APPLICATION TO

NORTH DAKOTA PUBLIC SERVICE COMMISSION

FOR

CERTIFICATE OF CORRIDOR COMPATIBILITY

FOR THE BELFIELD TO RHAME TRANSMISSION PROJECT

(CASE NUMBER PU-07-169)

by

BASIN ELECTRIC POWER COOPERATIVE

April 2008

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A. Project Description

A.1 Type

Electrical power transmission improvements are needed in southwestern North Dakota to meet increasing load demands. A systems study concluded that the transmission of additional power to the Rhame, North Dakota, area was the most effective way of meeting future demands. As a result, Basin Electric Power Cooperative (BEPC) proposes to construct and operate a new 230-kilovolt (kV) transmission line and substation to meet existing and future electric power requirements in southwestern North Dakota. The new transmission line would transfer power from the Western Area Power Administration (Western) grid at the existing Belfield Substation, near Belfield, North Dakota, to a new substation that would be constructed near Rhame, which would be owned and operated by BEPC. Approximately 55 megawatts (MW) of power would be transferred from the Western grid at the Belfield Substation to the proposed Rhame Substation.

The proposed project would be located in Stark, Slope, and Bowman counties, in southwestern North Dakota. The Belfield Substation is located in Stark County, approximately 7 miles southeast of the City of Belfield. The proposed Rhame Substation would be located in Bowman County, approximately 5 miles south of the City of Rhame. A 6-mile-wide corridor was identified from the Belfield Substation to the proposed Rhame Substation site in accordance with North Dakota Public Service Commission (PSC) requirements, as illustrated in **exhibit A-1**.

The proposed 74-mile-long transmission line would be constructed using steel single-pole structures within a 125-foot-wide right-of-way (ROW). In addition to the construction of a new substation near Rhame, North Dakota, minor modifications to the existing Belfield Substation also would occur entirely within the existing substation site. Two new microwave towers also would be constructed as part of the proposed project for communications during transmission line operation; one microwave tower would be constructed adjacent to the proposed Rhame Substation and an additional microwave tower would be constructed on East Rainy Butte.

A.2 Product

Electricity would be transmitted via the proposed transmission line between the existing Belfield Substation and the proposed Rhame Substation.

A.3 Size and Design

Section A.3.2, Transmission Line Specifications, and section A.3.3, Other Facilities, provide general information regarding the size and design of the proposed transmission line, Rhame Substation and Microwave Tower, and East Rainy Butte Microwave Tower.

Proposed construction procedures are provided in the following sections.

A.3.1 Right-of-Way and Construction Procedures

A.3.1.1 Permits, Pre-construction Surveys, and Geotechnical Analyses

Various studies must be completed and permits acquired before construction begins, including an Environmental Assessment (EA) to be completed by Western, cultural resource clearance, biological surveys, ROW procurement, and final transmission structure siting.

BEPC and/or its contractors would perform initial transmission line survey work, consisting of survey control, route centerline location, profile surveys, and access surveys prior to construction. These surveys would likely be conducted concurrently with other pre-construction tasks.

Geotechnical analyses would be conducted at transmission line angle points and other locations to determine engineering requirements for structures. A truck-mounted auger would be transported to each site to drill a small-diameter borehole. Cuttings from each borehole would be evaluated to determine soil characteristics. Geotechnical analyses would be conducted during the winter to minimize impacts to local agricultural activities; land disturbance would be confined to a relatively small area needed for site access and equipment operations. Geotechnical locations would require an area totaling approximately 400-square-feet (ft^2) in addition to an access trail.

A.3.1.2 ROW Access and Construction Preparation

Crews would gain access from public roads and section line trails as well as within the transmission line ROW for constructing, operating, and maintaining the line. Access for line construction would be by truck travel within the ROW; structure sites located along section lines would be accessed directly from section line roads and trails. New graded surface access roads are not anticipated. Existing roads and trails would be left in comparable or better condition than what existed before construction.

Gates would be installed where fences cross the ROW and locks would be installed at the landowner's request. Gates not in use would be closed but not locked, unless requested by the landowner.

During construction, it is anticipated that three temporary material staging and equipment laydown areas, each averaging approximately 2 to 5 acres, would be used. Two of the three areas would be located within the construction ROW. The third area is an abandoned railroad siding in Griffin, North Dakota. Available lands at the Belfield Substation site and the proposed Rhame Substation site also would be used. Appropriate biological and cultural resource surveys would be conducted before grading any temporary material staging and equipment laydown areas. Staging areas would be re-graded and revegetated when work in the area is complete and the staging area is no longer needed.

Tree and brush removal in the ROW is anticipated to be minimal because the project area consists largely of cultivated cropland and rangeland, and because woodlands associated with drainages were avoided during the routing process. Narrow bands of trees in shelterbelts also were avoided, to the extent practicable, to minimize impacts to wooded areas. The ROW would only be cleared if the trees and/or shrubs present interfere with construction activities or the safe, reliable operation of the transmission line. Trees would be cut at ground level to provide access within the ROW and to allow vehicle access. Stumps and roots would remain in the ROW unless the landowner requests otherwise. Disposal of cut trees and brush would be consistent with the landowner's directives.

A.3.1.3 Transmission Structure Site Preparation

Transmission structure site clearing would be accomplished using mowers, to the extent feasible. The project area and locations along the proposed route are relatively flat; the need for structure site leveling is expected to be minimal. It is anticipated that at some structure locations, blading of small areas (up to 12 feet by 25 feet for crane and manlift landings) may be required to level the ground surface to allow the safe operation of the equipment. Blading would be confined to the ROW and accomplished using bulldozers or front-end loaders. Soil removed during leveling would be stockpiled and replaced following construction; special emphasis would be placed on salvaging topsoil to be used for reclamation. The ground would be re-graded to the approximate original contour and revegetated (rangeland) or tilled (cropland) when the work has been completed.

A.3.1.4 Borehole Excavation

Crews would use a truck-mounted auger or other special tracked vehicle equipped with a power auger to drill holes for the structures at appropriate locations along the ROW. The total disturbance at each structure location would vary depending on terrain and equipment; however, all disturbance would be confined to the ROW.

Borings for the pole holes would have an average diameter of 4 feet and an average depth of 20 feet. Structures would be lowered by crane into boreholes and the annulus around the pole would be backfilled with excavated material. Surplus material (expected to total approximately 3 cubic yards per structure) would be spread around the area at a depth of approximately 2 to 4 inches or disposed (most likely in the case of cropland) in accordance with landowner specifications.

Structures requiring a reinforced concrete foundation would require a 4- to 6-foot-diameter boring to an average depth of 20 feet. Approximately 8 cubic yards of surplus material would be either spread in the vicinity of the structure or disposed of in accordance with landowner specifications. Disposal of waste material, including concrete spoil, would be in compliance with applicable regulations and would not include placement in wetlands or aquatic sites. Site-specific borehole diameters, depth, and the use of reinforced concrete foundations would be determined during geotechnical engineering evaluations.

A.3.1.5 Structure Assembly and Erection

Structure components (i.e., poles, hardware, insulators, and related materials) would be hauled to structure work site locations and assembled. Insulators and other appurtenances would be attached to the poles while on the ground at each structure location, within the 125-foot-wide ROW. Erection crews would place assembled structures in the boreholes (directly imbedded) or on reinforced foundations (i.e., self-supporting angle point and deadend structures) using cranes or large boom trucks. The structure would then be plumbed and the holes backfilled, as previously described.

A.3.1.6 Conductor Stringing and Tensioning

Following structure construction, crews would install the conductors and an optical groundwire (OPGW) using conductor stringing sheave blocks and line pulling and tensioning equipment. The conductor and OPGW are kept under tension during the stringing process to keep the conductor clear of energized circuits, the ground, and obstacles that could damage the conductor and OPGW surfaces.

Pulling and tensioning sites are typically located at 10,000-foot intervals and at angle point structures. Pulling and tensioning sites at tangent structures are located within the construction ROW while pulling and tensioning sites for angle points are typically located outside of the construction ROW. Each site typically requires two, 37,500-square-foot (0.9 acre) temporary use areas. The temporary use areas would be within the 125-foot-wide ROW along tangent structures. Pulling and tensioning at angle point structures frequently requires land outside of the ROW. The landowner would be compensated for the temporary use of land outside the ROW; while impacts are expected to be minimal, areas that would be disturbed would be evaluated prior to construction to identify sensitive biological and cultural resources. Disturbed land would be restored to pre-construction conditions, to the extent possible.

Stringing equipment generally consists of wire pullers, tensioners, conductor reels, OPGW reels, and sheave blocks. About 10,000 feet of conductors and OPGW could be installed for each pull. After the conductors and OPGW are pulled for a section of line, they are tightened or sagged to the required design tension in compliance with the National Electrical Safety Code (NESC). The process would be repeated until the OPGW and conductors are pulled through all sheaves. Conductor stringing also would require access to each structure for securing the conductor to the insulators or OPGW to each structure, once final line sag is established.

For public safety and property protection, temporary wooden guard structures would be used to provide temporary support when stringing conductors and OPGW across existing transmission lines, roads, highways, railroads, and other linear obstacles. The structures would be removed when stringing is complete; the pole borings would be backfilled and the temporary support structure sites would be reclaimed. All temporary wooden guard structures would be installed within the construction ROW.

A.3.2 Transmission Line Specifications

The proposed transmission line would be constructed using steel single-pole structures within a 125-foot-wide ROW. The transmission line structures would be approximately 110 feet in height, depending on span distances between structures and area topography. The average span length between structures would be

800 feet; taller structures could be used for crossing existing distribution and transmission lines or where unusual terrain exists. The single-pole structure would be designed to support three conductors and one OPGW, which would be used for communication purposes and also protect the transmission line from electrical outages as a result of lightning strikes. Tangent structures would be free-standing and directly imbedded into the soil. Angle structures (used where the transmission line changes direction) and dead-end structures (used to provide longitudinal stability along the length of the line) would be steel with concrete foundations. Guy wires would not be needed to support these structures.

Project construction would meet the requirements of the NESC for the Heavy Loading District, BEPC design criteria, and other applicable local or national building codes. The Heavy Loading District refers to those areas (including North Dakota) that are subject to severe ice and wind loading. The proposed transmission line would be protected from lightning by the OPGW mounted at the top of the structures. **Table A-1** describes the typical physical design characteristics for the proposed transmission line, and a typical single-pole structure is illustrated in **exhibit A-2**.

Minimum conductor clearance is measured at the point of greatest conductor sag and closest proximity to the ground. The proposed transmission line would be constructed with clearances that exceed standards set by the NESC. Minimum conductor height would be 26 feet over agricultural land, 28 feet over rural roads, and 31 feet over paved highways.

Table A-1 Transmission Line Characteristics

Design Component	Value
Voltage (kV)	230
ROW width (feet)	125
Average span (feet)	800
Average height of structures (feet)	110
Average number of structures (per mile)	6.6
Temporary disturbance per structure (square feet) (approximately 125-foot x 100-foot area)	12,500
Permanent disturbance per structure (acre) (approximately 3-foot diameter per structure leg)	0.0002
Minimum conductor ground clearance to agricultural land at 100°C (feet)	26
Minimum conductor-ground clearance to rural roads at 100°C (feet)	28
Minimum conductor-ground clearance to paved highways at 100°C (feet)	31
Circuit configuration	Vertical
Conductor diameter (inches)	1.345

A.3.3 Other Facilities

The proposed project also includes construction of a new substation, access road, and microwave tower near Rhame, North Dakota. BEPC purchased 80 acres of land for the substation site. Concrete foundations, support structures and electrical equipment would be installed within a 12.0-acre fenced area for the proposed substation that would include a 2,000 ft^2 control building, electrical bays, structures, and appurtenances.

Construction of the access road would disturb approximately 0.2 acre of land. Modifications to the Belfield Substation would be minor and would occur entirely within the existing substation site.

The proposed Rhame Substation site would be cleared and leveled in a manner similar to that proposed for the transmission structures. Aggregate would be spread throughout undeveloped areas within the substation site. Topsoil would be segregated from underlying soils and redistributed on disturbed areas. Soil erosion would be minimized during construction using Best Management Practices (BMPs). Substation components would be hauled to the site on local highways and roads and off-loaded using cranes and similar equipment. Concrete and aggregate from local sources would be hauled to the site via trucks.

A Supervisory Control and Data Acquisition (SCADA) system would interconnect the Belfield Substation and proposed Rhame Substation. Hard-wire system communications would utilize fiber optics within the OPGW between the two substations and microwave communications equipment would be installed for SCADA redundancy and to facilitate voice and data communications by field personnel. A microwave tower and dish would be constructed at the proposed Rhame Substation. A microwave dish would be installed on an existing microwave relay tower on an existing tower at the Belfield Substation. However, modifications to this tower would not be required. The microwave tower and dish at the proposed Rhame Substation would be approximately the same height as drop structures at the facility. Two microwave dishes would be attached to a 180-foot-tall microwave self-supporting tower that would be constructed on East Rainy Butte. The proposed microwave tower would be constructed within a 1-acre leased area adjacent to an existing Western microwave tower site and would disturb approximately 0.1 acre of land.

A.4 Time Schedule

Exhibit A-3 illustrates the time schedule for important permitting and construction phases of the proposed project. Construction of the proposed transmission line and substation would likely begin in late 2008. Private contractors would likely construct the proposed transmission line and also would haul away construction wastes associated with the proposed project.

Transmission line construction would generally follow a sequential set of activities performed by crews proceeding along the length of the proposed transmission line. **Table A-2** lists construction activities.

Table A-2 Conventional Personnel, Equipment, and Time Requirements for Construction

Task	Number of Personnel	Equipment	Length of Time
Substation Construction			
Substation Grading	6	Dozers, scrapers, motor graders, and water trucks	1–2 months
Substation and Construction Yards and Material Staging	3–4	Pickup trucks, flatbed trucks with cranes, pole delivery trucks, rubber-tire digging equipment, all terrain vehicles (ATVs), portable compressors	Continuous during construction period
Landscape Rehabilitation	4	Pickups, flatbed trucks, backhoe, tractor, seeding equipment, hand-seeding equipment	3 months
Transmission Line Construction			
Structure Site Clearing and Vegetation Management	4–6	Pickups, mower, ATVs	1 month

Table A-2 Conventional Personnel, Equipment, and Time Requirements for Construction

Task	Number of Personnel	Equipment	Length of Time
Gate Installation	3	Flatbed and pickup trucks	1 month
Structure Assembly	6–8	Pickups, cranes, material trucks, rubber-tired crane, 4x4 pickups	4 months
Hole Excavation	2–3	Rotary drilling rigs, backhoes, pickups, rubber-tired digging equipment, ATVs, portable compressors	4 months
Structure Erection	6–8	Rubber-tired cranes, boom trucks, 4x4 pickups	5 months
Ground Wire and Conductor Stringing	16–20	Pickups, manlifts/boom trucks, hydraulic tensioning machines, reel trailers	3 months
Cleanup	4	Pickups, dump trucks, flatbed trucks	Duration of project
Landscape Rehabilitation	4	Pickups, flatbed trucks, backhoe, caterpillar, seeding equipment, hand-seeding equipment	3 months
Concrete Foundations	10	Excavators, concrete trucks, skid steer	1–2 months
Equipment Installation	10	Cranes and trucks	3–4 months
Microwave Tower Construction			
Microwave Tower Foundation Excavation	3	Digger truck	4 days
Microwave Tower Erection	3	Gin pole	2 weeks
Building and Antenna Setting	2-3	Flatbed and pickup trucks	1 week

The proposed transmission line and substation would take an estimated 7 months to construct. Additional time (3 months) for construction has been included in **exhibit A-3** to account for possible delays in construction due to adverse weather conditions. Construction activities associated with the proposed project are estimated to begin during late 2008. It is anticipated that the proposed transmission line and substation would be in-service by early 2010.

B. Studies

B.1 Environmental Reports/Application

Western is the federal Lead Agency for an Environmental Assessment (EA) that is being completed for the proposed project and a federal power-marketing agency within the United States (U.S.) Department of Energy (DOE). Western sells and delivers federal electric power to municipalities, public utilities, federal and state agencies, and Native American tribes in 15 western and central states. As a federal agency, Western is required to comply with the National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321 et seq.), and guidelines set forth under Council on Environmental Quality (40 Code of Federal Regulations [CFR] 1500 – 1508) and 10 CFR Part 1021, DOE NEPA Implementing Procedures.

BEPC is the project applicant (also referred to as project sponsor or project proponent) and would be responsible for construction, operation, maintenance, and decommissioning of the proposed project. BEPC is one of the largest electric generation and transmission cooperatives in the U.S. and provides power to 121 member rural electric systems in nine states. BEPC's northern service area within North Dakota, South Dakota, and Montana is illustrated in **exhibit B-1**.

The NEPA requires federal agencies to make a series of evaluations and decisions that anticipate adverse effects on environmental resources and that a reasonable range of project alternatives identify potential direct, indirect, and cumulative environmental impacts. If impacts cannot be fully avoided, mitigation measures are to be recommended to reduce the severity of impacts.

Western issued a determination that an EA would be required for the proposed project on March 21, 2007. Letters were mailed to potentially affected landowners, interested individuals, non-governmental organizations, interest groups, and agencies on July 6, 2007. BEPC opened a field office in Dickinson, during July 2007 to facilitate interaction with the public. Public scoping meetings were held in Belfield and Bowman on July 23 and 24, 2007, respectively. Public input was used to refine transmission line alignments and to identify potential impacts and mitigation measures.

Specific regulations require Western to coordinate and consult with federal, state, and local agencies about the potential of the proposed project and alternatives to affect sensitive resources. The coordination and consultation must occur in a timely manner and these activities are required before any final decisions are made. Issues related to agency consultation may include biological resources, cultural resources, socioeconomics, land, and water management. Biological resource consultations are completed to address potential impacts to sensitive species or habitats, as required by Section 7 of the Endangered Species Act (ESA). Cultural resource consultations are completed to address potential impacts to important cultural or archaeological sites, as required under Section 106 of the National Historic Preservation Act (NHPA). The federal, state, and local agencies that Western contacted are provided in **appendix A**, Notification. **Appendix B**, Agency Correspondence, is a compilation of correspondence letters in response to the notification letters submitted by Western and telephone call summary notes documenting items discussed with agency resource specialists.

In compliance with the NHPA, as amended, Western initiated government-to-government consultation for the proposed project by sending letters and project maps on July 9, 2007, to the following tribal groups: Eastern Shoshone Tribe, Northern Arapahoe Tribe, Northern Cheyenne Tribe, Oglala Lakota Nation, Rosebud Sioux Tribe, Cheyenne River Sioux Tribe, Standing Rock Sioux, Crow Tribe, Fort Peck Tribes, and Three Affiliated Tribes. The letters were sent to inform the various tribal groups of the proposed undertaking and to solicit any comments the tribes may have concerning traditional cultural properties (TCPs) or places of cultural and religious importance to the tribes in the project area. At this time, no TCPs or places of cultural and religious importance have been identified within the project area either through inventory or by the contacted tribal groups.

B.2 Affected Environment

B.2.1 Jurisdictions, Land Use, and Agricultural Practices

The proposed corridor is located in Stark, Slope, and Bowman counties in southwestern North Dakota and oriented to avoid exclusion and avoidance areas to the extent practicable, including population centers of Belfield, South Heart, New England, Bowman, and Rhame. National wildlife refuges (NWRs) and grasslands, such as the Little Missouri National Grassland, White Lake NWR, Cedar Lake NWR, and Stewart Lake NWR also were avoided. Resources that could not be fully avoided in the proposed corridor included rural residences and water resources.

Agriculture and livestock production dominates approximately 95 percent of land uses within the proposed corridor. Land uses within the proposed corridor were classified from U.S. Geological Services (USGS)-State of North Dakota data as open water, developed, barren land (badlands), forested, rangeland, grassland (primarily maintained pasture), cropland, riparian, and emergent wetlands (USGS 2003, 2004).

The proposed corridor includes 323,515 acres of land, of which 92 percent are classified as cropland and grassland. The land use composition of the proposed corridor is provided in **table B-1**.

Table B-1 Land Use Categories within the Proposed Corridor

Land Use Category	Acres	Percent
Open Water	724	0.2
Developed	13,924	4.3
Barren Land/Badlands	913	0.2
Deciduous Forest	684	0.2
Rangeland (scrub/shrub)	5,148	2.0
Grassland (maintained pasture)	92,067	28.4
Cropland (cultivated)	207,593	64.1
Riparian	2,299	0.6
Emergent Wetlands	163	0.0
Total	**323,515**	**100.0**

B.2.2 Physiography, Topography, Soils, Geology, and Minerals

The proposed corridor is located within the Great Plains Province. The Missouri Slope Upland Region is characterized by broad valleys, hills, and buttes that are largely the result of erosion of siltstone, claystone, and lignite that were deposited 65 to 55 million years ago.

B.2.2.1 Physiography

The Little Badlands are located in the northern portion of the proposed corridor, approximately 11 miles southeast of Belfield. The Little Badlands are similar to those of the Little Missouri National Grassland, but limited to an area covering approximately 6 square miles. The Little Badlands are characterized by rugged topography with sparse vegetation. The remainder of the area consists of relatively flat farmland and rangeland with isolated buttes.

B.2.2.2 Topography

Topography within the proposed corridor is characterized by gentle slopes with scattered buttes ranging from 100 to 400 feet above the ground surface. Although most buttes are relatively small, some occupy several hundred acres. East Rainy Butte and West Rainy Butte are located in the central portion of the proposed corridor in Slope County at elevations 3,310 and 3,340 feet above mean sea level (amsl), respectively. Elevations in the northern and southern portions of the proposed corridor are approximately 2,590 feet amsl and 2,950 feet amsl, respectively.

B.2.2.3 Mineral Resources

The single largest deposit of lignite in the world is in western North Dakota (Murphy, not dated). Harmon and Hansen lignite beds extend over 5,500 square miles in Bowman, Adams, Slope, and Golden Valley counties of southwestern North Dakota. Mining in eastern Bowman County has been ongoing since 1925. South Heart Coal, LLC is planning to begin lignite mining at a site south of South Heart and east of the Belfield Substation.

Clinker, commonly referred to as scoria, consists of clay, silt, and sandstone baked or fused by heat generated from the burning of underlying lignite. Scoria is mined at several locations and is commonly used for road construction. Oil production within the proposed corridor is limited to scattered areas in northwestern Stark County and southern Bowman County.

B.2.2.4 Seismic Activity Potential

Bluemle (not dated) indicates that North Dakota is located in an area of low earthquake probability and that infrequent, small earthquakes may occur near or within the state. Geologic structures that are in proximity to the proposed corridor and may contribute to earthquakes are deeply buried and relatively inactive. Two deep faults, the Thompson Boundary Fault and the Tabbernor Fault/Fold Zone, extend north-south through the Western Dakota Mobile Belt in western North Dakota. The Bluemle (2005) ranks North Dakota among states having the lowest potential for earthquakes.

B.2.2.5 Soils

The proposed 6-mile-wide corridor includes 31 soil types. Thirteen soil types are found within alluvial fans, terraces, and similar landforms and 13 are associated with upland plains, swales, and similar landforms. Four soil types are associated with hills, slopes, and ridges. Only one soil type is associated with bottomlands and low lying areas. Soil types are described in **appendix C**, Soil Types.

Prime and Unique Farmland and Farmland of Statewide Importance occur within the proposed corridor (section D, **exhibits D-9** through **D-12**). Prime farmland is characterized as the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban or built-up land or water areas). It has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner when treated and managed, including water management, according to acceptable farming methods. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable levels of acidity or alkalinity, an acceptable content of salt and sodium, and few or no rocks. They have soils that are permeable to water and air. Prime farmland is neither excessively erodible nor saturated with water for a long period of time, and it either does not flood frequently, or is protected from flooding (Natural Resources Conservation Service [NRCS] 2007).

Specific technical criteria were established by Congress to identify prime farmland soils. In general, criteria reflect adequate natural moisture content; specific soil temperature range; pH between 4.5 and 8.4 in the rooting zone; low susceptibility to flooding; low risk to wind and water erosion; minimum permeability rates; and low rock fragment content (NRCS 2007).

Unique farmland is defined by the NRCS as land other than prime farmland that is used for the production of specific high-value food and fiber crops. It has the special combination of soil qualities, location, growing season, and moisture supply needed for the economic production of sustained high yields of a specific high-quality crop when treated and managed by acceptable farming methods.

Unique farmland is used for a specific high-value food or fiber crop; has an adequate supply of available moisture for the specific crop because of stored moisture, precipitation, or irrigation; and has a combination o soil qualities, growing season, temperature, humidity, air drainage, elevation, aspect, and other factors, such as nearness to markets, that favors the production of a specific food or fiber crop (NRCS 2007).

Farmland of Statewide Importance is determined by the state agencies. Some areas other than areas of prime and unique farmland are of statewide importance in the production of food, feed, fiber, forage, and oilseed crops. The criteria used in defining and delineating these areas are determined by the appropriate state agency or agencies. Generally, additional farmland of statewide importance includes areas that nearly meet the criteria for prime farmland and that economically produce high yields of crops when treated and managed by acceptable farming methods. Some areas can produce as high a yield as prime farmland if conditions are favorable. In some states, additional farmland of statewide importance may include tracts of land that have been designated for agriculture by state law (NRCS 2007).

Prime and Unique Farmland and Farmland of Statewide Importance were compiled from Soil Survey Geographic databases. Data indicate that prime farmland soils occupy approximately 4 percent of the proposed corridor and Farmlands of Statewide Importance comprise approximately 46 percent of the proposed corridor. Prime and Unique Farmland and Farmland of Statewide Importance are included in **table B-2**.

Table B-2 Important Soils within the Proposed Corridor

Soil Types	Acres	Percent
Prime and Unique Farmland	14,020	4.3
Farmland of Statewide Importance	149,387	46.2
Other Lands	160,108	49.5
Total	**323,515**	**100.0**

B.2.3 Hydrology and Drainage

Drainages within the proposed corridor are largely intermittent or ephemeral. Named streams and rivers in the vicinity of Belfield Substation flow in a northeasterly direction and include South Branch Heart River, Bull Creek, and Antelope Creek. Philbrick, Cannonball, Chanta, and Cedar creeks occur in the central portion of the proposed corridor and flow in an easterly/southeasterly direction. Spring Creek and Coyote Creek occur in the vicinity of Bowman and Rhame and flow in a southeasterly direction.

Flood hazard areas, designated by the Federal Emergency Management Agency, include three flood hazard zones within the proposed corridor as described in **table B-3**. Flood hazard areas are scattered throughout the proposed corridor and are not discretely mapped.

Table B-3 Flood Hazard Areas (Flood Zones) within the Proposed Corridor

Zone Name	Zone	Description
Zone X (500-year)	X500	An area inundated by 500-year flooding; an area inundated by 100-year flooding with average depths of less than 1-foot or with drainage areas less than 1-square-mile; or an area protected by levees from 100-year-flooding.
Zone AE	AE	An area inundated by 100-year flooding, for which BFEs have been determined.
Zone A	A	An area inundated by 100-year flooding, for which no Base Flood Elevations (BFEs) have been determined.

B.2.4 Vegetation Resources

Vegetation types within the proposed corridor predominantly include grasslands and agricultural (cultivated) vegetation within minor contributions from other vegetation cover types. Grasslands comprise approximately 92,067 acres and agricultural vegetative cover comprises approximately 207,593 acres. Vegetation cover types that occur within the proposed corridor are listed in **table B-4**.

Table B-4 Vegetation Cover Types within the Proposed Corridor

Vegetation Types	Acres	Percent
Grassland	92,067	28.5
Range (Shrub-scrub)	5,148	1.6
Agriculture	207,593	64.2
Forested	684	0.2
Riparian (wooded wetlands)	2,298	0.7
Emergent Wetlands	163	0.0
Badlands	913	0.3
Other Lands	14,649	4.5
Total	**323,515**	**100.0**

Source: National Land Cover Database 2007.

Vegetation within the proposed corridor was characterized from a literature review of the North Dakota Game and Fish Department (NDGFD) and North Dakota Comprehensive Wildlife Conservation Strategy (NDCWCS) (Hagen et al. 2005). The proposed corridor is located within the Missouri Slope region of North Dakota, which is dominated by mixed-grass prairie vegetation. The landscape includes level to rolling plains topography with isolated sandstone buttes and badland formations and localized wetlands. Shrub steppe communities and forested areas also are scattered throughout the proposed corridor. Open water and waterbodies, developed land, and areas with barren lands do not support terrestrial vegetation or are sparsely vegetated.

B.2.4.1 Grasslands

<u>Mixed-Grass Prairie Community</u>

The mixed-grass prairie of North Dakota is a combination of the tallgrass species of eastern North Dakota and the shortgrass species found in the western part of the state. It is comprised of warm- and cool-season grasses and sedges. Common grasses include prairie junegrass (*Koeleria macrantha*), western wheatgrass (*Elymus smithii*), green needlegrass (*Nassella viridula*), needle-and-thread (*Hesperostipa comata*), blue grama (*Bouteloua gracilis*), little bluestem (*Schizachyrium scoparium*), and needleleaf sedge (*Carex duriuscula*) (Hagen et al. 2005). Other grass species include Canada wildrye (*Elymus canadensis*), spike oats (*Helictotrichon hookeri*), mat muhly (*Muhlenbergia richardsonis*), spikemoss (*Selaginella* spp.), plains reedgrass (*Calamagrostis montanensis*), and buffalograss (*Buchloe dactyloides*) (Hagen et al. 2005). Forbs included in the mixed-grass prairie community include pasqueflower (*Pulsatilla* spp.), western wallflower (*Erysimum asperum*), prairie smoke (*Geum triflorum*), Missouri milkvetch (*Astragalis missouriensis*), lead plant (*Amorpha canescens*), Indian breadroot (*Pediomelum* spp.), purple prairie clover (*Dalea purpurea*), gaura (*Gaura* spp.), harebell (*Asyneuma* spp.), fringed sage (*Artemesia frigida*), purple coneflower (*Echinacea purpurea*), yarrow (*Achillea* spp.), and several species of goldenrods (*Solidago* spp.) (Hagen et al. 2005).

<u>Shortgrass Prairie Community</u>

The shortgrass prairie is mostly found within elevated portions of the Missouri Slope region of North Dakota. It is comprised of warm-season species that can survive the low average rainfalls of southwestern North Dakota. Common grass species include spikemoss, blue grama, needleleaf sedge, threadleaf sedge, buffalograss, and needle-and-thread. These species mature at 6 to 12 inches in height. Forbs include white wild onion (*Allium textile*), death camas (*Zigadenus* spp.), buffalo-bean (*Thermopsis* spp.), purple loco (*Oxytropis lambertii*), silverleaf (*Astragalus* spp.), prickly pear (*Optunia polyacantha*), moss phlox (*Phlox subulata*), white beardtongue (*Penstemon* spp.), and fringed sage (Hagen et al. 2005).

Planted Grassland

Planted grassland is described as prairie that has been converted to cropland and then re-planted to hayland or native grasses. Conservation Reserve Program land is a major component of this landscape. Predominant vegetation in this community includes smooth brome (*Bromus inermis*), crested wheatgrass (*Agropyron cristatum*), intermediate wheatgrass (*Thinopyrum intermedium*), tall wheatgrass (*Thinopyrum ponticum*), big bluestem (*Andropogon gerardii*), alfalfa (*Medicago sativa*), and sweet clover (*Melilotus* spp.) (Hagen et al. 2005).

B.2.4.2 Badlands

Dominant vegetation within the badlands is comprised of cottonwood (*Populus* spp.), green ash (*Fraxinus pennsylvanica*), Rocky Mountain juniper (*Juniperus scopulorum*), ponderosa pine (*Pinus ponderosa*), limber pine (*Pinus flexilis*), bur oak (*Quercus macrocarpa*), creeping juniper (*Juniperus horizontalis*), spiny saltbush (*Atriplex* spp.), greasewood (*Sarcobatus* spp.), prickly pear, rabbitbrush (*Chysothamnus nauseosus*), silver sage (*Artemesia cana*), western wheatgrass, blue grama, little bluestem, prairie sandreed (*Calamovilfa longifolia*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Indian ricegrass (*Achnatherum oryzopsis*), yucca (*Yucca* spp.), winterfat (*Krascheninnikovia lanata*), golden eriogonum (*Eriogonum flavam*), large-flowered dock (*Rumex venosus*), butte primrose (*Oenothera caespitosa*), standing milkvetch (*Astragalus laxmannii*), penstemon (*Penstemon* spp.), purple coneflower, and long-headed coneflower (*Ratibida columnifera*) (Hagen et al. 2005).

B.2.4.3 Shrub Steppe

Shrub steppe consists of eroded buttes, scoria mounds, and salt pans, which is similar to the badlands. Shrub steppe is characterized by a general absence of agriculture and human occupancy. Big sagebrush (*Artemisia tridentata*) is the dominant species.

B.2.4.4 Agriculture

Agricultural land within proposed corridor is considered cropland. This community is comprised mostly of wheat fields, although fields of sunflowers and other crops also occur in the proposed corridor.

B.2.4.5 Wetlands

Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of wetland vegetation typically adapted for life in saturated soil conditions (Environmental Laboratory 1987). Wetland types present within the proposed corridor include palustrine and riverine wetlands. Dominant vegetation in wetland areas includes fine-textured grasses, sedges, and rushes (Hagen et al. 2005).

The palustrine wetlands include all non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens. They can be grouped into vegetated wetlands traditionally called by such names as marsh, swamp, bog, fen, and prairie, which are found throughout the U.S. It also includes the small, shallow, permanent, or intermittent waterbodies often called ponds (Cowardin et al. 1979).

The palustrine wetlands that occur in the proposed corridor include seasonal, semi-permanent, and permanent subcategories. Seasonal wetlands are described as having surface water present for extended periods in spring and early summer, but usually disappear as early as mid-summer (Hagen et al. 2005). Semi-permanent wetlands have water present year-round in most years but during dry years, water may disappear as early as mid-summer (Hagen et al. 2005). Permanent wetlands contain water throughout the year (Hagen et al. 2005).

Riverine wetlands include wetlands contained within a channel, with two exceptions: 1) wetland dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens; and 2) habitats with water containing ocean-derived salts. Water is usually, but not always, flowing in the riverine system. Upland islands or palustrine wetlands may occur in the channel, but they are not included in the riverine system. The lower perennial subsystem includes waterbodies where some water flows throughout the year and the gradient is low and water velocity is slow. Substrates consist mainly of sand and mud. The intermittent subsystem includes channels where the water flows for only part of the year (Cowardin et al. 1979).

National Wetland Inventory (NWI) data indicate a total of 3,651acres are classified as wetlands within the proposed corridor. Approximately 1,537 freshwater emergent wetlands occupy a total of 3,150 acres, 3 lakes comprise a total 33 acres, 394 freshwater ponds comprise a total of 620 acres, and 18 freshwater forested/shrub wetlands total 18 acres. Wetland types that occur within the proposed corridor are listed in **table B-5**.

Table B-5 Wetland Types within the Proposed Corridor

Wetland Types	Acres	Number
Lake	33	3
Freshwater Pond	384	620
Freshwater Emergent Wetland	3,150[1]	1,537
Freshwater Forested/Shrub Wetland	18	18
Other	65	100
Riverine	1	5
Total	**3,651**	**2,283**

Source: NWI maps.

[1]Wetland acreage differs from acreage provided in **table B-4** due to different data sources.

B.2.4.6 Forested

Forested habitats are found in only a few locations in North Dakota, and they do not cover large contiguous areas (Hagen et al. 2005). Although forests do not occur within the proposed corridor, species associated the Upland Deciduous/Green Ash Forest and Conifer/Juniper Forest occur within smaller woody draws and isolated stands dominated by woody species. Within the proposed corridor, localized woody draws occur along several creeks and rivers. The most expansive wooded areas within the proposed corridor occur along the slope faces of East Rainy Butte and West Rainy Butte. In addition to these areas, trees have been planted in rows over the past 30 to 70 years within some farmland areas to create shelterbelts, which provide windbreaks, reduce wind erosion, and collect snow and improve soil moisture in adjacent cropland.

<u>Upland Deciduous/Green Ash Forest</u>

The dominant natural vegetation of these forests includes bur oak (*Quercus macrocarpa*), green ash (*Fraxinus pennsylvanica*), quaking aspen (*Populus tremuloides*), balsam poplar (*Populus balsamifera*), box elder (*Acer negundo*), and paper birch (*Betula papyrifera*). Shrubs associated with these forests include beaked hazel (*Corylus cornuta*), highbush cranberry (*Viburnum opulus* var. *americanum*), juneberry (*Amelanchier alnifolia*), red raspberry (*Rubus idaeus*), and chokecherry (*Prunus virginiana*) (Hagen et al. 2005).

Conifer/Juniper Forest

Ponderosa pine and Rocky Mountain juniper are the most common species within this forested area. These forests are dispersed through the southern half of North Dakota's badlands (Hagen et al. 2005).

B.2.5 Wildlife and Fisheries

The predominant wildlife habitats within the proposed corridor include agricultural land, planted grasslands, mixed-grass prairie, and shortgrass prairie. These vegetation types support a diversity of wildlife species. This section focuses on species of high economic and/or recreational importance and those that are considered sensitive to human disturbance.

B.2.5.1 Big Game

Big game species within the proposed corridor include mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), elk (*Cervus elaphus*), and pronghorn (*Antilocapra americana*). No seasonal big game ranges were identified by the NDGFD.

B.2.5.2 Small Game

Small game species that occur within the proposed corridor include native and non-native furbearers, upland game birds, and waterfowl. Common furbearers within the proposed corridor include red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), badger (*Taxidea taxus*), and striped skunk (*Mephitis mephitis*). Upland game birds in the proposed corridor include ring-necked pheasant (*Phasianus colchicus*) (an introduced species), gray partridge (*Perdix perdix*), and wild turkey (*Meleagris gallopavo*). Waterfowl species include mallard (*Anas platyrhynchos*), blue-winged teal (*Anas discors*), northern shoveler (*Anas clypeata*), and gadwall (*Anas strepera*).

B.2.5.3 Nongame Species

The western mixed-grass/shortgrass community has a diversity of nongame species (e.g., mammals, reptiles and birds). The NDCWCS identified a variety of species within the proposed corridor. Mammalian species include the thirteen-lined ground squirrel (*Spermophilus lateralis*), northern pocket gopher (*Thomomys talpoides*), olive-backed pocket mouse (*Perognathus fasciatus*), Ord's kangaroo rat (*Dipodomys ordii*), western harvest mouse (*Reithrodontomys megalotis*), deer mouse (*Peromyscus maniculatus*), prairie vole (*Microtus ochrogaster*), meadow vole (*Microtus pennsylvanicus*), meadow jumping mouse (*Zapus hudsonius*), western small-footed myotis (*Myotis ciliolabrum*), coyote (*Canis latrans*), mountain lion (*Felis concolor*), and bobcat (*Lynx rufus*).

Reptilian species possibly inhabiting the proposed corridor include the Woodhouse's toad (*Bufo woodhousii*), Great Plains toad (*Bufo cognatus*), northern leopard frog (*Rana pipiens*), western chorus frog (*Pseudacris triseiata*), tiger salamander (*Ambystoma tigrinum*), common garter snake (*Thamnophis sirtalis*), yellowbelly racer (*Coluber constrictor*), bullsnake (*Pituophis melanoleucus*), and prairie rattlesnake (*Crotalus viridis*).

Migratory birds are protected by the Migratory Bird Treaty Act (MBTA) (16 USC 703-711) and Executive Order (EO) 13186 (66 Federal Register 3853), which makes it unlawful to take, kill, or possess migratory birds. EO 13186 was enacted to, among other things, ensure that environmental analyses of federal actions evaluate impacts of actions and agency plans on migratory birds. Other elements of EO 13186 state that the federal agency should restore and enhance the habitat for migratory birds and abate the detrimental alteration of the environment from pollution. Most avian species are protected by the MBTA with the exception of a few species, typically those that are non-native, such as the European starling (*Sturnus vulgaris*). The NDCWCS lists 33 federal migratory species that may be impacted by the proposed project. Based on review of this list and habitat requirements, all 33 species may occur within the proposed corridor (**appendix A**).

Migratory birds are considered integral to natural communities and act as environmental indicators based on their sensitivity to environmental changes caused by human activities. Examples of migratory bird species that occur within the proposed corridor include the mourning dove (*Zenaida macroura*), killdeer (*Charadrius vociferous*), common nighthawk (*Chordeiles minor*), western kingbird (*Tyrannus verticalis*), eastern kingbird (*Tyrannus tyrannus*), horned lark (*Eremophila alpestris*), eastern bluebird (*Sialia sialis*), mountain bluebird (*Sialia currucoides*), common yellowthroat (*Geothlypis trichas*), clay-colored sparrow (*Spizella pallida*), vesper sparrow (*Pooecetes gramineus*), lark sparrow (*Chondestes grammacus*), savannah sparrow (*Passerculus sandwichensis*), western meadowlark (*Sturnella neglecta*), and brown-headed cowbird (*Molothrus ater*).

Raptor species that occupy habitats within the proposed corridor are those associated with tall- and mixed-grass prairie, shrubland, woodlands, badlands, and cropland. Those species include eagles (bald and golden eagles), buteos (e.g., red-tailed and ferruginous hawks), falcons (American kestrel and prairie falcon), owls (western burrowing owl, great horned owl, and short-eared owl), northern harrier, and other birds of prey including the turkey vulture (Peterson 1990). Protected raptor species that have been identified for the proposed corridor include bald eagle, golden eagle, peregrine falcon, prairie falcon, ferruginous hawk, northern harrier, Swainson's hawk, short-eared owl, and western burrowing owl (**appendix A**). These species all are designated as North Dakota Species of Conservation Priority. Two golden eagle nests were identified within the proposed corridor during field surveys conducted in September 2007 (**exhibit B-1**). In addition, raptor species observed in flight during the September 2007 surveys include the ferruginous hawk, short-eared owl, Swainson's hawk, northern harrier, and golden eagle.

B.2.5.4 Fisheries Resources

The majority of the proposed corridor crosses intermittent and ephemeral streams. One perennial stream, the South Branch Heart River, occurs in Stark County. Although no fisheries are identified at this crossing, the entire length of the Heart River supports a warmwater fishery with representative game fish species that include walleye, catfish, and pike (NDGFD 2007c). Federal and state wildlife agencies have not expressed any concerns for fish species or sensitive aquatic habitat within any of the waterbodies crossed by the proposed corridor.

B.2.6 Special Status Species and Noxious Weeds

Special status species are those in which state and/or federal agencies provide protection by law, regulation or policy. Federally listed and federally proposed for listing species with designated critical habitat are protected under the ESA. Special status species also include those species that have been designated as species of conservation priority by NDGFD.

The State of North Dakota categorizes wildlife species into three levels of conservation priority (Hagen et al. 2005). The following categories were developed to describe the conservation needs for North Dakota species of conservation priority:

- Level I: species with a high level of priority due to the declining status here or across the range or high rate of occurrence in North Dakota, constituting the core of the species breeding range but are at-risk range wide.
- Level II: species with a moderate level of priority or species with a high level of priority but a substantial level of non-state wildlife grants funding.
- Level III: species with a moderate level of priority but are believed to be peripheral or non-breeding in North Dakota.

Special status species analysis focused on wildlife and plant species and habitats that may be affected by construction and operation of the proposed project. The process considered federal laws and state statutes. The ESA is administered by the U.S. Fish and Wildlife Service (USFWS) and provides broad national protection for fish, wildlife, and plants that are listed as endangered, threatened or proposed for listing. The ESA outlines procedures for federal agencies to follow when a listed species or designated habitat may be affected by an action they authorize, fund, or permit. North Dakota species of conservation priority also receive some protection. The MBTA also is administered by the USFWS. The MBTA is a federal law enabling the U.S. to fulfill its international, bilateral conventions for conserving migratory bird populations and their habitats. The MBTA makes it unlawful to take, kill, or possess migratory birds, nests, eggs, or parts of birds without a permit.

Methods for establishing a baseline of status, occurrence and associated habitat for special status species that may occur within the proposed corridor include reviewing published literature, natural heritage database information, internet websites, agency correspondence and field surveys. Biologists with the USFWS, NDGFD, and North Dakota Natural Heritage Program (NDNHI) were contacted for information about the status of plant and wildlife species, habitat, special wildlife features and habitats in the proposed corridor (USFWS 2007; NDNHI 2007). Initial baseline biological surveys were conducted within the proposed corridor in September 2007.

Federally listed species that may be present within the proposed corridor include the whooping crane (*Grus Americana*), gray wolf (*Canis lupus*), and black-footed ferret (*Mustela nigripes*). Special status species that occur or may occur within the proposed corridor are provided in **appendix D**.

B.2.6.1 Sensitive Ecological Communities

Sensitive ecological communities were identified by the NDNHI. These terrestrial natural communities consist of interrelated assemblages of plants, animals, and other living organisms incorporated into their physical surroundings including geologic substrate, soils, topography, and aspect that are shaped by climate and other natural processes. These high quality communities are ones that provide diverse assemblages of native species and represent the least distressed examples of ecosystems that existed in North Dakota prior to European settlement (Hagen et al. 2005). Sensitive ecological communities identified by the NDNHI (2007b) that occur within the proposed corridor include:

Needle-and-Thread Mixed Grass Prairie

This prairie community is associated with flat to rolling topography with deep, sandy loam to loam, coarse-textured soils. Although typically associated with uplands, this community may also occur lower in the landscape, such as coulee and draw bottoms, if soils are sufficiently coarse (usually sandstone-derived). The elevation ranges are typically from 2,000 to 5,500 feet amsl and the average annual precipitation ranges from slightly less than 10 to 20 inches. The dominant vegetation consists of moderate to moderately dense medium-tall grasses (NatureServe 2007).

Western Wheatgrass Saline Seep

This prairie community is found in depressions and on (ephemeral) stream terraces on deep, moderately saline soils, sometimes with a clayey subsoil. These soils are wet for part of the year and may flood periodically. The vegetation is dominated by graminoids (i.e., grass-like plants), which may be as tall as 3 feet, but typically are less than 1.8 feet. The dominants are western wheatgrass (*Pascopyrum smithii*) and inland saltgrass (*Distichlis spicata*). Heavy grazing and lack of fire throughout its range may cause many stands to have a high proportion of exotics (NatureServe 2007).

Green Ash Upland Woodland

This community type occurs in upland ravines, broad valleys, moderately steep slopes, and along small permanent or ephemeral streams, including deep mesic ravines and canyon bottoms that are not flooded or saturated. On these sites, soil and topography permit greater than normal moisture. The soils are clay loams, sandy clay loam, and sandy loam, dry to moist, and moderately well-drained. The parent material is typically colluvium or alluvium. The dominant vegetation of this community is green ash (*Fraxinus pennsylvanica*) (NatureServe 2007).

Horizontal Juniper-Little Bluestem Shrubland

This creeping juniper community type occurs on moderate to steep slopes, usually on upper slopes. Soils are silty loam, sandy loam, or clay loam and it occurs on north- and, rarely, west-facing slopes. Parent materials are sandstone, siltstone, claystone, and sandy glacial till. This community is dominated by short shrubs and graminoids (NatureServe 2007).

Badlands Slope

This ecological system is typified by extremely dry and easily eroded, consolidated clay soils with bands of sandstone or isolated consolidates and little to no cover of vegetation (usually less than 10 percent but can be as high as 20 percent). Vegetated patches within the badlands system may have cover higher than 20 percent. In those areas with vegetation, species can include scattered individuals of many dryland shrubs or herbaceous taxa, including gumweed (*Grindelia squarrosa*), rubber rabbitbrush (*Gutierrezia sarothrae*) (especially with overuse and grazing), greasewood (*Sarcobatus vermiculatus*), Gardner's saltbush (*Atriplex gardneri*), birdfoot sagebrush (*Artemisia pedatifida*), buckwheat (*Eriogonum* spp.), plains muhly (*Muhlenbergia cuspidata*), bluebunch wheatgrass (*Pseudoroegneria spicata*), and Hooker's sandwort (*Arenaria hookeri*). Patches of Artemisia spp. can also occur. This system can occur where the land lies well above its local base level or below and is created by several factors, including elevation, rainfall, carving action of streams, and parent material (NatureServe 2007).

Sandreed Prairie

This prairie sandreed grassland is found on gentle slopes but can also be found on flat land or moderate to steep slopes. Soils consist of thin sands, sandy loams, and loamy sands, in places derived from sandstone. Most stands of this community are not very large. The vegetation is dominated by graminoids, with two strata including one strata consisting of mid to tall grasses and the other strata consisting of dense short sedges (NatureServe 2007).

Western Wheatgrass Prairie

This western wheatgrass prairie community occurs on flat or gently sloping terrain including floodplains, gentle valley slopes, and uplands. The soils are clay loam, silt loam, or loam and usually deep and fertile. This community is dominated by medium and short graminoids (NatureServe 2007).

Western Floodplain Forest

This ash-elm woody draw community type occurs on upland sites along steep north-facing slopes and, occasionally, along intermittent drainages or near the bases of north-facing slopes of upland sites. Soils are typically moist and poorly drained, and usually silty clay or clay. This is a moderately to densely vegetated forest with an open to dense shrub understory (NatureServe 2007).

Silver Sage-Western Wheatgrass Scrub

This silver or coaltown sagebrush shrubland occurs on flat alluvial deposits on floodplains, terraces or benches, or alluvial fans. The soils are moderately deep to deep and either silt loam, clay loam, or sandy loam. This community is dominated by a combination of shrubs and graminoids. The total vegetative cover is moderate with the tallest and most conspicuous stratum in this community consisting of a shrub layer that is usually 1.8 to 3.1 feet (NatureServe 2007).

Buckbrush Shrubland

This buckbrush shrubland is occurs in mesic depressions and swales, typically surrounded by upland grassland communities. The soils are silts and loams. This type has three distinct vegetation layers, a shrub layer, a graminoid-dominated layer, and a forb-dominated layer (NatureServe 2007).

B.2.6.2 Noxious Weeds

Several noxious weed species are known to be a problem in North Dakota. If not controlled, noxious weeds can infest areas, resulting in the loss of native grasses and forbs. Noxious weeds identified by the NRCS that potentially occur within the proposed corridor are listed in **table B-6**. The list includes state and county prohibited or restricted noxious weeds that are managed and controlled by the state of North Dakota.

Table B-6 Noxious Weeds Potentially Occurring Within the Proposed Corridor

Common Name	Scientific Name	Counties		
		Stark	Slope	Bowman
Russian knapweed	*Acroptilon repens*	X	X	X
Absinth wormwood	*Artemisia absinthium*	X	X	X
Musk thistle	*Carduus nutans*	X	X	X
Canada thistle	*Cirsium arvense*	X	X	X
Diffuse knapweed	*Centaurea diffusa*	X	X	X
Spotted knapweed	*Centaurea maculata*	X	X	X
Yellow starthistle	*Centaurea solstitialis*	X	X	X
Field bindweed	*Convolvulus arvensis*	X	X	X
Leafy spurge	*Euphorbia esula*	X	X	X
Dalmation toadflax	*Linaria genistifolia*	X	X	X
Purple loosestrife	*Lythrum salicaria*	X	X	X
Hoarycress*	*Cardaria draba*	X		
Yellow toadflax*	*Linaria vulgaris*	X		
Black henbane*	*Hyoscyamus niger*	X		
Baby's breath*	*Gypsophila paniculata*			X
Houndstongue*	*Cynoglossum* spp.		X	
St. Johnswort*	*Hypericum* spp.		X	

*Noxious weeds identified by county in addition to the North Dakota State List.

Source: USDA/NRCS 2005; NRCS 2007b, NRCS 2007c, NRCS 2007e.

B.2.7 Archaeological and Historic Resources

There are 165 previously documented cultural resource sites that occur within the proposed corridor. Eighty-nine of the documented sites are architectural sites, including 38 recorded structures in the Town of Rhame. Many of the architectural sites are farmsteads, homesteads, or ranches; however, they also include other types of structures such as bridges, schoolhouses, churches, and cemeteries. Twenty-one of the sites are historic archaeological sites, which include cultural material scatters, dumps, depressions and foundations, and mines. The remaining 55 sites are prehistoric. Of these, 39 are lithic scatters, 12 are open camps, three are quarry sites, and one is an unidentified rock feature.

B.2.8 Native American Setting

Southwestern North Dakota and surrounding areas traditionally have been used by Native Americans since pre-recorded time. Present-day tribes with ties to the area include:

- Eastern Shoshone Tribe – Fort Washakie, Wyoming;
- Northern Arapaho Tribe – Fort Washakie, Wyoming;
- Northern Cheyenne Tribe – Lame Deer, Montana;

- Oglala Lakota Nation – Pine Ridge, South Dakota;
- Rosebud Sioux Tribe – Rosebud, South Dakota;
- Cheyenne River Sioux Tribe – Eagle Butte, South Dakota;
- Standing Rock Sioux – Fort Yates, North Dakota;
- Crow Tribe – Crow Agency, Montana;
- Fort Peck Tribes – Poplar, Minnesota; and
- Three Affiliated Tribes – New Town, North Dakota.

B.2.9 Paleontological Resources

Southwestern North Dakota is well-known for paleontological resources. Paleontological resources present in Stark, Slope, and Bowman counties have been observed in areas where the Brule, Chadron, Hell Creek, Sentinel Butte, Bullion Creek, and Golden Valley formations of the Tertiary and Cretaceous periods are exposed. Data from the North Dakota Geological Survey (2007) indicate that fossils from eight mammalian and three reptilian species occur in these areas.

B.2.10 Transportation Network

Major surface transportation routes in the project area consist of Interstate 94 (I-94), U.S. Highway 85, U.S. Highway 12, and State Routes (SR) 22, 21, and 67. I-94 provides access across southern North Dakota and interconnects cities throughout the upper Midwest and western states. U.S. Highway 12 interconnects Rhame, Bowman, and cities to the east and west. Major north-south routes include U.S. Highway 85 from Belfield to Bowman and SR 22 from Dickinson to New England. SR 21 and 67 serve the central portion of the project area.

Local highways include County Major Collector Route 619, which extends south of Rhame and adjacent to the proposed Rhame Substation site. Local roads are oriented on a north-south/east-west grid along section lines. Local roads vary from primitive (unimproved) trails to roads that are gravel, graded, and drained. Local roads along section lines are typically within a 66-foot-wide ROW.

AirNav data (2007a,b) indicate that commercial airports are located in Bowman and Dickinson. The public owned Bowman Municipal Airport has a single asphalt/aggregate surface runway measuring 4,800 feet long and 75 feet wide. The Dickinson – Theodore Roosevelt Regional Airport main runway is asphalt grooved, 6,400 feet long and 100 feet wide; the cross-wind runway is asphalt grooved, 4,700 feet long and 75 feet wide. Several private landing strips are scattered throughout the proposed corridor.

B.2.11 Socioeconomic Values

The proposed corridor includes Stark, Slope, and Bowman counties in rural, southwestern North Dakota. Stark County includes approximately 1,340 square miles of land and has a population of 22,167 residents (U.S. Census Bureau 2006). The proposed corridor extends south through Slope County, which includes approximately 1,219 square miles of land and has a population of 713 residents. The southern portion of the proposed corridor and the proposed Rhame Substation is located in Bowman County. Based on a 2006 report completed by the U.S. Census Bureau, the county includes a population of 2,991 residents.

Median household income for communities within the proposed corridor ranges from $20,375 in Rhame, located in the southern portion of the proposed corridor in Bowman County to $35,750 in South Heart, located in the northern portion of the proposed corridor in Stark County (U.S. Census Bureau 2000). Racial composition of residents within all 3 counties within the proposed corridor is predominantly white; 97.9 percent in Stark County, 99.9 percent in Slope County, and 99.5 percent in Bowman (U.S. Census Bureau 2000).

Agriculture is the primary industry, with spring wheat as the most common crop produced, followed by durum wheat, winter wheat, and hay. Livestock production is the second largest industry, primarily producing beef cattle, dairy cattle, and hogs. Service industries and retail trade support residents in the area towns. During the hunting season, the tourism industry provides recreational activities such as big and small game hunting.

B.2.12 Environmental Justice

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was signed on February 11, 1994. EO 12898 directs federal agencies to review proposals and identify, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations to the greatest extent practicable and permitted by law. As such, the proposed project must be evaluated in terms of an adverse effect that:

a. Is predominantly borne by a minority population and/or low-income population; or

b. Would be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the nonminority population and/or nonlow-income population.

Racial composition of the residents within all three counties is predominantly white. While the communities of Belfield and Rhame report a higher percentage (19 percent) of individuals below the poverty level as compared to the North Dakota's state average of 11.4 percent below poverty, the proposed project does not directly affect these communities.

B.2.13 Visual Resources

Visual resources within the proposed corridor largely consist of broad expanses of cultivated fields, rangeland, and grasslands. Areas that are not used for crop or livestock production are limited to urbanized centers associated with cities and towns. Sensitive receptors within the area include rural residents living in scattered housing on farmsteads.

B.2.14 Noise

Ambient noise levels within the proposed corridor have not been measured; however, given the rural setting, they are likely to be low. Levels near developed areas and along area roads and highways are likely to be higher due to vehicle movement and other human activities. Wind is a major contributor to ambient noise levels within the area. Agricultural machinery noise is a contributor to noise levels, when operated near residences and other sensitive receptors. Sensitive receptors within the area are limited to residents in scattered locations and those in developed areas.

B.2.15 Meteorology and Air Quality

Average maximum and minimum annual temperatures in the proposed corridor range from 55.1 degrees Fahrenheit (°F) to 30.3°F and average below freezing temperatures occur during October through April. Precipitation ranges from a low monthly average of 0.38 inch during February to a high monthly average of 3.44 inches in June. Annual precipitation totals 15.28 inches (High Plains Regional Climate Center 2008).

The North Dakota Department of Health, Division of Air Quality has determined that the concentrations of the criteria pollutants in the proposed corridor are currently lower than the allowable limits established by the national and state Ambient Air Quality Standards (AAQS). Thus, the proposed corridor is considered to be in attainment of the AAQS for all pollutants.

C. Need for Facility

C.1 Analysis of Need

The proposed transmission line and Rhame Substation are needed to meet load forecasts of BEPC customers in southwestern North Dakota. Oil and gas development activity in southwestern North Dakota is causing accelerated growth in requirements for available power, which would increase from 85 MW in 2007 to an expected demand of 140 MW by 2016.

BEPC evaluated power requirements through a systems study that included evaluations of existing substation and transmission line resources in the area, effects of various interconnection scenarios, and consequences of the addition of new facilities. A new transmission line from Belfield to Rhame, a new substation at Rhame, and relocation of existing substation interconnections from the existing Rhame Substation to the new Rhame Substation was determined to be the most cost-effective and practical means to meet existing and future power requirements.

The need for a new substation near Rhame results from load limits at Little Missouri Substation (located near Baker, Montana) that currently serves southwestern North Dakota and surrounding areas. Although capacitor additions have increased the load limit from 65 MW to 85 MW, voltage load curtailing (i.e., brownouts) at the Little Missouri Substation would continue. Additional modifications to Little Missouri Substation cannot be made because the existing 230-kV yard is a tap configuration and a new 230-kV fully developed breaker system cannot be added without the extensive addition of new equipment, which would require reconstruction of a new and substantially larger substation in the area. Similar space limitations at the Bowman Substation also preclude expansion of that facility.

Construction and operation of the proposed Rhame Substation represents the most expedient and cost effective solution to ensuring adequate power supply to the region into the foreseeable future. Development of the substation also offers an opportunity to provide redundancy to a 115-kV transmission system between Little Missouri Substation and the proposed Rhame Substation. The Little Missouri Substation, proposed Rhame Substation, Western's 230-kV Transmission Line, and the proposed transmission line are schematically illustrated in **exhibit C-1**. Current and future power requirements for the Little Missouri Substation are illustrated in **exhibit C-2**.

C.2 Alternatives

Several structural and non-structural alternatives were considered, but eliminated from further analyses. Operation of a power generating facility in the Rhame area could reduce or eliminate the need for a new transmission line from Belfield to Rhame; however, construction and operation of a new fossil-fueled generating station (e.g., gas-fired simple- or combined-cycle facility) would be cost prohibitive and could result in greater environmental impacts than would result from a new transmission line. The development of local wind power facilities would fail to provide reliable base load power that is needed.

Demand side management is a non-structural method that is often called upon to aid in meeting power supply shortfalls. North Dakota Department of Commerce is mandated to implement the State Energy Program promoting energy conservation and efficiency and reducing energy consumption growth rates. Implementation of additional demand side management energy conservation efforts would fail to meet near-term and future energy needs in southwestern North Dakota.

Engineering and cost analyses were applied to evaluate various transmission line structure designs and materials. Structure design options included single-pole, H-frame, and lattice. Materials considered included steel (galvanized and self-weathering), wood (wood pole), and laminated wood. Factors considered included durability, cost of installation, cost and frequency of periodic maintenance, and potential environmental impacts.

BEPC originally selected steel H-frame structures for the project because the materials and installation are relatively inexpensive, they can withstand heavy ice and wind loading, and spans between structures can be longer than wood. Use of steel H-frame structures also would largely eliminate the use of guy wires. Based on comments received during public scoping, BEPC reconsidered the use of single-pole structures, rather than H-frame structures. Single-pole structures would greatly reduce potential conflicts with agricultural machinery operations, allow placing structures between (on) property lines (thereby reducing impacts to any one property owner), and reduce the amount of land needed for any one structure.

Span distances would be less for single-pole structures (800 feet) than that of H-frame structures (1,000 feet). Therefore, more structures would be required per mile of line and for the project. Shorter span distances are, in part, due to differing conductor configurations. H-frame structures would have a horizontal conductor configuration with all three phases an equal height above ground level. Single-pole structures would have a vertical conductor configuration.

C.3 Deviation from Ten-Year Plan

The description of the proposed project corresponds with information provided in the most recent Ten-Year Plan, which was submitted to the PSC by BEPC in June 2007. There were no deviations between the planned project described in the Ten-Year Plan and the proposed project described in this application.

D. Location

D.1 Study Area

North Dakota Administrative Code, Section 69-06-04-02 1 b. requires that the width of the corridor for the proposed transmission line be at least 10 percent of its length, but not less than 1 mile and not greater than 6 miles, unless approved by the PSC. Thus, the proposed project would require a 6-mile-wide corridor. Due to geographic constraints, a single 6-mile-wide corridor was routed from the Belfield area to the Rhame area as illustrated in **exhibit A-1**.

Factors provided in Section NDCC 49-22-09 that are to be considered in evaluating application and designation of sites, corridors, and routes are listed below. The PSC shall be guided by, but is not limited to, the following considerations, where applicable, to aid in the evaluation and designation of sites, corridors, and routes:

1. *Available research and investigations relating to the effects of the location, construction, and operation of the proposed facility on public health and welfare, natural resources, and the environment*.

   A Class I file search of recorded cultural resource sites within the proposed corridor was completed using data from the Division of Archaeology and Historic Preservation, State Historical Society of North Dakota. The North Dakota Natural Heritage Inventory also provided database information regarding threatened, endangered, and state sensitive plant species. In addition, an EA is currently being completed by Western for the proposed project.

2. *The effects of new energy conversion and transmission technologies and systems designed to minimize adverse environmental effects.*

   BEPC would use self-supporting electric transmission line structures without the use of guy wires for support. Steel single-pole structures would be used instead of steel H-frame structures, which would result in less permanent disturbance. Also, the construction of the proposed Rhame Substation would eliminate the need for the existing Rhame Substation, which would be removed from operation after the proposed Rhame Substation became operational.

3. *The potential for beneficial uses of waste energy from a proposed energy conversion facility.*

   Not applicable.

4. *Adverse direct and indirect environmental effects which cannot be avoided should the proposed site or route be designated.*

   To the extent practicable, all effects from the construction and operation of a transmission line and substation within the proposed corridor would be mitigated. With the exception of the proposed Rhame Substation and access road, proposed structure locations, and microwave tower sites all other lands that would be disturbed during construction would be returned to the current land use. No other permanent direct or indirect adverse effects are anticipated.

5. *Alternatives to the proposed site, corridor, or route which are developed during the hearing process and which minimize adverse effects.*

   No alternatives to the proposed corridor location have been identified at this time. Alternative corridors may be identified during the public hearing process.

6. *Irreversible and irretrievable commitments of natural resources should the proposed site, corridor, or route be designated.*

   Irreversible and irretrievable commitments of natural resources would include the permanent loss of vegetation and soil productivity from 12.3 aces of land associated with the proposed Rhame Substation, access road, and microwave tower. Minimal amounts (<0.2 acre) of land at the structure locations and Rainy Butte Microwave Tower site (0.1 acre) would be taken permanently out of production. No other irreversible or irretrievable commitments of natural resources would occur from project construction and operation. All areas of natural vegetation within the ROW would be reclaimed with agency-recommended or landowner seed mixtures and wetlands and woodlands would be avoided.

7. *The direct or indirect economic impacts of the proposed facility*.

   Economic impacts would be positive. Ad valorem taxes would be paid annually, which help the economy. North Dakota sales or use tax would be paid on all materials purchased. During construction, workers would increase the level of business activity in the area.

8. *Existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site, corridor, or route.*

   Proposed developments within the proposed corridor include a lignite mine/power plant project and an airport relocation project.

   South Heart Coal, LLC has proposed the development of lignite mining and a coal gasification plant southeast of the Belfield Substation. If developed, the mine would likely impact several square miles of agricultural land. Impacts from this proposed project would be long term and would likely affect biological, cultural, socioeconomic, and visual resources within the area.

   Although a plan of development is not available for the proposed mine and power plant, assumptions have been made based on similar operations elsewhere. Mining operations would likely require removal and stockpiling of topsoil, excavation of lignite resources and surface restoration that would permanently change surface uses, biological resources, and surface hydrology. Heavy equipment would be brought to the site on public roads, which could create temporary transportation impacts. Coal handling would be confined to the property boundary, but would likely require transport to the plant site by truck, dedicated rail line, or conveyor system.

   Although a site for the proposed new Bowman County Airport has not been identified, it would be located in the vicinity of the proposed project. The new airport would likely occupy approximately 1 square mile of cropland and/or pastureland. Airport property would be fenced and would include a terminal, hangers, runway marking features, storage tanks, and other structures that would change the visual character of the area. The facility also would result in the loss of wildlife habitat, cultural resources, and the loss of agricultural lands.

9. *The effect of the proposed site or route on existing scenic areas, historic sites and structures, and paleontological or archaeological sites.*

   The proposed corridor does include several historic sites, structures, and archaeological sites. It is anticipated that the proposed route would avoid these sites.

10. *The effect of the proposed site or route on areas which are unique because of the biological wealth or because they are habitats for rare and endangered species*.

    The proposed corridor includes wetlands and wooded areas in localized areas. A total of 52 special status wildlife species and 6 special status plant species potentially occur within the proposed corridor.

However, impacts to these species are not anticipated to these species with the implementation of BMPs and mitigation measures.

11. *Problems raised by federal agencies, other state agencies, and local entities.*

    To date, no problems have been indentified. Federal and state agencies were contacted during the data collection phase of the proposed project. These agencies have provided input and identified concerns that have been addressed in this document.

D.2 Proposed Corridor Location Criteria

The proposed corridor must originate at the Belfield Substation and terminate at the proposed Rhame Substation. The criteria used to arrive at the corridor's location within the study area are illustrated in **exhibits D-1** through **D-12**.

D.3 Proposed Corridor Selection Criteria

The proposed transmission line must originate at the Belfield Substation and terminate at the proposed Rhame Substation. No alternative corridors were selected or evaluated. Alternative corridors would not be feasible based on the proposed project's need and design.

The criteria identified and illustrated in section D.2 and **exhibits D-1** through **D-12** are difficult to list in order of importance in terms of relative value as they are closely interrelated. They were of equal value and importance in the corridor selection process. The selection criteria are discussed in the following section.

D.4 North Dakota Public Service Commission Criteria

The PSC requires a two-step process consisting of identifying and selecting corridors, and routes within corridors. BEPC solicited, and was granted a waiver to combine corridor and routing processes into a single document. PSC routing requirements are applicable to identifying appropriate corridors as well as specific transmission line routes.

The PSC requires initial analyses of alternative transmission line corridors. Corridor widths are to be 10 percent of the total corridor length, with a maximum width not to exceed 6 miles.

Transmission line routing criteria have been developed using PSC guidelines for Energy Conversion and Transmission Siting (North Dakota Century Code, Title 49). Additional criteria have been included, when appropriate. The criteria are applicable to the identification of potential alternative corridors and potential alternative routes. Routing criteria were updated and refined to reflect issues and concerns expressed by federal, state, and local agencies, the applicant, and the public.

The PSC classifies routing constraints as exclusion areas, avoidance areas, selection criteria, and policy criteria. The criteria are summarized in the following sections.

D.4.1 Exclusion Areas

Exclusion areas are defined as geographical areas that are to be completely avoided during transmission line routing. Buffer zones of reasonable distance are to be applied to each exclusion area; natural screening may be considered in determining the extent of the buffer zone. **Exhibits D-1** through **D-4** illustrate exclusion areas that occur within and immediately adjacent to the proposed corridor. Exclusion areas include:

1. *Designated or registered national: parks, memorial parks; historic sites and landmarks; natural landmarks; monuments; and wilderness areas.*

   None are located within the proposed corridor.

2. *Designated or registered state: parks, historic sites; monuments; historical markers; archaeological sites and nature preserves.*

   The proposed corridor was selected to avoid White Butte (highest point in North Dakota). Based on the review of cultural resources information obtained from the State Historical Society of North Dakota, cultural resource sites occur within the proposed corridor.

3. *County parks and recreational areas; municipal parks; and parks owned or administered by other governmental subdivisions.*

   The Butte View State Campground occurs along the extreme southern boundary of the proposed corridor in the Bowman, North Dakota, area. No other parks or recreational areas occur within the proposed corridor.

4. *Areas that are critical to the life stages of threatened or endangered animal or plant species.*

   Although federally listed species, such as the whooping crane, bald eagle, gray wolf, and black-footed ferret, may occur within the proposed corridor, critical habitat for these species does not occur within the proposed corridor.

5. *Areas where animal or plant species that are unique or rare to the state would be irreversibly damaged.*

   Although state sensitive animal and plant species occur within the proposed corridor, none of these species would be irreversibly damaged by construction activities. **Exhibits D-1** through **D-4** illustrate general locations of state sensitive animal and plant species populations present within and adjacent to the proposed corridor.

D.4.2 Avoidance Areas

Avoidance areas are defined as geographical areas that are to be completely avoided during transmission line routing, unless the applicant shows that under the circumstances, there is no reasonable alternative. In determining whether an avoidance area should be designated for a facility, the applicant may consider, among other things, the proposed management of adverse impacts; the orderly siting of facilities; system reliability and integrity; the efficient use of resources; and alternative routes. Economic considerations alone shall not justify approval of these areas. Buffer zones of a reasonable distance shall be included, unless a distance is specified in the criteria. Natural screening may be considered in determining the width of the buffer zone. **Exhibits D-5** through **D-8** illustrate the avoidance areas that occur within the proposed corridor. Avoidance areas include:

1. *Designated or registered national: historic districts; wildlife areas; wild, scenic, or recreational rivers; wildlife refuges; and grasslands.*

   The proposed corridor was selected to avoid the White Lake NWR, Stewart Lake NWR, and Little Missouri National Grassland. There are no wild, scenic, or recreational rivers within the proposed corridor.

2. *Designated or registered state: wild, scenic, or recreational rivers; game refuges; game management areas; management areas; forests; forest management lands; and grasslands.*

   The proposed corridor was selected to avoid designated or registered state wild, scenic, or recreational rivers; game refuges; game management areas; management areas; forests; forest management lands; and grasslands.

3. *Historic resources that are not specifically designated as exclusion or avoidance areas.*

   None are located within the proposed corridor.

4. *Areas that are geologically unstable.*

   Seismic activity within the area is minimal. Five faults occur within the proposed corridor approximately 8 miles northeast of Bowman. The Little Missouri Badlands are the only potentially geologically unstable areas within the vicinity of the proposed corridor.

5. *Areas within 500 feet of a residence, school, or place of business (also to include community centers, healthcare facilities, and daycare facilities).*

   Residences, other structures, active and abandoned schools and businesses are located within the proposed corridor. The majority of the residences and other structures are scattered throughout the proposed corridor. The highest density or residences and businesses are located in the town of Bowman, which is located in the extreme southern portion of the proposed corridor. Several schools occur within the proposed corridor, of which the majority occur in rural portions of the proposed corridor.

6. *Reservoirs and municipal water supplies.*

   None are located within the proposed corridor.

7. *Water sources for organized rural water districts.*

   None are located within the proposed route.

8. *Irrigated land.*

   Irrigated land is not present within the proposed corridor.

9. *Areas of recreational significance that are not designated as exclusion areas.*

   None are present within the proposed corridor.

D.4.3 Selection Criteria

In selecting its proposed corridor, a corridor or route shall be designated only when it is demonstrated to the PSC by the applicant that any significant adverse effects that would result from the location, construction, and maintenance of the facility as they relate to the following, would be at an acceptable minimum, or that those effects would be managed and maintained at an acceptable minimum. Selection criteria within the proposed corridor are illustrated in **exhibits D-9** through **D-12**. Selection criteria include:

1. *Agricultural production.*

   Land within the proposed corridor is predominantly used for agricultural production, which could not be avoided during the corridor identification process.

2. *Family farms and ranches.*

   Family farms and ranches could not be avoided during the corridor identification process. Rural residences and buildings would be avoided during the routing process.

3. *Land that the owner can demonstrate has soil, topography, drainage, and an available water supply that cause the land to be economically suitable for irrigation.*

   Irrigated lands do not occur within the proposed corridor. Land suitable for future irrigation within the proposed corridor has not been identified at this time. Any areas for future irrigation would be identified along the proposed route via landowner discussions and avoided to the extent practicable.

4. *Surface drainage patterns and groundwater flow patterns.*

   Section B.2.3, Hydrology and Surface Drainage, provides a general description of the hydrology and surface drainage within the proposed corridor. Perennial, ephemeral, and intermittent creeks and wetlands occur within the proposed corridor. These areas would be would be identified along the proposed route and avoided to the extent practicable.

5. *Noise-sensitive land uses.*

   Section B.2.14, Noise, provides information regarding existing noise levels and potential sensitive receptors within the proposed corridor.

6. *The visual effect on the adjacent area*.

   Section B.2.13, Visual Resources, provides information regarding the visual landscape and potential sensitive receptors within the proposed corridor.

7. *Extractive and storage resources.*

   The proposed South Heart lignite mining site was identified during the corridor identification process. Avoidance of the site and individual mineral extraction sites has been addressed in the Route Permit Application.

8. *Wetlands, woodlands, and wooded areas.*

   Wetlands, woodlands, and wooded areas, including shelterbelts, occur in localized areas within the proposed corridor. These areas would be avoided wherever feasible by the proposed route.

9. *Radio and television reception, and other communication or electronic control facilities.*

   Several radio, television, and other communication facilities occur within the proposed corridor. However, the operation of the proposed project would not affect either communication transmission or reception.

10. *Human health and safety.*

    Not applicable to the corridor selection process. Potential impacts to human health and safety has been addressed in the Route Permit Application.

11. *Animal health and safety.*

    Not applicable to the corridor selection process. Potential impacts to animal health and safety has been addressed in the Route Permit Application.

12. *Plant life.*

    Not applicable to the corridor selection process. Potential impacts to plant life have been addressed in the Route Permit Application.

D.4.4 Policy Criteria

The PSC may give preference to an applicant that would maximize benefits that result from the adoption of the following policies and practices, and in a proper case, may require the adoption of such policies and practices. The PSC also may give preference to an applicant that would maximize interstate benefits. Policy criteria include:

1. *Location and design.*

   The proposed corridor was selected to avoid sensitive resources to the extent possible.

2. Training and utilization of available labor in North Dakota for the general and specialized skills required.

   Not applicable.

3. *Economics of construction and operation.*

   Not applicable.

4. *Use of citizen coordinating committees.*

   Not applicable.

5. *A commitment of a portion of the transmitted product for use in North Dakota.*

   Power would be purchased by Upper Missouri Electric Cooperative and Slope Electric Cooperative, which are local energy suppliers.

6. *Labor relations.*

   Union and non-union construction contractors would bid on the proposed project. The construction contract would be awarded to the lowest qualified bidder. Transmission line and substation construction would require special skills and equipment. The construction contractor would be encouraged to use local labor, when possible.

7. *The coordination of facilities.*

   The existing Belfield Substation would be used to interconnect with Western's transmission line. The proposed project would terminate south of Rhame and would interconnect to Montana-Dakota Utilities' transmission line and the 115-kV transmission system.

8. *Monitoring of impacts.*

   Not applicable.

9. *Utilization of existing and proposed ROWs and corridors.*

   Corridors were selected to maximize the potential use of existing highways, roads, and section lines.

10. *Other existing or proposed transmission facilities.*

Not applicable.

D.4.5 Design and Construction Limitations

In order to serve the intended functions of transmitting electricity from the Belfield Substation to the southwestern North Dakota area, the proposed transmission line must originate at the Belfield Substation and terminate in the Rhame area. Areas of construction limitations including exclusion areas, avoidance areas, selection criteria, and policy criteria are described in sections D.4.1 through D.4.4 and illustrated in **exhibits D-1** through **D-12.**

D.4.6 Economic Considerations

BEPC is committed to constructing the proposed transmission line, Rhame Substation, and microwave towers as economically as possible while strictly adhering to the PSC's criteria. The anticipated construction cost for installation of the proposed transmission line, Rhame Substation, and microwave towers within the proposed corridor is $33 million; annual operation costs are estimated at approximately $27,300 per year for the proposed transmission line and approximately $29,460 per year for the proposed Rhame Substation.

D.5 Mitigative Measures

Construction specifications would be designed to minimize potential impacts associated with the proposed transmission line, Rhame Substation, access road, and microwave tower. Certain impacts may not be entirely avoidable, but could be mitigated to reduce the severity and longevity. Specific mitigation measures for the proposed project have been provided in **appendix E**.

D.6 List of Preparers and Qualifications

This application for a Certificate of Corridor Compatibility was prepared by ENSR, BEPC, and Metcalf Archaeological Consultants. The qualifications of the individuals who participated in the preparation and review of this application are provided in **table D-1**.

Table D-1 Qualifications of Application Preparers

Company and Person	Responsibilities	Education and Experience
ENSR Corporation - Fort Collins, Colorado		
Jon Alstad	Corridor Compatibility Application Manager	M.S. Range Science B.S. Animal Science A.A. Liberal Arts 19 Years Experience
George High	Project Manager	B.S. Biology 34 years experience
Peggy Roberts	Assistant Project Manager, Public Involvement Specialist	B.J. Journalism/PR M.S. Public Communications (in progress) 10 years experience
Patricia Lorenz	Biological Resources	B.S. Wildlife Biology 5 Years Experience
Kim Munson	Cultural Resources	M.A. Anthropology B.A. Anthropology 16 Years Experience

Table D-1 Qualifications of Application Preparers

Company and Person	Responsibilities	Education and Experience
Merlyn Paulson	GIS	B.L.A. Landscape Architecture M.L.A. Landscape Architecture 33 Years Experience
Brent Read	GIS	B.S. Forestry Science M.S. Watershed Science 5 Years Experience
Susan Coughenour	Technical Editor	Two Years General Studies 24 Years Experience
Basin Electric Power Cooperative – Bismarck, North Dakota		
Duey Marthaller	Project Manager	M.S. Civil Engineering B.S. Civil Engineering 29 Years Experience Registered Professional Engineer
Kevin Solie	Environmental Analyst	M.S. Geology B.S. Geology B.S. Geological Engineering (in progress) 17 Years Experience
Mike Murray	Right-of-Way	A.A. Business Administration Various Courses through International ROW Association SR/WA (Senior ROW designation) 8 Years Experience
Phil Novak	Right-of-Way	Various courses through International ROW Association 20 Years Experience
Joyce Novak	Right-of-Way	Various courses through International ROW Association 20 Years Experience
Curt Pearson	Corporate Communications	B.S. Business Administration M.B.A. Certified Cooperative Communicator 30 Years Experience
Metcalf Archaeological Consultants – Eagle, Colorado		
Patrick O'Brien	Cultural Resources	M.A. Anthropology B.A. Anthropology 16 Years Experience

D.7 Maps

Detailed maps (i.e., exhibits) of the proposed corridor have been provided in the Exhibits section.

D.8 Permits, Licenses, Approvals, and Consultation Requirements

Permits, consultations, and approvals would be required from various federal and state agencies, which would include:

- North Dakota Public Service Commission – Certificate of Corridor Compatibility and Route Permit;
- Western – System Interconnection Authorization, compliance with the National Environmental Policy Act and Native American Consultation;
- USFWS – Compliance with the ESA (Section 7 consultation), compliance with the Migratory Bird Treaty Act;
- State of North Dakota Historic Preservation Office – Compliance with the National Historic Preservation Act (Section 106 consultation);
- Federal Highway Administration – Permit to construct and operate a transmission line across or within rights-of-way;
- Federal Aviation Administration – Aeronautical study with a determination of hazards and requirements for painting and/or lighting;
- Federal Communications Commission – Agency may require registration and lighting of tower less than 200 feet tall;
- North Dakota Department of Transportation – Permit to construct and operate a transmission line across or within rights-of-way;
- Burlington Northern–Santa Fe Railroad – Authorization to construct and operate a transmission line across railroad rights-of-way;
- NDGFD – Consultation to identify any state-listed species of concern that could potentially be affected by the proposed project; and
- North Dakota Department of Health – Acquire Storm Water Pollution Prevention Permit, if required, for construction of the proposed Rhame Substation.
- Bowman County – Acquire Zoning Permit.

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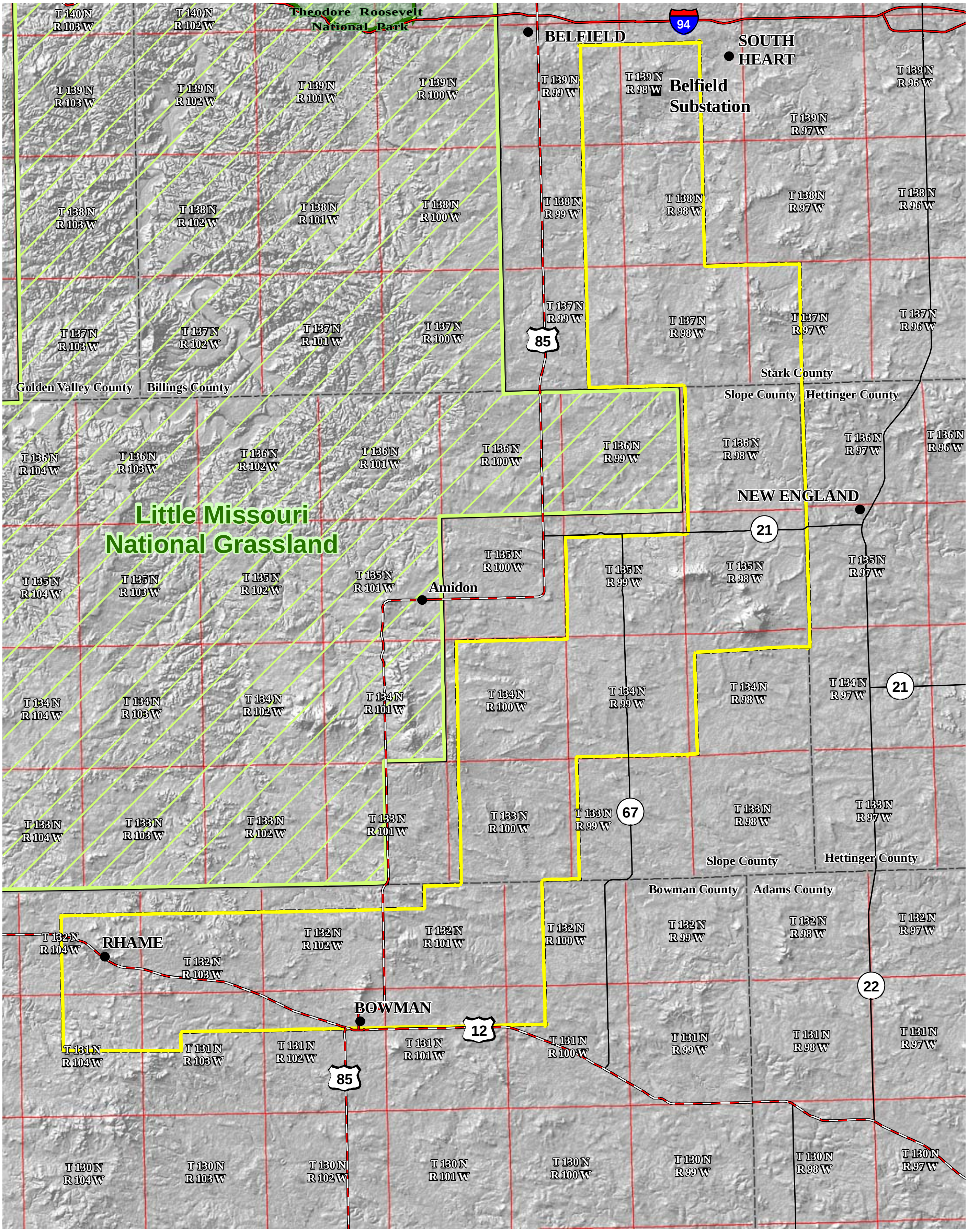
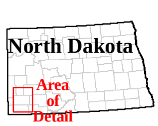
Exhibits





LEGEND

- Proposed Corridor
- Substation
- City or Town
- National Park
- National Grassland
- Township

Scale in Miles: 4 2 0 4

Map Projection: UTM
Zone: 13 North

Datum: NAD 1983
Grid Units: Meters

Belfield to Rhame Transmission Project

Basin Electric Power Cooperative — A Touchstone Energy Cooperative
Western Area Power Administration

Exhibit A-1 Belfield - Rhame Proposed Corridor

ENSR | AECOM

March 2008

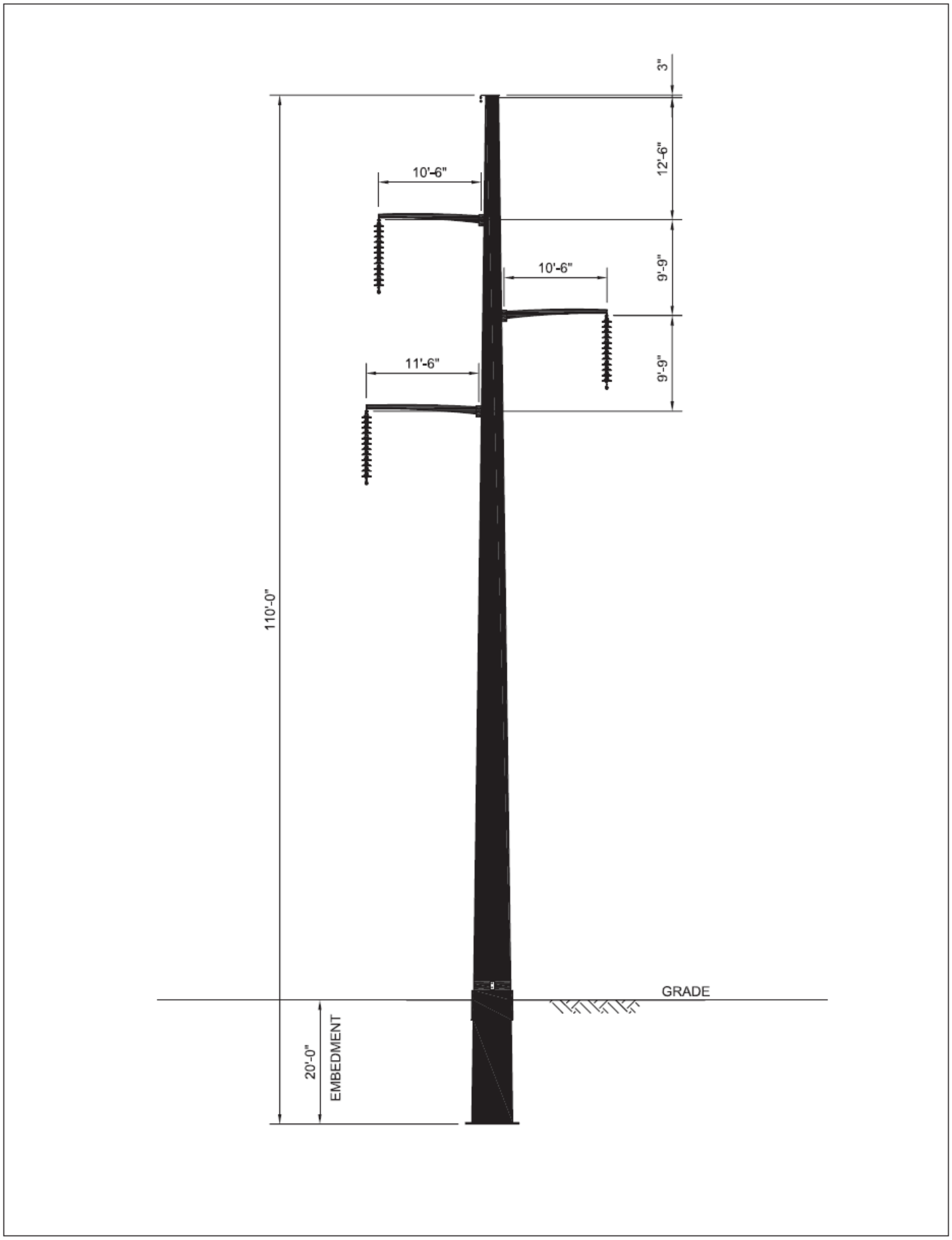
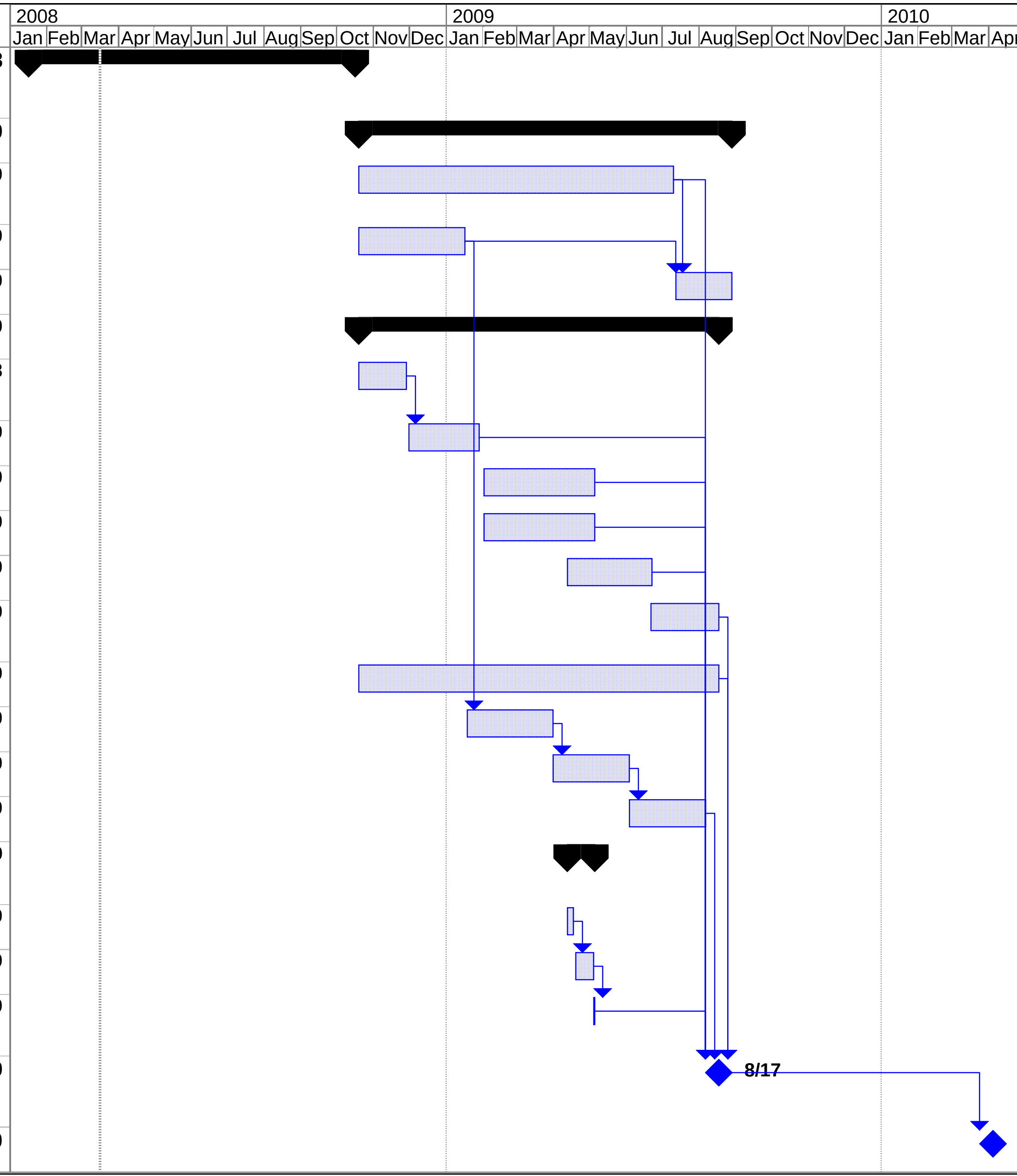


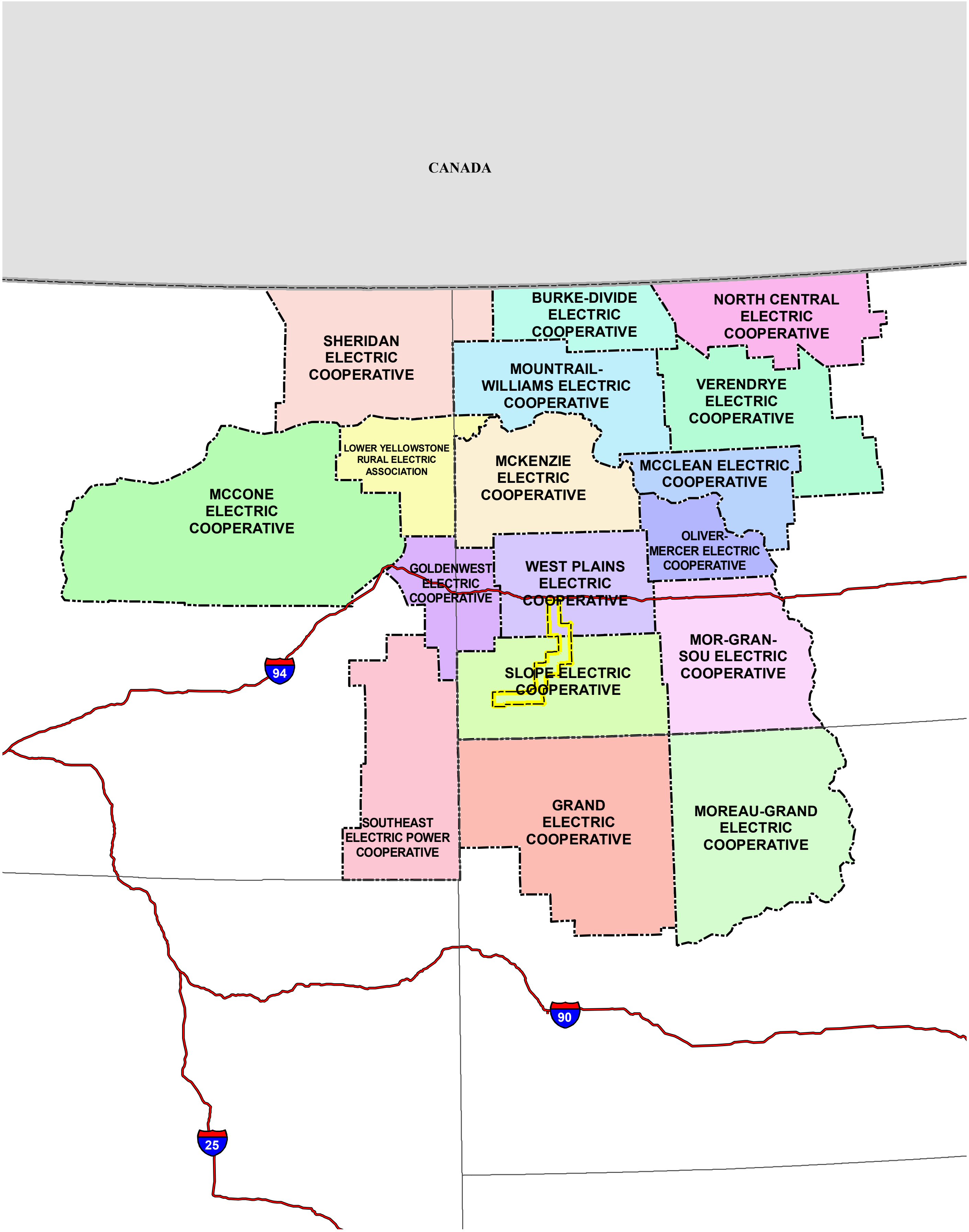
Exhibit A-2 Typical Single-Pole Structure

Exhibit A-3. Proposed Time Schedule for Permitting and Construction

ID	Task Name	Start	Finish
1	**PSC Corridor Compatibility and Route Permit Applications**	**Thu 1/17/08**	**Fri 10/17/08**
8	**Substation Construction**	**Mon 10/20/08**	**Fri 8/28/09**
9	Substation and Construction Yard and Material Staging	Mon 10/20/08	Fri 7/10/09
10	Substation Grading	Mon 10/20/08	Fri 1/16/09
11	Landscape Rehabilitation	Mon 7/13/09	Fri 8/28/09
12	**Transmission Line Construction**	**Mon 10/20/08**	**Mon 8/17/09**
13	Vegetation Management and Structure Site Clearing	Mon 10/20/08	Fri 11/28/08
14	Gate Installation	Mon 12/1/08	Wed 1/28/09
15	Structure Assembly	Mon 2/2/09	Tue 5/5/09
16	Hole Excavation	Mon 2/2/09	Tue 5/5/09
17	Structure Erection	Mon 4/13/09	Mon 6/22/09
18	Ground Wire and Conductor Stringing	Mon 6/22/09	Mon 8/17/09
19	Cleanup	Mon 10/20/08	Mon 8/17/09
20	Concrete Foundations	Mon 1/19/09	Tue 3/31/09
21	Equipment Installation	Wed 4/1/09	Wed 6/3/09
22	Landscape Rehabilitation	Thu 6/4/09	Thu 8/6/09
23	**Microwave Tower Construction**	**Mon 4/13/09**	**Tue 5/5/09**
24	Foundation Excavation	Mon 4/13/09	Fri 4/17/09
25	Tower Erection	Mon 4/20/09	Mon 5/4/09
26	Building and Antenna Setting	Tue 5/5/09	Tue 5/5/09
27	**Project Construction Complete**	**Mon 8/17/09**	**Mon 8/17/09**
28	**Project In-Service**	**Mon 4/5/10**	**Mon 4/5/10**



Task | Milestone | Summary



LEGEND
Interstate Highway
Proposed Corridor
Cooperative Boundary

50 25 0 50
Scale in Miles

Belfield to Rhame Transmission Project

BASIN ELECTRIC POWER COOPERATIVE
A Touchstone Energy® Cooperative
Western Area Power Administration

Exhibit B-1 BEPC's Northern Service Area

ENSR | AECOM

March 2008

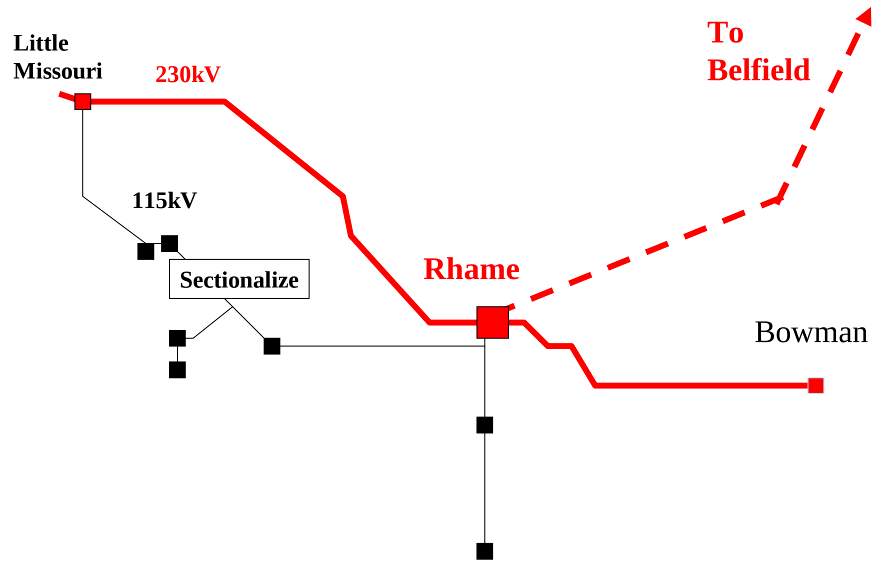


Exhibit C-1 Schematic Drawing of Transmission Lines and Substations

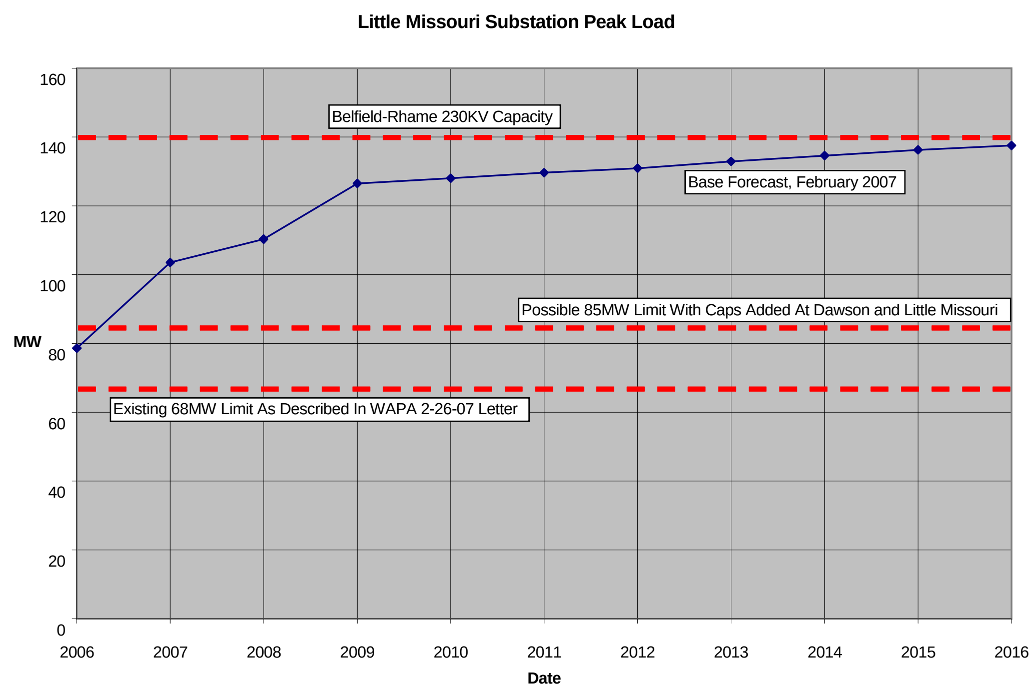
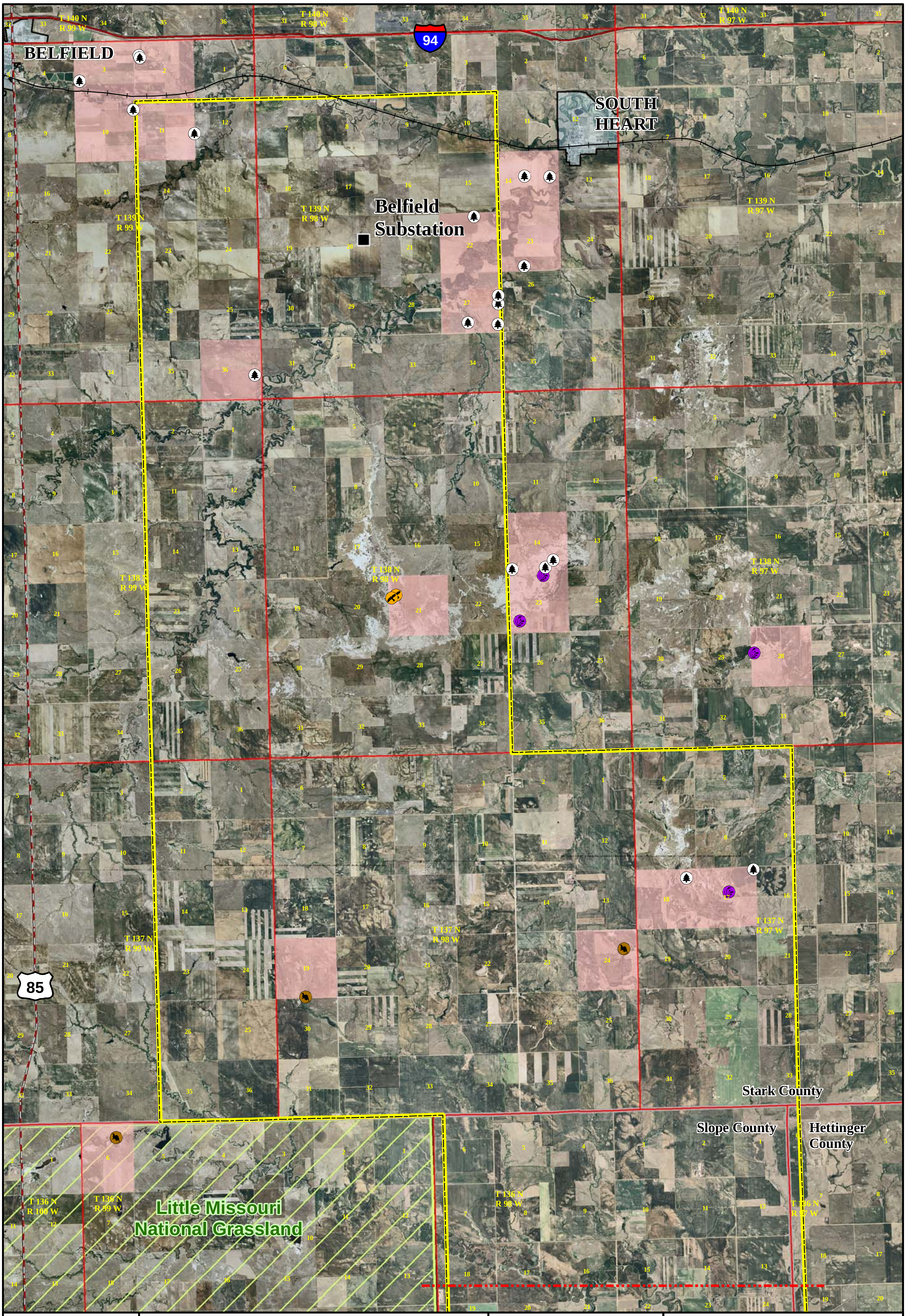
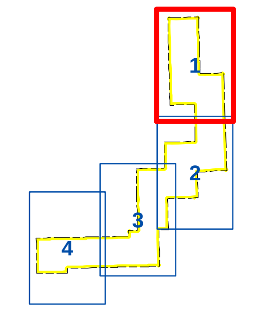


Exhibit C-2 Current and Future Power Requirements





LEGEND

- Proposed Corridor
- Substation
- Match Line
- Township
- City/Town

Exclusion Features

- Section With Natural Heritage Species Observations

Exclusion Features

- Golden Eagle Nest
- Rare Animal Observation
- Rare Ecological Community
- Rare Plant Observation
- Campground

1 0.5 0 1
Scale in Miles

2 1 0 2
Scale in Kilometers

Belfield to Rhame Transmission Project

BASIN ELECTRIC POWER COOPERATIVE
A Touchstone Energy Cooperative

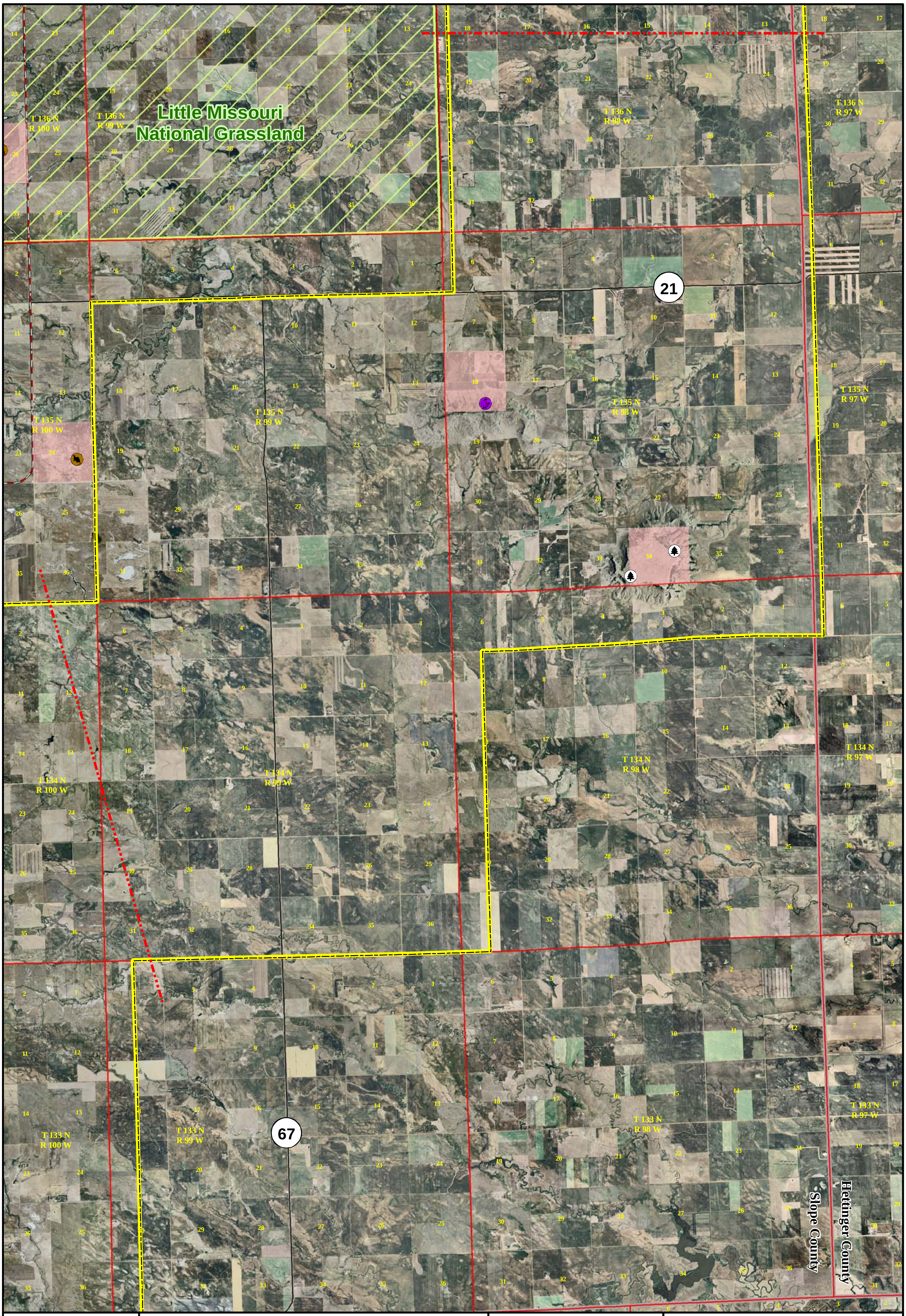
Western AREA POWER ADMINISTRATION

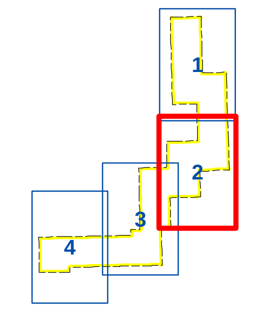
Exhibit D-1
Proposed Corridor
Exclusion Areas

ENSR | AECOM

March 2008

Sources: Wildlife/Ecology - NDNHI 2007.





LEGEND

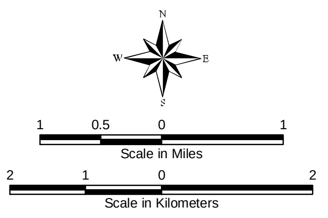
- Proposed Corridor
- Substation
- Match Line
- Township
- City/Town

Exclusion Features

- Section With Natural Heritage Species Observations

Exclusion Features

- Golden Eagle Nest
- Rare Animal Observation
- Rare Ecological Community
- Rare Plant Observation
- Campground



Belfield to Rhame Transmission Project

BASIN ELECTRIC POWER COOPERATIVE — A Touchstone Energy® Cooperative

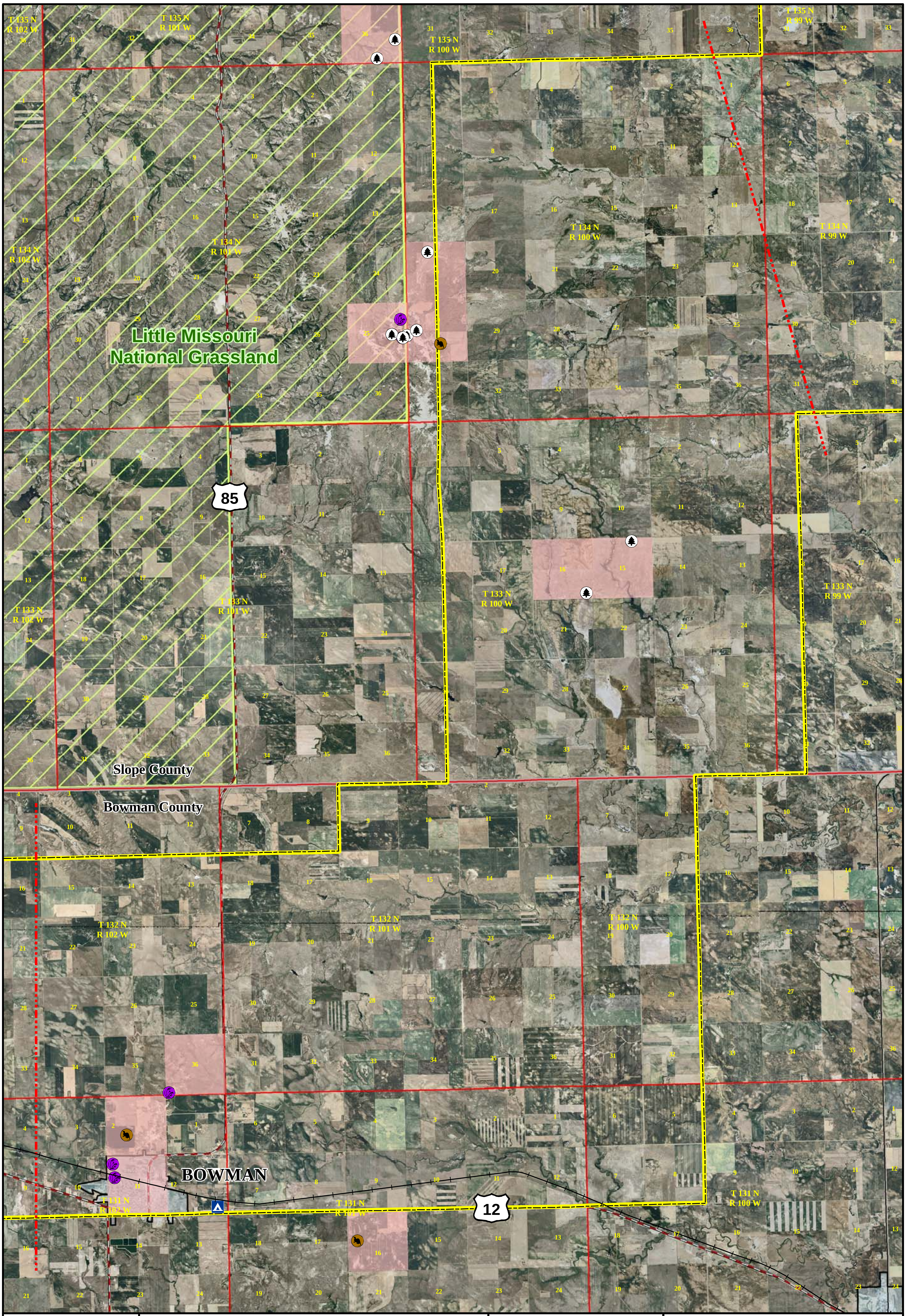
Western Area Power Administration

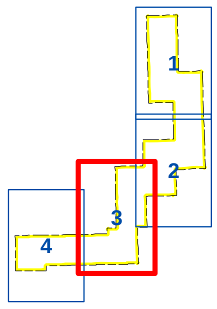
Exhibit D-2
Proposed Corridor
Exclusion Areas

ENSR | AECOM

March 2008

Sources: Wildlife/Ecology - NDNHI 2007.





LEGEND

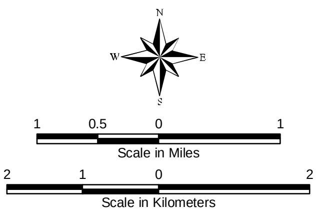
- Proposed Corridor
- Substation
- Match Line
- Township
- City/Town

Exclusion Features

- Section With Natural Heritage Species Observations

Exclusion Features

- Golden Eagle Nest
- Rare Animal Observation
- Rare Ecological Community
- Rare Plant Observation
- Campground



Belfield to Rhame Transmission Project

BASIN ELECTRIC POWER COOPERATIVE
A Touchstone Energy Cooperative

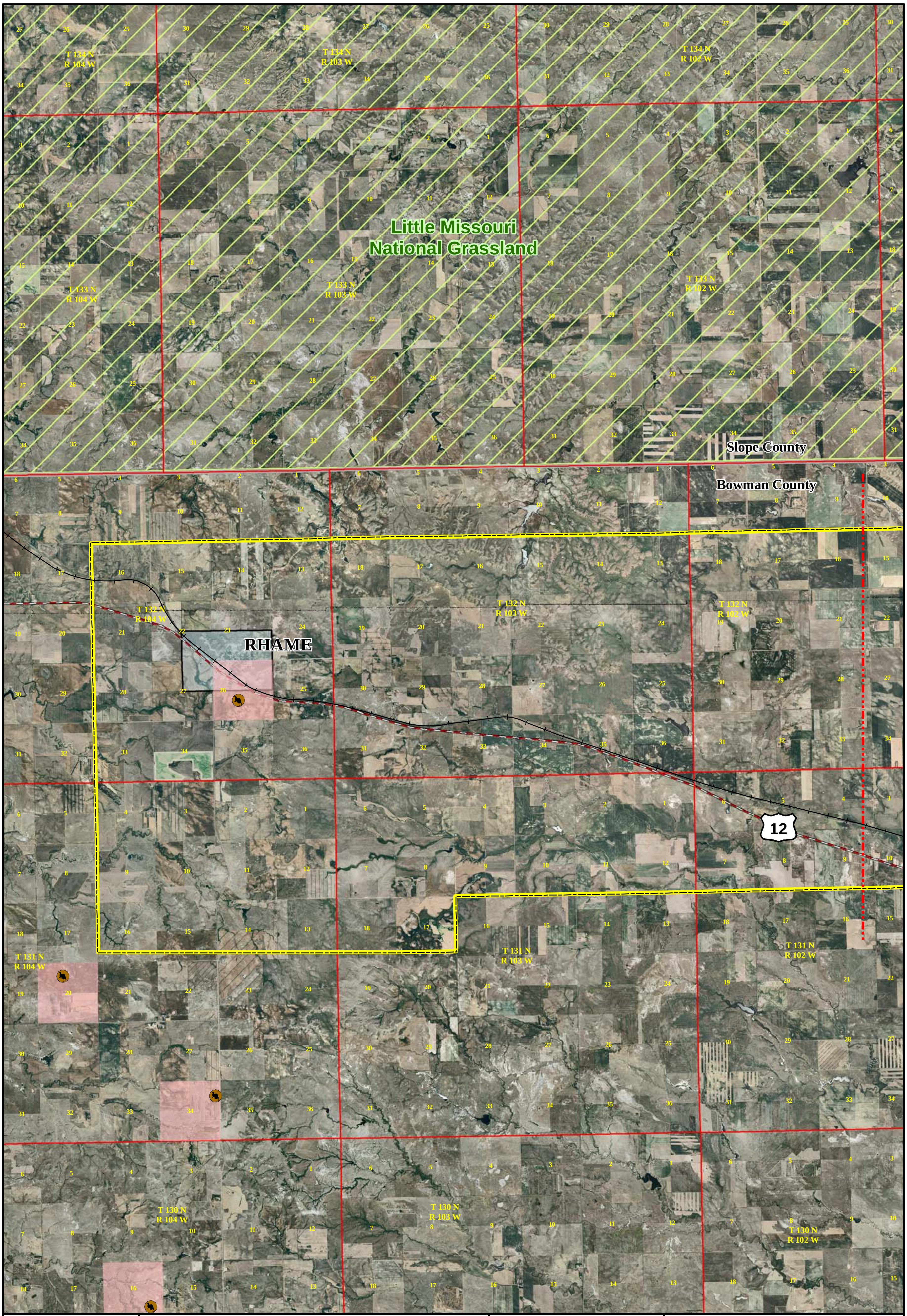
Western Area Power Administration

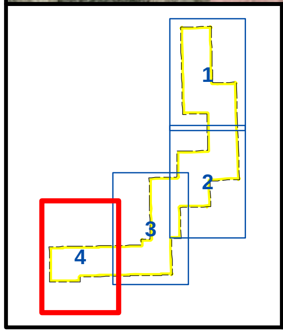
Exhibit D-3
Proposed Corridor
Exclusion Areas

ENSR | AECOM

March 2008

Sources: Wildlife/Ecology - NDNHI 2007.





LEGEND

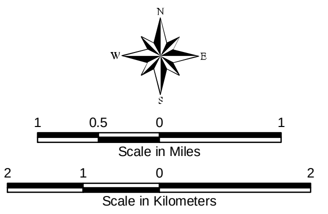
- Proposed Corridor
- Substation
- Match Line
- Township
- City/Town

Exclusion Features

- Section With Natural Heritage Species Observations

Exclusion Features

- Golden Eagle Nest
- Rare Animal Observation
- Rare Ecological Community
- Rare Plant Observation
- Campground



Belfield to Rhame Transmission Project

BASIN ELECTRIC POWER COOPERATIVE — A Touchstone Energy® Cooperative

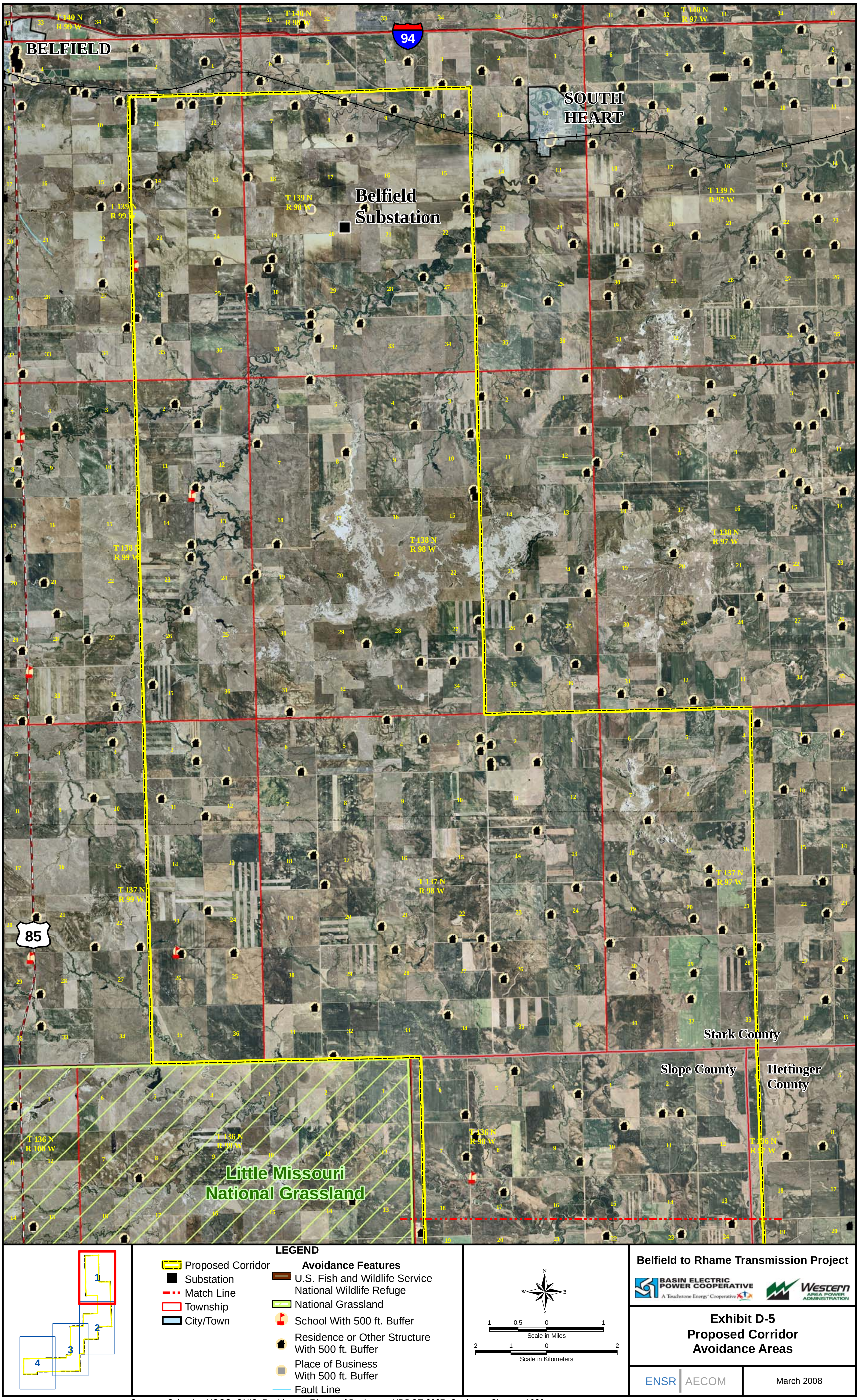
Western Area Power Administration

Exhibit D-4
Proposed Corridor
Exclusion Areas

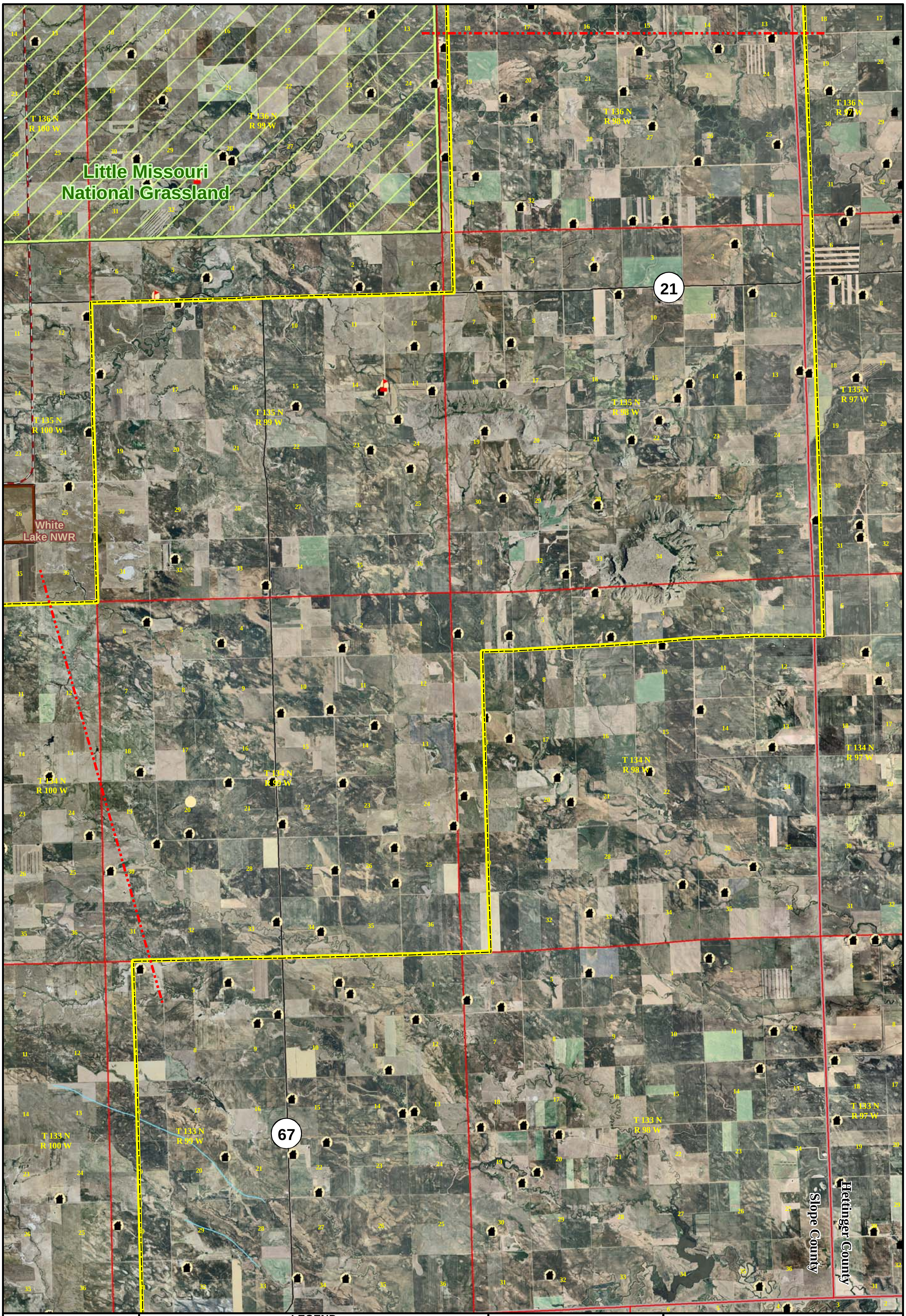
ENSR | AECOM

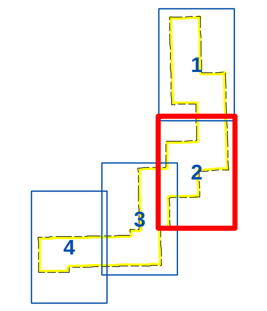
March 2008

Sources: Wildlife/Ecology - NDNHI 2007.



Sources: Schools - USGS, GNIS; Residences/Places of Business - NDDOT 2007; Geology - Clayton, 1980





LEGEND

Proposed Corridor
Substation
Match Line
Township
City/Town

Avoidance Features

U.S. Fish and Wildlife Service National Wildlife Refuge
National Grassland
School With 500 ft. Buffer
Residence or Other Structure With 500 ft. Buffer
Place of Business With 500 ft. Buffer
Fault Line

1 0.5 0 1
Scale in Miles
2 1 0 2
Scale in Kilometers

Belfield to Rhame Transmission Project

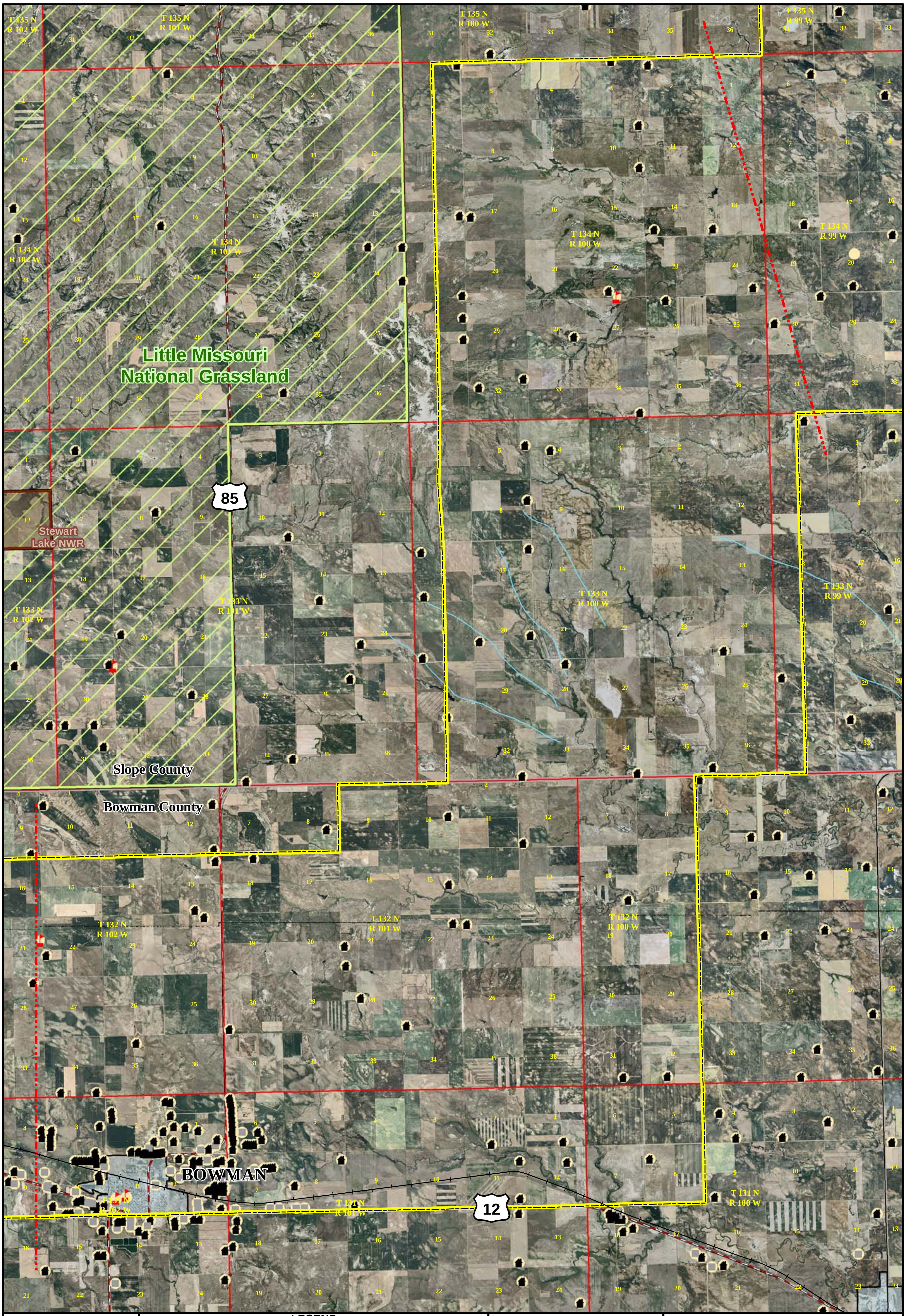
BASIN ELECTRIC POWER COOPERATIVE
A Touchstone Energy Cooperative
Western Area Power Administration

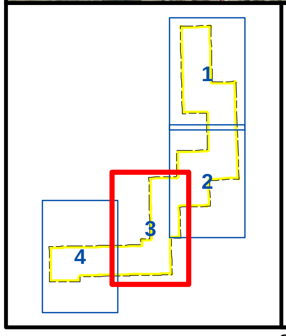
Exhibit D-6
Proposed Corridor
Avoidance Areas

ENSR | AECOM

March 2008

Sources: Schools - USGS, GNIS; Residences/Places of Business - NDDOT 2007; Geology - Clayton, 1980





LEGEND

- Proposed Corridor
- Substation
- Match Line
- Township
- City/Town

Avoidance Features

- U.S. Fish and Wildlife Service National Wildlife Refuge
- National Grassland
- School With 500 ft. Buffer
- Residence or Other Structure With 500 ft. Buffer
- Place of Business With 500 ft. Buffer
- Fault Line

Scale in Miles: 1 0.5 0 1

Scale in Kilometers: 2 1 0 2

Belfield to Rhame Transmission Project

BASIN ELECTRIC POWER COOPERATIVE — A Touchstone Energy Cooperative

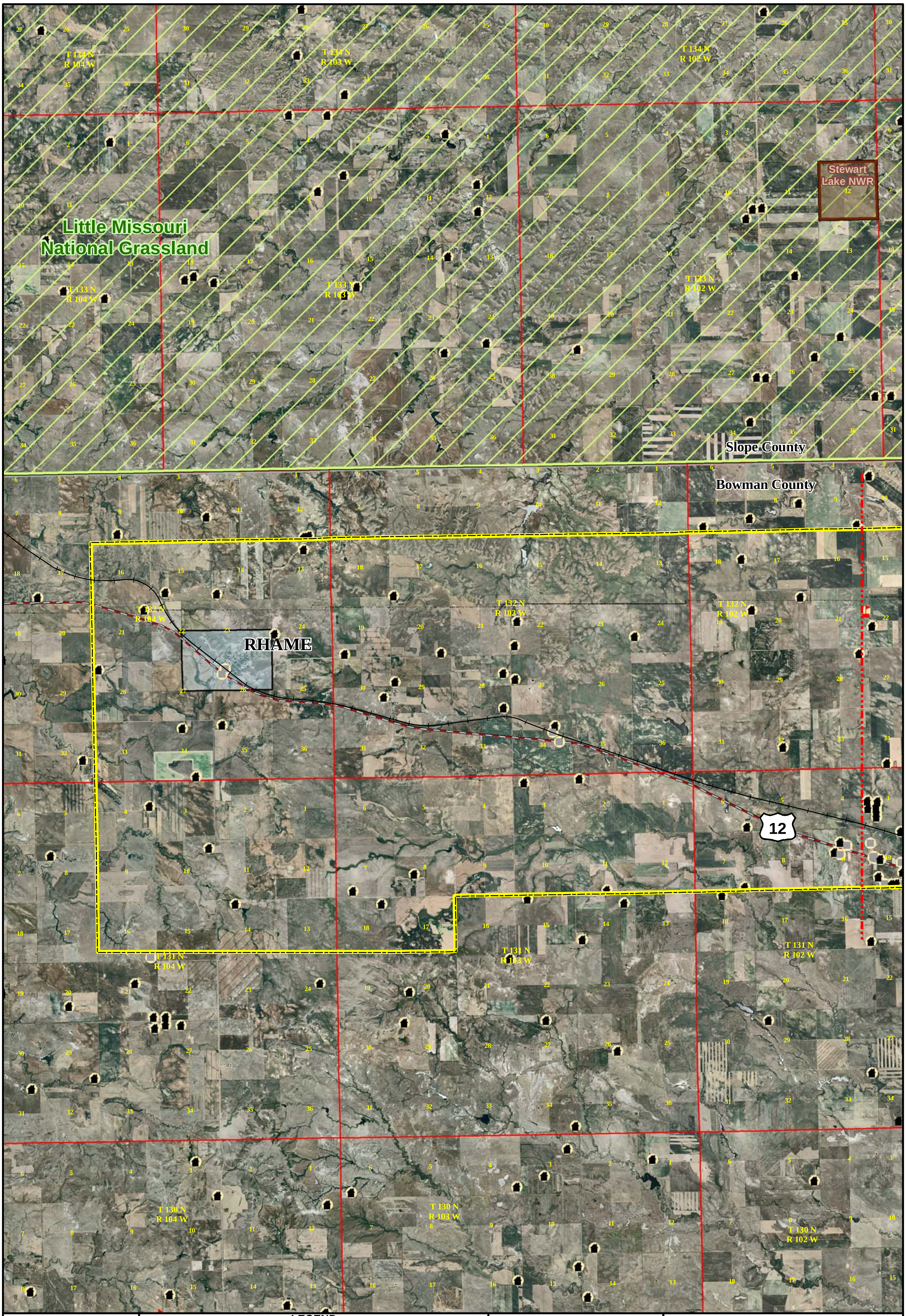
Western Area Power Administration

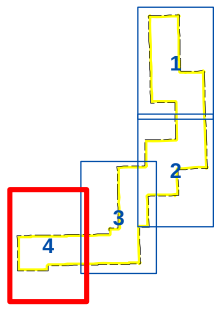
Exhibit D-7
Proposed Corridor
Avoidance Areas

ENSR | AECOM

March 2008

Sources: Schools - USGS, GNIS; Residences/Places of Business - NDDOT 2007; Geology - Clayton, 1980





LEGEND

- Proposed Corridor
- Substation
- Match Line
- Township
- City/Town

Avoidance Features

- U.S. Fish and Wildlife Service National Wildlife Refuge
- National Grassland
- School With 500 ft. Buffer
- Residence or Other Structure With 500 ft. Buffer
- Place of Business With 500 ft. Buffer
- Fault Line

N W E S

Scale in Miles: 1 0.5 0 1

Scale in Kilometers: 2 1 0 2

Belfield to Rhame Transmission Project

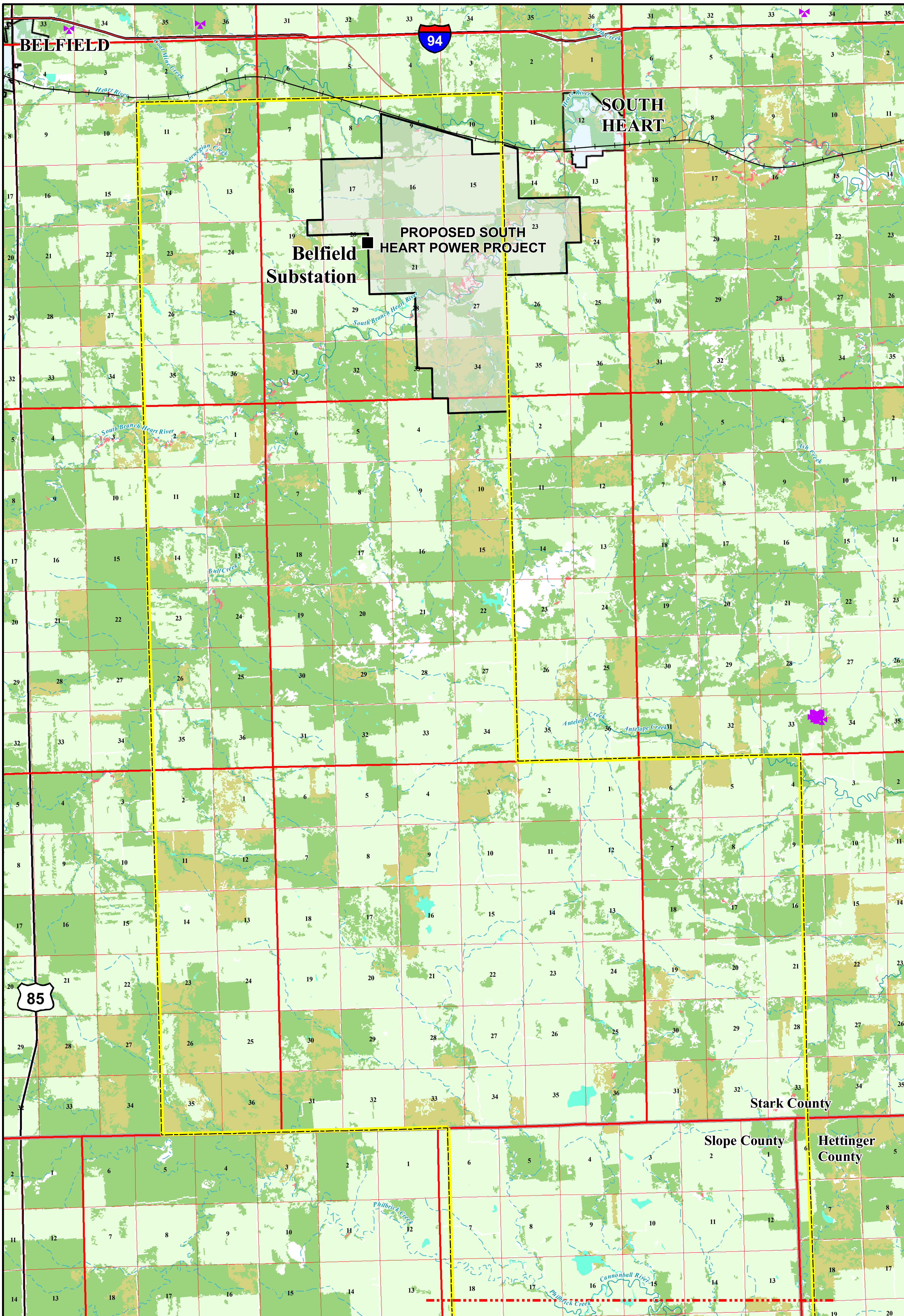
BASIN ELECTRIC POWER COOPERATIVE
A Touchstone Energy® Cooperative

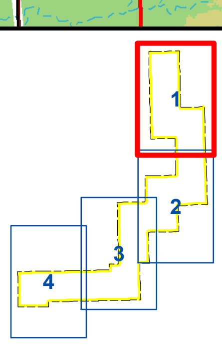
Western AREA POWER ADMINISTRATION

Exhibit D-8
Proposed Corridor Avoidance Areas

ENSR | AECOM | March 2008

Sources: Schools - USGS, GNIS; Residences/Places of Business - NDDOT 2007; Geology - Clayton, 1980





LEGEND

- Proposed Corridor
- Substation
- Match Line
- Township
- City/Town

Selection Criteria

- Proposed South Heart Power Project
- Prime Farmland
- Farmland of Statewide Importance

Selection Criteria

- Cultivated Crops
- Forested
- Grassland
- Pasture/Hay
- Intermittent Stream
- Perennial Stream
- Pond, Lake, or Wetland
- Radio, TV, or Communication Structure

Scale in Miles: 1 0.5 0 1

Scale in Kilometers: 2 1 0 2

Belfield to Rhame Transmission Project

BASIN ELECTRIC POWER COOPERATIVE — A Touchstone Energy® Cooperative

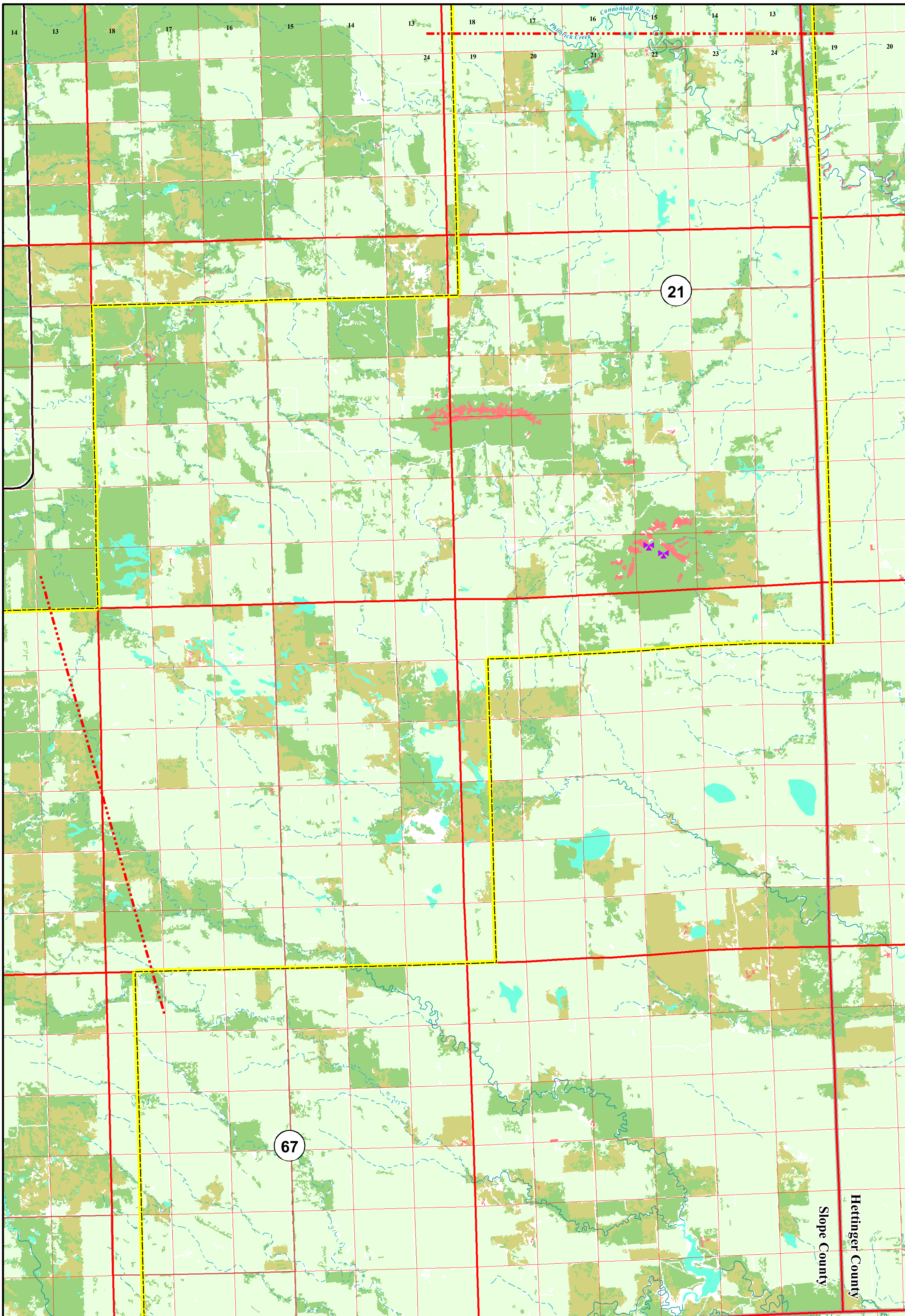
Western Area Power Administration

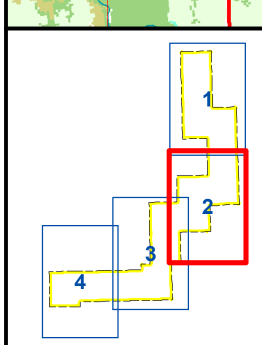
Exhibit D-9
Proposed Corridor
Selection Criteria

ENSR | AECOM

March 2008

Sources: Landcover - NLCD 2001; Farmland Types - SSURGO; Wetlands/Waterbodies - NWI, NHD.





LEGEND

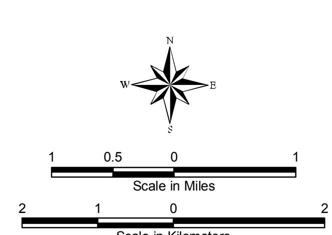
- Proposed Corridor
- Substation
- Match Line
- Township
- City/Town

Selection Criteria

- Proposed South Heart Power Project
- Prime Farmland
- Farmland of Statewide Importance

Selection Criteria

- Cultivated Crops
- Forested
- Grassland
- Pasture/Hay
- Intermittent Stream
- Perennial Stream
- Pond, Lake, or Wetland
- Radio, TV, or Communication Structure



Belfield to Rhame Transmission Project

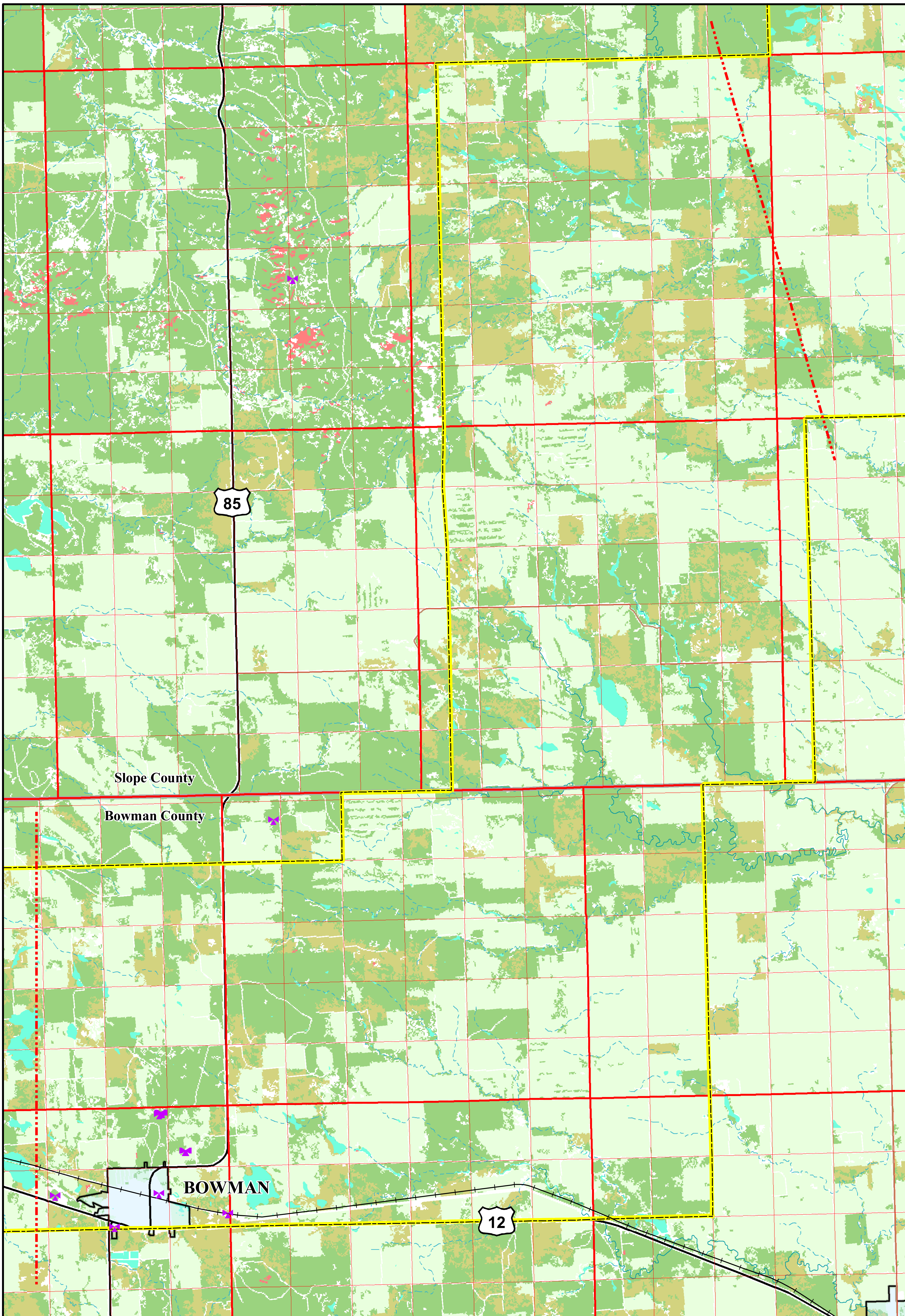
BASIN ELECTRIC POWER COOPERATIVE
A Touchstone Energy® Cooperative
Western AREA POWER ADMINISTRATION

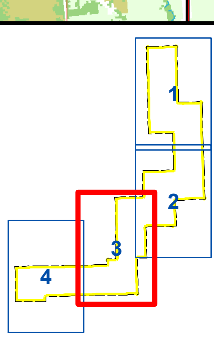
Exhibit D-10
Proposed Corridor
Selection Criteria

ENSR | AECOM

March 2008

Sources: Landcover - NLCD 2001; Farmland Types - SSURGO; Wetlands/Waterbodies - NWI, NHD.





LEGEND

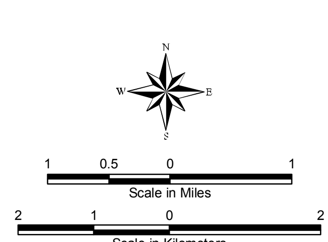
- Proposed Corridor
- Substation
- Match Line
- Township
- City/Town

Selection Criteria

- Proposed South Heart Power Project
- Prime Farmland
- Farmland of Statewide Importance

Selection Criteria

- Cultivated Crops
- Forested
- Grassland
- Pasture/Hay
- Intermittent Stream
- Perennial Stream
- Pond, Lake, or Wetland
- Radio, TV, or Communication Structure



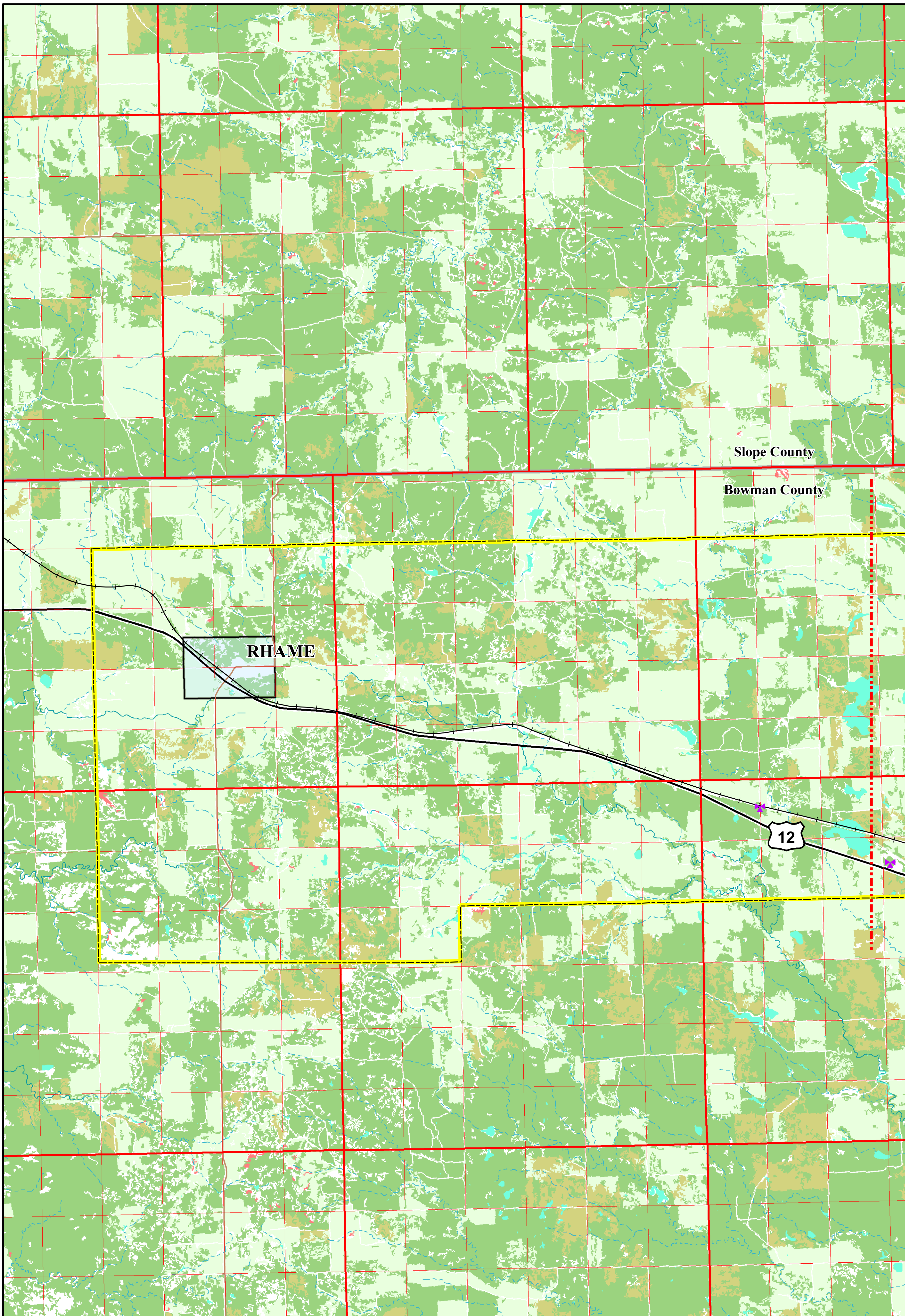
Belfield to Rhame Transmission Project

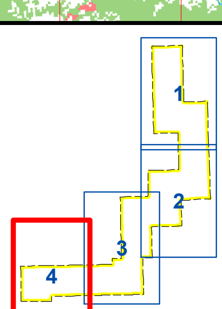
BASIN ELECTRIC POWER COOPERATIVE
A Touchstone Energy® Cooperative
Western AREA POWER ADMINISTRATION

Exhibit D-11
Proposed Corridor
Selection Criteria

ENSR | AECOM | March 2008

Sources: Landcover - NLCD 2001; Farmland Types - SSURGO; Wetlands/Waterbodies - NWI, NHD.



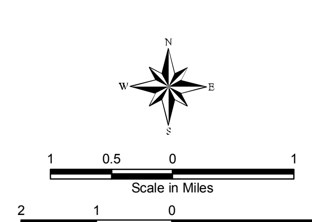


LEGEND

Proposed Corridor
Substation
Match Line
Township
City/Town

Selection Criteria
Proposed South Heart Power Project
Prime Farmland
Farmland of Statewide Importance

Selection Criteria
Cultivated Crops
Forested
Grassland
Pasture/Hay
Intermittent Stream
Perennial Stream
Pond, Lake, or Wetland
Radio, TV, or Communication Structure



Belfield to Rhame Transmission Project

BASIN ELECTRIC POWER COOPERATIVE
A Touchstone Energy® Cooperative
Western AREA POWER ADMINISTRATION

Exhibit D-12
Proposed Corridor
Selection Criteria

ENSR | AECOM

March 2008

Sources: Landcover - NLCD 2001; Farmland Types - SSURGO; Wetlands/Waterbodies - NWI, NHD.

Appendix A

Notification

Belfield to Rhame Transmission Project
EA Notification List
July 3, 2007

Federal Agencies

U.S. Fish and Wildlife Services
Field Supervisor for Ecological Services
U.S. Fish and Wildlife Service
3425 Miriam Avenue
Bismarck, ND 58501-7926

U.S. Army Corps of Engineers
Col. David Press
District Commander
Omaha District, Corps of Engineers
106 South 15th Street
Omaha, NE 68102-1618

Federal Emergency Management Agency
Mr. Bob Cox
Regional Environmental Officer
Federal Emergency Management Agency
Department of Homeland Secutiry
P.O. Box 25267
Denver, CO 80225-0267

Federal Aviation Administration
Christopher R. Blum
Regional Administrator
Federal Aviation Administration
Great Lakes Region
O'Hare Lake Office Center
2300 East Devon Avenue
Des Plaines, IL 60018

Federal Highway Administration
Mr. Ronny Hartel
Federal Highway Administration
1471 Interstate Loop
Bismarck, ND 58503-0567

Environmental Protection Agency, Region 8
Mr. Larry Svoboda
Director, NEPA Program – 8EPR-N Mail Code
Office of Ecosystem Protection and Remediation
U.S. Environmental Protection Agency
999 18th Street, Suite 300
Denver, CO 80202-2466

Natural Resource Conservation Service

J. L. Flores
State Conservationist
North Dakota NRCS State Office
Natural Resources Conservation Service
220 East Rosser Avenue
Federal Building, Room 270
Bismarck, ND 58501

Farm Service Agency

Gary Nelson
State Executive Director
North Dakota State Farm Service Agency
1025 28th St. S
Fargo, ND 58103-2372

Lavonne Wegner
County Executive Director
Bowman County Farm Service Agency (serving Slope County)
111 2nd Ave. NW
Bowman, ND 58623-4333

Pete Solemsaas
County Executive Director
Stark County Farm Service Agency
2493 4th Ave. W. Room B
Dickinson, ND 58601-2623

Mr. Eugene Zimmerman
County Executive Director
Stark County Farm Service Agency
319 Brown Avenue
Mott, ND 58103-2372

North Dakota Congressional Delegation

The Honorable Earl Pomeroy
Room 328, Federal Building
220 East Rosser Avenue
Bismarck, ND 58501

The Honorable Byron Dorgan
312 Federal Building
P.O. Box 2579
Bismarck, ND 58502

The Honorable Kent Conrad
U.S. Federal Building, Room 228
220 East Rosser Avenue
Bismarck, ND 58501

State Agencies

North Dakota Department of Agriculture
Mr. Roger Johnson, Commissioner
North Dakota Department of Agriculture
600 E. Boulevard Ave., Dept 602
Bismarck, ND 58505-0020

North Dakota Forest Service
Commissioner
North Dakota Forest Service
Molberg Center
307 First Street East
Bottineau, ND 58318

North Dakota Game and Fish Department
Mr. Terry Steinwand, Director
North Dakota Game and Fish Department
100 N. Bismarck Expressway
Bismarck, ND 58501-5095

North Dakota State Historical Board
Mr. Marvin L. Kaiser, President
North Dakota State Historical Board
612 East Boulevard Avenue
Bismarck, ND 58505-0830

North Dakota Indian Affairs Commission
Ms. Cheryl Kulas, Executive Director
North Dakota Indian Affairs Commission
600 East Boulevard Avenue
1st Floor Judicial Wing, Room #117
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Director
North Dakota State Land Department
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North Dakota Department of Transportation
Mr. Francis G. Ziegler, Director
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608 East Boulevard Avenue
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North Dakota Department of Commerce
Mr. Paul Govig, Director
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Sandi Tabor, Acting Director
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Environmental Health Section
North Dakota Department of Health
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Senator Bill L. Bowman, District 39
408 First Street, SW
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Representative David Drovdal, District 39
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Representative Keith Kempenich, District 39
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Representative C. B. Haas, District 36
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Representative Shirley Meyer, District 36
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Michael Sonsalla, Mike Teske
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Bowman County, North Dakota
County Commissioners
Kenneth Steiner, Chair
Pine Abrahamson, Bill Bowman
County Courthouse
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Bowman, ND 58623

Stark County, North Dakota
County Commissioners
Duane Wolf, Chair
Russ Hoff, George Nodland, Chester Willer, Ken Zander
County Courthouse
51 3rd Street East
Dickinson, ND 58601

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606 1st Street SW
Bowman, ND 58623-4461

Greg Sund, City Administrator
City of Dickinson
99 2nd Street East
Dickinson, ND 58601-5222

City Administrator
City of New England
9 East 7th Street
New England, ND 58647-7137

City Administrator
City of South Heart
103 6th Street NW
South Heart, ND 58655-7116

City Administrator
City of Rhame
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Rhame, ND 58651
City of Amidon
Ronald Clendenen
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Bismarck, ND 58501

Executive Director
Nature Preserves Program
North Dakota Parks and Recreation Department
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The Nature Conservancy
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Mr. Ivan Posey, Chairman
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cc:

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cc:

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Ft. Peck Tribes
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cc:

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Three Affiliated Tribes Business Council
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Appendix B

Agency Correspondence

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
3425 Miriam Avenue
Bismarck, North Dakota 58501

JUL 24 2007

Mr. Nicholas J. Stas, Environmental Manager
Western Area Power Administration
Upper Great Plains Customer Service Region
P.O. Box 35800
Billings, Montana 59107-5800

Dear Mr. Stas:

The U.S. Fish and Wildlife Service (Service) has reviewed Western Area Power Administration's (Western) July 5, 2007, letter regarding notification of Western's plans to prepare an Environmental Assessment (EA) for construction of a 230-kilovolt (kV) transmission line. Basin Electric Cooperative (Basin) is proposing to construct the transmission line from Western's Belfield Substation in Stark County, to the new Rhame Substation to be located along the existing Little Missouri-Bowman 230-kV line in the vicinity of the town of Rhame, North Dakota. Basin has requested an interconnection with Werter's transmission system at the Belfield Substation. This interconnection request is a federal action which requires a National Environmental Policy Act (NEPA) review. The Service requests the opportunity to review the Draft EA. We offer the following comments under the authority of and in accordance with the Migratory Bird Treaty Act (16 U.S.C. 703 et seq.) and the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.).

As part of the National Wildlife Refuge System, the Service administers fee title Refuge and Waterfowl Production Areas, as well as wetland and grassland easements, throughout North Dakota. A review of our county plat maps indicate no Service property interests are located within in the proposed project corridor.

Our review of the National Wetland Inventory (NWI) maps and photographs indicate the proposed planning areas include numerous water features. Our primary environmental concern is with construction through wetlands and stream channels. The Service recommends for overhead lines that poles and other construction be sited to avoid placement of fill in wetlands and stream channels along the route.

To minimize disturbance to fish and wildlife resources in the project area, the Service provides the following recommendations:

- Defer the timing of construction to late summer (after July 15) or fall so as not to disrupt wildlife during the nesting season.

- Make no stream channel alterations or changes in drainage patterns.
- Replace trees/shrubs at a ratio of two planted for each one removed.
- Install and maintain appropriate erosion control measures to reduce sediment transport off-site.
- Reseed disturbed areas with a mixture of native grass and forb species.

If construction routes intersect wetlands, streams, or rivers, the Corps of Engineers (Corps) may require a Department of the Army permit for the placement of dredge or fill material into waters of the U.S., including wetlands, or other impacts to navigable waters. We suggest you contact Mr. Daniel Cimarosti, Regulatory Office, Corps of Engineers, 1513 South 12th Street, Bismarck, North Dakota 58504 (701-255-0015), to determine the Corps' permit requirements.

To minimize the electrocution hazard to birds, the Service, with support from the Rural Utilities Service, recommends that new or updated overhead power lines be constructed in accordance with the current guidelines for preventing bird electrocutions. The recommended guidelines can be found in "Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006". To increase power line visibility and reduce bird fatalities resulting from collisions with power lines, the Service recommends power lines that cross or run adjacent to rivers or large wetlands be modified according to "Mitigating Bird Collisions with Power Lines: The State of the Art in 1994". Both publications can be obtained by writing or calling the Edison Electric Institute, P.O. Box 266, Waldorf, Maryland 20604-0266, (1-800-334-5453) or visiting their website at www.eei.org.

Bowman, Slope, and Stark Counties are on the western edge of the known whooping crane migratory route through North Dakota. The following table contains records of confirmed whooping crane sightings in Bowman, Slope, and Stark Counties through 2004 (U.S. Fish and Wildlife Service unpublished data).

County	# ADULTS	# JUVENILES	TOTAL BIRDS	YEAR	LATITUDE	LONGITUDE	LEGAL DESCRIPTION	SEASON
Bowman	2	0	2	2002	4608	10306	T131N,R99W,S29	Fall
Slope	2	1	2	1982	4622	10305	T134N,R99W,S35,NE4	Fall
Stark	2	0	3	1977	4655	10226	T140N,R93WN,R80W,S25	Fall

Every effort should be made to protect whooping cranes from colliding with new or existing electric transmission lines in the project area. To assist Western in protecting whooping cranes, the Service is enclosing an issue paper authored by Thomas V. Stehn and Tom Wassenich that provides background on the issue and seeks to promote actions to reduce whooping crane mortality from collisions with utility lines. We encourage Western to consider the information presented in Whooping Crane Collisions with Power Lines: an Issue Paper in their determination of the potential effects to whooping cranes from the proposed project.

A current list of federally endangered and threatened species that may be present within the proposed project's area of influence is enclosed. This list fulfills requirements of the Service under Section 7 of the Endangered Species Act.

If a Federal agency authorizes, funds, or carries out a proposed action, the responsible Federal agency, or its delegated agent, is required to evaluate whether the action "may affect" listed species. If the Federal agency determines the action "may affect" listed species, then the responsible Federal agency shall request formal section 7 consultation with this office. If the evaluation shows a "no effect" determination for listed species, further consultation is not necessary. If a private entity receives Federal funding for a construction project, or if any Federal permit is required, the Federal agency may designate the fund recipient or permittee as its agent for purposes of section 7 consultation.

Thank you for the opportunity to comment on this project. If you require further information or the project plans change, please have your staff contact Terry Ellsworth of my staff or contact me directly at (701) 250-4481, or at the letterhead address above.

Sincerely,

for Jeffrey K. Towner
Field Supervisor
North Dakota Field Office

Enclosures

cc: Regulatory Office, Army Corps of Engineers, Bismarck
(Attn: D. Cimarosti)
Director, ND Game and Fish Dept., Bismarck
(Attn: M. McKenna)

References

McCabe, T.L. 1981. The Dakota skipper, *Hesperis dacotae* (Skinner): range and biology, with special reference to North Dakota. Journal of the Lepidopterist' Society 35(3):179-193.

Royer, R.A. and G.M. Marrone. 1992. Conservation status of the Dakota skipper (*Hesperis dacotae*) in North and South Dakota. Unpublished report, U.S. Fish and Wildlife Service, Denver, CO. 15 March 1992. 44+pp.

FEDERAL THREATENED AND ENDANGERED SPECIES
FOUND IN STARK COUNTY
NORTH DAKOTA
July 2007

ENDANGERED SPECIES

Birds

Whooping crane (Grus Americana): Migrates through west and central counties during spring and fall. Prefers to roost on wetlands and stockdams with good visibility. Young adult summered in North Dakota in 1989, 1990, and 1993. Total population 140-150 birds.

Mammals

Black-footed ferret (Mustela nigripes): Exclusively associated with prairie dog towns. No records of occurrence in recent years, although there is potential for reintroduction in the future.

Gray wolf (Canis lupus): Occasional visitor in North Dakota. Most frequently observed in the Turtle Mountains area.

THREATENED SPECIES

Birds

Bald eagle (Haliaeetus leucocephalus): Migrates spring and fall statewide but primarily along the major river courses. It concentrates along the Missouri River during winter and is known to nest in the floodplain forest.

9-C

FINAL DRAFT FINAL DRAFT FINAL DRAFT
July 12, 2006

WHOOPING CRANE COLLISIONS WITH POWER LINES: AN ISSUE PAPER

THOMAS V. STEHN, U. S. Fish and Wildlife Service, P.O. Box 100, Austwell, TX 77950

TOM WASSENICH[1], Texas State University - San Marcos, Texas 78666

Introduction

The whooping crane (*Grus americana*) is one of the most widely known endangered species in North America and symbolizes the struggle to maintain the vanishing creatures of this world. Collision with power lines is the greatest source of mortality for fledged whooping cranes in the Aransas-Wood Buffalo population (AWBP) that migrate from nesting grounds in the Northwest Territories, Canada through the central U. S. to winter on the Texas coast (Fjetland 1987, Lingle 1987, Lewis et al. 1992). Such mortality affects the recovery of this endangered species and accentuates the need to minimize such losses (Howe 1989). Power line expansion in North America remains one of the chief threats to the species (USFWS 1994). This paper provides background on the issue and seeks to promote actions to reduce whooping crane mortality from collisions with utility lines.

Environmental concerns of the public about bird collisions have grown with the expansion of electric utilities that has multiplied miles of lines to meet increased demand for electric power (APLIC 1994). In an attempt to begin addressing both collision (specifically whooping cranes) and electrocution problems, an ad hoc committee represented by several investor-owned electric utilities (IOUs), the National Audubon Society, and the U.S. Fish and Wildlife Service (USFWS) was created in 1983. By 1989, a more formal relationship was established with the creation of the Avian Power Line Interaction Committee (APLIC) composed then of nine IOUs and USFWS, with technical advice from staff of the National Audubon Society, Clemson University, and the University of Idaho (Lewis 1997). APLIC was housed in the IOU trade association Edison Electric Institute (EEI), Washington, D.C. (Huckabee 1993). APLIC has served as a clearinghouse for information and communication on avian and powerline interaction issues. Currently, APLIC is composed of electric utilities, utility organizations, and Federal agencies involved in bird and power line interaction issues.

I would like to thank Albert Manville and Wendy Brown of USFWS for providing their expertise on the issues and Marty Folk, Florida Fish and Wildlife Conservation Commission for providing data on the Florida population. The views in this paper are those of the authors and do not necessarily reflect the views of the U. S. Fish and Wildlife Service.

[1] Current address is 11 Tanglewood, San Marcos, TX 78666.

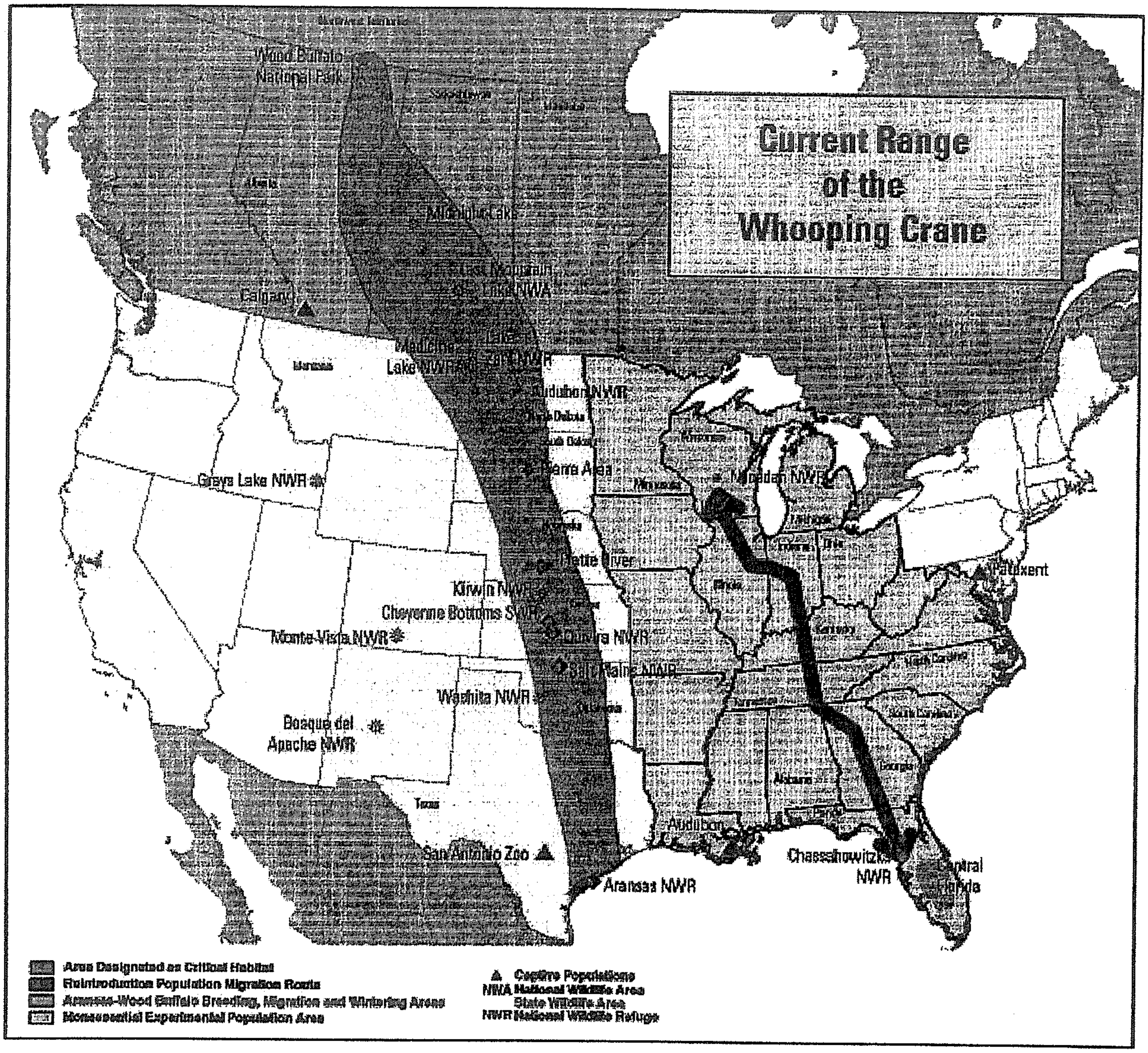
Species Status

There were once over 10,000 whooping cranes in North America that ranged from the Rocky Mountains to the Atlantic Coast and from northern Canada to Mexico (CWS and USFWS 2005). Population numbers declined to the brink of extinction from shooting, the destruction of nesting and migration habitat due to drainage of wetlands for farming, and collection of eggs and specimens as the species became increasingly rare. In 1941, only 15 individuals remained in the AWBP, the only migratory population that survived. Since yearly census estimates were initiated in 1938, the growth of this population has averaged 4.5% annually and numbered 215 in spring, 2005.

Until the whooping crane population grows to at least 1,000 individuals, the species is in a race against time as the limited genetic material that survived the bottleneck continues to be lost in each generation (CWS and USFWS 2005). Thus, it is important to accelerate the rate of species recovery to minimize genetic loss. Also, with the very restricted range of the AWBP in both summer and winter, chances of species survival in case of a catastrophic event would be increased if additional populations were established (USFWS 1994). Attempts from 1975-1989 to establish a whooping crane flock in the Rocky Mountains using cross-fostering with whooping crane eggs placed in sandhill crane (*G. canadensis*) nests were unsuccessful, with high flock mortality and no attempts at breeding due to improper sexual imprinting of the whooping cranes.

The current range of the whooping crane is shown in Figure 1. A non-migratory flock in Florida started in 1993 numbered about 60 birds in August, 2005. Adults in this flock have paired, nested and fledged young, but mortality continues to be high and is preventing population growth (CWS and USFWS 2005). An eastern migratory flock started in 2001 that uses ultralight aircraft to teach juvenile whooping cranes a migration between Wisconsin and Florida numbered 66 birds in August, 2005. At that time, there were 481 whooping cranes in North America, including 3 wild flocks and 139 birds in captivity. Three major captive breeding flocks produce 25-40 young annually for reintroductions.

Figure 1 – Current Range of the Whooping Crane



Problem

Rural electrification in North America resulted in the proliferation of power lines into areas traditionally used by migratory birds, resulting in substantial whooping crane mortality in migration (Brown et al. 1987, USFWS 1994). At the present time, with a growing U.S. population, industrial expansion and public demand for more electricity, additional power lines are being installed (Manville 2005). This will increase the potential for whooping crane collision mortalities. The most recent nationwide estimates indicate that there are more than 500,000 miles (804,500 km) of bulk transmission lines in the U.S. (APLIC 1996, Harness 1997, Edison Electric Institute 2000). Transmission lines in the U.S. carry ≥115,000 volts/115 kV, with conductors attached to either tall wood, concrete or steel towers. Distribution lines (those in the U.S. carrying ≤ 69,000 volts/69 kV) are constructed on 11-15 m (36-49 ft) wooden, steel, or concrete poles, typically configured with one, two, or three energized (phase) wires and one neutral (grounded) wire. Williams (2000) cited the figure of 116,531,289 distribution poles in the U.S. but listed no figure for wire length. Because of rapid expansion, new development, and jurisdictional issues, no good accounting of the total amount of distribution line is available for the U.S.; it is certainly in the millions of kilometers (Manville 2005).

Cranes and other birds apparently collide with lines because they do not see them in time to avoid them and suffer traumatic injury from the collision itself, or from the resulting impact falling to the ground (Brown et al. 1984). Non-conducting groundwires, usually installed above conductor wires to intercept lightning strikes and prevent power outages, are the wires most often struck by birds in flight (Scott et al. 1972, Willard et al. 1977, Ward and Anderson 1992). Because groundwires are normally 0.9-1.3 cm (0.4-0.5 in) in diameter and smaller than conductor wires, they sometimes appear to be invisible because of background or lighting conditions. Consequently, birds often see and avoid conductor wires only to strike the less visible groundwires (Brown et al. 1987, Faanes 1987, Ward and Anderson 1992), and are more prone to strike wires mid-span rather than near utility poles (Ward et al. 1996).

Collisions with transmission and distribution power lines can be a significant source of mortality for bird populations and may kill annually anywhere from hundreds of thousands to 175 million birds in the U.S. based on extrapolations by Koops (1987) and Erickson et al. (2001). The range of values is so large because of poor monitoring of utilities for strikes (Manville 2005). Faanes (1987) observed 7,000 flights of all types of birds near prairie wetlands and lakes in North Dakota. He observed about a 1% collision rate and estimated 124 avian fatalities/km/yr (200/mile/yr). He also counted dead birds under power lines and found 122 dead in the fall and 511 in the spring.

Sandhill cranes, a species closely related to whooping cranes that can serve as a surrogate species to study the problem, suffer appreciable mortality from collision with power lines (Morkill and Anderson 1991). Line collisions resulted in 36% of the known mortality to fledged sandhill cranes in the Rocky Mountains (Drewien 1973). Whooping cranes are presumably even more susceptible to striking power lines than sandhill cranes (Morkill and Anderson 1991) because of their larger body size and wing span, slower wing beat, and relative lack of maneuverability. Juveniles are more vulnerable to collisions than adults, presumably due to lack of experience and flight skills (Ward et al. 1986, Brown et al. 1987, Ward and Anderson 1992, APLIC 1994, Brown and Drewien 1995). Archibald (1987) found that 2.1% of adults and 13.4% of chicks of red-crowned cranes (*G. japonensis*) were killed striking powerlines. Janss and Ferrer (2000) estimated mortality from power line collisions for a wintering population of common cranes (*G. grus*) in Spain. The collision rate (i.e. number of cranes hitting a power line / number of cranes crossing a power line) was 3.93 x 10^{-5} and minimum annual collision mortality was 2.36/km/yr (1.47/mi/yr). Morkill and Anderson (1991) observed 3.4 sandhill crane collisions / km (5.4/mi), as reported in Janss and Ferrer (2000).

Most studies have concluded that collision with power lines is not a major threat to bird populations but may be more of a problem for large birds (APLIC 1994). Crivelli et al. (1988) estimated a 1.3-3.5% decrease of dalmation pelicans (*Pelecanus crispus*) in the breeding population from collisions. Collisions caused 44% of the mortality of fledged trumpeter swans (*Cygnus buccinator*) in Wyoming (Lockman 1988).

Collisions become biologically significant when they affect a bird population's ability to sustain or increase its numbers, a problem that may be especially acute with endangered species (APLIC 1994). Whooping crane mortality from striking utility lines may be biologically significant to a small, endangered population and lower the probability of survival for the entire population (Wassenich 2003a). Collisions with power lines are known to have accounted for the death or serious injury of at least 43 whooping cranes since 1956 (Table 1). Of 18 documented mortalities of fledged whooping cranes in the reintroduced Rocky Mountain population prior to 1987, 8 (39%) were a result of collisions with power lines (Brown et al. 1987) (Table 2). Twenty individuals out of a total of 166 known causes of mortality (12%) of the nonmigratory Florida whooping crane population, and two out of eleven cases (18%) of post-release mortality in the migratory Wisconsin population, have been from collisions with power lines (T. Stehn, unpublished data). The percentage of whooping crane mortality caused by collisions with power lines is hard to extrapolate for the AWBP because of the less intense monitoring done on that population compared to reintroduced flocks. In the 1980's, 2 of 9 radio-marked juvenile whooping cranes in the AWBP died within the first 18 months of life as a result of power line collisions, 33% of the total post fledging losses of the radioed birds (Kuyt 1992). Five of 13 known causes of mortality (38%) for the AWBP between the months of April and November, 1950 to 1987 resulted from collisions with utility lines (Lewis et al. 1992). During that same period, total mortality equaled 133 cranes. (Lewis et al. 1992). Extrapolating from the known causes of mortality, an estimated 51 of the 133 whooping cranes (38%) may have been killed colliding with power lines. Whereas predation by bobcats has been the primary source of mortality for the nonmigratory Florida whooping cranes, predation of fledged whooping cranes is thought to be uncommon in the AWBP (CWS and USFWS 2005).

Table 1. Known Mortalities from Whooping Crane Collisions with Power Lines

Aransas-Wood Buffalo Flock

#	Date	Province/ State	County	Site	Died	Age	Sex	Wire	Notes
1	May 56	TX	Lampasas	-	No[A]	YRL	F	transmission	clear skies
2	Nov 65	KS	Rawlins	Ludell	Yes	A	F	distribution (3-wire)	clear skies
3	Apr 67	KS	Russell	Dorrance	Yes	A	F	distribution (3-wire)	clear skies
4	Oct 81	SK	-	Glaslyn	Yes[B]	JUV	-	distribution (1-wire, 30 ft)	in barley field
5	Oct 82	TX	Coryell	Oglesby	Yes	A	F	distribution (4-wire, 20-25 ft)	clear, in maize
6	Oct 88	NE	Howard	St. Paul	No[C]	A	-	distribution (2-wire, 35 ft)	corn granary
7	Oct 89	NE	Hitchcock	Stratton	Yes	YRL	M	distribution (12 kV)	wheat by wetland
8	Oct 97	SK	-	Zelma	Yes	SA	-	distribution (1-wire 14.4 kV)	agricultural field
9	Apr 02	TX	-	DeLeon	Yes	A	F	distribution line	

Rocky Mountain Flock

#	Date	State	County	Site	Died	Age	Sex	Wire	Notes
1	May 77	WY	Uinta	Lonetree	Yes[D]	JUV	M	distribution	roadside
2	Apr 81	CO	RioGrande	MonteVista	Yes	JUV	-	distribution (69kV)	barley
3	Oct 82	CO	Alamosa	Alamosa	No[E]	A	-	transmission (115 kV)	
4	Mar 83	CO	Alamosa	Alamosa	Yes	A	F	transmission (115 kV)	(hit same line as # 3)
5	Apr 84	CO	Alamosa	Alamosa	Yes	JUV	-	distribution (69kV)	high winds, barley
6	Apr 84	CO	Mesa	Grand Junction	No[F]	JUV	-	unknown	
7	May 84	CO	-	Monte Vista	Yes	JUV	-	possible distribution (69 kV)	
8	Sept 85	ID	Caribou	Grays Lake	Yes	JUV	M	transmission	died 10-2-85 from injuries
9	Apr 86	ID	Bancock	Oxford Slough	Yes	A	M	unknown	wetland
10	fall 87	CO		San Luis Valley	Yes	JUV	-	unknown	bird diagnosed with tuberculosis
11	Mar 89	CO		San Luis Valley	Yes	A	F	unknown	
12	Mar 98	CO	Alamosa	Monte Vista	Yes	A	F	transmission	
13	Mar 00	CO	Rio Grande	Monte Vista	Yes	A	F	distribution	

A = adult, JUV=juvenile, SA = subadult, YRL=yearling, F=female, M=male

Florida Nonmigratory Flock

#	Date	State	County	Site	Died	Age	Sex	Wire	Notes
1	Jan 97	FL	Osceola	Escape	Yes[G]	JUV	M	distribution	along dirt road
2[H]	Nov 97	FL	Brevard	Sartori	Yes	SA	M	distribution (4-wire)	by road
3[H]	Nov 97	FL	Brevard	Sartori	Yes	SA	M	distribution (4-wire)	by road
4[H]	Nov 97	FL	Brevard	Sartori	Yes	SA	M	distribution (4-wire)	by road
5	Mar 98	FL	Lake	Geraci	Yes	SA	M	distribution	
6	Feb 99	FL	Lake	Geraci	Yes	JUV	M	distribution (3-wire)	
7	Jan 01	FL	Lake	Groveland	Yes	A	M	distribution (4-wire)	
8	Mar 02	FL	Polk	Lake Wales	Yes	JUV	F	distribution	
9	Mar 03	FL	Sumter	Bexley	Yes	JUV	M	transmission[I]	
10	Aug 03	FL	Polk	Lake Wales	Yes	A	M	distribution	
11	Dec 03	FL	Lake	Pruitt	Yes	JUV	F	transmission[I]	
12	Nov 04	FL	Sumter	Bexley	Yes	SA	M	transmission[I]	
13[J]	Jan 05	FL	Lake	Pruitt	Yes	SA	F	transmission[I]	
14	Feb 05	FL	Lake	Pruitt	Yes	SA	F	transmission[I]	
15	Mar 05	FL	Sumter	Hi Acres	Yes	SA	F	transmission[I]	
16	Mar 05	FL	Lake	Pruitt	Yes	SA	M	transmission[I]	
17	Apr 05	FL	Osceola	Holopaw	Yes	A	M	transmission	
18	Aug 05	FL	Sumter	Pruitt	Yes	SA	M	transmission	
19	Dec 05	FL	Polk	--	Yes	A	M	transmission	
20	May 06	FL	Lake/Sumter	near Pruitt	Yes	A	M	transmission	

Wisconsin-Florida Migratory Flock

#	Date	State	County	Site	Died	Age	Sex	Wire	Notes
1[K]	Oct 01	WI	Green	-	Yes	JUV	M	distribution	windstorm, collision at night
2	July 05	WI	Green Lake	-	Yes	SA	M	transmission	

[A] Injured and had to be kept in captivity (named Rosie) and bred.
[B] Injured bird died while being transported to captivity.
[C] Bird fell to ground and flew off after 5-10 minutes. Postulated it was 1 of birds that failed to show up on wintering grounds that fall.
[D] Collision could have been from power line, vehicle, or fence, but believed to be power line.
[E] Fractured tarsus. Continued migration, but never recovered with abnormal behavior. Died 1-20-83.
[F] Upper elbow injury required amputation. Placed in captivity.
[G] Cause of death considered as probable powerline. However, necropsy could not rule out being struck by a car on the roadway next to the power line.
[H] Three whooping cranes killed in the same incident.
[I] This major transmission line follows the border of Lake/Sumter County and has been hit in multiple incidents.
[J] Radio found hanging from power line and bird disappeared indicating mortality.
[K] Strike occurred at a migration stopover at night when the crane escaped from a pen during a storm.

Table 2. Percent causation of known mortality from powerline strikes of fledged birds in whooping crane populations.

Whooping Crane Population	Number of Documented Mortalities from Power Lines	% Mortality of Fledged Birds	Source
Rocky Mountain	13	39	Brown et al. 1987
Florida nonmigratory	20	12	Stehn unpub. data
WI to FL migratory	2	18	Stehn unpub. data
AWBP radioed juveniles[a]	2[a]	33	Kuyt 1992
AWBP all fledged birds[b]	5[b]	38	Lewis et al. 1992

[a] Two of 9 juveniles radioed between 1981-1984 died in power line collisions.
[b] Losses that occurred between April and November, 1950-1987.

Whooping cranes are no longer radio-tracked in migration between Texas and Canada. Color bands or radios have not been placed on AWBP whooping cranes since 1988. This is partly because of a mortality rate approaching 1% during capture of wild whooping cranes in Canada. Thus, data on power line strikes of AWBP whooping cranes are being obtained through chance observations as reported by the general public and agency personnel, and tabulated by the Whooping Crane Migration Cooperative Monitoring Project (CWS and USFWS 2005).

Crane Biology and Power Lines

Although migration involves only 17-20% of a whooping crane's annual activities, bird deaths are significantly greater during migration due to exposure to new hazards as birds travel through unfamiliar environments. Losses during migration may comprise 60-80% of annual mortality (Lewis et al. 1992). Whooping cranes normally migrate from 1,000 to 6,000 feet (305-1,829 m) above the ground (Kuyt 1992) and well above the height of power lines, but stop every night to roost in shallow wetlands (Howe 1989). With approximately 12-15 stopovers during each 4,000 km (2,486 mi) migration (Kuyt 1992), whooping cranes have multiple opportunities to encounter power lines.

When radiotracking whooping cranes in migration, T. Stehn (unpublished data) noted cranes were commonly seen at foraging sites with power lines nearby. Encounters with power lines usually occur as whooping cranes are making short, low altitude flights between foraging and roosting areas. These local flights frequently occur near sunrise and sunset when light levels are diminished.

For local flights, the proximity of power lines to locations where birds are landing and taking off is critical (Lee 1978, Thompson 1978, Faanes 1987). Power lines suspended across a river channel near crane roosts present hazardous obstacles to cranes flying after dark (Windingstad 1988, Morkill 1990). Power lines dividing wetlands used for roosting from grain fields used for feeding caused the most collisions for cranes because these circumstances encouraged crossing the lines at low altitude several times each day (Brown et al. 1987). Cranes frequently flew 10-15 m (33-49 ft) above the ground between fields; as a consequence, 12-m-high (39 ft) transmission lines obstructed their typical flight path. No sandhill crane or waterfowl collisions were observed where distances from power lines to bird use areas exceeded 1.6 km (1 mi) (Brown et al. 1984, 1987).

Birds flying over power lines from adjacent roosting or foraging sites have less time and distance to react and avoid wires (Thompson 1978, Beaulaurier (1981), Brown et al. 1987, Scott et al. 1992). Observations of crane flight behavior by Morkill and Anderson (1991) indicated that crane flocks reacted more when flying less than 250 m (273 yd) before or after crossing a power line and were lower in altitude and increased their altitude to avoid the wires, similar to reactions of cranes observed by Brown et al. (1987). Flight distance was also related to height flown above wires; cranes flying less than 250 m (273 yd) before or after line crossing tended to fly 1-5 m (1.1- 5.5 yd) above the wires, but cranes flying more than 250 m (273 yd) tended to fly higher than 6 m (6.6 yd) above the wires (Morkill and Anderson 1991). Cranes were not observed to fly under transmission lines except occasionally when flushed near a line. Even at a 27-m-high (88.6 ft) study segment, cranes seemed reluctant to fly under the lines and instead flew vigorously upwards to cross over the wires (Morkill and Anderson 1991).

Cranes reacted more often to marked than unmarked spans, and more dead cranes were found under unmarked spans than marked spans (Morkill and Anderson 1991). When approaching marked spans, cranes commonly increased altitude farther than 5 m (5.5 yd) from the wires, suggesting they saw marker balls from a distance and avoided them. Cranes flared more often within 5 m (5.5 yd) of unmarked than marked spans, as if they were unaware of the unmarked wires (Morkill and Anderson 1991).

Collisions can occur under optimal weather conditions. One whooping crane at Monte Vista National Wildlife Refuge (NWR) in Colorado died apparently in good weather hitting a power line that it had crossed numerous times (R. Garcia, Alamosa NWR, Colorado, pers. comm.). However, inclement weather is one of the most frequently described factors affecting collisions and can increase the probability of collisions (Walkinshaw 1956, Avery et al. 1977, Willard et al. 1977, Anderson 1978). The weather conditions most associated with collisions are related to reduced visibility (fog, dense cloud cover, and precipitation), and reduced flight control (high-velocity winds) (APLIC 1994). Brown and Drewien (1995) found that wind was a significant factor increasing the frequency of sandhill cranes hitting utility lines. When flying in high-velocity winds, birds may be buffeted into fully visible power lines with which they are quite familiar, but which they cannot avoid because they cannot maintain flight control (Brown et al. 1987, Morkill and Anderson 1991, Raevel and Tomball 1991, Brown and Drewien 1995).

Whooping crane mortality does occur with birds striking both high transmission lines as well as low distribution lines in rural prairie areas. Manville (2005) found that much of the problem of bird collisions is associated with transmission lines. Ward and Anderson (1992) found sandhill cranes collided 4 times more frequently with transmission lines than distribution lines, although distribution lines were twice as abundant in their study area. Some studies have suggested that distribution lines are a greater threat for bird strikes because of their smaller size and lower visibility of conductors (Thompson 1978, Beaularier 1981, APLIC 1994).

For whooping cranes, more collisions have been documented on distribution lines (Wassenich 2003a), although this could simply reflect a greater frequency of encounters with distribution lines. Of the 41 known whooping crane mortalities, 14 hit transmission lines, 23 collided with distribution lines, and 4 were unknown. Exact geographic locations on many of the known whooping crane collisions with power lines were not recorded, with only general descriptions noted (i.e. location from nearest town). Thus, it is not possible to analyze the exact type of line or habitat in the vicinity of every known collision.

Power line strikes by whooping cranes do not always cause serious injury. One collision of a whooping crane in Florida was discovered when the bird's radio transmitter that had been attached to a plastic band on its leg was found dangling from a distribution line. The crane subsequently limped for a day with a swollen hock but recovered. One of the eastern migratory whooping cranes after being flushed by the public hit a distribution line in North Carolina in April 2004, but remained airborne and later rejoined the other birds it was migrating with. In 1983, a juvenile whooping crane hit a 115 kV line in the San Luis Valley, Colorado after being flushed by a landowner checking on his irrigation system. The bird was found under the line, struggling to stand, appearing dazed, but was able to fly off 30 minutes later and recovered. Increased hazard from human disturbance (e.g., flushing birds from farming activities, hunting, or intentional hazing of birds depredating crops) has been well-documented as a contributing factor to collisions (Krapu 1974, Blokpoel and Hatch 1976, Anderson 1978, Brown et al. 1984, Archibald 1987).

Recent Research

Wassenich (2003a) compiled and analyzed a database consisting of 30 known collisions between 1956 and 2002, updating a list initiated by Halvorson (1984). This was done in collaboration with T. Stehn as a first step to try to come up with a remedy for reducing the high rate of whooping crane/power line strikes. Subsequent to this list being compiled, there have been 11 additional whooping crane/utility line strike mortalities between 2002 and 2005 located in Florida (10) and Wisconsin (1) (Table 1). Collisions have occurred in 8 states and 1 province, with the most strikes in Colorado and Florida (Table 3).

Table 3. Locations of known whooping crane strikes with utility lines.

Location	Number
Saskatchewan	2
Colorado	10
Florida	17
Texas	3
Idaho	2
Kansas	2
Nebraska	2
Wisconsin	2
Wyoming	1
Total	41

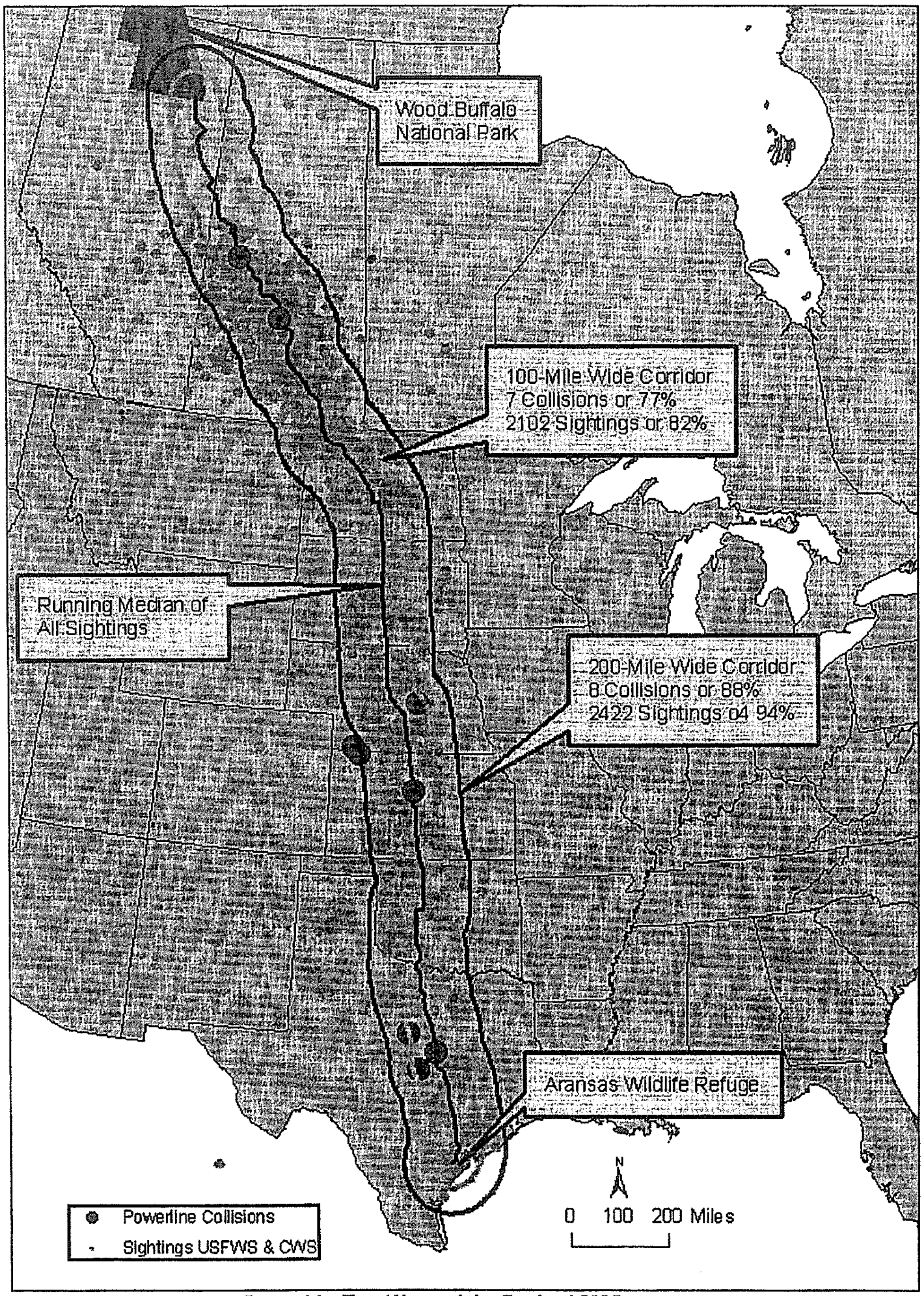
In Colorado, 80% of total losses (n=10) occurred as cranes gathered together for a prolonged stopover during the spring migration, a behavior referred to as staging. Whooping cranes from the now extirpated Rocky Mountain population would spend from 4-6 weeks with sandhills during the spring migration in the San Luis Valley of Colorado, an area where most strikes occurred as power line density increased dramatically due to development of center pivot irrigation of agricultural fields. The high number of strikes in Florida (n=17) are from the resident Florida whooping crane population that have exposure to power lines throughout the year, whereas the AWBP usually only has exposure to lines during migration. The AWBP stages in the fall in southcentral Saskatchewan.

The difficulty for protecting whooping crane in the AWBP comes from deciding which lines to mark for a species with a 2,500 by 200-mile (4,023 x 322 km) migration corridor that mostly does not use traditional stopover sites (Wassenich 2003a). It is hard to predict where whooping cranes will stop. Howe (1989) using telemetry data on migrating whooping cranes found that "individuals did not use the same stopovers in different migrations, and groups migrating independently rarely shared stopovers used by other groups". However, some locations considered to be traditional stopover sites are used by small groups of whooping cranes nearly annually (Austin and Richert 1999). Some of these are designated by law as Critical Habitat since they are areas considered as required for the survival of the species. Examples of critical habitat include Salt Plains NWR in Oklahoma, Quivira NWR in Kansas, and a 56-mile (90 km) stretch of the Platte River in Nebraska.

Collision locations and all known confirmed sightings of AWBP whooping cranes in the U.S. (n=1,100, Austin and Richert 1999) and Canada (n=1,600, Brian Johns 2003, Canadian Wildlife Service files, Saskatoon, Saskatchewan) were placed on a map using ArcGIS for visual analysis (Wassenich 2003b)(Fig. 2). SPSS 2003 statistical software was used to calculate a running median on all migration sighting data points to better define the whooping crane migration corridor. From the derived centerline of the migration pathway, corridors of various widths were defined to determine how many of the known collisions and total sightings occurred within that given corridor width. Results showed that a migration corridor 100 miles wide (161 km) contained 77% of known collisions and 82% of total sightings. Increasing the corridor width to 200 miles (322 km) accounted for 88% of known collisions and 94% of all sightings, an increase of only 12% of total sightings (Fig. 2). This type of information could be used to target which power lines to mark to more effectively reduce whooping crane mortality.

0-15

Figure 2. Power Line Collisions and Sightings in 100 and 200-Mile Corridors



Created by Tom Wassenich - Revised 2005

9-16

Management Actions

Power lines can sometimes be redesigned or altered when necessary to reduce collisions. However, marking is neither necessary nor appropriate over large areas with low bird-collision potential (APLIC 1994). Studies have concluded that marking lines is a highly effective way to reduce sandhill crane collisions in specific problem areas (Morkill 1990, Morkill and Anderson 1991, Brown and Drewien 1995) and would also be expected to reduce whooping crane mortality (Morkill and Anderson 1991). The marking of the overhead groundwire has been the focus of research because it appears to be the one most often struck by birds in flight (Scott et al. 1972, Willard et al. 1977, Brown et al. 1987, Faanes 1987). A review of the literature indicated that increasing the visibility of power lines by installing markers on the groundwires was the most cost-effective and logistically feasible potential method for reducing bird collisions (Beaulaurier 1981, Archibald 1987) and are the most common modification made by the electric power industry to reduce bird collisions (APLIC 1994). Except for part of the Brown and Drewien (1995) study, all other marking systems discussed below have been installed on the unenergized overhead groundwires (APLIC 1994).

Aerial marking spheres, spiral vibration dampers (SVD's), and Bird Flight Diverters (BFD's) have all been used to significantly reduce collisions (APLIC 1994). Total bird mortality was reduced 57-89% depending on spacing by BFD's placed on overhead groundwires in the Netherlands where it has become standard to mark lines in bird-collision zones (Koops 1987). Collisions were reduced by 53% for non-passerine species at a South Carolina transmission line outfitted with yellow marker balls (Savereno et al. 1996) and by 54% for lesser sandhill cranes in Nebraska using 1-5 spheres per span (Morkill and Anderson 1991). In southwestern Colorado, yellow SVD's installed to cover 27.5% of a span reduced collisions of cranes and waterfowl by 61%, while yellow fiberglass square plates reduced mortality to the same species by 63% (Brown and Drewien 1995). However, the aerodynamic instability of the swinging plates proved to be very damaging to the conductors (Miller 1990, Brown and Drewien 1995). Yellow plastic tubes placed on power lines near Hokaiddo, Japan reduced mortality and was a primary factor for the increase in the population of red-crowned cranes after 1976 (Archibald 1987).

Brown and Drewien (1995) suggested that color is an important factor in marker effectiveness; they selected yellow-colored SVD's in their study because SVD's were highly visible in poor light. Yellow has been shown to be useful in color-marking system studies because it reflects light longer on both ends of the day, and does not blend in with background colors as readily as international orange (APLIC 1994). Other potentially helpful devices to reduce strikes include bird flappers and diverters, such as the Firefly and BirdMark, which swivel in the wind, glow in the dark, and use fluorescent colors designed specifically for bird vision. More research is needed on such devices to test their effectiveness.

A limited study compared the use of an oversized overhead groundwire with a conventional overhead groundwire (Brown et al. 1987, Miller 1990). Researchers concluded that there were no significant effects on bird response (APLIC 1994). Removal of overhead groundwires can be an effective means of reducing bird collisions (Beaulaurier 1981, Brown et al. 1987). The development of polymer insulation and polymer lightning arrestors has introduced another option in the removal of overhead groundwires (APLIC 1994).

9-17

Manville (2005) provided an update on industry efforts to minimize avian collisions.

> "In an attempt to comprehensively address the collision problem, APLIC (1994) provided voluntary guidance to the industry on avoiding power line strikes. The document will be updated once research being conducted by the Electric Power Research Institute and others at the Audubon NWR, North Dakota, is completed, and results of tests on a Bird Strike Indicator and Bird Activity Monitor can be published. Other research findings will also likely be included."

Techniques currently recommended to reduce whooping crane strikes include marking lines to make them more visible in areas frequently used by cranes (Brown et al. 1987). USFWS recommends to avoid placing new line corridors near wetlands or other crane use areas, and usually recommends lines should be marked when crossing wetlands, or at a minimum distance within 0.4 km (0.25 mi) of a known crane roost or use area (W. Jobman, USFWS, Grand Island, Nebraska, pers. comm.). Brown et al. (1987) recommended locating new power lines at least 2.0 km (1.2 mi) from traditional roost and feeding sites based on their finding of no collisions observed when roosting and foraging sites were more than 1.6 km (1 mi) apart.

Additional Recommended Actions

The following actions recommended for species recovery are listed in the draft Canada-U.S. Whooping Crane Recovery Plan (CWS and USFWS 2005):

- Use telemetry and/or continue to document sightings with the whooping crane reporting network to better define areas receiving high crane use and locations where power lines are a significant problem.

- Monitor the placement and design of all new power lines in areas of known crane use. When possible, bury new power lines or route them around areas frequently used by whooping cranes.

- Mark existing problem lines to reduce collisions. Visibility should be maximized on any existing structures or those, which of necessity, must be constructed in whooping crane use areas or flight routes by following CWS and/or USFWS guidelines to reduce bird strikes.

- Remove unnecessary power lines from traditional stopover sites, Critical Habitat, National Wildlife Areas, National Wildlife Refuges and National Wetland Areas used by whooping cranes.

- The Whooping Crane Recovery Team should make contact with the Avian Power Line Interaction Committee (APLIC) to stay appraised of new developments in collision reduction and work jointly to ascertain and implement actions to reduce whooping crane mortality due to collisions with power lines.

With power line strikes the greatest source of mortality of fledged whooping cranes, a species still very endangered, it is important to try to reduce the current level of mortality. The USFWS, working in collaboration with representatives of the electric utility industry, desires over the next several years to perform the following tasks. The point of contact for USFWS will be its Whooping Crane Coordinator.

- Develop contacts with key members of APLIC and work together to agree upon the most effective actions needed to reduce whooping crane mortality. Create a Whooping Crane Strike Avoidance Team to more formally address this issue with industry and other stakeholders.

- Work with APLIC to better define criteria for which lines need to be marked. Create maps showing the main whooping crane migration corridor where lines may need to be marked. Define areas where lines do not need to be marked, such as highly developed urban areas or areas at the edges of the migration corridor.

- Spread information about power line strikes being the primary short-term threat to survival of fledged whooping cranes in migration. This manuscript should be refined and published at the 10th North American Crane Workshop in February, 2006. Send out information to USFWS Ecological Services offices, other agencies and industry representatives.

- Standardize USFWS policy carried out by Ecological Services offices within the whooping crane migration corridor to ensure an increased effort to recommend marking existing and new lines where needed.

- Work with the Ecological Services and Refuge divisions of USFWS to concentrate initially on getting lines marked within or near Critical Habitat, National Wildlife Refuges, and Wildlife Management Areas. Ensure that areas around traditional stopover sites are adequately marked.

- Monitor the placement and design of all new lines in the whooping crane migration corridor.

- Work to gain support to increase the overall percentage of marked lines in the whooping crane migration corridor to reduce mortality. Insure that this percentage continues to increase even as new lines are constructed.

- Encourage the electric utility industry and others to fund further research into reducing whooping crane strikes that would provide beneficial information for all diurnal species.

- Use information from this issue paper to help write and implement voluntary Avian Protection Plans for utilities in the migration corridor of the AWBP corridor. These plans would be utility-specific programs to reduce damage caused by avian interactions with electric utility facilities and reduce bird strikes. Guidelines for Avian Protection Plans are currently available on-line.

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DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
106 SOUTH 15TH STREET
OMAHA NE 68102-1618
July 27, 2007

REPLY TO
ATTENTION OF

Planning, Programs, and Project Management Division

Mr. Matt Marsh
Upper Great Plains Region
Western Area Power Administration
P.O. Box 35800
Billings, Montana 59107-5800

Dear Mr. Marsh:

The U.S. Army Corps of Engineers, Omaha District (Corps), has reviewed your letter dated July 5, 2007, regarding the Basin Electric Power Cooperatives proposed transmission line.
The Corps offers the following comments:

If the proposed powerline construction crosses the flood plains of small drainageways and streams, flood-related problems should not occur if the supporting structures for overhead powerlines are located as far from the banks of the drainageways and streams as possible. This will minimize the potential for erosion hazards and floodflow obstruction. Similarly, flood-related problems should not occur with underground power lines, if the lines are buried far enough below the beds of drainageways and streams to prevent exposure due to streambed erosion during periods of high floodflows. If any aboveground construction is subject to flood damage, such as electrical boxes, they should either be placed above, or flood proofed to, a level above the 100-year flood elevation.

Your plans should be coordinated with the U.S. Environmental Protection Agency, which is currently involved in a program to protect groundwater resources. If you have not already done so, it is recommended you consult with the U.S. Fish and Wildlife Service and the South Dakota Game, Fish and Parks Department regarding fish and wildlife resources. In addition, the South Dakota State Historic Preservation Office should be contacted for information and recommendations on potential cultural resources in the project area.

If construction activities involve any work in waters of the United States, a Section 404 permit may be required. For a detailed review of permit requirements, preliminary and final project plans should be sent to:

U.S. Army Corps of Engineers
Pierre Regulatory Office
Attention: CENWO-OD-R-SD/Naylor
28563 Powerhouse Road, Room 120
Pierre, South Dakota 57501

If you have any questions, please contact Ms. Kristine Nemec at (402) 221-4628.

Sincerely,

Larry D. Janis, Chief
Environmental, Economics, and
Cultural Resources Section
Planning Branch

121-A

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
P.O. Box 1458
Bismarck, ND 58502-1458

July 26, 2007

Nicholas Stas
DOE – Western Area Power Administration
Upper Great Plains Region
PO Box 35800
Billings, MT 59107-5800

RE: Belfield – Rhame 230 kV Transmission Line Project – Bowman, Hettinger, Slope, and Stark Counties, ND

Dear Mr. Stas:

The Natural Resources Conservation Service (NRCS) has reviewed your letter regarding the referenced activity. NRCS has a major responsibility with the Farmland Protection Policy Act (FPPA) in documenting conversion of farmland (i.e., prime, statewide, and local importance) to non-agricultural use. FPPA is not affected by "Finding of No Significant Impact" but is driven by the use of Federal funding for a project. Your letter does not indicate a funding source; assuming your project in not federally funded, FPPA will not apply. At this time, NRCS has no comment on your project.

If you have additional questions pertaining to FPPA, please contact Steve Sieler, State Soil Liaison, at (701) 530-2019.

Sincerely,

J.R. FLORES
State Conservationist

cc:
Mike Sondeland, DC, NRCS, Bowman, ND
Darrin Olin, DC, NRCS, Mott, ND
Todd Solem, DC, NRCS, Dickinson, ND
Terry Gisvold, ASTC (FO), NRCS, Dickinson, ND

NORTH DAKOTA
DEPARTMENT *of* HEALTH

ENVIRONMENTAL HEALTH SECTION
Gold Seal Center, 918 E. Divide Ave.
Bismarck, ND 58501-1947
701.328.5200 (fax)
www.ndhealth.gov

July 23, 2007

Matt Marsh, Environmental Protection Specialist
Upper Great Plans Region
Western Area Power Administration
P.O. Box 35800
Billings, MT 59107-5800

Re: Belfield-Rhame 230-kV Transmission Line Project
Bowman, Hettinger, Slope and Stark Counties, ND

Dear Mr. Marsh:

This department has reviewed the information concerning the above-referenced project under date of July 5, 2007, with respect to possible environmental impacts.

This department believes that environmental impacts from the proposed construction will be minor and can be controlled by proper construction methods. With respect to construction, we have the following comments:

1. All necessary measures must be taken to minimize fugitive dust emissions created during construction activities. Any complaints that may arise are to be dealt with in an efficient and effective manner.

2. Noise from construction activities may have adverse effects on persons who live near the construction area. Noise levels can be minimized by ensuring that construction equipment is equipped with a recommended muffler in good working order. Noise effects can also be minimized by ensuring that construction activities are not conducted during early morning or late evening hours.

The department owns no land in or adjacent to the proposed improvements, nor does it have any projects scheduled in the area. In addition, we believe the proposed activities are consistent with the State Implementation Plan for the Control of Air Pollution for the State of North Dakota.

If you have any questions regarding our comments, please feel free to contact this office.

Sincerely,

L. David Glatt, P.E., Chief
Environmental Health Section

LDG:cc

U.S. Department
of Transportation
**Federal Aviation
Administration**

Federal Aviation Administration
Bismarck Airports District Office
2301 University Drive, Building 23B
Bismarck, North Dakota 58504

August 6, 2007

Mr. Matt Marsh, Environmental Protection Specialist
Upper Great Plains Region
Western Area Power Administration
PO Box 35800
Billings, MT 59107-5800

Dear Mr. Marsh:

Re: Belfield-Rhame 230kV Transmission Line Project
Bowman, Hettinger, Slope, and Stark Counties
Belfield to Rhame, North Dakota

The Bowman County Airport Board is Sponsor of proposed construction improvements for the existing Bowman Municipal Airport and has authorized Brosz Engineering (and it's subcontractor Ulteig Engineers) of Bowman, North Dakota, to prepare environmental documentation needed for our review of the proposed actions. Federal funds are being provided to conduct an environmental assessment on possible airport enhancements to meet the airports aeronautical needs. A new county airport site is one consideration being evaluated under this process.

The Bowman County Airport Board is currently studying three locations near Bowman for the airport relocation. The Bowman Municipal Airport Environmental Assessment location maps are enclosed (4 pages). One of the proposed locations for the Bowman Municipal Airport, Study Area B, is in/near the proposed location of the Belfield-Rhame 230kV transmission line project.

The Bismarck Airports District Office would like to be included in the project mailing list and the review of potential transmission line impacts to the potential airport relocation sites.

If not already included in your planning process, we request that the Bowman County Airport Board and the North Dakota Aeronautics Commission be given the opportunity to provide input and comments on the Bowman-Rhame 230kV Transmission Line Environmental Assessment.

If not already included in your planning process, we request you contact FAA technical operations to identify any possible impacts to aircraft navigation and/or communication

6-1

equipment in the proposed transmission study area. The Minneapolis Technical Support Center (MSP TSCM) for the proposed area may be contacted by phone at (952) 997-9261 or in writing. The address for the MSP TSCM is:

Federal Aviation Administration
Minneapolis Technical Support Center
Attn: MSP TSCM
14800 Galaxie Ave, Suite 300
Apple Valley, MN 55124

The proponent shall ensure the design, construction, and operation of the transmission line and any required wetland and/or wildlife habitat mitigation does not create a hazardous wildlife attractant to surrounding airports. Hazardous wildlife and hazardous wildlife separation distances are defined in FAA Advisory Circular (AC) 150/5200-33A, Hazardous Wildlife Attractants on or near airports. All design, construction, and operation of the transmission line and its components (such as materials handling, landscaping, ditches, and storm water management) shall comply with FAA AC 150/5200-33A, Hazardous Wildlife Attractants on or near Airports. A copy of the advisory circular may be obtained at www.faa.gov.

Please be advised FAA Advisory Circular 150/5200-33A, Hazardous Wildlife Attractants On or Near Airports, advises a 10,000 foot separation distance between certain airports and a hazardous wildlife attractant. Additionally, it is recommended that a 5-mile separation distance be considered when the attractant could cause wildlife movement into or across the approach or departure airspace.

If you or the proponents are uncertain if the proposed development will cause a wildlife hazard for your airport or other airports in the area, we recommend you or the proponent consult with the United States Department of Agriculture, APHIS, Wildlife Services or an other qualified wildlife biologists. We recommend any wildlife biologist consulting on a matter such as this, meet the qualifications identified FAA Advisory Circular 150/5200-36, "Qualifications for wildlife biologist conducting wildlife hazard assessments and training curriculums for airport personnel involved in controlling wildlife hazards on airports".

Also, the proponent of the transmission line shall notify the Federal Aviation Administration (FAA) of construction or alterations as required by Federal Aviation Regulations, Part 77, Objects Affecting Navigable Airspace, Paragraph 77.13. Please note that Part 77 includes temporary construction vehicles and equipment. The Notice of Proposed Construction or Alteration Form 7460-1 may be obtained and filed online at https://oeaaa.faa.gov or mailed to:

Express Processing Center
FAA Southwest Regional Office
Obstruction Evaluation Service, AJR-32
2601 Meacham Boulevard
Fort Worth, TX 76137-0520

I appreciate that our office was given the opportunity to review this project. Please contact me if you have any questions or need further information.

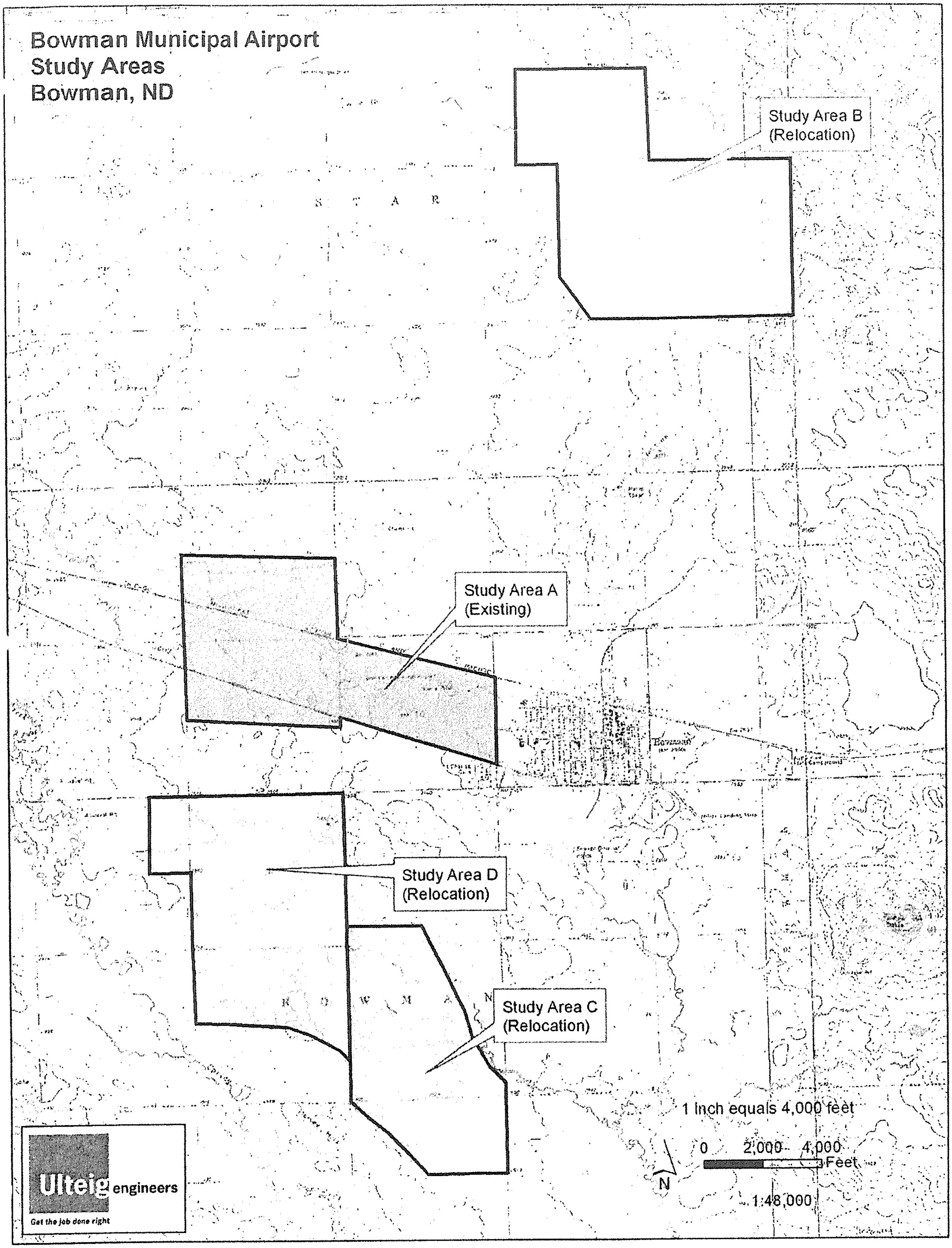
If you have additional questions, please contact our office at (701) 323-7380.

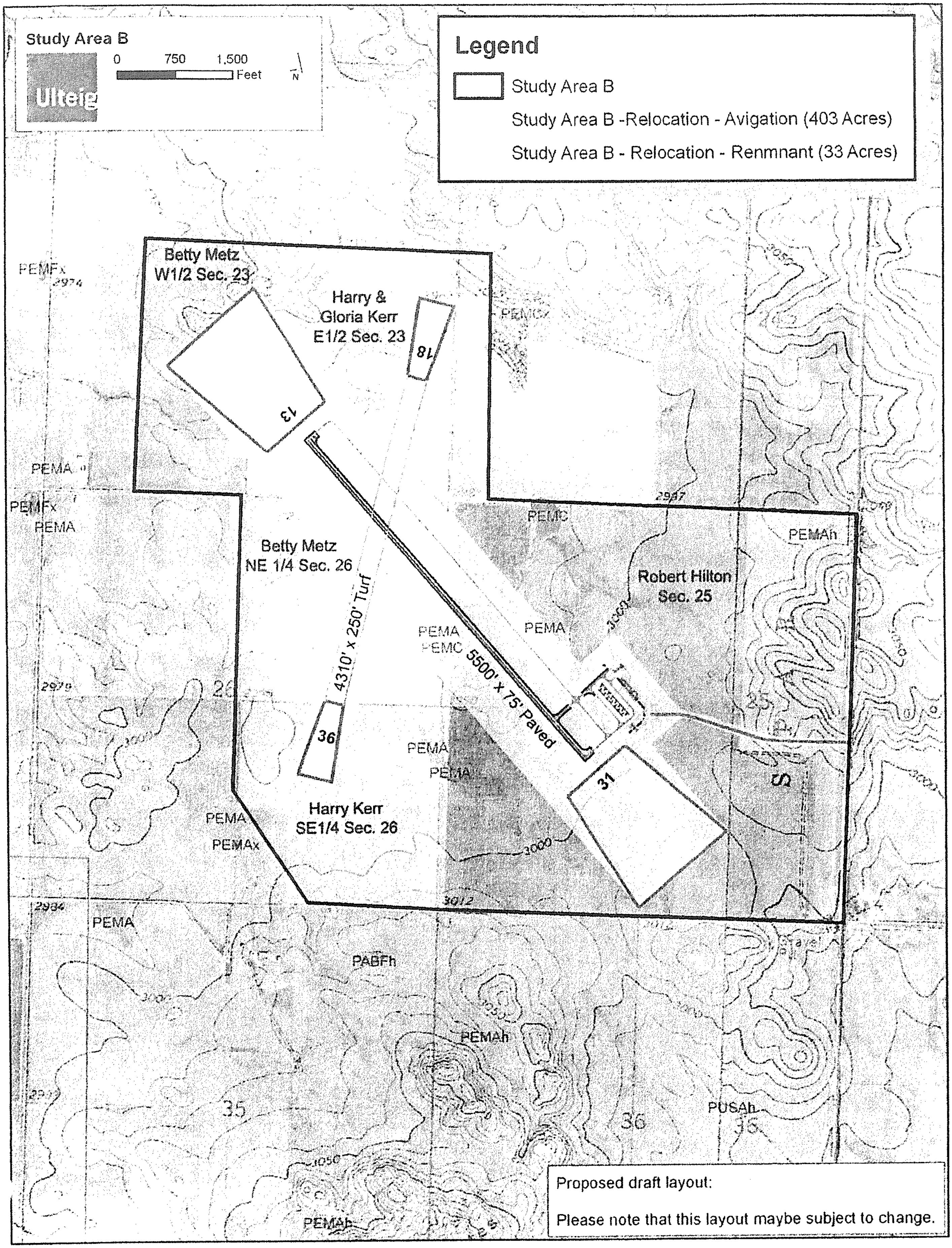
Sincerely,

Patricia L. Dressler
Environmental Protection Specialist
Bismarck Airports District Office

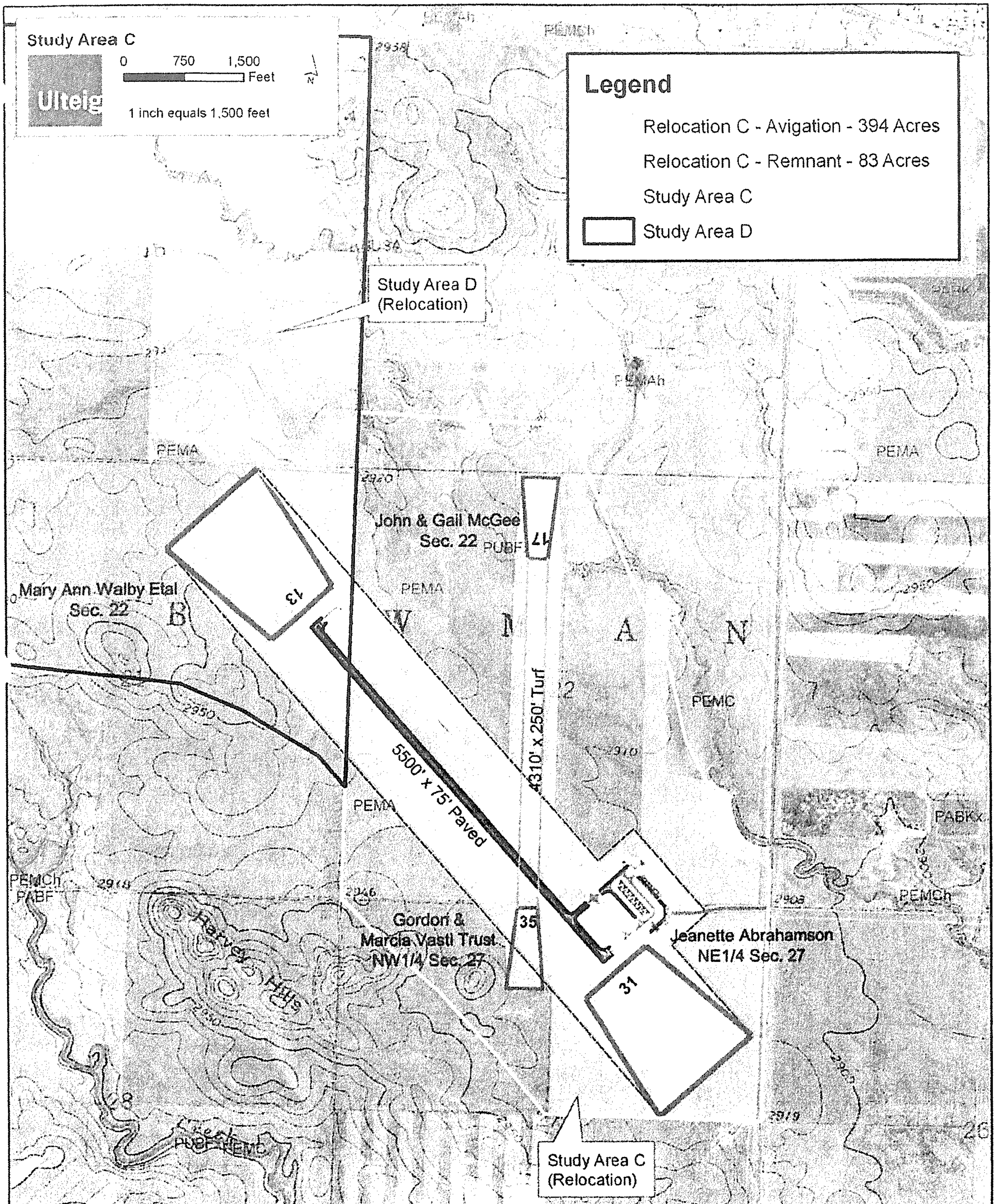
Enclosure

cc w/o enclosure:
Bowman County Airport Board
North Dakota Aeronautics Commission


Bowman Municipal Airport
Study Areas
Bowman, ND
Study Area B
(Relocation)
STAR
Study Area A
(Existing)
Study Area D
(Relocation)
BOWMAN
Study Area C
(Relocation)
1 inch equals 4,000 feet
0 2,000 4,000
Feet
N
1:48,000
Ulteig engineers
Get the job done right


Study Area B
0 750 1,500 Feet
N
Ulteig
Legend
Study Area B
Study Area B -Relocation - Avigation (403 Acres)
Study Area B - Relocation - Renmnant (33 Acres)
Betty Metz W1/2 Sec. 23
Harry & Gloria Kerr E1/2 Sec. 23
18
13
Betty Metz NE 1/4 Sec. 26
4310' x 250' Turf
5500' x 75' Paved
36
31
Robert Hilton Sec. 25
Harry Kerr SE1/4 Sec. 26
PEMFx
PEMA
PEMC
PEMAh
PEMAx
PABFh
PUSAh
35
36
Proposed draft layout:
Please note that this layout maybe subject to change.

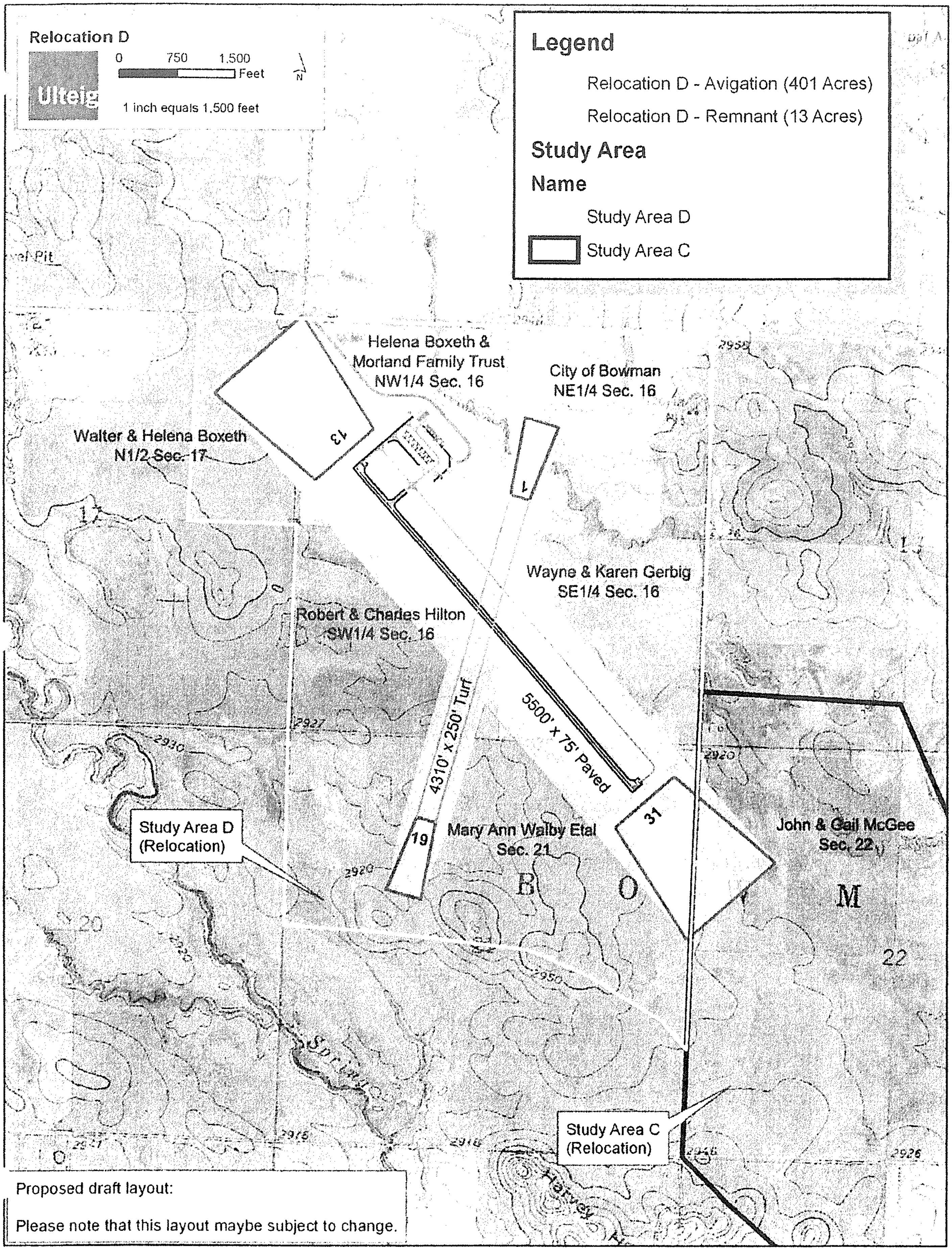
36-5



Proposed draft layout:

Please note that this layout maybe subject to change.

26


Relocation D
0 750 1,500 Feet
Ulteig
1 inch equals 1,500 feet
Legend
Relocation D - Avigation (401 Acres)
Relocation D - Remnant (13 Acres)
Study Area
Name
Study Area D
Study Area C
Helena Boxeth & Morland Family Trust NW1/4 Sec. 16
City of Bowman NE1/4 Sec. 16
Walter & Helena Boxeth N1/2 Sec. 17
13
1
Wayne & Karen Gerbig SE1/4 Sec. 16
Robert & Charles Hilton SW1/4 Sec. 16
4310' x 250' Turf
5500' x 75' Paved
31
19
Mary Ann Walby Etal Sec. 21
John & Gail McGee Sec. 22
Study Area D (Relocation)
Study Area C (Relocation)
Proposed draft layout:
Please note that this layout maybe subject to change.

NORTHERN CHEYENNE TRIBE
TRIBAL HISTORICAL PRESERVATION OFFICE
P.O. Box 128
Lame Deer, Montana 59043
(406) 477-6035 Fax(406)477-6210

Native American Consultation Response Form

From: Northern Cheyenne Tribal Historical Preservation Office (Conrad Fisher)

Re: Consultation

Site Name:	Basin Electric Power Cooperative
TCNS Notification ID Number:	
TCNS Filing/Notification Date:	
Site Address:	Belfield N.D

Response:

- [x] We have no comments related to proposed project.
- [ ] Will have no effect on tribal religious or sacred sites.
- [x] May affect tribal religious or sacred site; please notify if cultural resources are found during site investigation/construction.
- [ ] Other (please specify)____________________

Exception: If archaeological materials or human remains are encountered during construction, the State Historic Preservation Office and applicable Native American Tribes will be notified.

[signature] 8/9/07
Signature Date

Mr. Conrad Fisher, Director N.C.T./THPO 1(406)477-6035
Printed Name Telephone No.

Preserving the Land, Cultural Heritage, Tradition for the Future Generation

Rosebud Sioux Tribe
Tribal Historic Preservation Office
P.O. Box 809
Rosebud, South Dakota
Telephone: (605) 747-4255
Fax: (605) 747-4211
Email: rstthpo@yahoo.com

Russell Eagle Bear
Officer

Kathy Arcoren
Administrative Assista

August 8, 2007

Department of Energy
Western Area Power Administration
Upper Great Plains Region
PO Box 35800
Billings, Mont. 59107-5800
Atten: Steve Tromly

Re: Transmission line from Belfield and Rhame

Dear Mr. Tromly,

We are responding to your letter dated July 09, 2007 in reference to the request from Basin Electric to interconnect a proposed transmission line with the Western's transmission system in the State of North Dakota, from Belfield Substation east of Belfield to a new substation to be built south of Rhame.

As the Tribal Historic Preservation Officer for the Rosebud Sioux Tribe I appreciate your notification of the undertaking and the awareness you are demonstrating for the archaeological sites and cultural heritage of Indigenous peoples.

Please forward the Environmental Assessment for this proposed project. At this time we have no concerns for this project to proceed as planned; we will make our comments once we receive the EA and have time to review the document.

Thank you for your time and consideration of this letter.

Sincerely,

Kathy Arcoren

In Mr. Russell Eagle Bear

ENSR

Correspondence Summary Sheet

By: Patti Lorenz

Date: 11/16/07

Talked With: John Schumacher

Project Number: 10735-006

Title: Resource Biologist

Project Name: Basin Electric – Belfield to Rhame Transmission Line

Of: North Dakota Game and Fish Department (NDGFD)

Subject: Special Status Species

Telephone Number: (701) 328-6321

Facsimile Number:

Email or Internet Address (if applicable): jdschumacher@nd.gov

Supplemental Information Attached? YES NO

Indicate Documentation Type: **Telephone** **Facsimile** **Internet** **Email**

I called John to gather more information regarding special status species impacts and mitigation for the proposed transmission line project. Items discussed include:

- Species evaluated as possibly occurring within the proposed project were gathered using the North Dakota Comprehensive Wildlife Conservation Strategy. North Dakota does not have state listed threatened and endangered species, only species of conservation priority;
- No species specific surveys will be required from NDGFD;
- Consultation with the U.S. Fish and Wildlife Service (USFWS) resulted in concern for four federally listed species (i.e. black-footed ferret, gray wolf, whooping crane, and bald eagle);
- Any species not associated with native prairie or wetland/riparian habitats can be eliminated from further analysis;
- John will gather information regarding known sage grouse lek locations and send it to me if found.

John replied that the NDGFD's Conservation Priority program is fairly young. NDGFD is currently working on lists for projects such as this. As for now, there are no differentiations on the requirements for each level of North Dakota species of conservation priority.

FILE NAME- PL_JS_111607.doc

Patricia M. Lorenz

Signature

Distribution: (1) File (2) Self (3) Report

ENSR

Correspondence Summary Sheet

By: Patti Lorenz

Date: 10/01/07

Talked With: Andrea Bowman

Project Number: 10735-006-800

Title: Extension Agent

Project Name: Basin Electric – Belfield to Rhame Transmission Line

Of: Bowman County Extension Office

Subject: Noxious Weeds

Telephone Number: (701) 523-5271

Facsimile Number:

Email or Internet Address (if applicable): NA

Supplemental Information Attached? **YES** **NO**

Indicate Documentation Type: **Telephone** **Facsimile** **Internet** **Email**

Andrea listed Baby's breath (*Gypsophila* paniculata) as a noxious weed specific to Bowman County in addition to the state list.

FILE NAME- PL_AB_BCEO_100107.doc

Patricia M. Lorenz

Signature

Distribution: **(1)** File **(2)** Self **(3)** Report

ENSR

Correspondence Summary Sheet

By: Patti Lorenz

Date: 10/01/07

Talked With: Secretary

Project Number: 10735-006-800

Title: Weed Board

Project Name: Basin Electric – Belfield to Rhame Transmission Line

Of: Stark County Extension Office

Subject: Noxious Weeds

Telephone Number: (701) 456-7665

Facsimile Number:

Email or Internet Address (if applicable): NA

Supplemental Information Attached? **YES** **NO**

Indicate Documentation Type: **Telephone** **Facsimile** **Internet** **Email**

The secretary of the Stark County Extension Office listed noxious weeds specific to Stark County. These noxious weeds are in addition to the state list. They include:

- Hoary cress (*Cardaria draba*);
- Yellow toadflax (*Linaria vulgaris*); and
- Black henbane (*Hyoscyamus niger*).

FILE NAME- PL_SCEO_100107.doc

Patricia M. Lorenz

Signature

Distribution: **(1)** File **(2)** Self **(3)** Report

ENSR

Correspondence Summary Sheet

By: Patti Lorenz

Date: 10/16/07

Talked With: Joan Lorge

Project Number: 10735-006-800

Title: Weed Officer

Project Name: Basin Electric – Belfield to Rhame Transmission Line

Of: Slope County Extension Office

Subject: Noxious Weeds

Telephone Number: (701) 879-6316

Facsimile Number:

Email or Internet Address (if applicable): NA

Supplemental Information Attached? **YES** **NO**

Indicate Documentation Type: **Telephone** **Facsimile** **Internet** **Email**

Joan Lorge of the Slope County Extension Office listed noxious weeds specific to Slope County. These noxious weeds are in addition to the state list. They include:

- St. Johnswort (*Hypericum* sp.); and
- Hound's tongue (*Cynoglossum* sp.).

FILE NAME- PL_SCEO_101607.doc

Patricia M. Lorenz

Signature

Distribution: **(1)** File **(2)** Self **(3)** Report

Appendix C

Soil Types

Table C-1 Soil Series Crossed by Transmission Line Corridors

Soil Type	Slope (%)	Landform	Parent Material	Runoff	Permeability	Present Flooding	Present Ponding	Natural Drainage Class	Main Use
Soil Mapping Unit: s4800									
Vebar	2 - 28	level to very steep uplands	calcareous sandstone	negligible to medium	moderately rapid	None	None	Well drained	Agriculture (corn and small grains)
Regent	2 - 28	level to very steep, long and plane or slightly convex slopes on uplands	alkaline soft shale, siltstone or mudstone	low to very high	slow	None	None	Well drained	Agriculture
Cabba	2 - 28	sedimentary plains; escarpments; hills	semiconsolidated, loamy sedimentary beds	low to high	moderately	None	None	Well drained	Rangeland
Amor	2 - 28	level to moderately steep uplands	stratified soft sandstone, siltstone and mudstone	negligible to high	moderately	None	None	Well drained	Agriculture
Soil Mapping Unit: s4804									
Rhoades	2 - 25	level to steep concave swales on uplands and terraces	soft shale, siltstone or mudstone	medium to very high	very slow	None	None	Well drained	Grasslands; rangeland; pasture
Moreau	2 - 25	level to very steep sedimentary upland plains	soft calcareous alkaline shales.	negligible to very high	slow	None	None	Well drained	Agriculture (small grains); rangeland; pasture

Table C-1 Soil Series Crossed by Transmission Line Corridors

Soil Type	Slope (%)	Landform	Parent Material	Runoff	Permeability	Present Flooding	Present Ponding	Natural Drainage Class	Main Use
Cabba	2 - 25	sedimentary plains; escarpments; hills	semiconsolidated, loamy sedimentary beds	low to high	moderately	None	None	Well drained	Rangeland
Belfield	2 - 25	level and nearly level terraces, flats and upland swales and on nearly level to moderately sloping uplands	alkaline, calcareous residuum, or alluvium mainly of tertiary origin	negligible to medium	slow	None	None	Well drained	Agriculture (small grains)
Soil Mapping Unit: s4809									
Rhoades	4 - 45	level to steep concave swales on uplands and terraces	soft shale, siltstone or mudstone	medium to very high	very slow	None	None	Well drained	Grasslands; rangeland; pasture
Cabba	4 - 45	sedimentary plains; escarpments; hills	semiconsolidated, loamy sedimentary beds	low to high	moderately	None	None	Well drained	Rangeland
Amor	4 - 45	level to moderately steep uplands	stratified soft sandstone, siltstone and mudstone	negligible to high	moderately	None	None	Well drained	Agriculture
Soil Mapping Unit: s4813									
Golva	2 - 45	fans and terraces, and in shallow concave swales	silty alluvium	negligible to medium	moderately	None	None	Well drained	Agriculture (small grains); some row crops, hay, and pasture

Table C-1 Soil Series Crossed by Transmission Line Corridors

Soil Type	Slope (%)	Landform	Parent Material	Runoff	Permeability	Present Flooding	Present Ponding	Natural Drainage Class	Main Use
Chama	2 - 45	level to very steep uplands	soft siltstone, mudstone and shale on uplands	medium to rapid	moderately or moderately slowly	None	None	Well drained	Agriculture (small grains)
Cabba	2 - 45	sedimentary plains; escarpments; hills	semiconsolidated, loamy sedimentary beds	low to high	moderately	None	None	Well drained	Rangeland
Soil Mapping Unit: s4821									
Straw	1 - 40	floodplains, stream terraces and drainageways	alluvium	negligible to medium	Moderate	None	None	Well drained	Agriculture (dryland and irrigated) and rangeland
Ruso	1 - 40	outwash plains and stream terraces	loamy alluvium over sand and gravel	Slow	moderately rapid in the upper part and very rapid in the substratum	None	None	Well drained	Agriculture (small grains and alfalfa)
Parshall	1 - 40	terraces, outwash plains and upland swales	alluvium	negligible to medium depending on slope and surface texture	moderately rapidly	None	None	Well drained	Agriculture (small grains, flax, tame grass, and alfalfa)

Table C-1 Soil Series Crossed by Transmission Line Corridors

Soil Type	Slope (%)	Landform	Parent Material	Runoff	Permeability	Present Flooding	Present Ponding	Natural Drainage Class	Main Use
Bowdle	1 - 40	outwash plains and stream terraces	loamy alluvium underlain by sand and gravel	negligible to medium	moderate in the solum and rapid or very rapid in the underlying material	None	None	Well drained	Agriculture (small grains, flax, tame grass, and alfalfa)
Soil Mapping Unit: s4824									
Tally	2 - 14	stream terraces, alluvial fans, till plains, drainageways, hills, sedimentary plains and outwash plains	eolian deposits, alluvium, or glaciofluvial deposits	NA	moderately rapid	None	None	Well drained	Agriculture (irrigated and non-irrigated) and rangeland
Stady	2 - 14	stream terraces	loamy alluvium over sand and gravel	negligible to low	moderate in the upper horizons and very rapid in the 2Bk and 2C horizons	None	None	Well drained	Agriculture (spring wheat, other small grains, and corn)
Shambo	2 - 14	terraces and fans along stream valleys and are on fans on uplands	calcareous alluvium mainly from soft sandstone, mudstone and shale	negligible to high	moderately	None	None	Well drained	Agriculture

Table C-1 Soil Series Crossed by Transmission Line Corridors

Soil Type	Slope (%)	Landform	Parent Material	Runoff	Permeability	Present Flooding	Present Ponding	Natural Drainage Class	Main Use
Rhoades	2 - 14	level to steep concave swales on uplands and terraces	soft shale, siltstone or mudstone	medium to very high	very slow	None	None	Well drained	Grasslands; rangeland; pasture
Soil Mapping Unit: s4828									
Vebar	1 - 30	level to very steep uplands	calcareous sandstone	negligible to medium	moderately rapid	None	None	Well drained	Agriculture (corn and small grains)
Parshall	1 - 30	terraces, outwash plains and upland swales	alluvium	negligible to medium depending on slope and surface texture	moderately rapidly	None	None	Well drained	Agriculture (small grains, flax, tame grass, and alfalfa)
Flasher	1 - 30	gently sloping to very steep side slopes, shoulder slopes and summits of hills and ridges on uplands and side slopes of valleys	soft sandstone	slow or medium	moderately rapid or rapid	None	None	excessively drained	Rangeland; pasture
Amor	1 - 30	level to moderately steep uplands	stratified soft sandstone, siltstone and mudstone	negligible to high	moderately	None	None	Well drained	Agriculture

Table C-1 Soil Series Crossed by Transmission Line Corridors

Soil Type	Slope (%)	Landform	Parent Material	Runoff	Permeability	Present Flooding	Present Ponding	Natural Drainage Class	Main Use
Soil Mapping Unit: s4829									
Vebar	1 - 25	level to very steep uplands	calcareous sandstone	negligible to medium	moderately rapid	None	None	Well drained	Agriculture (corn and small grains)
Reeder	1 - 25	uplands	material weathered from soft, calcareous sandstone, siltstone or mudstone	medium or rapid	moderately	None	None	Well drained	Agriculture (small grains, flax, corn, hay and grass) used in a crop summer fallow rotation
Cabba	1 - 25	sedimentary plains; escarpments; hills	semiconsolidated, loamy sedimentary beds	low to high	moderately	None	None	Well drained	Rangeland
Amor	1 - 25	level to moderately steep uplands	stratified soft sandstone, siltstone and mudstone	negligible to high	moderately	None	None	Well drained	Agriculture
Soil Mapping Unit: s4830									
Rhoades	1 - 25	level to steep concave swales on uplands and terraces	soft shale, siltstone or mudstone	medium to very high	very slow	None	None	Well drained	Grasslands; rangeland; pasture

Table C-1 Soil Series Crossed by Transmission Line Corridors

Soil Type	Slope (%)	Landform	Parent Material	Runoff	Permeability	Present Flooding	Present Ponding	Natural Drainage Class	Main Use
Moreau	1 - 25	level to very steep sedimentary upland plains	soft calcareous alkaline shales.	negligible to very high	slow	None	None	Well drained	Agriculture (small grains); rangeland; pasture
Belfield	1 - 25	level and nearly level terraces, flats and upland swales and on nearly level to moderately sloping uplands	alkaline, calcareous residuum, or alluvium mainly of tertiary origin	negligible to medium	slow	None	None	Well drained	Agriculture (small grains)
Soil Mapping Unit: s4831									
Regent	2 - 18	level to very steep, long and plane or slightly convex slopes on uplands	alkaline soft shale, siltstone or mudstone	low to very high	slow	None	None	Well drained	Agriculture
Reeder	2 - 18	uplands	material weathered from soft, calcareous sandstone, siltstone or mudstone	medium or rapid	moderately	None	None	Well drained	Agriculture (small grains, flax, corn, hay and grass) used in a crop summer fallow rotation
Moreau	2 - 18	level to very steep sedimentary upland plains	soft calcareous alkaline shales.	negligible to very high	slow	None	None	Well drained	Agriculture (small grains); rangeland; pasture

Table C-1 Soil Series Crossed by Transmission Line Corridors

Soil Type	Slope (%)	Landform	Parent Material	Runoff	Permeability	Present Flooding	Present Ponding	Natural Drainage Class	Main Use
Cabba	2 - 18	sedimentary plains; escarpments; hills	semiconsolidated, loamy sedimentary beds	low to high	moderately	None	None	Well drained	Rangeland
Soil Mapping Unit: s4842									
Regent	2 - 25	level to very steep, long and plane or slightly convex slopes on uplands	alkaline soft shale, siltstone or mudstone	low to very high	slow	None	None	Well drained	Agriculture
Morton	2 - 25	uplands	material weathered from soft calcareous silty shales, siltstones, and fine grained sandstones	negligible to medium	moderately	None	None	Well drained	Agriculture (small grains, flax, corn, hay, and pasture)
Moreau	2 - 25	level to very steep sedimentary upland plains	soft calcareous alkaline shales.	negligible to very high	slow	None	None	Well drained	Agriculture (small grains); rangeland; pasture
Farland	2 - 25	terraces, valley foot slopes and fans on uplands	stratified alluvium	slow or medium	moderate or moderately slow	None	None	Well drained	Agriculture (small grains, flax, corn, hay, and pasture)

Appendix D

Special Status Species

Table D-1 Special Status Species

Species	Scientific Name	Status[1]	Habitat Association	Primary Habitat	Potential for Occurrence Within Project Area	Eliminated from Detailed Analysis	Counties	Source
MAMMALS								
Black-footed ferret	*Mustela nigripes*	FE; ND Level I	Suitable habitat consists of prairie dog colonies or complexes (10,000 acres or greater) with towns no further than three miles apart to sustain a viable population of 120 ferrets. The black-footed ferret is presumed extirpated from North Dakota.	Prairie dog colonies	Yes	No	Bowman Slope Stark	USFWS Webpage – Region 6; Hagen et al. 2005; USFWS 2007a
Black-tailed prairie dog	*Cynomys ludovicianus*	ND Level I	This species inhabits prairie communities with short vegetation and flat topography. Often found in relation to areas grazed by livestock and live in large colonies known as "towns".	Shortgrass prairie/grazed areas	Yes	No	Bowman Slope Stark	Hagen et al. 2005; NatureServe 2007
Gray wolf	*Canis lupis*	FE; ND Level III	This species inhabits a wide range of habitats where large ungulates are found. Use mixed hardwood-coniferous forests in wilderness and sparsely settled areas, to forest and prairie landscapes dominated by agricultural and pasture lands.	Any	Yes	No	Bowman Slope Stark	Hagen et al. 2005; USFWS 2007a
Hispid pocket mouse	*Chaetodipus hispidus*	ND Level III	This species prefers short and mixed-grass prairie and may also utilize grain fields.	Shortgrass and mixed-grass prairie	Yes	No	Bowman Slope	Hagen et al. 2005
Long-eared myotis	*Myotis evotis*	ND Level III	This species typically roosts in rugged terrain in small groups or alone in rock crevices and under tree bark. They are also associated with coniferous trees. This species hibernates in caves and abandoned mines.	Rugged terrain and coniferous trees	Yes	No	Bowman Slope Stark	Hagen et al. 2005; NDGFD 2007b

Table D-1 Special Status Species

Species	Scientific Name	Status[1]	Habitat Association	Primary Habitat	Potential for Occurrence Within Project Area	Eliminated from Detailed Analysis	Counties	Source
Long-legged myotis	*Myotis volans*	ND Level III	This species typically roosts in rugged terrain in small groups or alone in rock crevices and under tree bark. They are also associated with coniferous trees.	Rugged terrain and coniferous trees	Yes	No	Bowman Slope	Hagen et al. 2005; NDGFD 2007b
River otter	*Lontra canadensis*	ND Level II	This species prefers aquatic habitats with year-round water supplies. They utilize wetland/riparian areas with a constant food supply and adequate cover. Also associated with beaver activity.	Riparian	Yes	No	Bowman Slope Stark	Hagen et al. 2005
Sagebrush vole	*Lemmiscus curtatus*	ND Level III	This species prefers semi-arid areas with loose soil; usually a combination of grass and sagebrush.	Semi-arid lands	Yes	No	Bowman Slope Stark	Hagen et al. 2005; NDGFD 2007b
Swift fox	*Vulpes velox*	ND Level II	This species is found in short-, mid-, and mixed-grass prairies with gently rolling hills. Den sites are typically located on flat areas or along slopes or ridges that provide a good view. Dens are typically on sites dominated by blue grama or buffalograss. Young are born in late March, April, or early May. The swift fox is presumed extirpated in North Dakota.	Grasslands	Yes	No	Bowman Slope Stark	Hagen et al. 2005
Western small-footed myotis	*Myotis ciliolabrum*	ND Level III	This species typically roosts in rugged terrain in small groups or alone in rock crevices and under tree bark. They are only found in North Dakota's badlands and are also associated with coniferous trees.	Rugged terrain and coniferous trees	Yes	No	Stark	Hagen et al. 2005; NDGFD 2007b

Table D-1 Special Status Species

Species	Scientific Name	Status[1]	Habitat Association	Primary Habitat	Potential for Occurrence Within Project Area	Eliminated from Detailed Analysis	Counties	Source
BIRDS								
American advocet	*Recurvirostra americana*	ND Level II	This species prefers ponds or lakes with exposed, sparsely vegetated shorelines. Peak breeding season: mid-May to early July.	Ponds or lakes	Yes	No	Bowman Slope Stark	Hagen et al. 2005
American bittern	*Botaurus lentiginosus*	ND Level I	This species inhabits a variety of wetlands, particularly large wetlands with tall emergent vegetation. This migratory bird will also nest in tall, dense grassland. Peak breeding season: mid-June to late July.	Wetlands and tall, dense grasslands	Yes	No	Secondary range: Bowman Slope Stark	Hagen et al. 2005
Baird's sparrow	*Ammodramus bairdii*	ND Level I	This species prefers extensive tracts of native prairie but will utilize idle, tame grasslands, and lightly to moderately grazed pastures. Stands of grasses with narrow leaves are readily used. Peak breeding season: early June to late July.	Extensive tracts of native mixed-grass prairie and lightly grazed pastures	Yes	No	Bowman Slope Stark	Hagen et al. 2005
Bald eagle	*Haliaeetus leucocephalus*	ND Level II	This species typically occurs near large bodies of water that support suitable roosting and foraging habitat. Nest sites typically occur in proximity to open water and generally are found in mature heterogeneous stands of multi-storied trees, but also may nest on cliffs. Winter habitat typically includes areas of open water, adequate food sources, and sufficient diurnal perches and night roosts. Breeding season: January through July. Winter season: November 15 through March 15.	Large rivers and waterbodies	Yes	No	Bowman Slope Stark	Hagen et al. 2005; USFWS 2007a

Table D-1 Special Status Species

Species	Scientific Name	Status[1]	Habitat Association	Primary Habitat	Potential for Occurrence Within Project Area	Eliminated from Detailed Analysis	Counties	Source
Bobolink	*Dolichonyx oryzivorus*	ND Level II	This species uses a variety of grasslands but prefers moderate to tallgrass prairie, hayland, and retired croplands. Peak breeding season: early June to mid-July.	Grasslands	Yes	No	Bowman Slope Stark	Hagen et al. 2005
Black-billed cuckoo	*Coccyzus erythropthalmus*	ND Level I	This species inhabits bushy margins or openings of woodlands, and thickets of small trees or shrubs on the prairie. Also uses riparian areas, shelterbelts and wooded areas of towns and farmsteads. Peak breeding season: mid-June to late July.	Wooded areas	Yes	No	Bowman Slope Stark	Hagen et al. 2005
Brewer's sparrow	*Spizella breweri*	ND Level II	This species inhabits shrubland communities dominated by sagebrush and juniper woodlands. This species is present in North Dakota from May to mid-September. Peak breeding season: mid-May to late July.	Sagebrush communities	Yes	No	Bowman Slope	Hagen et al. 2005; NDNHI 2007; NDGFD 2007b
Burrowing owl	*Athene cunicularia*	ND Level II	This migratory species inhabits open grasslands with short vegetation and bare ground. Rely exclusively on burrowing mammals to create burrows for nest sites. Peak breeding season: early May to mid-August.	Prairie dog colonies	Yes	No	Bowman Slope Stark	Hagen et al. 2005
Chestnut-collared longspur	*Calcarius ornatus*	ND Level I	This species is described as a native prairie specialist. Level to rolling, open, arid, mixed-grass and shortgrass prairie is utilized. Peak breeding season: early May to mid-July.	Native prairie	Yes	No	Bowman Slope Stark	Hagen et al. 2005

Table D-1 Special Status Species

Species	Scientific Name	Status[1]	Habitat Association	Primary Habitat	Potential for Occurrence Within Project Area	Eliminated from Detailed Analysis	Counties	Source
Canvasback	*Aythya valisineria*	ND Level II	This species prefers deep wetlands, particularly semipermanent wetlands with emergent cover. Peak breeding season: mid-May to mid-August.	Open water	Yes	No	Bowman Slope Stark	Hagen et al. 2005
Dickcissel	*Spiza americana*	ND Level II	This species uses a variety of grassland habitats but prefers areas with alfalfa, sweet clover, and other brushy grasslands. Peak breeding season: early June to mid-August.	Grasslands	Yes	No	Bowman Slope Stark	Hagen et al. 2005
Ferruginous hawk	*Buteo regalis*	ND Level I	This species inhabits a variety of open country and shrubland. Usually avoids cultivated fields, heavily grazed pastures, high elevations, and forest interiors. May be associated with prairie dog towns. Peak breeding season: late April to mid-July.	Open country and shrublands	Yes	No	Bowman Slope Stark	Hagen et al. 2005; Gomes (No Date)
Golden eagle	*Aquila chrysaetos*	ND Level II	This species inhabits rugged portions of badlands and buttes over looking open shrubland and grasslands. Typically nests on south facing cliffs and may be associated with prairie dog towns. Peak breeding season: late April to late June.	Cliffs	Yes	No	Bowman Slope Stark	Hagen et al. 2005; Gomes (No Date)
Grasshopper sparrow	*Ammodramus savannarum*	ND Level I	This species inhabits grasslands of intermediate height, clumped vegetation, patches of bare ground, moderate litter depth, and sparse woody vegetation. Also uses native and tame grasslands, CRP, haylands, and croplands. Peak breeding season: early June to late July.	Open country	Yes	No	Bowman Slope Stark	Hagen et al. 2005

Table D-1 Special Status Species

Species	Scientific Name	Status[1]	Habitat Association	Primary Habitat	Potential for Occurrence Within Project Area	Eliminated from Detailed Analysis	Counties	Source
Greater sage grouse	*Centrocercus urophasianus*	ND Level II	This species uses a wide variety of sagebrush mosaic habitats, including tall, low and a mixture of sagebrush types. Riparian and upland meadows, irrigated and non-irrigated croplands and pasturelands are also used. Peak breeding season: early May to mid July.	Sagebrush habitats	Yes	No	Bowman Slope	NDGFD Webpage – GSG Conservation plan; NDGFD 2007a
Lark bunting	*Calamospiza melanocorys*	ND Level I	This species inhabits mixed-grass prairies and sagebrush communities. Weedy cropland, CRP, hayland, and pastures are also used. Peak breeding season: early June to early August.	Open country and shrubland	Yes	No	Bowman Slope Stark	Hagen et al. 2005
LeConte's sparrow	*Ammodramus leconteii*	ND Level II	This species prefers fens, wet meadows, and marshes of sedge grasses. Peak breeding season: late May to mid-August.	Wetlands	Yes	No	Bowman Slope Stark	Hagen et al. 2005
Loggerhead shrike	*Lanius ludovicianus*	ND Level II	This species prefers open country with thickets of small trees, shrubs, and shelterbelts. Peak breeding season: early May to mid-June.	Open country with tree clumps	Yes	No	Bowman Slope Stark	Hagen et al. 2005
Long-billed curlew	*Numenius americanus*	ND Level I	This species uses expansive, open, level to gently rolling or sloping grasslands of short vegetation such as short-grass and grazed mixed-grass prairie for breeding. Proximity to water is an important factor in habitat selection. Nests in dry uplands next to wet meadows. Peak breeding season: early May to early July.	Open grasslands adjacent to water	Yes	No	Bowman Slope Stark	Hagen et al. 2005

Table D-1 Special Status Species

Species	Scientific Name	Status[1]	Habitat Association	Primary Habitat	Potential for Occurrence Within Project Area	Eliminated from Detailed Analysis	Counties	Source
Marbled godwit	*Limosa fedoa*	ND Level I	This species requires large expanses of short, sparse to moderately vegetated uplands for nesting and a variety of wetlands for foraging. Requires a high percentage of grass cover and wetlands. Peak breeding season: early May to late June.	Prairie adjacent to wetlands	Yes	No	Bowman Slope Stark	Hagen et al. 2005
McCown's longspur	*Calcarius mccownii*	ND Level III	This species prefers arid, shortgrass prairie or heavily grazed mixed-grass prairie. Peak breeding season: late May to mid-July.	Shortgrass prairie	Yes	No	Bowman Slope	Hagen et al. 2005
Northern harrier	*Circus cyaneus*	ND Level II	This species inhabits open grasslands and wetlands with tall, dense vegetation. This migratory bird will utilize native or tame vegetation in wet or dry grasslands, fresh to alkali wetlands, lightly grazed pastures, croplands, shrubby fields and fallow fields. Breeding season: late April to early August.	Grasslands, agricultural fields, and wetlands	Yes	No	Bowman Slope Stark	Hagen et al. 2005; Gomes (No Date)
Northern pintail	*Anas acuta*	ND Level II	This species prefers wetland complexes of open water and associated upland native prairie. Peak breeding season: early April to early July.	Open water	Yes	No	Bowman Slope Stark	Hagen et al. 2005

Table D-1 Special Status Species

Species	Scientific Name	Status[1]	Habitat Association	Primary Habitat	Potential for Occurrence Within Project Area	Eliminated from Detailed Analysis	Counties	Source
Peregrine falcon	*Falco peregrinus*	ND Level III	This species uses open expanses of native prairie, badland complexes, rocky cliffs overlooking rivers, lakes, or other water in North Dakota. Nests on high ledges, cliffs, steep sides of buttes, and tall buildings. Only one breeding pair has been identified in Fargo, North Dakota. Peak breeding season: May to July.	Cliffs	Yes	No	Bowman Slope Stark	Hagen et al. 2005; Gomes (No Date)
Prairie falcon	*Falco mexicanus*	ND Level II	This species inhabits shortgrass prairie, shrubsteppe, and agricultural areas in generally arid landscapes. Nests primarily on cliffs, buttes, canyon walls, rock outcrops, and ridges. May nest in trees and transmission line towers. Peak breeding season: April to July.	Cliffs	Yes	No	Bowman Slope Stark	Hagen et al. 2005; Gomes (No Date)
Redhead	*Aythya americana*	ND Level II	This species uses a variety of wetland types but prefers semipermanent and deep seasonal wetlands. Peak breeding season: early June to late August.	Open water	Yes	No	Bowman Slope Stark	Hagen et al. 2005
Red-headed woodpecker	*Melanerpes erythrocephalus*	ND Level II	This species prefers natural stands of mature deciduous trees along river bottoms, shelterbelts, and wooded areas of towns. Peak breeding season: early June to early August.	Deciduous tree stands	Yes	No	Bowman Slope Stark	Hagen et al. 2005

Table D-1 Special Status Species

Species	Scientific Name	Status[1]	Habitat Association	Primary Habitat	Potential for Occurrence Within Project Area	Eliminated from Detailed Analysis	Counties	Source
Sharp-tailed grouse	*Tympanuchus phasianellus*	ND Level II	This species uses mixed-grass prairie with patches of shrubs and small trees. CRP grasslands are important to this species. Nests in lightly grazed native prairie, haylands, CRP, and may be located close to the margin of a thicket of shrubs or small trees. Peak breeding season mid May to early August.	Mixed-grass prairie with patches of shrubs	Yes	No	Bowman Slope Stark	Hagen et al. 2005
Short-eared owl	*Asio flammeus*	ND Level II	This species inhabits large expanses of open grassland and wetland areas. Uses native prairie, hayland, retired cropland, small grain stubble, shrubsteppe, and wet meadow zones of wetlands. CRP land is important for this species. Peak breeding season: late April to mid-July.	Open country	Yes	No	Bowman Slope Stark	Hagen et al. 2005
Sprague's pipit	*Anthus spragueii*	ND Level I	This species requires large native grasslands of intermediate height and sparse to intermediate vegetation density, low forb density, and little bare ground but low litter depth. Peak breeding season: early may to mid-August.	Large native grasslands	Yes	No	Bowman Slope Stark	Hagen et al. 2005
Swainson's hawk	*Buteo swainsoni*	ND Level I	This species inhabits open grasslands with scattered trees or shrubs. Also uses shortgrass, mixed-grass, tallgrass prairie, riparian areas, isolated trees, shelterbeds, pasture, hayland, cropland, and wetland borders. Peak breeding season: April to August.	Open country with scattered trees and shrubs	Yes	No	Bowman Slope Stark	Hagen et al. 2005; Gomes (No Date)

Table D-1 Special Status Species

Species	Scientific Name	Status[1]	Habitat Association	Primary Habitat	Potential for Occurrence Within Project Area	Eliminated from Detailed Analysis	Counties	Source
Upland sandpiper	*Bartramia longicauda*	ND Level I	This species inhabits native and tame grassland, wet meadows, hayland, pastures, CRP, cropland, highway and railroad rights-of-way. Often uses wooden fence posts for viewing. Peak breeding season: late May to early July.	Open country	Yes	No	Bowman Slope Stark	Hagen et al. 2005
Whooping crane	*Grus americana*	FE; ND Level III	During migration, this species uses primarily wetlands and cropland ponds for rooting and feeding. Spring and fall migration through the project regions generally occurs from April to mid-May and from mid-September to October.	Wetlands bordered by agricultural fields	Yes	No	Bowman Slope Stark	USFWS Webpage – Region 6; Hagen et al. 2005; USFWS 2007a
Willet	*Cataptrophorus semipalmatus*	ND Level I	Large expanses of short, sparse grasslands, particularly native grasslands, are important for nesting and foraging. Prefer wetlands with shallow water areas with sparse shoreline vegetation. Peak breeding season: late May to mid-July.	Wetlands with sparse shorelines adjacent to native shortgrass prairie.	Yes	No	Bowman Slope Stark	Hagen et al. 2005
Wilson's phalarope	*Phalaropus tricolor*	ND Level I	This species uses wetlands with open water, emergent vegetation, and open shoreline for foraging and wet meadows, upland grasslands, and wetlands for nesting. Peak breeding season: late May to early June.	Wetlands adjacent to upland grasslands	Yes	No	Secondary range: Bowman Slope Stark	Hagen et al. 2005
Reptiles / Amphibians								
Common snapping turtle	*Chelydra serpentina*	ND Level II	This species prefers warm water in permanent lakes or rivers with a muddy bottom and plenty of aquatic vegetation.	Lakes or rivers	Yes	No	Bowman Slope Stark	Hagen et al. 2005

Table D-1 Special Status Species

Species	Scientific Name	Status[1]	Habitat Association	Primary Habitat	Potential for Occurrence Within Project Area	Eliminated from Detailed Analysis	Counties	Source
Northern sagebrush lizard	*Sceloporus graciosus*	ND Level III	This species prefers sagebrush and rocky areas near water.	Sagebrush	Yes	No	Slope	Hagen et al. 2005; NDGFD 2007b
Plains spadefoot	*Spea bombifrons*	ND Level I	This species inhabits dry, open grasslands with sandy or loose soils. Temporary wetlands without vegetation, such as those found in agricultural fields, are easily flooded and may provide tolerable breeding habitat.	Open grasslands	Yes	No	Bowman Slope Stark	Hagen et al. 2005
Short-horned lizard	*Phrynosoma douglassi*	ND Level II	This species prefers semi-arid, shortgrass prairie in rough terrain.	Arid landscapes	Yes	No	Bowman Slope	Hagen et al. 2005; NDGFD 2007b
Western hognose snake	*Heterodon nasicus*	ND Level I	This species prefers dry, sandy or gravelly areas in grassland, open sand prairies, or sand dunes. Burrows into loose soil or small mammal burrows for cover.	Open sand prairies	Yes	No	Bowman Slope Stark	Hagen et al. 2005; NDGFD 2007b
Fish								
Blue sucker	*Cycleptus elongatus*	ND Level I	This species inhabits streams with swift currents and large turbid rivers. Found mostly in riffles or narrow chutes. Requires gravel bottoms free of sediment.	Large, turbid rivers with gravel bottoms free of sediment	No	Yes – No suitable habitat crossed by the ROW	Slope	Hagen et al. 2005

Table D-1 Special Status Species

Species	Scientific Name	Status[1]	Habitat Association	Primary Habitat	Potential for Occurrence Within Project Area	Eliminated from Detailed Analysis	Counties	Source
Flathead chub	*Platygobio gracilis*	ND Level II	This species occurs in small creeks and the largest rivers that have turbid fluctuating water levels and unstable sand bottoms. This species relies on flood flows to spawn successfully. Spawning occurs after water levels have subsided after peak flows, when water temperatures are warmer and substrate is more stable. Relies on flood flows to spawn successfully. Spawns after rivers have subsided following peak flow.	Turbid rivers with sandy substrate	Yes	No – suitable habitat for this species occurs within the Cannonball and Heart Rivers crossed by the Project.	Bowman Slope Stark	Hagen et al. 2005
Northern redbelly dace	*Phoxinus eos*	ND Level II	This species occurs in a variety of habitats ranging from streams to bog lakes.	Waterbodies	Yes	No – Suitable habitat for this species is found within the South Fork Heart and Cannonball rivers crossed by the project.	Bowman Slope Stark	NDNHI 2007
Invertebrates								
Pink papershell	*Potamilus oheinsis*	ND Level III	This species occurs within the tributaries of large river systems. The substrate of the rivers is mud, sand, or gravel	Medium to large rivers	None – September Surveys	Yes – No suitable habitat crossed by the ROW.	Slope Stark	Hagen et al. 2005

Table D-1 Special Status Species

Species	Scientific Name	Status[1]	Habitat Association	Primary Habitat	Potential for Occurrence Within Project Area	Eliminated from Detailed Analysis	Counties	Source
Plants								
Alkali sacaton	*Sporobolus airoides*	ND SOC	This perennial grows in large bunches 2-3.5 feet tall on dry to moist sites with sand or gravelly soils. Most often found growing on alkaline flats, prairies, and sandy plateaus. Common along drainages in desert and semi-desert areas. Flowers in mid-summer.	Sand prairies	Yes	No	Bowman	NDNHI 2007; USDA, NRCS 2007
Bent-flowered milkvetch	*Astragalus vexilliflexus*	ND SOC	This perennial is rare but common where found. It occurs on rocky prairie knolls and ridges.	Rocky knolls and ridges	Yes	No	Slope Stark	NDNHI 2007; Kantrud 1995; USDA, NRCS 2007; NDGFD 2007
Narrow-leaved wirelettuce	*Stephanomeria tenuifolia*	ND SOC	Open, dry, often rocky areas in the foothills to moderate elevations. Blooms in June through September.	Open, dry areas	Yes	No	Stark Slope Bowman	NDNHI 2007; USDA, NRCS 2007
Slim flowered scurfpea	*Psoralea tenuiflora*	ND SOC	This species occurs within dry prairies and open woodlands. This species is drought tolerant and prefers well-drained soils.	Dry prairies	Yes	No	Bowman	NDNHI 2007; NatureServe 2007; USDA, NRCS 2007
Torrey's cat's-eye	*Cryptantha torreyana*	ND SOC	This annual is common in open areas at low to mid-elevation ranges in the mountains. Flowers from May to July.	Open areas	Yes	No	Bowman	NDNHI 2007; NatureServe 2007; BMNHC 2007; USDA, NRCS 2007

Table D-1 Special Status Species

Species	Scientific Name	Status[1]	Habitat Association	Primary Habitat	Potential for Occurrence Within Project Area	Eliminated from Detailed Analysis	Counties	Source
White locoweed	*Oxytropis sericea*	ND SOC	This perennial occurs on open, well-drained slopes of the western plains. It is infrequent to common on prairie uplands, streambanks, valleys, and alpine sites. It occurs on sandy, gravelly, or rocky soils but grows best on sandy loams. It is tolerant of moderately saline soils and low nutrient conditions but does not tolerate water-saturated soils such as heavy clay. White locoweed is drought tolerant but is not tolerant of excessive shade. It is tolerant to freezing temperatures during the growing season and competes well on nutrient-rich, deep loam on subalpine sites. White locoweed thrives at medium elevations. First bloom for white locoweed occurs in mid-June to early July. Seed dissemination begins in mid-July and lasts until mid-August. The plant begins to dry in late September.	Open slopes of the plains	Yes	No	Slope	NDNHI 2007; Esser 1993.

[1]FE = Federally Endangered, ND Level I, II, III = North Dakota Level I, II, III Species of Conservation Priority, ND SOC = North Dakota Species of Concern.

Appendix E

Mitigation Measures, Reclamation, and Best Management Practices

BELFIELD TO RHAME 230-KV TRANSMISSION PROJECT

Mitigation Measures, Reclamation, and Best Management Practices

1. Jurisdictions, Land Use, and Agricultural Practices

Land Use

- The movement of crews and equipment will be limited to the ROW and other areas that have been surveyed for cultural, historical and biological resources. The construction contractor will limit movement on the ROW so as to minimize damage to rangeland, cropland, or property.
- The proposed transmission line will be routed 500 feet or more away from inhabited structures.

Agricultural Practices

- The proposed transmission line will span fields to the extent feasible.
- The proposed transmission line will be routed along section and mid-section lines to avoid diagonal crossings of fields, when possible.
- Where practical, construction activities will be scheduled during periods when agricultural activities would be minimally affected or the landowner will be compensated accordingly.
- Fences, gates, and similar improvements that are removed or damaged will be promptly repaired or replaced.
- ROW will be purchased through negotiations with each landowner affected by the proposed project and payment will be made of full value for crop damages or other property damage during construction or maintenance.
- When weather and ground conditions permit, all deep ruts that are hazardous to farming operations and to movement of equipment would be eliminated or compensation will be provided as an alternative if the landowner desires. Such ruts will be leveled, filled, and graded, or otherwise eliminated in an approved manner. Ruts, scars, and compacted soils from construction activities in cropland or rangeland will be loosened and leveled by scarifying, harrowing, discing, or other appropriate method. Damage to ditches, terraces, roads, and other features of the land will be corrected. The land and other features will be restored as nearly as practicable to their original conditions.

2. Physiography, Topography, Soils, Geology, and Minerals

Soils

- Topsoil will be salvaged and stockpiled during construction of the proposed Rhame Substation; after construction, topsoil will be re-spread.
- Erosion and sediment controls will be established prior to construction, then maintained and controlled through the use of standards BMPs.

- Sediment control measures (e.g., installation of silt fences) will be used, where appropriate, to prevent sediment from moving offsite and into water bodies.
- Maintenance operations will be scheduled during periods of minimum precipitation to minimize the potential of surface runoff and to reduce the risk of erosion, sedimentation, and soil compaction. However, emergency repairs to the proposed transmission line may occur during periods of inclement weather.
- Staging areas will be located in previously disturbed areas, whenever practicable.

Geology

- Transmission line structures will not be sited on any potentially active faults.

3. Hydrology and Drainage

- A 100-foot buffer will be established adjacent to wetlands and creeks, where practicable, to prevent or minimize impacts to those ecosystems. Construction vehicles and equipment will not traverse through wetlands and riparian areas thereby avoiding direct impacts to these sensitive areas.
- Transmission line structures will be sited so that streams and drainages are spanned and remain undisturbed.
- Staging areas and refueling areas will not be located near surface water bodies.
- Areas that need to be cleared during construction will be revegetated with an approved native seed mix as soon as technically feasible to minimize soil erosion and sediment runoff.
- A Spill Prevention and Response Plan will be developed prior to the start of construction to prevent the potential for spills of hazardous substances into streams and drainages, and potential contamination of groundwater. The plan will include a procedure for storage of hazardous materials and refueling of construction equipment outside of riparian zones, spill containment and recovery plan, and notification and activation protocols.
- Refueling of construction vehicles will occur at commercial fueling facilities and at staging areas, if onsite fuel storage is needed for refueling.
- A Storm Water Pollution Prevention Plan will be developed and implemented prior to initial construction activities. This plan will include an analysis of materials that will be utilized and site activities that could potentially impact storm water and the associated Best Management Practices (BMPs) to minimize that potential. Plan implementation will include regular inspections of areas under construction, material storage and laydown areas, and structural devices for storm water management. All construction personnel will be trained on the plan and will be required to comply with its requirements and the maintenance of all BMPs. The plan will be maintained until final stabilization of all disturbed areas is completed.

4. Vegetation Resources

- In areas where wooded areas or shelterbelts cannot be avoided, the proposed transmission line will be placed in areas with the lowest density of trees, whenever feasible, thereby reducing the number of trees that will require removal within the construction ROW.
- Woody species (i.e., trees and shrubs) removed (i.e., cut or mowed) during construction will be replaced at a 2:1 ratio (i.e., 2 plants would be planted for every plant removed).

- Prior to construction, a woody (e.g., trees and shrubs) species inventory will be conducted in areas where vegetation will be removed (i.e., cut or mowed) to determine the numbers, sizes, and locations of woody species present in these areas. A Woody Species Inventory Report will be developed, which will summarize the information collected during the woody species inventory. In addition, a Woody Species Planting Plan will be developed that will provide detailed information regarding the numbers, sizes, and locations of species that will be planted and methods used to plant these species.

- All vegetative materials resulting from clearing operations will either be chipped on site, or removed and disposed in a permitted facility.

- Existing native vegetation within the construction ROW will be preserved whenever feasible.

- Surface disturbance areas will be reclaimed using native species and will be planted at the appropriate times, as recommended by agencies or landowners, to reestablish native vegetative cover and minimize the potential for invasion by non-native species.

- Wetland and riparian communities will be spanned by the proposed transmission line thereby avoiding impacts to these ecosystems.

- Erosion and sedimentation controls will be implemented to minimize indirect impacts to wetlands and riparian areas.

5. Wildlife and Fisheries

- Prior to surface disturbance activities during the migratory bird (not including raptors) breeding season (April 15 through July 31), a qualified biologist would survey within suitable habitat (i.e., non-cultivated land) for nesting activity and other evidence of nesting (e.g., mated pairs, territorial defense, birds carrying nest material, transporting food). If active nests are located, or other evidence of nesting is observed, appropriate protection measures, including establishment of buffer areas and constraint periods, would be implemented until the young have fledged and dispersed from the nest area. These measures will be implemented on a site-specific and species-specific basis, in coordination with Western.

- If construction is to occur during the breeding season for raptors (February 1 through August 15), prior to construction activities, raptor breeding surveys will be conducted by a qualified biologist through areas of suitable nesting habitat to identify any active nest sites within 0.5 mile (1.0 mile for bald eagles) from the project area. If applicable, appropriate protection measures, including seasonal constraints and establishment of buffer areas will be implemented at active nest sites until the young have fledged and have dispersed from the nest area. These measures will be implemented on a site-specific and species-specific basis, in coordination with Western.

- Standard measures to minimize avian collision risk with overhead transmission lines, as outlined in *Mitigating Bird Collisions with Power Lines* (APLIC 1994), will be examined and appropriate measures will be developed in coordination with the USFWS and NDGFD.

- Adequate raptor proofing designs, as described in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 (APLIC 2006),* will be implemented on the steel H-frame structures in coordination with the NDGFD to minimize raptor use of these structures.

- Holes that are drilled or excavated for pole placement or foundation construction and left unattended overnight will be marked and secured with temporary fencing to reduce the potential for livestock and wildlife entering the holes and for public safety.

6. Special Status Species and Noxious Weeds

Special Status Species

- Prior to construction activities, prairie dog town, black-footed ferret, and burrowing owl occurrence surveys will be conducted by a qualified biologist to identify any suitable black-footed ferret and burrowing owl habitat within the project area. Based on the USFWS 1989 survey guidelines for the black-footed ferret, black-tailed prairie dog complexes/colonies of 80 acres or greater will require surveys for black-footed ferrets. If applicable, mitigation measures will be implemented, in coordination with Western.

- Prior to construction activities, surveys for the presence of migrating whooping cranes will be conducted during the migration periods (April to mid-May and mid-September to October) by a qualified biologist within 1 mile of the project area. If whooping cranes are observed during the survey, Western will coordinate with the USFWS regarding additional mitigation that would be warranted.

- Mitigation measures developed during Section 7 consultations, as specified by the USFWS, will be implemented.

Noxious Weeds

- Prior to the initiation of construction activities, construction vehicles and equipment would be thoroughly cleaned to prevent the possible spread of noxious weed seeds within the project area.

- Noxious weeds present within proposed disturbance areas will be controlled prior to the initiation of construction to prevent the potential spread of noxious weeds.

- If noxious weeds are observed in the surface disturbance areas, populations will be controlled with the application of herbicides, which will be applied by a certified herbicide applicator in accordance with label instructions and state and local County Weed Board regulations. Biological control methods (i.e., use of spurge beetles, etc.) also may be used for weed control.

- Herbicides will not be used near surface water.

- The construction ROW and other surface disturbance areas will be monitored for noxious weeds for a three-year period following construction and reclamation.

- Landowners will be consulted regarding all noxious weed control issues.

- Herbicide applications will occur in late spring or early summer to eradicate or control noxious weeds before they mature.

7. Archaeological and Historic Resources

- Cultural resource surveys will be conducted within proposed surface disturbance areas prior to construction. A Class III cultural resources report will be prepared and sent to Western and the North Dakota SHPO for review and consultation.

- If any previously unknown cultural resources or human remains are discovered during project construction, all work within 200 feet of the discovery that might adversely affect the cultural resource will cease until Western, in consultation with the appropriate parties, could evaluate the discovery. Western will be notified immediately (within 24 hours) and will have a cultural resource specialist or a Tribal monitor with the proper expertise for the suspected resource type on-site as soon as possible. Construction will not proceed until authorized by Western.

- All cultural resources will be evaluated using the criteria of eligibility for the National Register of Historic Places established at 36 CFR Part 60.4. Consultation with the appropriate parties (i.e., North Dakota State Historic Preservation Officer [SHPO], interested Native American groups) will be initiated prior to making the determination. Western will then make a Determination of Eligibility, as required by Section 106 of the National Historic Preservation Act (NHPA) and consult with the appropriate parties to determine any mitigation efforts necessary to eliminate or reduce adverse effects.

8. Paleontological Resources

- Prior to construction, a field survey for paleontological resources will be conducted within the construction ROW and other surface disturbance areas only in exposed rock areas associated with the White River Group and Golden Valley, Sentinel Butte, and Bullion Creek formations. A paleontological report will be developed and provided to Western, which will summarize the results of the field survey. If fossils are observed in these areas, a paleontologist will be present during construction in these areas in order to identify any paleontological resources. If paleontological resources are observed during construction, construction activities in the area will cease and Western will be contacted to discuss the importance of the paleontological resources and develop appropriate mitigation.

9. Transportation Network

- The transportation of materials and equipment will be conducted in accordance with North Dakota Department of Transportation regulations.

- All necessary provisions will be made to conform to safety requirements for maintaining the flow of public traffic. Construction operations will be conducted to offer the least possible obstruction and inconvenience to public traffic.

- Public roads, section lines and existing trails will be used, to the extent practicable, to access the proposed transmission line.

10. Socioeconomic Values

- Potential impacts to populations and housing within the project area will be minimized.

11. Hazardous Materials and Solid Waste

- The proposed project will likely be subject to the requirements associated with hazardous waste management as a small quantity generator as described in 40 CFR 262.

12. Meteorology and Air Quality

- The contractors will apply standard environmental protection measures associated with construction.

- Fugitive dust emissions generated as a result of surface disturbance activities and vehicle use of access roads will be controlled by the periodic application of water, to the extent practicable.

- Vehicles and equipment will be properly maintained to avoid excessive emission of exhaust gases due to poor engine adjustments.

- The speed of vehicles traveling on unpaved roads will be limited, to the extent practicable, to reduce the generation of fugitive dust.

- Burning or burying waste materials within the ROW and proposed Rhame Substation site will not be permitted and all waste materials will be disposed at permitted waste disposal areas or landfills.