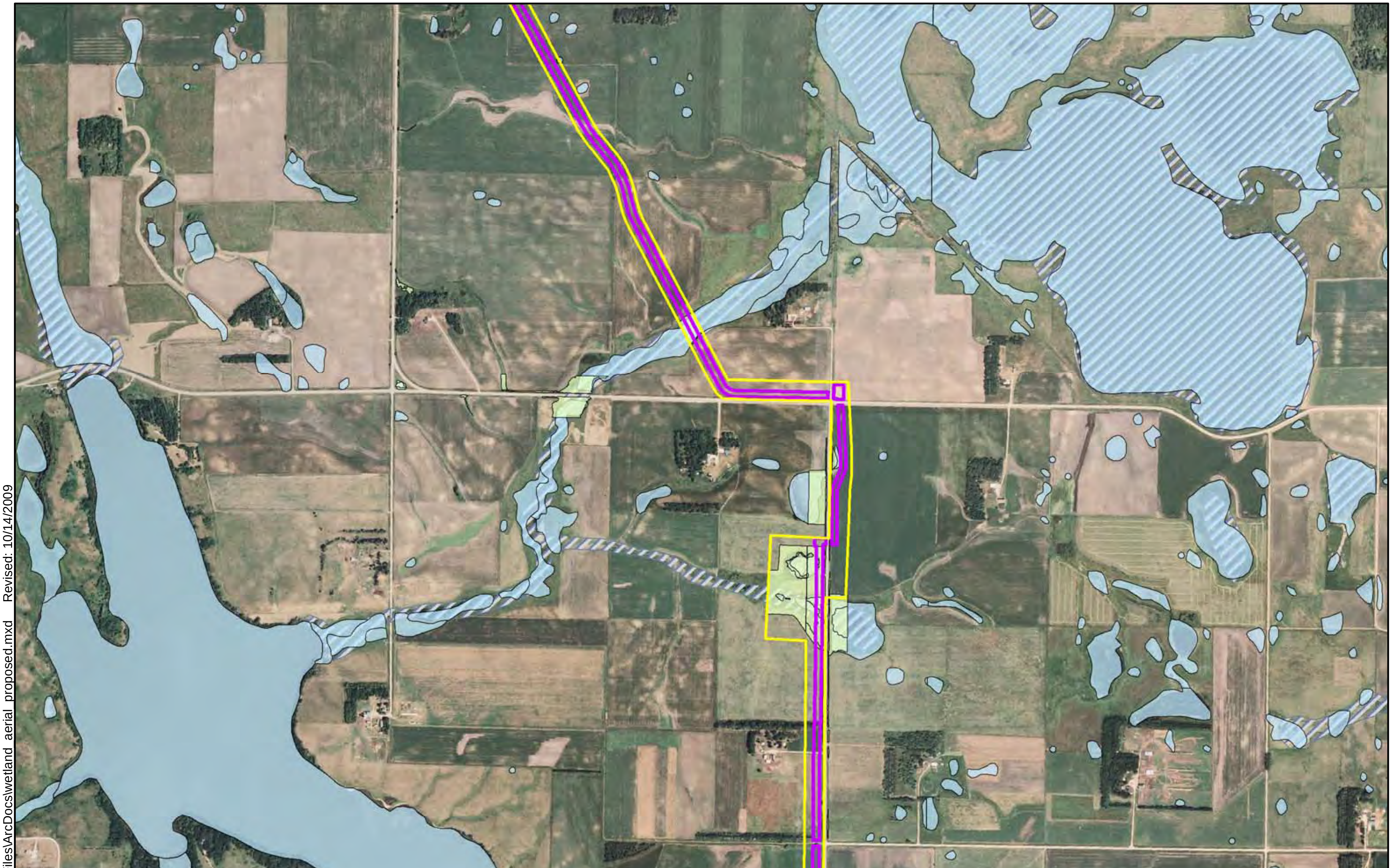
0 500 1,000 2,000 Feet

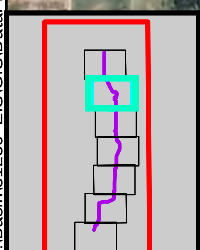
NORTH

Source: USDA NAIP; ESRI; FWS NWI; FEMA; Basin Electric Power Cooperative

Deer Creek Station Project EIS
Basin Electric Power Cooperative
Brookings and Deuel Counties, SD
White Site 1 Project
Figure E

(THIS PAGE INTENTIONALLY LEFT BLANK)





Legend

- White Site 1 Boundaries
- White Site 1 Plant Layout
- White Site 1 Natural Gas Pipeline Route 75' Corridor
- White Site 1 Natural Gas Pipeline Route 200' Corridor
- H2O Well Sites A and B
- Delineated Wetlands
- NWI Wetlands
- FEMA Floodplains

0 500 1,000 2,000 Feet

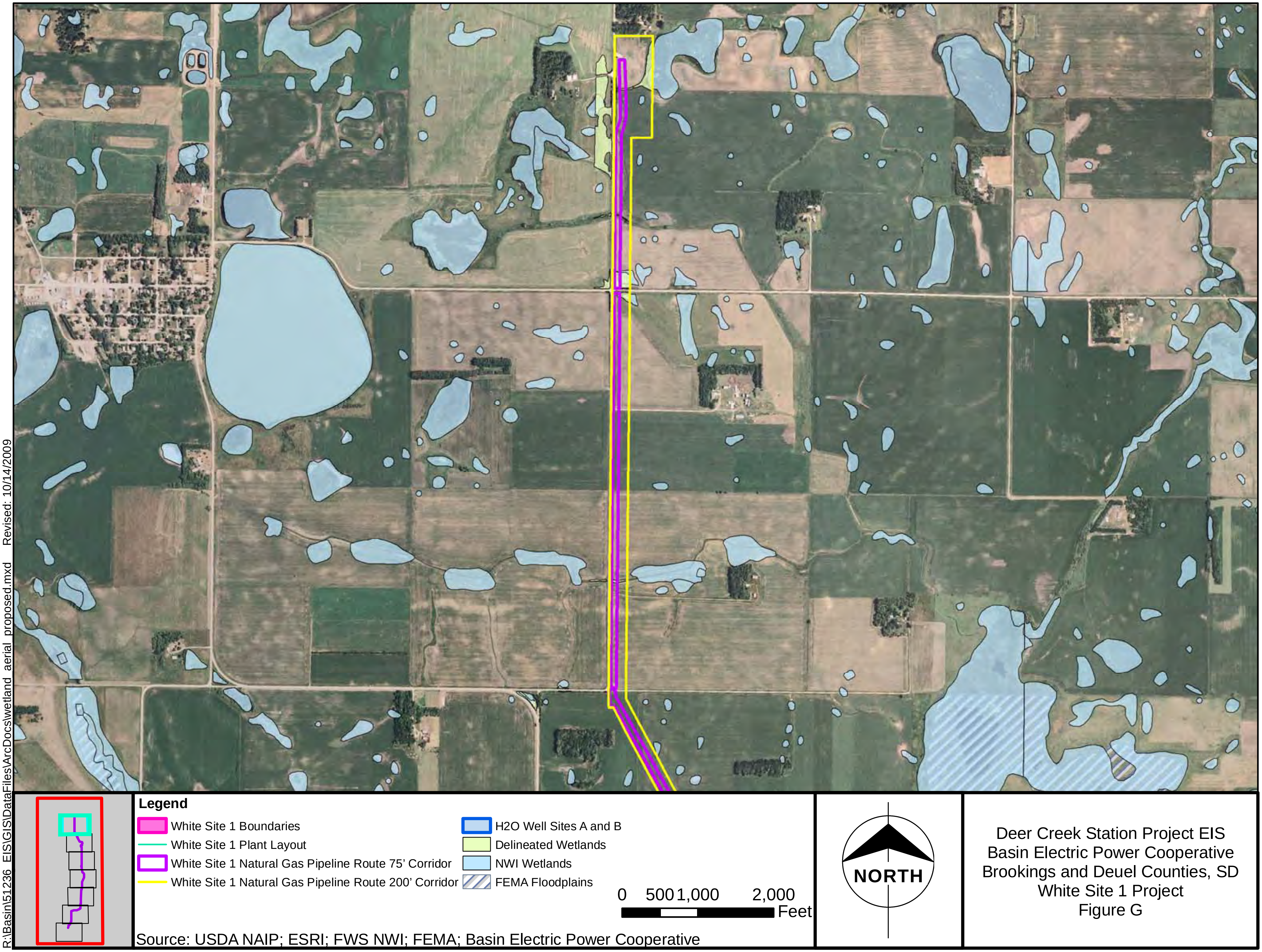
NORTH

Deer Creek Station Project EIS
Basin Electric Power Cooperative
Brookings and Deuel Counties, SD
White Site 1 Project
Figure F

Source: USDA NAIP; ESRI; FWS NWI; FEMA; Basin Electric Power Cooperative

R:\Basin\51236_EIS\GIS\DataFiles\ArcDocs\wetland_aerial_proposed.mxd Revised: 10/14/2009

(THIS PAGE INTENTIONALLY LEFT BLANK)



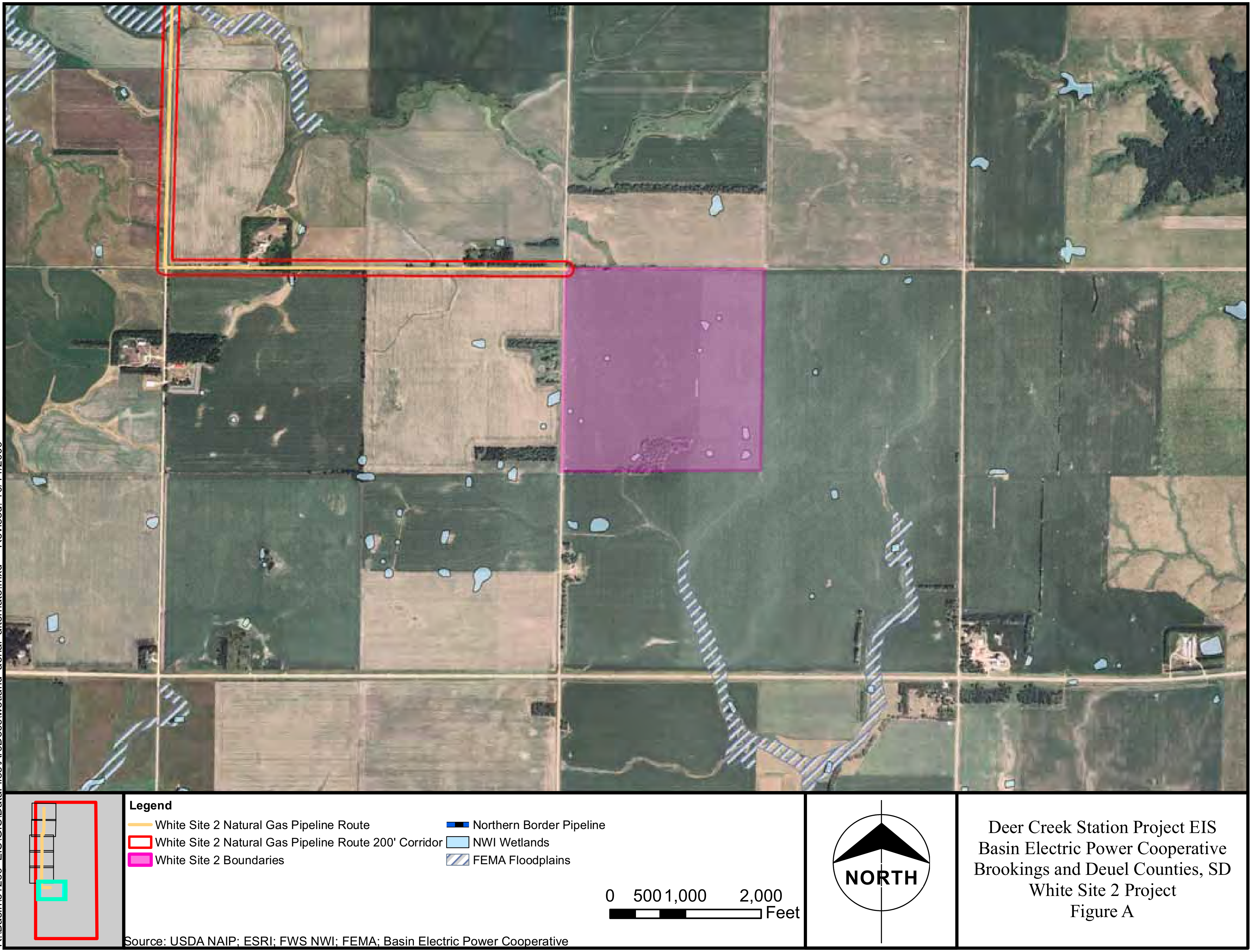
Source: USDA NAIP; ESRI; FWS NWI; FEMA; Basin Electric Power Cooperative

Deer Creek Station Project EIS
Basin Electric Power Cooperative
Brookings and Deuel Counties, SD
White Site 1 Project
Figure G

R:\Basin\51236_EIS\GIS\DataFiles\ArcDocs\wetland_aerial_proposed.mxd Revised: 10/14/2009

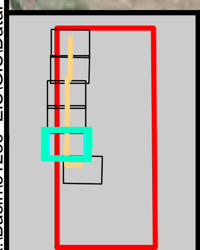
(THIS PAGE INTENTIONALLY LEFT BLANK)

R:\Basin\51236 EIS\GIS\DataFiles\ArcDocs\wetland aerial alternate.mxd Revised: 10/14/2009



(THIS PAGE INTENTIONALLY LEFT BLANK)

R:\Basin\51236 EIS\GIS\DataFiles\ArcDocs\wetland aerial alternate.mxd Revised: 10/14/2009



Legend

- White Site 2 Natural Gas Pipeline Route
- White Site 2 Natural Gas Pipeline Route 200' Corridor
- White Site 2 Boundaries
- Northern Border Pipeline
- NWI Wetlands
- FEMA Floodplains

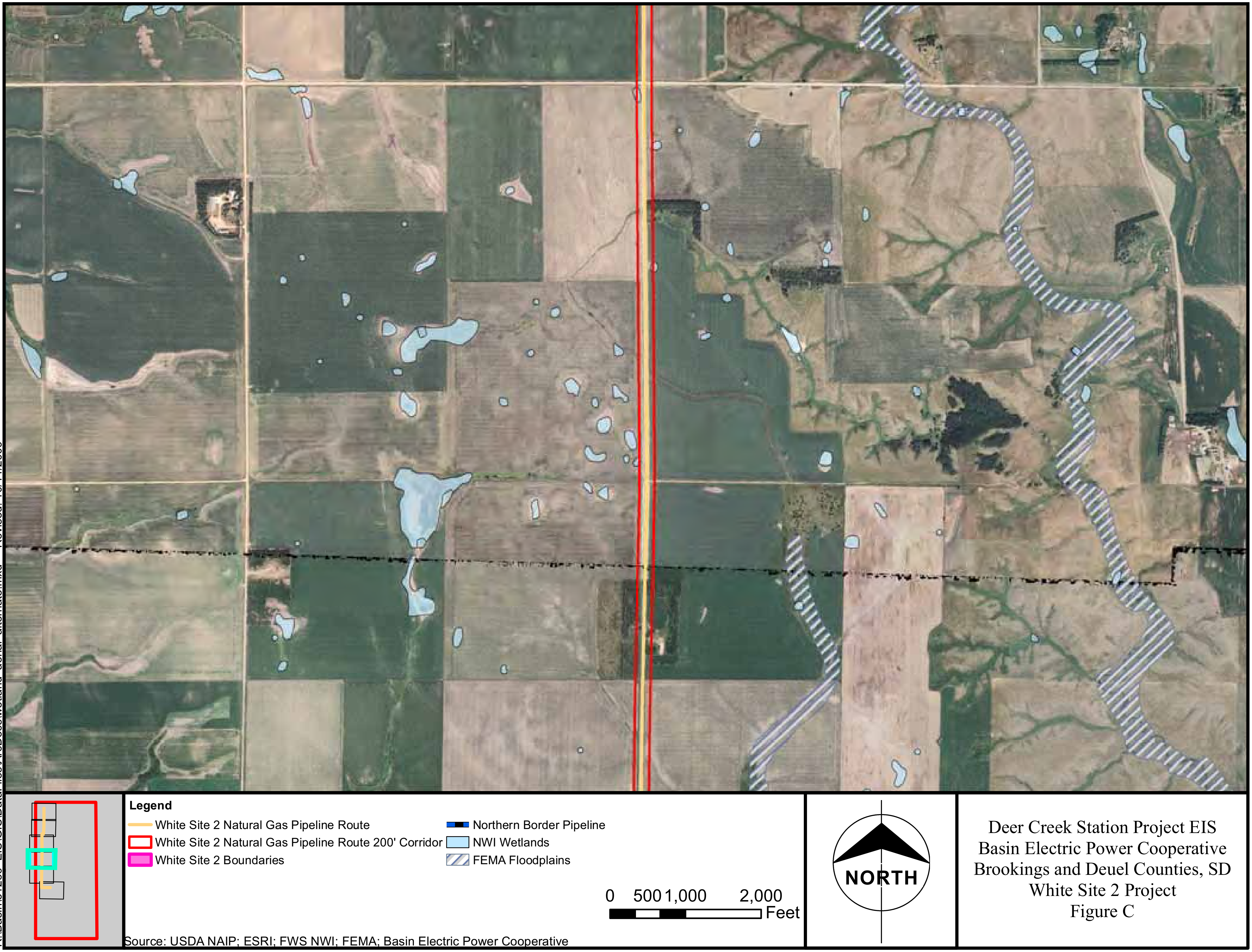
0 500 1,000 2,000 Feet

NORTH

Deer Creek Station Project EIS
Basin Electric Power Cooperative
Brookings and Deuel Counties, SD
White Site 2 Project
Figure B

Source: USDA NAIP; ESRI; FWS NWI; FEMA; Basin Electric Power Cooperative

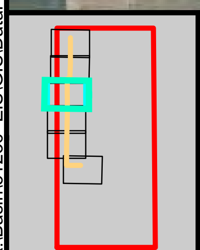
(THIS PAGE INTENTIONALLY LEFT BLANK)



Deer Creek Station Project EIS
Basin Electric Power Cooperative
Brookings and Deuel Counties, SD
White Site 2 Project
Figure C

R:\Basin\51236_EIS\GIS\DataFiles\ArcDocs\wetland_aerial_alternate.mxd Revised: 10/14/2009

(THIS PAGE INTENTIONALLY LEFT BLANK)



Legend

- White Site 2 Natural Gas Pipeline Route
- White Site 2 Natural Gas Pipeline Route 200' Corridor
- White Site 2 Boundaries
- Northern Border Pipeline
- NWI Wetlands
- FEMA Floodplains

0 500 1,000 2,000 Feet

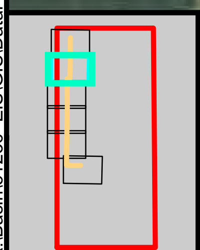
NORTH

Source: USDA NAIP; ESRI; FWS NWI; FEMA; Basin Electric Power Cooperative

Deer Creek Station Project EIS
Basin Electric Power Cooperative
Brookings and Deuel Counties, SD
White Site 2 Project
Figure D

R:\Basin\51236_EIS\GIS\DataFiles\ArcDocs\wetland_aerial_alternate.mxd Revised: 10/14/2009

(THIS PAGE INTENTIONALLY LEFT BLANK)



Legend

- White Site 2 Natural Gas Pipeline Route
- White Site 2 Natural Gas Pipeline Route 200' Corridor
- White Site 2 Boundaries
- Northern Border Pipeline
- NWI Wetlands
- FEMA Floodplains

0 500 1,000 2,000
Feet

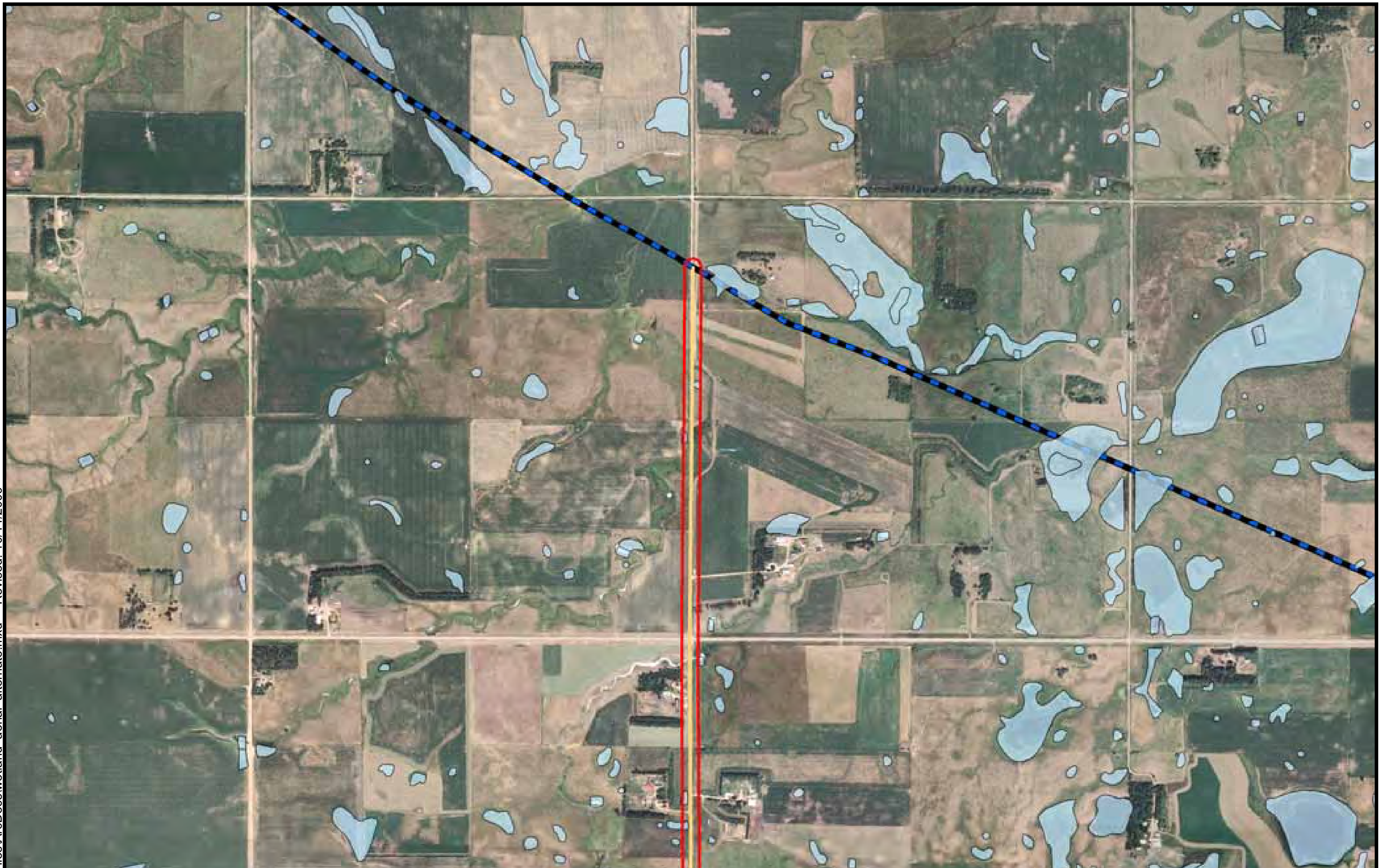
NORTH

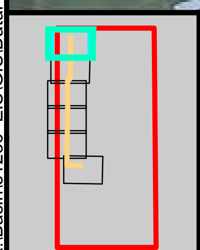
Source: USDA NAIP; ESRI; FWS NWI; FEMA; Basin Electric Power Cooperative

Deer Creek Station Project EIS
Basin Electric Power Cooperative
Brookings and Deuel Counties, SD
White Site 2 Project
Figure E

R:\Basin\51236_EIS\GIS\DataFiles\ArcDocs\wetland_aerial_alternate.mxd Revised: 10/14/2009

(THIS PAGE INTENTIONALLY LEFT BLANK)





Legend

- White Site 2 Natural Gas Pipeline Route
- White Site 2 Natural Gas Pipeline Route 200' Corridor
- White Site 2 Boundaries
- Northern Border Pipeline
- NWI Wetlands
- FEMA Floodplains

0 500 1,000 2,000 Feet

Source: USDA NAIP; ESRI; FWS NWI; FEMA; Basin Electric Power Cooperative

NORTH

Deer Creek Station Project EIS
Basin Electric Power Cooperative
Brookings and Deuel Counties, SD
White Site 2 Project
Figure F

R:\Basin\51236_EIS\GIS\DataFiles\ArcDocs\wetland_aerial_alternate.mxd Revised: 10/14/2009

(THIS PAGE INTENTIONALLY LEFT BLANK)

APPENDIX C - PARTIAL LISTING OF WILDLIFE OBSERVED OR KNOWN TO OCCUR NEAR THE PROPOSED PROJECT

(THIS PAGE INTENTIONALLY LEFT BLANK)

APPENDIX C

Partial Listing of Wildlife Observed or Known to Occur near the Proposed Project

Scientific Name*	**Common Name***
Mammals	
Odocoileus virginianus	White-tailed deer
Odocoileus hemiounus	Mule deer
Procyon lotor	Raccoon
Mustela nivalis	Least weasel
Mustela frenata	Long-tailed weasel
Mephitis mephitis	Striped skunk
Spilogale putorius	Spotted skunk
Taxidea taxus	American badger
Vulpes vulpes	Red fox
Vulpes velox	Swift fox
Urocyon cinereoargenteus	Common gray fox
Canis latrans	Coyote
Marmota monax	Woodchuck
Geomys bursarius	Plains pocket gopher
Spermophilus tridecemlineatus	Thirteen-lined ground squirrel
Spermophilus richardsonii	Richardson's ground squirrel
Sciurus niger	Eastern fox squirrel
Perognathus flavescens	Plains pocket mouse
Peromyscus leucopus	White-footed mouse
Onychomys leucogaster	Northern grasshopper mouse
Microtus pennsylvanicus	Meadow vole
Microtus ochrogaster	Prairie vole
Zapus hudsonius	Meadow jumping mouse
Sorex hoyi	Pygmy shrew
Cryptotis parva	Least shrew
Castor canadensis	Beaver
Lontra canadensis	River otter
Ondatra zibethicus	Muskrat
Sylvilagus floridanus	Eastern cottontail
Lepus townsendii	White-tailed jackrabbit
Lepus californicus	Black-tailed jackrabbit
Mustela nigripes	Black-footed ferret
Myotis septentrionalis	Northern myotis
Lasionycteris noctivagans	Silver-haired bat
Myotis lucifugus	Little brown myotis
Lasiurus borealis	Eastern red bat
Galleria mellonella	Big brown bat
Lasiurus cinereus	Hoary bat

Scientific Name*	**Common Name***
Reptiles and Amphibians	
Anaxyrus americanus	American toad
Hyla chrysoscelis	Cope’s gray tree frog
Hyla versicolor	Gray tree frog
Spea bombifrons	Plains spadefoot
Lithobates sylvaticus	Plains leopard frog
Lithobates catesbeiana	Bullfrog
Ambystoma tigrinum	Tiger salamander
Eumeces septentrionalis	Prairie skink
Chelydra serpentine	Snapping turtle
Chrysemys picta	Painted turtle
Apalone spinifera	Spiny softshell
Diadophis punctatus	Ring-necked snake
Heterodon platirhinos	Eastern hognose snake
Elaphe vulpina	Western fox snake
Storeria occipitomaculata	Northern redbelly snake
Storeria dekayi	Brown snake
Thamnophis radix	Plains garter snake
Upland Game Birds	
Perdix perdix	Gray partridge
Tympanuchus phasianellus	Sharp-tailed grouse
Phasianus colchicus	Ring-necked pheasant
Meleagris gallopavo	Wild turkey
Zenaida macroura	Mourning dove
Avian Species	
Haliaeetus leucocephalus	Bald eagle
Aquila chrysaetos	Golden eagle
Pandion haliaetus	Osprey
Accipiter cooperii	Cooper’s hawk
Buteo jamaicensis	Red-tailed hawk
Pandion haliaetus	Osprey
Falco sparverius	American kestrel
Strix varia	Barred owl
Megascops asio	Eastern screech-owl
Bubo virginianus	Great horned owl
Bubo scandiacus	Snowy owl
Pelecanus erythrorhynchos	American white pelican
Botaurus lentiginosus	American bittern
Ixobrychus exilis	Least bittern
Ardea herodias	Great blue heron
Anas acuta	Northern pintail
Gallinago delicata	Wilson’s snipe
Anas platyrhynchos	Mallard
Podilymbus podiceps	Pie-billed grebe
Phalacrocorax auritus	Double-breasted comorant
Casmerodius albus	Great egret
Plegadis chihi	White-faced ibis
Chen caerulescens	Snow goose

Scientific Name*	**Common Name***
Branta canadensis	Canada goose
Aix sponsa	Wood duck
Anas crecca	Green-winged teal
Anas americana	American widgeon
Aythya valisineria	Canvasback
Aythya americana	Redhead
Mergus merganser	Common merganser
Oxyura jamaicensis	Ruddy duck
Grus americana	Whooping crane
Charadrius melodus	Piping plover
Larus pipixcan	Franklin's gull
Chlidonias niger	Black tern
Melanerpes erythrocephalus	Red-headed woodpecker
Calamospiza melanocorys	Lark bunting
Ammodramus bairdii	Baird's sparrow
Spizella passerina	Chipping sparrow
Calcarius ornatus	Chestnut-collared longspur
Spiza americana	Dickcissel
Bartramia longicauda	Upland sandpiper
Numenius americanus	Long-billed curlew
Capella gallinago	Common snipe
Coccyzus erythropthalmus	Black-billed cuckoo
Chordeiles minor	Common nighthawk
Ceryle alcyon	Belted kingfisher
Picoides pubescens	Downy woodpecker
Contopus virens	Eastern wood peewee
Icterus spurious	Orchard oriole
Agelaius phoeniceus	Red-winged blackbird
Sturnella neglecta	Western meadowlark
Xanthocephalus xanthocephalus	Yellow-headed blackbird
Lanius ludovicianus	Loggerhead shrike
Tyrannus verticalis	Western kingbird
Hirundo rustica	Barn swallow
Sturnus vulgaris	European starling
Tachycineta bicolor	Tree swallow
Turdus migratorius	American robin
Toxostoma rufum	Brown thrasher
Quiscalus quiscula	Common grackle

*This summary of occurrence information is based on a collection of data from SD-GAP Program (2001), data collected in the field in October 2008 by EDAW, Inc., and information provided by the SDGFP-Natural Heritage Program (SDNHP 2008)

(THIS PAGE INTENTIONALLY LEFT BLANK)

APPENDIX D – FISH SPECIES KNOWN OR LIKELY TO OCCUR IN OR NEAR THE PROPOSED PROJECT

(THIS PAGE INTENTIONALLY LEFT BLANK)

APPENDIX D

Fish Species Known or Likely to Occur in or near the Proposed Project*

Scientific Name	Common Name
Lepisosteus platostomus	Shortnose gar
Hiodon alosoides	Goldeye
Dorosoma cepedianum	Gizzard shad
Campostoma anomalum	Central stoneroller
Couesius plumbeus	Lake chub
Cyprinella lutrensis	Red shiner
Cyprinus carpio	Common carp
Hybognathus hankinsoni	Brassy minnow
Hybognathus placitus	Plains minnow
Luxilus cornutus	Common shiner
Macrhybopsis gelida	Sturgeon chub
Macrhybopsis storeriana	Silver chub
Nocomis biguttatus	Hornyhead chub
Notemigonus crysoleucas	Golden shiner
Notropis atherinoides	Emerald shiner
Notropis dorsalis	Bigmouth shiner
Notropis heterolepis	Blacknose shiner
Notropis hudsonius	Spottail shiner
Notropis rubellus	Rosyface shiner
Notropis stramineus	Sand shiner
Notropis topeka	Topeka shiner
Phenacobius mirabilis	Suckermouth minnow
Phoxinus eos	Northern redbelly dace
Pimephales notatus	Bluntnose minnow
Pimephales promelas	Fathead minnow
Hybognathus argyritis	Western silvery minnow
Platygobio gracilis	Flathead chub
Rhinichthys atratulus	Blacknose dace
Rhinichthys cataractae	Longnose dace
Semotilus atromaculatus	Creek chub
Ictiobus cyprinellus	Bigmouth buffalo
Ictiobus niger	Black buffalo
Carpiodes cyprinus	Quillback sucker
Carpiodes carpio	River carpsucker
Cycleptus elongatus	Blue sucker
Moxostoma macrolepidatum	Shorthead redhorse
Catostomus commersoni	White sucker
Catostomus platythynchus	Mountain sucker
Ictalurus punctatus	Channel catfish
Ameirus nebulosus	Yellow bullhead
Ameirus melas	Black bullhead
Noturus flavus	Stonecat
Noturus gyrunus	Tadpole madtom
Pylodictis olivaris	Flathead catfish

Scientific Name	**Common Name**
Percopsis amiscopmaycis	Trout perch
Fundulas diaphanus	Banded killfish
Fundulas sciadicus	Plains topminnow
Culaea inconstans	Brook stickleback
Morone chrysops	White bass
Pomoxis nigromaculatus	Black crappie
Pomoxis annularis	White crappie
Micropterus dolomieu	Smallmouth bass
Micropterus salmoides	Largemouth bass
Lepomis cyenallus	Green sunfish
Lepomis macrochirus	Bluegill
Lepomis gibbosus	Pumpkinseed
Lepomis humilis	Orangespotted sunfish
Stizostedion vitreum	Walleye
Stizostedion canadense	Sauger
Perca flevescens	Yellow perch
Percina caprodes	Logperch
Percina maculata	Blackside darter
Etheostoma nigrum	Johnny darter
Etheostoma exile	Iowa darter
Aplodinotus grunniens	Freshwater drum

*Information based upon review of the SDGFP Common Fish Identification Guide and SD-GAP program (2008)

APPENDIX E - SPECIAL STATUS SPECIES HABITAT DESCRIPTIONS

(THIS PAGE INTENTIONALLY LEFT BLANK)

APPENDIX E
Special Status Species Habitat Descriptions

American Burying Beetle

The American burying beetle is the largest of the carrion beetles in North America. The life cycle of the beetle includes approximately two to three months underground as larvae and pupae during the summer with adults also present underground during winter. The adults provide the larvae with a food source underground during this period. The species has been found in a variety of habitats (i.e. woodlands, prairies) in areas with relatively non-compacted soils, containing a measurable layer of humus or leaf litter, and with high prey abundance (Creighton and Schnell 1998, Lomolino and Creighton 1996, USFWS 1991). This noctural species will travel several miles to a variety of soil and habitat types if the appropriate food sources are available (Lomolino et al. 1995). American burying beetles are currently known to occur in counties in south-central South Dakota (Backlund et al. 2008); however, historic records exist from Brookings County (Backlund and Marrone 1997).

Topeka Shiner

The Topeka shiner (*Notropis topeka*) is a small, silvery minnow, typically less than 3 inches in total length, that occurs primarily in clear pools in small streams within prairie or former prairie streams. Current habitat for this species is limited to only a few watersheds in the United States; however within these watersheds the species may be found in relatively high abundance (Dahle 2001, 69 FR 44736-44770). Diet for this species is highly diverse, including vegetation matter, zooplankton, and small aquatic invertebrates (69 FR 44736-44770). The low-order, central prairie streams that Topeka shiners inhabit have ground-water levels and flows that have been found to be crucial for the survival of the species (Berg et al. 2004). The streams generally have high water quality, cool to moderate temperatures, as well as pool and run characteristics (Dahle 2001, Pflieger 1997). Topeka shiners have also been found in intermittent streams throughout their current range in isolated pools maintained by the percolation of ground water or underground springs (Minckley and Cross 1959; 69 FR 44736-44770). Topeka shiners have been recorded in small entrenched streams with high grazing pressure and bank erosion (69 FR 44736-44770). The South Dakota Management Plan (Shearer 2003) designates May 15 through July 31 as the Topeka shiner spawning period.

The Topeka shiner is known to occupy numerous small streams in eastern South Dakota. The species was recorded in 2000 in an unnamed tributary to Deer Creek approximately 1.5 miles northwest of water well supply sites A and B (SDNHP 2008). As a result, Deer Creek and its tributaries are considered to provide potential habitat for Topeka shiners. The Final Designation of Critical Habitat for the Topeka Shiner (69 FR 44736-44770) defers to Shearer (2003) for the management of Topeka shiner in South Dakota including designation of critical habitat within the state (69 FR 44736-44770). Portions of Deer Creek and the connected Medary Creek are classified as high habitat priority. Deer Creek and nearby tributaries range from high to low to moderate to low priority habitat throughout the proposed Project Area (Shearer 2003). The Deer Creek mainstem near the proposed Project Area is primarily classified as high priority habitat. The nearest designated critical habitat for the Topeka shiner is in Minnesota in the headwaters of Medary Creek, which confluences with Deer Creek downstream of the proposed Project. The designated critical habitat is located approximately eight miles southeast of the proposed Project.

The Medary Creek Complex critical habitat consists of two stream segments in Lincoln County, Minnesota. According to the critical habitat designation (69 FR 44736-44770), Topeka shiners recently have been captured from several localities in this complex. Primary threats to the Topeka shiner that require special management in this watershed include agricultural practices and channel maintenance that increases sedimentation and other water quality impacts. Special management for the Topeka shiner in this watershed would include grass waterways and riparian fencing to reduce erosion. To the south of Medary Creek and further from the proposed Project, Willow and Flandreau creeks are also designated critical habitat in Minnesota and South Dakota.

Western Prairie Fringed Orchid

The Federally-endangered western prairie fringed orchid (*Platanthera praeclara*) is a perennial herb with a showy flower. The species is restricted to areas west of the Mississippi and is currently found in Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, Oklahoma, and Manitoba, Canada; the orchid has not been recently documented in South Dakota. However, there are recorded populations in Lincoln and Pipestone Counties in Minnesota (Owenby and Morley 1991), which are both adjacent to Brookings County. Western prairie fringed orchids are associated primarily with moist to mesic areas in intact, native tall grass prairie. The orchid is associated with native tall grass prairie species, including big bluestem, Indian grass, Kentucky bluegrass, and switch grass (Ladd and Oberle 1995). Other potential habitat includes wet prairies, sedge meadows, sub-irrigated prairies, and swales in sand dune complexes. In hydric habitats, the orchid is associated with communities dominated by sedges and spikerushes (USFWS 1996). They have, however, been found in roadside ditches and reclaimed grasslands.

Habitat of fair quality may exist within the proposed Project Area on both plant sites, all four water supply well sites, and the natural gas pipeline corridors. Although much of the proposed Project Area is disturbed, the western prairie fringed orchid has shown the ability to either persist through disturbance or colonize following disturbances in a manner similar to many other native prairie species. This is indicated by its presence along roadsides and reclaimed grasslands (Missouri Department of Conservation 2005, Sieg and King 1995).

Whooping Crane

The whooping crane (*Grus americana*) currently exists in three wild populations and at six captive locations. The only self-sustaining natural wild population nests in the Northwest Territories and adjacent areas of Alberta, Canada, primarily within the boundaries of Wood Buffalo National Park. The flock has recovered from a population low of 15 or 16 birds in 1941, to more than 200. These birds migrate through South Dakota and winter at Aransas National Wildlife Refuge and adjacent areas in Texas. The migration pathways of whooping cranes in the spring and fall are similar. From nesting grounds in northeast Alberta, the migration pathway extends 2,500 miles south-southeast through south-central Saskatchewan, northeast Montana, western North Dakota, central South Dakota, central Nebraska and Kansas, west-central Oklahoma, and east-central Texas. Overall, the migration corridor varies from 50 to 200 miles wide and could include the proposed Project Area as part of the corridor's eastern boundary. However, most documented observations of whooping cranes occur in central South Dakota along the Missouri River valley. According to the April 7, 2009 USFWS letter, the likelihood of whooping crane occurrence at the proposed Project Area is very low. To date there have been no documented sightings in Brookings County, although sightings have been recorded in Kingsbury and Clark Counties 40 to 60 miles away (Austin and Richert 2001).

According to the Whooping Crane Recovery Plan (USFWS and CWS 2005), the current threats include limited genetics of the population, loss and degradation of migration stopover habitat, construction of additional power lines, degradation of coastal habitat, and threat of chemical spills in Texas. Collisions with power lines are a substantial cause of whooping crane mortality in migration and are known to have accounted for the death or serious injury of at least 30 whooping cranes since 1956. In the 1980s, two of nine radio-marked whooping cranes died within 18 months as a result of power line collisions.

Dakota Skipper

The Dakota skipper (*Hesperia dacotae*) is a small butterfly with a one-inch wingspan. Its habitat is native prairie consisting of bluestem grasses and forbs for nectar. This habitat is often located along transition zones of mixed and tall grass prairie (USFWS 2007). Dakota skippers inhabit dry-mesic hill prairies with abundant coneflower species, but also use mesic to wet-mesic tallgrass prairie habitats characterized by wood lily and smooth camas. Patches of suitable skipper habitat may be present within Brookings and Deuel counties, and the Dakota skipper has been documented at Oak Lake, approximately 1.5 miles west of the proposed pipeline ROW (SDNHP 2008).

Northern Redbelly Dace

Northern redbelly dace (*Phoxinus eos*) is a minnow found in boggy lakes, ponds, pools of headwaters and creeks. It has a dark olive or brown back and a dark stripe along its side. The body is silver or cream below the stripe, but turns red in breeding males. Northern redbelly dace feed on algae and small invertebrates and spawn in algal mats from late spring through summer (Ashton and Dowd 1991). In South Dakota it is documented in the Big Sioux River basin. It has been recorded less than one-half mile to the west of the alternative gas pipeline ROW in drainages connected to Deer Creek.

Banded Killifish

Banded killifish (*Fundulus diaphanus*) typically occur in shallow areas of clear lakes and ponds with a muddy or sandy substrate, and abundant submerged aquatic vegetation for attaching eggs. They eat insect larvae, mollusks, and small crustaceans. They are known to occur in Deuel County in South Dakota (Ashton and Dowd, 1991; COSEWEC 2003).

Blacknose Shiner

The blacknose shiner (*Notropis heterolepis*) is a minnow that requires clean, cool, well-oxygenated streams with abundant aquatic vegetation. The calm pool areas of the stream are critical to the survival of the species (Pflieger 1997). It feeds primarily on small aquatic insects, crustaceans, and algae. The species may occur in Brookings County (SDGFP 2001).

Sturgeon Chub

The sturgeon chub (*Macrhybopsis gelida*) is a minnow that requires continuously turbid, medium to large warm water rivers. It occurs in shallow areas of strong current with a coarse sand or gravel bottoms. It is not known to occur in locations from the proposed Project Area (Ashton and Dowd 1991, NatureServe 2009)

Eastern Hognose Snake

The eastern hognose snake (*Heterodon platirhinos*) is typically found in wooded edges, grassy fields, and river valleys with loose (sandy loam) soils. The species burrows into the soil to overwinter. It feeds primarily on toads, frogs, and salamanders (Kiesow 2006). It is not known to occur in the proposed Project Area (SDGFP 2001).

Lined Snake

The lined snake (*Tropidoclonion lineatum*) is a small, brown snake that prefers prairies, hillsides, and woodland edges. It utilizes deep rocky outcroppings and small mammal burrows for hibernation (Kiesow 2006). It is not known to occur in the proposed Project Area (SDGFP 2001).

Northern Redbellied Snake

The northern redbellied snake is found in woodlands, moist grassy areas, and meadows near water (Behler 1996, Kiesow 2006). It is known from the area of the proposed gas pipeline corridor (SDGFP 2001).

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) has been removed from the endangered species list, but is still protected by the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668c) and the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712). It can be observed throughout the State of South Dakota, including Brookings County, during any time of the year (69 FR 44736-44770). Only partially migratory, the bald eagle can inhabit a variety of locations in North America as long as adequate nesting, feeding, and watering grounds are available. Bald eagles feed on fish, waterfowl, small mammals, and carrion. The bald eagle builds large nests in the tops of trees near marshes, lakes and rivers. The USFWS indicated that there were no known bald eagle nests in the proposed Project Area. Oak Lake and Lake Hendricks may provide suitable roosting and nesting habitat.

References

Ashton, D.E. and E.M. Dowd. 1991. *Fragile Legacy. Endangered, Threatened and Rare Animals of South Dakota.* South Dakota Department of Game, Fish and Parks, Report No. 91-04. Jamestown, ND: Northern Prairie Wildlife Research Center Online. http://www.npwrc.usgs.gov/resource/wildlife/sdrare/index.htm (Version 08DEC97).

Austin, J. and A. Richert. 2001. *A Comprehensive Review of Observational and Site Evaluation Data of Migrant Whooping Cranes in the United States, 1943-99*. U.S. Geological Survey, Northern Prairie Wildlife Research Center, Jamestown, North Dakota.

Backlund, D.C., G.M. Marrone, C.K. Williams, and K. Tilmon. 2008. Population Estimates of the Endangered American Burying Beetle, *Nicrophorus americanus* Oliver (Coleoptera: Silphidae) in South Dakota. *The Coleopterists Bulletin* 62:9-15.

Backlund, D.C. and G. M. Marrone. 1997. New Records of the Endangered American Burying Beetle, *Nicrophorus americanus* Oliver (Coleoptera: Silphidae) in South Dakota. *Coleopterists Bulletin* 51:53-58.

Berg, J.A., T.A. Petersen, Y. Anderson, and R. Baker. 2004. *Hydrogeology of the Rock River Watershed, Minnesota, and Associated Off-Channel Habitats of the Topeka Shiner*. Minnesota Department of Natural Resources, St. Paul.

Committee on the Status of Endangered Wildlife in Canada (COSEWEC). 2003. *Assessment and Update Status Report on the Banded Killifish (Fundulus diaphanous).*

Creighton, J.C. and G.D. Schnell. 1998. Short-Term Movement Patterns of the Endangered American Burying Beetle *Nicrophorus americanus*. *Biological Conservation* 86:281-287.

Dahle, S.P. 2001. Studies of Topeka Shiner (*Notropis topeka*) Life History and Distribution in Minnesota. Master's Thesis. University of Minnesota, St. Paul.

Kiesow, A. 2006. *Field Guide to Amphibians and Reptiles of South Dakota*. South Dakota Department of Game Fish and Parks, Pierre.

Ladd, D. and F. Oberle. 1995. *Tallgrass Prairie Wildflowers*. The Nature Conservancy, Helena, Montana. 199 pp.

Lomolino, M.V. and J.C. Creighton. 1996. Habitat Selection, Breeding Success and Conservation of the Endangered American Burying Beetle *Nicrophorus americanus*. *Biological Conservation* 77:235-241.

Lomolino, M.V., J.C. Creighton, G.D. Schnell, and D.L. Certain. 1995. Ecology and Conservation of the Endangered American Burying Beetle *Nicrophorus americanus*. *Conservation Biology* 9:605-614.

Minckley, W.L. and F.B. Cross. 1959. Distribution, Habitat, and Abundance of the Topeka Shiner, *Notropis topeka* Gilbert, in Kansas. *American Midland Naturalist* 61:210-217.

Missouri Department of Conservation. 2005. *Endangered Species Guide Sheet: Western Prairie Fringed Orchid*. http://mdc.mo.gov/nathis/endangered/endanger/orchid/. (Accessed June 4, 2009).

NatureServe. 2009. NatureServe Explorer: An Online Encyclopedia of Life, Version 7.1. NatureServe, Arlington, Virginia. http://www.natureserve.org/explorer/. (Accessed June 4, 2009).

Owenby, G.B. and T. Morley. 1991. *Vascular Plants of Minnesota: A Checklist and Atlas*. University of Minnesota Press, Minneapolis.

Pflieger, W.L. 1997. *Fishes of Missouri, Revised Edition*. Missouri Department of Conservation, Jefferson City. 372 pp.

Shearer, J.S. 2003. *Topeka Shiner (Notropis topeka) Management Plan for the State of South Dakota*. South Dakota Department of Game, Fish and Parks Report 2003-10.

Sieg, C.H. and R.M. King. 1995. Influence of Environmental Factors and Preliminary Demographic Analysis of a Threatened Orchid, *Platanthera praeclara*. *American Midland Naturalist* 134:61-77.

SDGFP. 2001. South Dakota GAP Analysis Program (SD-GAP). *Occurrence and Distribution of Wildlife and Fish Species in South Dakota*. http://wfs.sdstate.edu/sdgap/mammal.html. (Accessed July/August 2009).

USFWS. 2007. USFWS Dakota Skipper (*Hesperia dacotae*) Fact Sheet. http://www.fws.gov/midwest/Endangered/insects/dask-color.pdf. (Accessed June 4, 2009).

USFWS and Canadian Wildlife Service (CWS). 2005. *International Recovery Plan for the Whooping Crane* (*Grus americana*). Ottawa: Recovery of Nationally Endangered Wildlife (NENEW), and USFWS, Albuquerque, New Mexico. 162 pp.

USFWS. 1996. *Platanthera praeclara (Western Prairie Fringed Orchid) Recovery Plan*. USFWS, Fort Snelling, Minnesota. 101 pp.

USFWS. 1991. *American Burying Beetle (Nicrophorus americanus) Recovery Plan*. Newton Corner, Massachusetts. 80 pp.

(THIS PAGE INTENTIONALLY LEFT BLANK)

APPENDIX F – STANDARD MITIGATION MEASURES

(THIS PAGE INTENTIONALLY LEFT BLANK)

Appendix F - Standard Mitigation Measures to be Used by Basin Electric for the Proposed Deer Creek Station Project

No.	Standard Mitigation Measure
General	
Gen-1	The requirements of all applicable Federal, State, and local environmental laws, executive orders, and regulations would be met during construction and operation of the proposed Project.
Gen-2	All permit conditions required by Federal, State, and local agencies would be adhered to for construction and operation of the proposed Project.
Gen-3	Prior to construction, all construction personnel and heavy equipment operators would be instructed on the protection of cultural, paleontological, and ecological resources, and all applicable permit requirements. Construction contracts would address: • Federal, State, and local laws regarding antiquities, fossils, plants, and wildlife, including collection/removal • The importance and necessity of protecting such resources • All applicable permit requirements
Air Quality	
Air-1	The emission of dust into the atmosphere during construction would be minimized to the extent practical during the manufacture, handling, and storage of concrete aggregate. Methods and equipment would be used as necessary to collect, dispose, or prevent dust during these operations. The methods of storing and handling cement and additives would also include means of minimizing atmospheric discharges of dust.
Air-2	All construction equipment and vehicles will be maintained in efficient operating condition. Vehicles and equipment that show excessive emissions or other inefficient conditions would not be operated until repairs or adjustments are made.
Air-3	All waste materials shall be disposed of at permitted waste disposal areas or landfills. Burning or burying waste materials on the right-of-way or plant construction area would not be permitted. Tree and grubbing residue may be buried on the plant site or in the right-of-way with landowner approval.
Air-4	Nuisance to persons, dwellings, or crops resulting from dust originating from construction would be minimized. Oil and other petroleum derivatives would not be used for dust control. Speed limits on local gravel roads would be

	enforced to reduce dust.
Water Resources	
Water-1	Construction activities would comply with the requirements of South Dakota permits for stormwater discharges for construction activities, which specify appropriate best management practices, erosion and sediment control measures, and disposal practices. Construction activities adjacent to or encroaching on streams or waterways, including work within rights-of-way, construction of access roads on hillsides, and dewatering work for structure foundations, or earthwork operations would be conducted to prevent disturbed soils, muddy water, and eroded materials from entering streams or waterways by construction of intercepting ditches, bypass channels, barriers, settling ponds, or by other approved means.
Water-2	Construction activities would be conducted to prevent the accidental spillage of solid matter contaminants, debris, hazardous liquids, or other pollutants into streams, waterways, lakes, land, and underground aquifers. Such pollutants and waste include, but are not restricted to, refuse, garbage, cement, concrete, sanitary waste, industrial waste, oil, and other petroleum products, aggregate processing tailing, mineral salts, and thermal pollution.
Water-3	Excavated material or construction materials would not be stockpiled or deposited near or on stream banks, lake shorelines, or other waterway perimeters unless protected from high water or storm runoff or encroachment upon the actual waterway itself.
Water-4	Wastewater discharge from any construction operations would not enter streams, waterways, or other surface waters without the appropriate permit(s).
Water-5	Equipment washing, storage of petroleum products, lubricants, solvents and hazardous materials, structure sites, and other disturbed areas would be located at least 100 feet, where practical, from rivers, streams (including ephemeral streams), ponds, lakes, and reservoirs. This includes construction vehicles and heavy equipment when parked overnight or longer.
Water-6	New access roads would be located at least 100 feet, where practical, from rivers, ponds, lakes, and reservoirs.
Water-7	All stream crossings considered jurisdictional by the USACE would be crossed by permit only. Where required, culverts of adequate size to accommodate the estimated peak flow of the stream would be installed. Disturbance of the stream banks and beds during construction would be minimized. Disturbed areas would be regarded and revegetated in accordance with mitigation measures listed for soil/vegetation resources.
Water-8	If the banks of ephemeral stream crossings are sufficiently high and steep that breaking them down for a crossing would cause excessive disturbance, culverts would be installed using the same measures as for culverts on perennial streams.

Water-9	Heavy equipment movement near streams and other surface waters would be minimized, to the extent practical.
Water-10	Narrow flood prone areas would be spanned.
Water-11	Proposed plant operation would comply with the SDDENR General Permit for Stormwater Discharges Associated with Industrial Activity and the associated stormwater pollution prevention plan, which requires use of appropriate BMPs, sediment control measures, and disposal practices. Proposed plant operations would be controlled and mitigated using BMPs. Operations would be conducted in a manner to prevent contamination of stormwater runoff that may leave the plant side and to prevent disturbed soils, muddy water, and eroded materials from entering the streams or waterways. BMPs would include intercepting ditches, bypass channels, barriers, settling ponds, or other approved measures.
Geology and Minerals, Paleontology, and Soils	
Geo-1	Removed topsoil would be used for landscaping and as engineered fill, as appropriate, or stockpiled and re-spread subsequent to construction.
Geo-2	During construction, if any paleontological resources are discovered, work would cease within a 50-foot radius of the discovery. Any artifacts or fossils discovered would not be disturbed and Western and RUS would be notified of the discovery immediately.
Geo-3	Access roads would generally follow the contour of the land to the greatest extent practical rather than a straight line along the right-of-way where steep features would result in a higher erosion potential.
Geo-4	To the extent practical, excavated areas would be re-contoured so that large volumes of water would not collect and stand therein. Before being abandoned, the sides of excavations would be brought to stable slopes, giving a natural appearance, and revegetated. Waste soil piles would be shaped to provide a natural appearance.
Biological Resources	
Bio-1	All wetland and riparian areas would be avoided to the extent practical. If wetland or riparian areas are unavoidable, impacts would be minimized or mitigated. Jurisdictional waters that are impacted as a result of implementing the proposed Project would be mitigated in accordance with USACE requirements.
Bio-2	Care would be used in preserving the natural landscape and vegetation. Construction operations would be conducted to prevent, to the extent practical, any unnecessary destruction, scarring, or defacing of the natural surroundings, vegetation, trees, and native shrubbery in the vicinity of the work. Vegetation would be replaced at landowner’s request, providing mitigation complying with North American Electric Reliability Council (NERC) requirements.
Bio-3	Upon completion of work, all non-agricultural disturbed areas and construction staging areas not needed for

	maintenance access would be regraded so that all surfaces drain naturally, blend with the natural terrain, and are reseeded to blend with native vegetation with a seed mixture certified as free of noxious or invasive weeds. All destruction, scarring, damage, or defacing of the landscape resulting from construction would be repaired.
Bio-4	Construction staging areas would be located and arranged in a manner to preserve trees and vegetation to the maximum practicable extent. Unless otherwise agreed upon by the landowner, all storage and construction buildings and all construction materials and debris would be removed from the construction staging areas once construction is complete, and the areas returned to original use or regraded and seeded as for non-agricultural disturbed areas.
Bio-5	Removal of vegetation would be done according to NERC safety and reliability requirements. Clearing for access roads would be limited to only those trees necessary to permit the passage of equipment. All vegetative materials resulting from clearing operations would either be chipped on site or stacked in the right-of-way in accordance with the landowner's request.
Bio-6	Native shrubs that would not interfere with access or the safe operation of the transmission line would be allowed to reestablish in the right-of-way. Areas with native shrubs that would be disturbed would be replanted with regionally-native species following the disturbance.
Bio-7	An Avian Protection Plan (APP) to minimize impacts to nesting birds, as well as to minimize the electrocution and collision of migratory and resident bird species, would be developed and implemented. The APP would include provisions for adequate distance between conductors and distances between conductors and grounded surfaces. The APP would identify time frames for construction and routine maintenance to avoid the nesting period of breeding birds. It would also include methods for minimizing bird collisions during line routing as well as methods for minimizing collisions following construction. The APP would follow guidelines described at www.aplic.org . The APP would be provided to the USFWS and State wildlife agency for comment. A copy of the APP would be provided to Western, RUS, and the applicable USFWS and State wildlife agency offices.
Bio-8	Holes drilled or excavated for pole placement or foundation construction and left unattended overnight would be marked and secured with temporary fencing to reduce the potential for livestock and wildlife to enter the holes, and for public safety.
Land Use	
Land-1	The minimum area necessary would be used for access roads during project construction.
Land-2	When practical, transmission structures would be located and designed to conform to the terrain. Leveling and benching of the structure sites would be the minimum necessary to allow structure assembly and erection.

Land-3	Transmission structures would be located, where practical, to span sensitive land uses. Where practical, construction access roads would be located to avoid sensitive conditions.
Land-4	The precise location of all structure sites, right-of-way, and other disturbed areas would be determined with landowners' or land management agencies' input.
Land-5	The movement of crews and equipment would be limited to the right-of-way and areas surveyed for cultural, historical, and biological resources, including access routes. To the extent practicable, the contractor would limit movement on the right-of-way to minimize damage to grazing land, crops, or property and would avoid marring the land.
Land-6	Where practical, construction activities would be scheduled during periods when agricultural activities would be minimally affected or the landowner would be compensated accordingly.
Land-7	Fences, gates, and similar improvements that are removed or damaged would be promptly repaired or replaced.
Land-8	Transmission structure design and placement would be selected to reduce potential conflicts with agricultural practices and to reduce the amount of land required for transmission lines.
Land-9	Right-of-way would be purchased through negotiations with each landowner affected by the proposed Project. Payment would be made of full value for crop damages or other property damage during construction or maintenance.
Land-10	When weather and ground conditions permit, all deep ruts that are hazardous to farming operations and equipment movement would be eliminated or compensation would be provided as an alternative if the landowner desires. Such ruts would be leveled, filled, and graded, or otherwise eliminated in an approved manner. Ruts, scars, and compacted soils from construction activities in productive hay or crop lands would be loosened and leveled by scarifying, harrowing, disking, or other appropriate methods. Damage to ditches, tile drains, terraces, roads, and other land features would be corrected. Land contours and facilities would be restored as nearly as practical to their original conditions.
Land-11	Where practical, all well drilling and installation would be completed in agricultural areas or uncultivated pastureland at the edge of farm fields. During pump testing, precautions would be taken to prevent erosion due to discharges of groundwater.
Land-12	To the extent possible, pipeline routing would occur along the right-of-way of county and township roads and along section lines, and along access roads.
Public Health and Safety	
PH-1	When appropriate, pilot vehicles would accompany the movement of heavy equipment. Traffic control barriers and

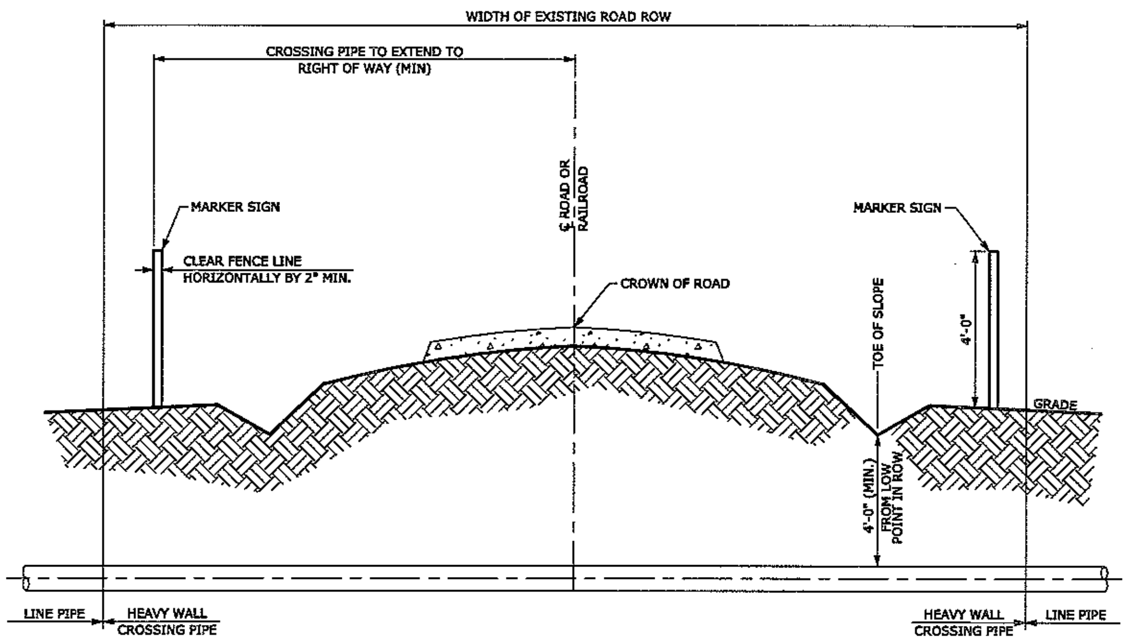
	warning devices would be used when appropriate.
PH-2	All necessary provisions would be made to conform to safety requirements for maintaining the flow of public traffic and avoiding congestion at critical locations. Construction operations would be conducted to offer the least possible obstruction and inconvenience to public traffic, such as by the use of pilot cars to accompany trucks with oversized loads and slow-moving vehicles, scheduling heavy equipment transport to avoid high traffic periods, and where feasible, use of existing rail facilities.
PH-3	Design would include reasonable mitigation measures to reduce problems of induced currents into conductive objects within the right-of-way. Problems of induced currents during construction and operation would be resolved, to the mutual satisfaction of the parties involved.
PH-4	Complaints of radio or television interference generated by the facility and related transmission lines would be investigated and appropriate mitigation measures would be implemented.
PH-5	Audible noise and electric and magnetic fields during construction and operation of the proposed Project would be addressed as necessary on a case-by-case basis.
PH-6	Transmission line materials would be designed to minimize corona. Tension would be maintained on all insulator assemblies to assure positive contact between insulators, thereby avoiding sparking. Caution would be exercised during construction to avoid nicking the conductor surface, which may provide points for corona to occur.
PH-7	The construction contractor would establish a health and safety program that incorporates Occupational Safety and Health Administration (OSHA) standards such as requirements for hearing protection, personal protective equipment, site access, chemical exposure limits, safe work practices, training program, and emergency procedures. The program would be reviewed with plant officials, fire department personnel, and emergency services personnel to reduce risk of construction and operation activities interfering with emergency response or evacuation plans and procedures.
PH-8	At the end of every work day, contractors would secure all construction areas to protect equipment and materials and discourage public access. Fueling of vehicles would be conducted in compliance with established procedures designed to minimize fire risks and fuel spills.
PH-9	Construction contractors would provide adequate notice to the public for all high-risk operations such as blasting. Only trained personnel would be permitted to conduct such high-risk operations. All other personnel would be required to maintain a safe distance from such operations.
Visual Resources	
Vis-1	The proposed Project major components would be painted to blend into the surrounding environment. Lighting

	would be minimized, to the extent practical. Lights would be shielded to minimize output to the surrounding environment and impacts to the night sky.
Vis-2	Structure types (designs) would be uniform, to the extent practical.
Vis-3	Transmission line materials would be designed to minimize corona. To reduce potential visual impacts at highway and trail crossings, structures would be placed at the maximum feasible distance from the crossing, within limits of structure design.
Noise	
Noise-1	An adequate buffer would be maintained around the proposed plant site to minimize construction and operational noise impacts on area residents.
Noise-2	Power lines would be designed to minimize noise and other effects from energized conductors.
Noise-3	To avoid nuisance noise conditions, transmission line construction would be limited to daytime hours whenever practical.
Noise-4	To avoid nuisance conditions due to construction noise, all internal combustion engines used in connection with construction activity would be fitted with an approved muffler and spark arrester.

(THIS PAGE INTENTIONALLY LEFT BLANK)

APPENDIX G – CONSTRUCTION DIAGRAMS FOR TRENCHING/DRILLING

(THIS PAGE INTENTIONALLY LEFT BLANK)



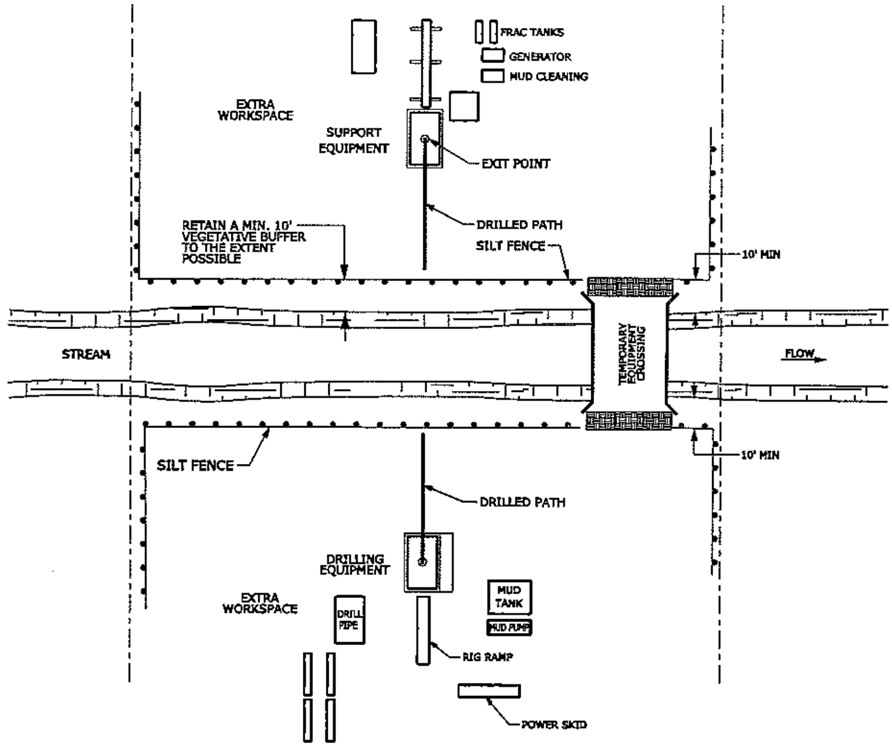
TYPICAL UNCASED BORED
ROAD CROSSING

NOTES:

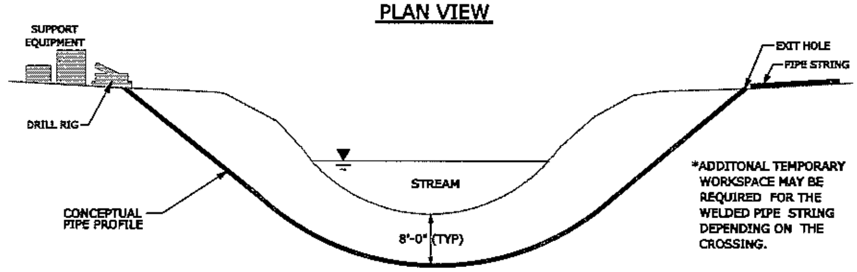
1. Road crossings shall comply with applicable permits.
2. Road crossing pipe shall be straight with no vertical or horizontal bends within the road right-of-way.
3. The minimum required pipe length and type of pipe shall be specified on the alignment sheets.
4. The pipe used for bored crossings shall include abrasion-resistant (ARB) coating.
5. Pipeline markers and test stations shall be installed on the right-of-way edge next to a fence if possible.

ProSource Technologies, Inc.	DEER CREEK PIPELINE PROJECT Basin Electric	TYPICAL UNCASED ROAD CROSSING BORE METHOD MONTANA-DAKOTA UTILITIES CO. A Division of MDU Resources Group, Inc.

Exhibit 3.9-2 Typical Roadway Horizontal Directional Drilling Plan



PLAN VIEW



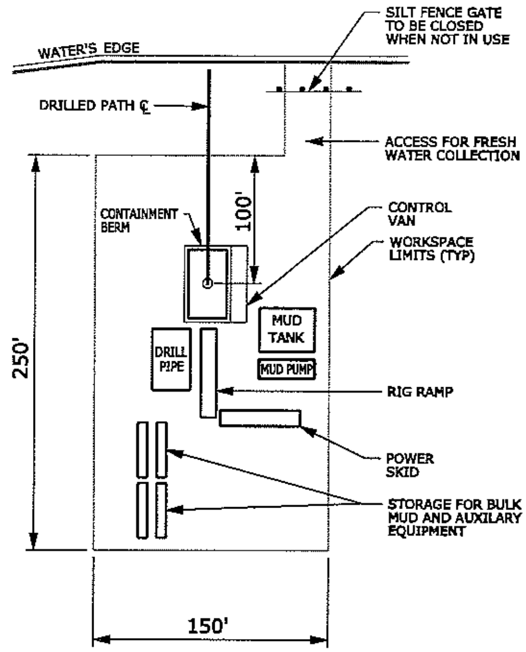
PROFILE

NOTES:

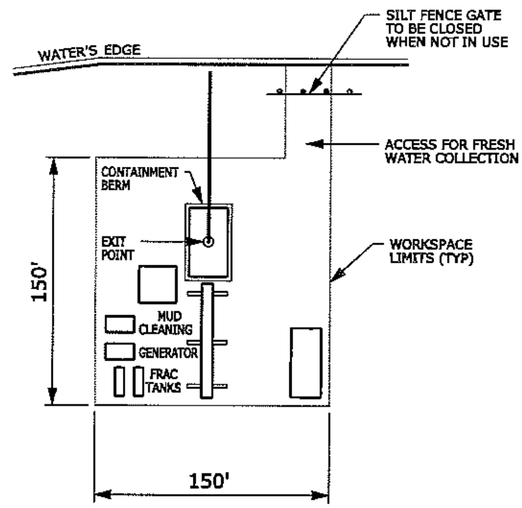
1. Maintain a 10 foot vegetative buffer if possible between the disturbed area and the stream.
2. Limit clearing to only the area needed for construction.
3. Install timber mats for equipment staging as necessary.
4. Install silt fence and/or other sediment barriers based on site specific conditons.
5. No refueling within 100 feet of a stream.
6. Install trench breakers and permanent slope breakers as needed.
7. Actual site layout may be modified based on site specific conditions.
8. Temporary equipment crossing will be installed outside of high water mark.

ProSource TECHNOLOGIES, INC.	DEER CREEK PIPELINE PROJECT Basin Electric	STREAM CROSSING TYPICAL HORIZONTAL DIRECTIONAL DRILL (HDD) SITE PLAN & PROFILE MONTANA-DAKOTA UTILITIES CO. A Division of MDU Resources Group, Inc.

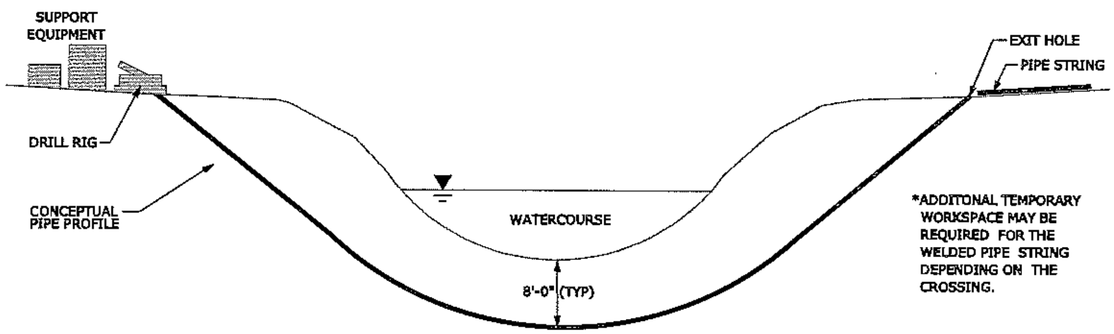
Exhibit 3.9-3 Typical Waterway Horizontal Directional Drilling Plan



SITE PLAN-ENTER SIDE



SITE PLAN-EXIT SIDE



PROFILE

NOTES:

1. To minimize impacts, install timber mats for equipment staging if necessary.
2. Install silt fence and/or other sediment barriers as needed.
3. No refueling within 100 feet of a waterbody.
4. Actual site layout may be modified based on site specific conditions.

ProSource TECHNOLOGIES, INC.	DEER CREEK PIPELINE PROJECT Basin Electric	TYPICAL HORIZONTAL DIRECTIONAL DRILL (HDD) SITE PLAN & PROFILE MONTANA-DAKOTA UTILITIES CO. A Division of MDU Resources Group, Inc.

Exhibit 3.9-4 Typical Horizontal Directional Drilling Operation Diagram

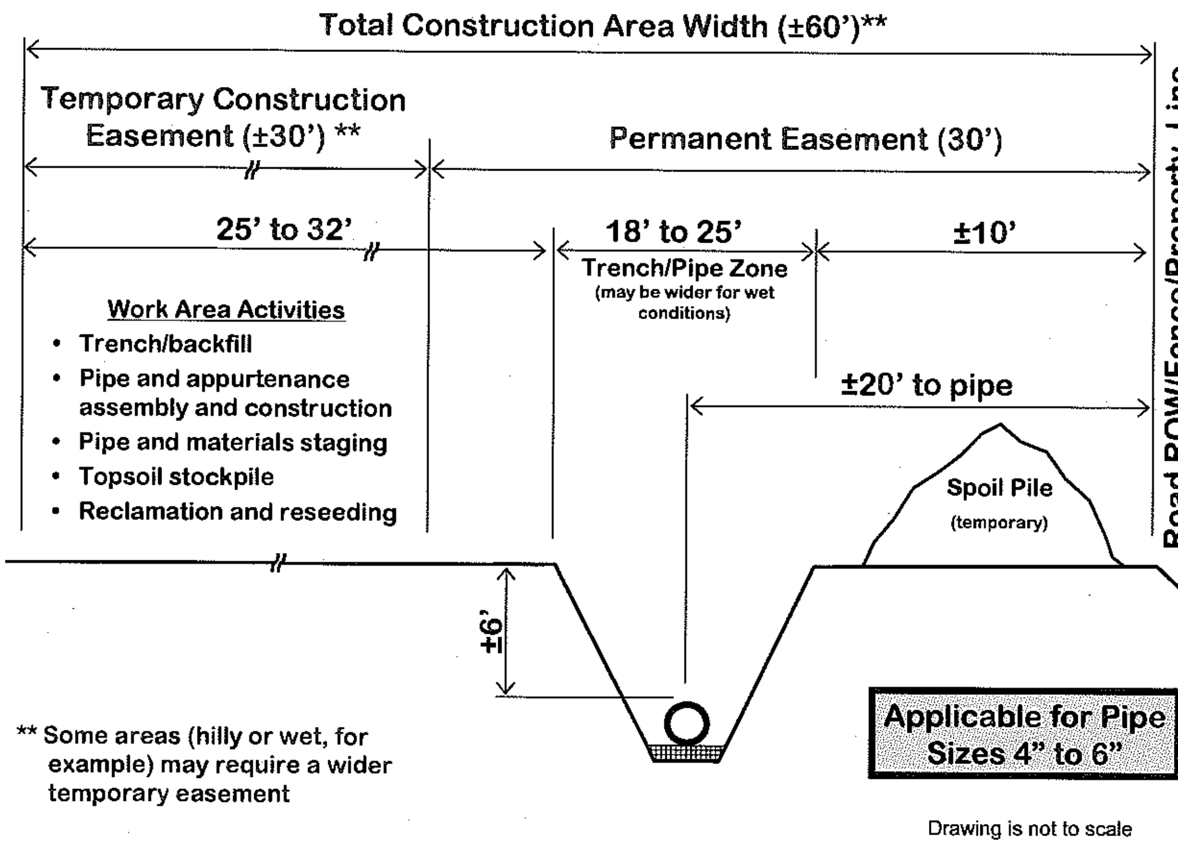


Exhibit 3.9-1 Typical Water Pipeline ROW Cross Section