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United States
Department of Agriculture
Rural Utilities Service
Engineering and Environmental
Staff
1400 Independence Avenue S.W.
Room 2244,
Washington D.C. 20250-1571

Draft Environmental Assessment

Bromley to Prairie Center 115-kV Transmission Line Project

Tri-State Generation and Transmission Association, Inc.

February 2014

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Prepared by:

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ACRONYMS AND ABBREVIATIONS

APE	Area of Potential Effect
APLIC	Avian Power Line Interaction Committee
APP	Avian Protection Plan
BGEPA	Bald and Golden Eagle Protection Act
BMC	Brighton Municipal Code
BMP	Best Management Practice
BNSF	Burlington Northern-Santa Fe
Bromley-Prairie Center Project	Bromley to Prairie Center 115-kV Transmission Line Project
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CPW	Colorado Parks and Wildlife
C.R.S.	Colorado Revised Statutes
CUP	Conditional Use Permit
CWA	Clean Water Act
dBA	Decibels on the A-weighted scale
EA	Environmental Assessment
EDM	EDM International, Inc.
EMF	electromagnetic field
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPM	Environmental Protection Measure
EPRI	Electric Power Research Institute
ER	Environmental Report
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
GLO	General Land Office
Hz	Hertz
I-76	Interstate-76
IBA	Important Bird Area
IF	isolated find
kHz	kilohertz
KOP	Key Observation Point
kV	kilovolt
kV/m	kilovolts per meter
L_{dn}	day-night average noise levels
L_{eq}	equivalent continuous sound level
MBTA	Migratory Bird Treaty Act
mG	milliGauss
NAAQS	National Ambient Air Quality Standards

ACRONYMS AND ABBREVIATIONS, CONTINUED

NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NIEHS	National Institutes of Environmental Health Sciences
NRC	National Research Council
NRCO	Natural Resource Conservation Overlay
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWP	Nationwide Permit
OAHP	Office of Archaeology and Historical Preservation
OHS	Overhead static wire
OPGW	optical groundwire
PUC	Public Utilities Commission
PUD	Planned Utility Development
RFFA	reasonably foreseeable future action
RMBO	Rocky Mountain Bird Observatory
ROW	right-of-way
ROWs	rights-of-way
RUS	Rural Utilities Service
RV	recreational vehicle
SFD	Swan Flight Diverter
SHPO	State Historic Preservation Office
SWMP	Stormwater Management Plan
TMDL	Total Maximum Daily Load
Tri-State	Tri-State Generation and Transmission
TUA	temporary use area
United Power	United Power, Inc.
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USDOT	U. S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USNVC	U.S. National Vegetation Classification
V/m	volts/meter
vpd	vehicles per day
WOUS	Waters of the U.S.

1.0 PROJECT OVERVIEW

1.1 Introduction

Tri-State Generation and Transmission Association, Inc. (Tri-State), in cooperation with its member system United Power Inc. (United Power), is proposing to construct and operate the Bromley to Prairie Center 115 kilovolt (kV) Transmission Line Project (Bromley-Prairie Center Project), which would be located in the city of Brighton and in unincorporated Adams County, Colorado. A map of the preferred and alternative routes is provided in Figure 1-1.

The project would complete the third and final phase of the United Power Transmission System Improvement Project, which was initiated by Tri-State and United Power in 2002. Phase I was completed in 2004 and consisted of construction of the Henry Lake Substation (Weld County), construction of a 115-kV transmission line between the Henry Lake Substation and the Bromley Substation, and improvements at the Bromley Substation. Phase II was completed in 2011 and consisted of construction of the Reunion and Prairie Center substations (both in Adams County) and construction of a new 115-kV transmission line between the Reunion Substation and the Prairie Center Substation.

Tri-State is a wholesale electric power supplier owned by the 44 electric cooperatives that it serves, including United Power. Tri-State generates and transmits electricity to its member systems throughout a 250,000-square-mile service territory across Colorado, Nebraska, New Mexico, and Wyoming. Tri-State owns (wholly or jointly) or has maintenance responsibilities for more than 5,200 miles of transmission line across its service territory.

Tri-State was founded in 1952 and today supplies power for approximately 1.5 million consumers in the four states. Tri-State serves its member systems through a combination of owned baseload, intermediate, and peaking power plants that use coal and natural gas as their primary fuels, plus supplemental purchased power, federal hydroelectricity allocations, and renewable energy.

1.2 Regulatory Process

Table 1-1 summarizes the federal, state, and local permits and approvals that would be needed for the proposed Bromley-Prairie Center Project.

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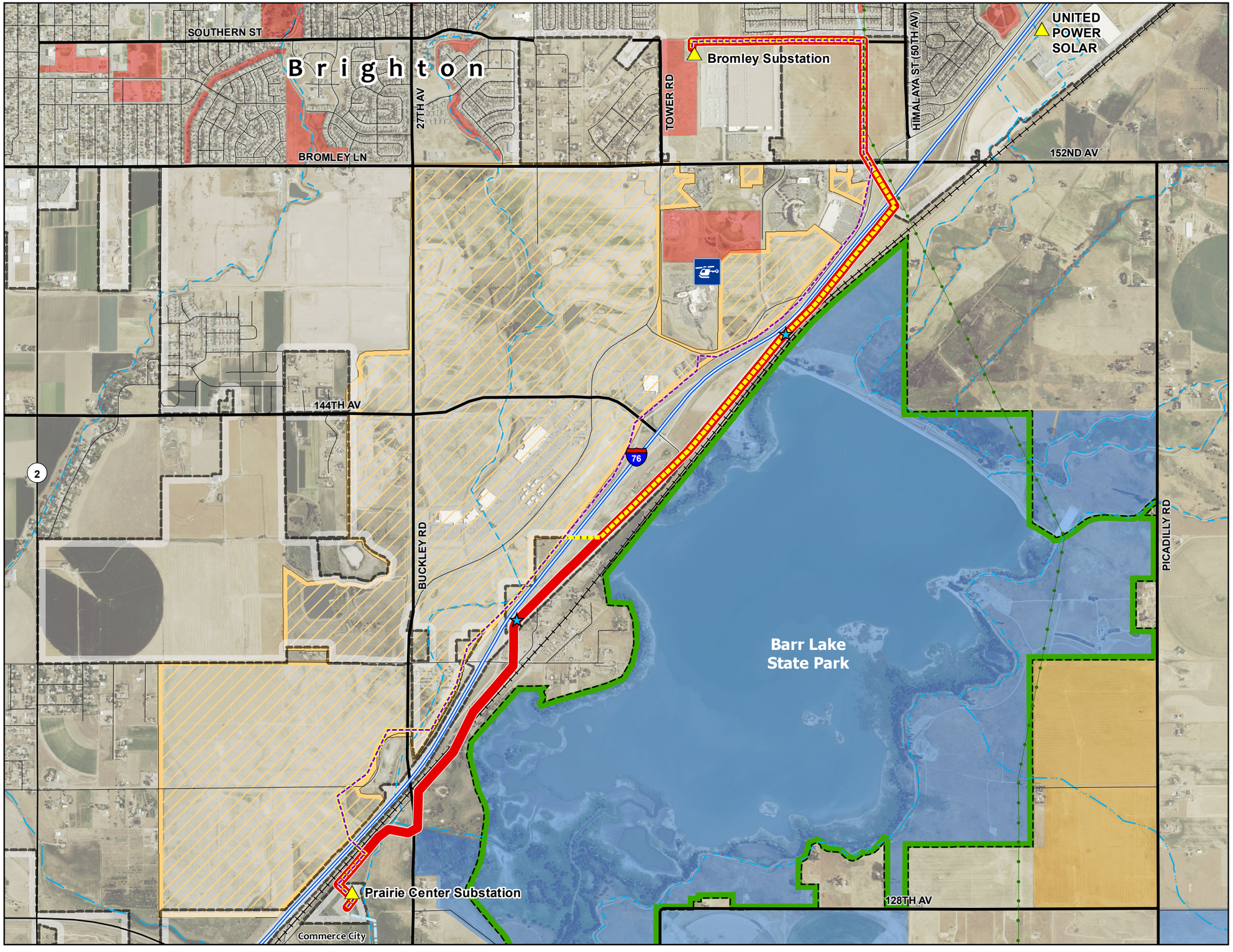
Bromley-Prairie Center 115kV Transmission Line Project

Figure 1-1
Preferred and Alternative Routes



N

0 1,000 2,000 4,000 Feet

1:24,000

1 inch = 2,000 feet

Project Facilities

- Substation
- Start/End Point: Distribution Line Underground
- Preferred Route
- Alternative A
- Alternative B
- Existing Gas Pipeline
- Existing Tri-State Lines

Streams

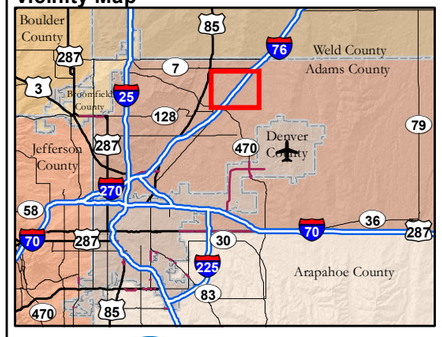
- Perennial Stream
- Intermittent Stream
- Canal/Ditch

Land Ownership

- Adams County
- City of Brighton
- State of Colorado
- Private, Unincorporated
- Private, City of Brighton
- Barr Lake State Park
- Prairie Center Development
- Platte Valley Medical Center Heliport

Imagery: NAIP 2013

Vicinity Map



TRI-STATE Generation and Transmission Association, Inc.

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Table 1-1 Permits and Approvals Required

Jurisdiction	Agency	Study/Permit/Coordination
Federal Agencies	U.S. Department of Agriculture, Rural Utilities Service	Environmental Assessment without scoping
	U.S. Army Corps of Engineers	Clean Water Act, Section 404 Nationwide Permit 12, Jurisdictional Waters of the United States
	U.S. Fish and Wildlife Service	Endangered Species Act, Migratory Bird Treaty Act, and Bald and Golden Eagle Protection Act Compliance
State Agencies	Colorado Parks and Wildlife (formerly Colorado Division of Wildlife)	State Threatened and Endangered Species Compliance
	Colorado Department of Public Health and Environment, Water Quality Control Division	Construction General Stormwater Permit and Stormwater Management Plan, Section 401 Water Quality Certification (if necessary)
	Colorado Office of Archaeology and Historic Preservation	Consultation for compliance with state and federal historic preservation requirements.
	Colorado Department of Transportation	Utility/Special Use Permit Application
Local Jurisdictions	Adams County	Areas and Activities of State Interest (1041) Permit
	City of Brighton	Conditional Use Permit
Private Ownership	Burlington Northern-Santa Fe Railway	Application for Wire Line Crossing or Longitudinal

1.2.1 Federal

Tri-State is requesting financial assistance from the U.S. Department of Agriculture (USDA) Rural Utilities Service (RUS) to construct the Bromley-Prairie Center Project. In accordance with the National Environmental Policy Act (NEPA), RUS has prepared this Environmental Assessment (EA) without scoping to assess project impacts in accordance with the RUS Bulletin 1794A-601 (Revised) *Guide for Preparing an Environmental Report for Electric Projects Requiring an Environmental Assessment* (RUS 1998). RUS regulations (§1794.22(a)(1)(iii) normally require an Environmental Report (ER) for a project of this size. However, based on public concerns regarding potential project impacts to Barr Lake State Park and associated wildlife resources, the RUS chose to complete an EA.

The RUS NEPA requirements outlined under 7 Code of Federal Regulations (CFR) 1794A-601 do not require formal scoping for a project of this scale. However, Tri-State and United Power hosted a voluntary public meeting on October 19, 2011 in Brighton, Colorado, followed by a Neighborhood Meeting on April 5, 2012, also in Brighton. These meetings were held to allow the public an opportunity to comment on the proposed Bromley-Prairie Center Project in support of the federal, county, and city permitting processes. Results of these meetings, including a description of the line routes, materials presented, and comments received by the public and other stakeholders, is contained in the *Meeting Summary Reports* in Appendix A.

The Proposed Action is for Tri-State to construct, operate, and maintain the new Bromley-Prairie Center 115-kV transmission line via the Preferred Route. This EA provides: (1) a detailed description of the Proposed Action and two project alternatives (i.e., Alternative A and Alternative B); (2) maps identifying the location of these three routes; and (3) a discussion of the impacts assessed for all four project alternatives, including the No Action Alternative.

If RUS finds, based on the EA, that the Proposed Action will not have a significant effect on the quality of the human environment, RUS will prepare a Finding of No Significant Impact (FONSI). Upon authorization of RUS, a notice would be published, which informs the public of the RUS finding and the availability of the EA and FONSI. The notice would be prepared and published in accordance with RUS guidance.

1.2.2 State

State coordination for the project includes the Colorado Public Utilities Commission (PUC), Colorado Parks and Wildlife (CPW), Colorado Office of Archaeology and Historic Preservation, (OAHP), the Colorado Department of Public Health and Environment (CDPHE), and the Colorado Department of Transportation (CDOT).

1.2.3 County and City

The project is subject to review and approval by Adams County and the city of Brighton. Adams County requires an *Areas and Activities of State Interest Permit (*1041) and city of Brighton requires a *Conditional Use Permit (*CUP).

1.2.4 Private Ownership

Coordination with Burlington Northern-Santa Fe (BNSF) Railway is required for this project for the completion of an *Application for Wire Line Crossing or Longitudinal*.

1.3 Purpose and Need

As the third and final phase of the United Power Transmission System Improvement Project, Tri-State is proposing to build a new single-circuit 115-kV transmission line between Bromley and Prairie Center substations. The purpose of the project is to provide redundant, reliable service to both the Prairie Center and Bromley substations, which are currently serviced by radial feeds.

The need for the project is to ensure United Power can continue to reliably supply electricity to residents, businesses, and critical services in the rapidly growing local community. To meet the growing electrical needs of Brighton and Adams County, additional power delivery infrastructure is required to allow Tri-State to be able to maintain an adequate and reliable supply of electricity to United Power who can then distribute the power to its member consumers.

The project is needed in order to:

- Provide the critical missing link to form a “loop” system to increase reliability.
- Provide increased electric load serving capacity to urban, residential, and commercial development.

- Provide additional reliability for the Adams County Justice Center, Platte Valley Medical Center, Prairie Center Retail, and Adams County Detention Center.

- Reduce system electrical losses and help maintain acceptable voltage levels required by the North American Electric Reliability Corporation (NERC).

Each of these points is discussed in more detail.

1.3.1 Redundant Service

Phase I of the United Power Transmission System Improvement Project consisted of building the Henry Lake Substation and a 115-kV transmission line that connected Henry Lake Substation to Bromley Substation. During Phase II, Reunion and Prairie Center substations were constructed, as well as a new 115-kV transmission line connecting Reunion to Prairie Center. Both of the Phase I and Phase II system additions support the loads served by United Power's Bromley, Prairie Center, and Reunion substations; however, the Phase I and Phase II transmission lines are only "radial" lines, with a single source of power.

The new Bromley to Prairie Center 115-kV Transmission Line would provide a "loop" system for the region, which would increase electrical reliability over only radial feeds. The completion of a loop system would allow power to flow from two different directions, rather than from a single source. Therefore, with a loop system, power outages to communities could be avoided by providing an alternative power source from a different direction.

Without the project, United Power customers could experience service disruptions if weather, accident, or system malfunction removed the Phase I or Phase II lines from service, especially during peak summer demand. Without the addition of Phase III, future area development also would be limited.

1.3.2 Increased Capacity

There are a number of high-profile community service consumers that are served by United Power that would benefit from the additional capacity. These community service consumers include the Platte Valley Medical Center; the Adams County Campus Offices, which include the new 911 Call Center for the county, with a data center and office complex; the Adams County Detention Facility and district police and fire stations for Brighton; the Adams County Justice Center; and the Prairie Center retail development.

In addition to community service consumers, the residential population in the area has grown substantially in recent years. Between 2000 and 2010, the population in Adams County has increased by over 21%. The populations of the cities of Brighton and Commerce City have increased during the same period by 59.5% and 118.7%, respectively (U.S. Census Bureau 2000, 2010a).

1.3.3 Regulatory Standards

Construction of Phase III would reduce system electrical losses and help maintain acceptable voltage levels required by the mandatory regulations imposed by NERC on transmission providers, including Tri-State. NERC is the reliability regulatory organization charged by the

Federal Energy Regulatory Commission (FERC) to set operational standards for electric utilities required to improve the reliability and security of the bulk power system in North America.

2.0 PROJECT DESCRIPTION

2.1 Project Alternatives

Tri-State completed a routing analysis for the proposed Bromley-Prairie Center Project to delineate potential routes between the Bromley and Prairie Center substations. A Routing Summary Report describing the routing process is included in Appendix B (Tri-State 2012). The routing analysis extended east and west from the two substations to allow for a number of alternative alignments to be considered. Several potential routes were eliminated from consideration, based on a number of site-specific factors (e.g., line length, number of residences). Also considered but eliminated from further analysis was locating the proposed 115-kV transmission line underground.

Three routes (i.e., Preferred Route, Alternative A, and Alternative B) were identified for the Project analyses and are shown in Figure 1-1. Therefore, the four project alternatives include: (1) Proposed Action (with the Preferred Route), (2) Alternative A, (3) Alternative B, and (4) No Action Alternative. Each of the alternatives is discussed in detail.

2.1.1 Proposed Action

The Proposed Action encompasses the 5.2-mile Preferred Route located along the southeast side of Interstate 76 (I-76) for the majority of its length (Figure 1-1). Detailed maps are provided in Appendix C. The Preferred Route would utilize existing Phase I 115-kV transmission structures for the 0.7 mile east-west segment exiting the Bromley Substation, before turning south to parallel a natural gas pipeline corridor to Bromley Lane. The Preferred Route would cross Bromley Lane and I-76 immediately south of the pipeline corridor. After crossing I-76, the Preferred Route would follow a property boundary between I-76 and the BNSF Railway for approximately 2.7 miles. The Preferred Route crosses the BNSF Railway just north of Buckley Road and follows the railway right-of-way (ROW) to the Buckley Road overpass. To avoid the Buckley Road overpass, the Preferred Route turns south to the intersection of Buckley Road and Cameron Drive, crosses Buckley Road, and remains on the south side of Cameron Drive for the remainder of the route into the Prairie Center Substation.

At a point approximately 0.7 miles from where the Preferred Route turns south after crossing I-76, the ROW parallels an existing United Power 12.47-kV overhead distribution line for 1.6 miles (see Figure 1-1). As part of the Proposed Action, United Power would remove and bury the 1.6-mile section of overhead distribution line. The final alignment of the underground portion of the distribution line is yet to be determined. However, it is assumed the majority of the alignment would occur within or in close proximity to the existing 25-foot distribution line ROW and the 115-kV transmission line ROW. Should the final alignment for the distribution line burial occur outside of the previously surveyed areas for rare plants, wetlands, and cultural resources, the applicable clearance surveys would be conducted as required (see EPMs T&E-1, WET-1, and CR-4, respectively, in Table 2-3).

2.1.2 Alternative A

Alternative A, shown on Figure 1-1 and in Appendix C, is 5.3 miles long and located on the west side of I-76 for the majority of its length. Alternative A also would utilize the existing Phase I 115-kV transmission structures for the 0.7-mile east-west segment exiting the Bromley Substation, before turning south to parallel a natural gas pipeline corridor to Bromley Lane.

Instead of crossing I-76, Alternative A would follow the west side of North Frontage Road/Medical Center Drive between the Platte Valley Medical Center and I-76. Alternative A would cross North Frontage Road/Medical Center Drive and continue along the boundary of the I-76 travel lanes for approximately 3 miles. Just north of the Holiday Inn, Alternative A would deviate from the travel lane boundary to avoid the Reba Shaw oil well, located approximately 230 feet northeast of the hotel building. Alternative A also deviates from the travel lanes near Buckley Road/132nd Avenue in order to avoid intrusion into CDOT travel lanes. Alternative A would cross I-76 at a point where the adjacent rights-of-way (ROWs) for I-76 and the BNSF Railway are narrow and would follow the same path as the Preferred Route into the Prairie Center Substation. United Power's existing 1.6-mile segment of 12.47-kV overhead distribution line would not be buried under Alternative A.

2.1.3 Alternative B

Alternative B, shown on Figure 1-1 and in Appendix C, totals 5.4 miles long and a combination of the Preferred Route and Alternative A. Alternative B follows the Preferred Route from the Bromley Substation for 3.2 miles, to a point just north of the Barr Lake Estates neighborhood. Alternative B would cross I-76 along a property line and follow the same alignment as Alternative A for 2 miles to the Prairie Center Substation. It is not expected that United Power would bury the existing 1.6-mile segment of 12.47-kV overhead distribution line under Alternative B. If this alternative was selected and if the overhead distribution line needed to be buried, surveys for wetlands and other "waters of the U.S.", federally listed plants species, and cultural resources would be conducted prior to construction if the disturbance occurred outside of areas previously surveyed for the Project.

2.1.4 No Action Alternative

Under the No Action Alternative, the project would not be constructed. Implementation of the No Action Alternative would not meet Tri-State's purpose and need to provide redundant service through the completion of a loop system, increase capacity, and comply with regulatory standards. Both the Bromley and Prairie Center substations would continue to be fed by one radial line, and no redundant second line would be available to ensure continued transmission service if a radial line failed. There is insufficient distribution line capacity to support the entire Bromley load. Under the No Action Alternative, no redundancy or increased capacity would be available to cover regional consumer demands.

2.1.5 Alternatives Considered but Eliminated

2.1.5.1 Alternative Line Routes

Additional routes were considered but then eliminated from further analysis, as discussed in the Routing Summary (Appendix B). These alternative routes, identified as Routes 1, 4, 5A, 5B, 6, and 7 are shown in Figure 3 of the Routing Summary (Appendix B).

2.1.5.2 Underground 115-kV Construction

Underground construction is frequently used with distribution lines that operate at 34.5-kV or less. At distribution voltages, burying a power line is more feasible. High-voltage overhead transmission lines provide a reliable, low-cost, easily maintained, and established method to transport bulk electricity across long distances. Issues with burying higher transmission voltages

include repair, heat dissipation, emergency access, increased surface disturbance, material costs, construction and operational costs, long-term line maintenance, and reduced life expectancy of the facilities.

An electric utility must take the following into consideration when determining whether high-voltage transmission facilities can be undergrounded:

- Damage to underground power lines is difficult to locate and repair, and the required repairs may take weeks to months, as compared to overhead lines that typically require hours to days to repair.

- The ground disturbance associated with the operation and future repair of underground power line construction are greater than for a comparable overhead line. An overhead transmission line typically requires one or more augured foundations that may be several feet in diameter. Such foundations are required at every structure location, and each structure span can vary from 400 to more than 1,000 feet apart. As a minimum, an underground transmission line would require a continuous trench at least 3 feet wide and 5 feet deep. Concrete manholes or large splice vaults are required at recurring intervals. During operational repairs, an entire segment between these vaults may require excavation.

- Depending on the conductor type, the life expectancy of an underground high-voltage line is about half that of an overhead line.

- Depending on the transmission voltage, the costs to build and maintain an underground line can range from 4 to 14 times the cost of an overhead transmission line due to time, materials, process, and the use of specialized labor.

- An underground line must be routed to avoid other underground installations such as water, gas, and sewer lines. Unstable slopes, hazardous material sites, wetlands, and bedrock also must be avoided, if possible. Placing the underground in existing paved road or highway requires additional costs for resurfacing the road or highway. Crossing roads, highways, or a river requires expensive construction techniques such as directional boring.

All these aspects of underground transmission construction lead to substantially higher costs than overhead line construction. As with the case of most electric utility cooperatives, Tri-State is a not-for-profit organization. Costs incurred by Tri-State and the member systems are directly passed on to the individual rate payers. Burying a transmission line in one part of the Tri-State service territory could result in the inequitable sharing of costs for customers outside of United Power's service territory. For this reason, Tri-State has a Board Policy that states the company will only consider burying transmission lines if the landowners and/or local jurisdictions agree to pay the difference in cost from overhead construction. Tri-State's Board Policy also states that the company will not construct underground high voltage lines in areas that would compromise the reliability of the transmission system. Examples of these scenarios include constructing through difficult terrain, surface water crossings, floodplains, or areas with seasonally restricted access or uncertain geological conditions.

2.2 Project Description

2.2.1 Proposed 115-kV Transmission Line

The proposed Bromley-Prairie Center Project would include both double-circuit and single-circuit structures. For approximately the first 0.7 mile, as the transmission line exits the Bromley Substation, the line would utilize the empty circuit of the Henry Lake-Bromley 115-kV transmission line, resulting in a double-circuit line for that line segment. The remainder of the transmission line would be a single-circuit line.

The proposed structure types are shown in Figure 2-1. The structures would be single pole, steel with a galvanized gray finish and would either have concrete foundations or would be directly embedded. These structures may use either brace post or suspension arm insulators. Typical structure height would range from 70 to 90 feet tall, depending on span distances. The number of structures per mile is estimated to be approximately nine structures per mile. Optical groundwire (OPGW) for internal Tri-State communications would be installed on the overhead static wire (OHS).

Taller structures would be needed in certain locations for required clearances over I-76 and BNSF Railway, in accordance with CDOT and BNSF utility accommodation policies. These locations include the following:

- Two structures located between Lark Bunting Road and the BNSF Railway, just north of East 144th Avenue. According to preliminary engineering, these structures would be approximately 95 feet in height.

- Two structures located between East 136th Avenue and Buckley road, where the transmission line crosses the BNSF Railway. According to preliminary engineering, these structures would be approximately 105 feet in height.

- Two structures located along the north side of the Buckley Road overpass over I-76. According to preliminary engineering, these structures would be approximately 95 feet in height.

Structure footprints would vary based on structure type and whether concrete foundations were required or the poles were directly embedded. Concrete foundations would require approximately 40 square feet per single pole structure. Directly embedded poles would require approximately 7 square feet per pole.

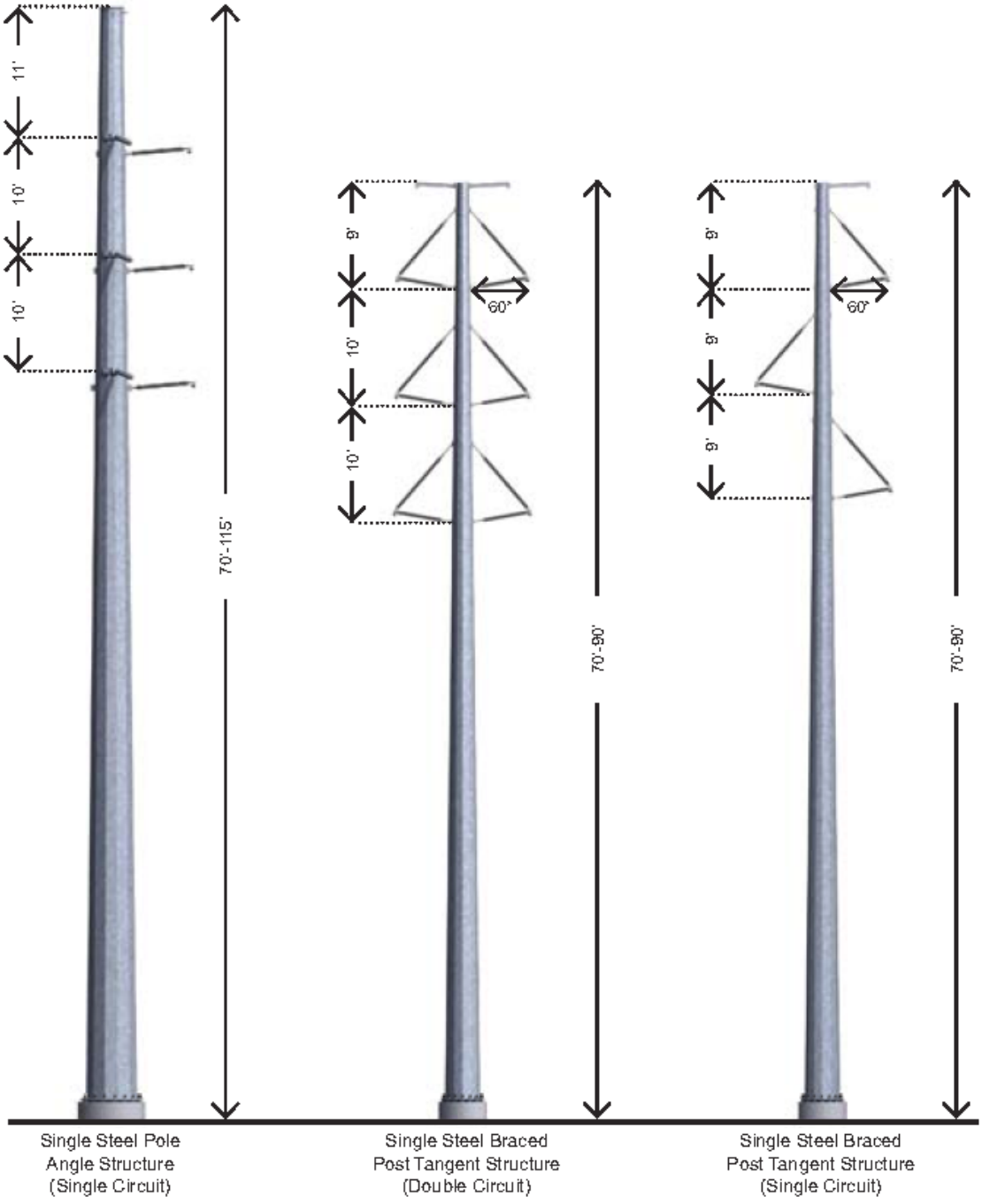

Figure 2-1 Typical Single-Pole Steel Structures

Table 2-1 lists the typical specifications for a 115-kV transmission line. Sheet maps showing both the preferred and alternative routes are provided in Appendix C.

Table 2-1 Typical Specifications of Single-Circuit 115-kV Transmission Structures

Design Component[a]	Single Steel Pole Structure
Typical ROW Width	75 feet
Typical Distance Between Structures	550 feet
Typical Structure Height	70-95 feet[b]
Typical Structures per mile	9
Ground Clearance (beneath conductor under maximum operating conditions)	28 feet

ROW=right-of-way
[a]Clearances would be maintained in accordance with the National Electric Safety Code (NESC).
[b]Structures at highway and railway crossings may be taller to comply with CDOT and BNSF Railway utility accommodation policies.

2.2.2 Right-of-Way Requirements

The 115-kV transmission line ROW width would be 75 feet (37.5 feet on either side of the centerline). Access to construct and maintain the project would be within, adjacent to, or in close proximity to the ROW. Permanent structures would be erected within the ROW. Additionally, temporary use areas (TUAs) would be required outside of the proposed 75-foot construction ROW for staging construction equipment, as well as wire pulling and splicing locations. Assuming a 75-foot-wide construction ROW, a maximum of 47 acres of surface area could be disturbed during transmission line construction.

Removing and burying the 1.6-mile segment of United Power's existing 12.47-kV distribution line would involve installing the distribution cable in an approximate 0.6 feet x 4 feet-deep trench with surface splice boxes. The direct disturbance area including the trench and trench soil would be a maximum of 5 feet in width, depending on the trenching method used. However, the 25-foot-wide construction ROW was used to assess any potential impacts that may occur during line burial, including vehicle access within the ROW. Using this 25-foot ROW for construction related impacts, a maximum 4.8 acres of surface area could be disturbed during line burial.

2.2.3 Access Routes

Project construction would require access along the project ROW to new structure sites and the Bromley and Prairie Center substations. Project operation would require periodic access to structures for line maintenance activities. No new access routes have been identified. Existing access routes encompass highways, county roads, private roads, and ROW easements. Overland access also would be used where suitable terrain and vegetation conditions exist. Sensitive resources identified when developing these routes are discussed in their respective resource sections. Tri-State continues to finalize these access routes, based on landowner authorization and engineering feasibility. Access routes exclusively required for transmission line maintenance equipment would be maintained, on an as-needed basis.

2.2.4 Project Construction

Initiation of the 115-kV transmission line construction and burying United Power's existing 12.47-kV distribution line along the 1.6-mile segment are proposed to begin in August of 2014

and be completed by November 1, 2015. The construction schedule is defined by Tri-State's commitment to construct outside the primary breeding season for migratory birds and prior to the winter roosting season for bald eagles associated with Barr Lake State Park. As stated in EPM G-2 in Table 2-3, an Environmental Monitor will be on-site during project construction in areas where sensitive resources occur.

The chronology of transmission line construction generally occurs in the following phases:

1. Site preparation and vegetation management
2. Burial of United Power's existing 12.47-kV distribution line
3. Material hauling
4. Construction of structure foundations
5. Structure assembly and erection
6. Conductor and OPGW stringing
7. Cleanup
8. Reclamation

The approximate number of personnel and type of equipment required for transmission line construction and distribution line burial are shown in Table 2-2.

Table 2-2 Construction Equipment and Personnel Required

Activity	Number of Persons Required	Equipment
Soil Exploration	3–4	1 truck with 4-inch auger, 2 pickup trucks
Permission to Survey	1	1 vehicle
12.47-kV distribution line burial	4-6	1 wheeled or tracked ditcher or backhoe with shovel or tamper, 1 utility truck, pickup trucks, cable trailers, and tamping equipment
115-kV transmission structure site work/right-of-way	1	1 vehicle
Surveying	6	2 pickup trucks
Materials hauling	8–12	2 tractor trailers, 2 hydrocranes, 3 pickup trucks, 2 flatbed trucks
Foundations	4-6	2 trucks with augers, crane digger, 2 pickup trucks, 1 Bobcat, 1 concrete truck, 1 hydrocrane, 1 portable compressor
Structure assembly/erection	6	1 hydrocrane, 2 pickup trucks, 1 flatbed truck, 1 crane, 1 bucket truck, 1 portable compressor
Shieldwire/conductor stringing	10–15	1 reel trailer, tensioner, puller, 3-5 pickup trucks, 1 flatbed truck, 1 tractor trailer, 2 bucket trucks
Cleanup	3	1 tractor, 1 flatbed truck, 1 Bobcat
Revegetation	3	1 tractor, disc, 1 pickup truck, 1 flatbed truck, 1 drill seeder

Site Preparation and Vegetation Management – Prior to materials being hauled to project construction sites, the ROW would be prepped for construction. Larger trees and shrubs that pose clearance issues to the 115-kV transmission or that would impede construction access would be removed, and grading would occur where warranted, (i.e., specific areas where level surfaces are required for construction vehicles and crane setup sites). Access roads would be cleared, improved, and constructed as necessary for transmission line construction.

Wetland mats would be required at all wetland crossings for construction, unless soils are protected by snow cover or soils are dry or frozen. If excavation work is required in wetland areas, the top 12 inches of soil would be removed at the excavation location and excavated material would not be stockpiled or deposited within 100 feet of delineated wetlands or other WOUS (see EPMs WET-2 and WQ-3 in Table 2-3). Upon completion of construction at that location, wetland mats would be removed and the topsoil would be redistributed on the wetland.

Burial of Existing Distribution Line – The distribution line would be buried prior to construction of the new 115-kV transmission line. Burying this 1.6-mile segment of distribution line would require removal of the existing poles and burying a new distribution cable. The trench opening would be approximately 5 feet in width. After installing the distribution cable, closing the trench would occur as soon as possible. During preparation to bury United Power's existing 12.47-kV distribution line, the centerline would be marked with lath and flagging to guide the trenching crew during digging operations.

Material Hauling – Project materials (e.g., steel structures, conductor, OPGW, insulators) would be mobilized to the construction site and stored at either the Bromley Substation or Prairie Center Substation, depending on the proximity to the construction areas.

Structure Foundations and Excavation of Pole Holes - The 115-kV structures would be single steel poles and would have either concrete foundations or would be directly embedded. Where warranted, structure foundations would be approximately 5-7 feet in diameter and 20-30 feet in depth.

Structure Assembly and Erection – Structure assembly would occur at both a material staging area and adjacent to each structure. Typically, the 115-kV steel structures would be assembled with the arms bolted in place. Insulators and wire stringing blocks would be attached and the entire structure would be erected on the foundation or embedded in the ground.

Conductor and OPGW Installation – Reels of conductor and OPGW would be delivered to the various wire stringing and pulling sites along the ROW. Light pulling lines would be installed through the stringing blocks and then connected to the conductor or OPGW. The line would then be pulled in using a tensioning machine to ensure the wires do not drag. To protect against accidental contact during the stringing operations, temporary guard pole structures would be installed at public roads, the BNSF Railway, the I-76 crossing, and any utility crossings. These temporary structures would be removed after wire installation was complete. Splices would be made at mid-span locations to connect separate reels of wire. After the appropriate sag contour is established between structures, crews would secure the wires to the insulators with suspension clamps and remove the stringing blocks.

Post-Construction Cleanup - Throughout the construction period, waste materials would be removed from the ROW and other work sites. The excavated materials from structure foundation construction would be hauled off site to an approved facility. After construction, final cleanup would be completed for all areas. Any areas of the ROW that may have been damaged

during construction would be re-graded and revegetated, as warranted. As part of the distribution line burial, the overhead line would be removed and disposed at an approved disposal site for treated wood products.

Reclamation and Revegetation – Topsoil would be salvaged to ensure topsoil is saved and protected for use during cleanup and restoration. Along the distribution line burial, the topsoil also would be separated during trenching to ensure trench spoil (subsoil) is not mixed with topsoil. Areas disturbed by project construction would be revegetated upon the completion of construction in the first appropriate season for seeding (i.e., fall or spring). Areas would be re-contoured to match original conditions to the extent possible and erosion control measures would be implemented until such time as the soils have been stabilized and vegetation has reached 70% of pre-construction conditions. Specific seed mixes would be determined in coordination with specific landowners.

In wetland areas, fabric and mats would be removed and the stored topsoil would be replaced. Wetlands would be restored to pervious conditions per the Nationwide Permit (NWP) guidelines.

The presence of noxious weeds would be monitored after construction is complete and treated until native vegetation can establish.

2.2.5 Operation and Maintenance

To support the regional safety and reliability, the physical inspection of the facilities, preventative maintenance, vegetation management, and the ability to access the line under emergency conditions would be required through the life of the project. Annual ground and/or aerial visual inspections of the transmission line would be conducted, including inspection of the conductors, insulators, supporting structures, hardware, OPGW, groundwires, anchors, vegetation encroachment, and the ROW.

If maintenance is required, large bucket and boom trucks would be used to access the transmission line using the approved access routes and project ROW. Repair and service restoration in emergency situations would warrant notification of the landowner as soon as feasible.

2.2.6 Environmental Protection Measures

Table 2-3 identifies the Environmental Protection Measures (EPMs) that have been developed as part of the proposed Bromley-Prairie Center Project to proactively minimize potential effects from project construction and operation. The measures detailed in Table 2-3 are summarized by resource or topic to ensure project construction, operation, and maintenance are consistent with the applicable federal, state, county, and local regulations. The following measures are incorporated into the project, applying to both public and private lands. They also apply to the three action alternatives (i.e., Preferred Route, Alternative A, and Alternative B).

Table 2-3 Committed Environmental Protection Measures

Category	Description
General	
G-1	The Contractor shall comply with all federal, state and local environmental laws, orders and regulations. Prior to construction, all supervisory construction personnel will be instructed on the protection of cultural and ecological resources (e.g., wetlands, Waters of the US. [WOUS], wildlife).
G-2	An Environmental Monitor will be on-site during project construction in areas where sensitive resources occur (e.g., wetlands, raptor nests). Prior to construction, Tri-State shall inform the Contractor of sensitive environmental areas within the project area and all environmental protection measures that will be implemented as outlined in the EA and incorporated into their contract.
G-3	While routine maintenance activities would abide by seasonal restrictions, buffers, and other environmental protection measures as outlined in this EA, emergency access will be allowed during any time of the year. In the event that emergency maintenance activities should result in disturbance to sensitive wildlife, surface waters, wetlands, or vegetation resources, the appropriate agency/landowner would be contacted as soon as possible to address impacts that may result from these activities.
G-4	Only the minimum amount of soils and vegetation necessary for the maintenance of the access routes and the safe and reliable operation of the transmission line will be disturbed. If excavation is necessary, topsoil will be conserved and reused as cover on temporarily disturbed areas to facilitate re-growth of vegetation. Vegetation will be cleared from those areas necessary to obtain adequate working width and turning radius space for maintenance equipment and allow for the safe operation of the transmission line.
Air Quality	
AQ-1	The Contractor shall utilize practicable methods and devices as are reasonably available to control, prevent, and otherwise minimize atmospheric emissions or discharges of air contaminants. Speed limits on access routes will be enforced to minimize dust emissions.
AQ-2	Possible construction-related dust disturbance shall be controlled by the periodic application of water to all disturbed areas along the ROW and access roads.
AQ-3	Vehicles and equipment showing excessive emission of exhaust gases due to poor engine adjustments or other inefficient operating conditions shall not be operated until corrective adjustments or repairs are made.
AQ-4	Post seeding mulch shall be utilized wherever appropriate during reclamation to help reduce wind erosion and blowing dust. The mulch/stabilization will be performed as soon as possible after completion of project activities to minimize potential fugitive dust generation as re-vegetation occurs.
Access Routes	
AR-1	No construction activities shall be performed during periods when the soil is too wet to adequately support equipment and vehicles. If equipment or vehicles create ruts in excess of 4-6 inches deep for a distance of 10 feet on native surface roads, the soil shall be deemed too wet to adequately support construction equipment. If equipment or vehicles create ruts in excess of 1 inch deep on graveled roads, the roads shall be deemed too wet to support construction equipment.

Table 2-3 Committed Environmental Protection Measures, continued

Category	Description
Cultural Resources	
CR-1	Prior to construction, all supervisory construction personnel shall be instructed on the protection of cultural resources with reference to relevant laws and penalties, and the need to cease work in the location if cultural resource items are discovered.
CR-2	Known National Register of Historic Places (NRHP)-eligible cultural resources within the project area of effect would be avoided during construction, as well as during project operation and maintenance. Ultimately, the transmission line may span these sites, but no structure placement would occur within the site boundaries, and vehicle access in the immediate vicinity of sites would be restricted to established roads and crossing points.
CR-3	Should any previously unknown historic/prehistoric sites or artifacts be encountered during construction, all land altering activities at that location shall be immediately suspended and the discovery left intact until such time that Tri-State is notified and appropriate measures taken to assure compliance with the National Historic Preservation Act (NHPA) and enabling legislation. A similar process shall apply if paleontological resources are discovered during excavations.
CR-4	If United Power's burial of the existing 12.47-kV distribution line extends beyond the cultural clearance areas completed to date, the applicable Class III cultural clearance surveys would be conducted.
Fire Prevention/Control	
FP-1	Construction vehicles shall be equipped with government approved spark arresters.
FP-2	The Contractor shall maintain in all construction vehicles a current list of local emergency response providers and methods of contact/communication.
Hazardous Materials	
HM-1	Tri-State shall comply with all applicable federal laws and regulations existing or hereafter enacted or promulgated regarding toxic substances or hazardous materials. In any event, Tri-State shall comply with the Toxic Substance Control Act of 1976, as amended (15 United States Code [U.S.C.] 2601, et seq.) with regard to any toxic substances that are used, generated by or stored on the ROW or on facilities (See 40 CFR, Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.). Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, section 102b. A copy of any report required or requested by any federal agency or state government as a result of a reportable release or spill of any toxic substance shall be furnished to the authorized officer concurrent with the filing of the reports to the involved federal agency or state government.
HM-2	No bulk fuel storage shall occur within the public lands portion of the project ROW. All fuel and fluid spills within this area will be handled in accordance with appropriate state and federal spill reporting and response requirements. Contractor shall notify Tri-State of any spills so appropriate notifications can be made to regulatory authorities.

Table 2-3 Committed Environmental Protection Measures, continued

Category	Description
HM-3	Any waste generated as a result of the proposed Bromley-Prairie Center Project shall be properly disposed in a permitted facility. Solid waste generated during construction and periodic maintenance periods will be minimal. All hazardous materials will be handled in accordance with applicable local, state and federal hazardous material statutes and regulations.
Land Use	
LU-1	All activities associated with the construction, operation, and maintenance of the transmission line shall occur within the authorized limits of the transmission line ROW and access routes and those identified as temporary use areas for construction, material staging, wire pulling, etc. Additional access routes or cross-country travel shall not be allowed outside of the authorized routes prior to review and approval by Tri-State.
LU-2	The Contractor shall maintain all fences, brace panels, and gates during the construction period. Any fence, brace panel, or gate damaged during construction will be repaired immediately by the Contractor to the appropriate landowner.
LU-3	The Contractor shall eliminate, at the earliest opportunity, all construction ruts that are detrimental to agricultural operations and/or hazardous to movement of vehicles and equipment. Such ruts shall be leveled, filled and graded, or otherwise eliminated in an approved manner. Damage to ditches, tile drains, culverts, terraces, local roads, and other similar land use features shall be corrected, as necessary, by the Contractor. The land and facilities shall be restored as nearly as practicable to their original condition.
LU-4	Structure foundation holes shall not be left open overnight and will be covered. Covers will be secured in place and will be strong enough to prevent livestock, wildlife, or the public from falling through and into the excavation.
Noise	
N-1	Construction vehicles and equipment shall be maintained in proper operating condition and shall be equipped with manufacturers' standard noise control devices or better (e.g., mufflers, engine enclosures).
N-2	Tri-State shall address complaints about radio or television noise interference associated with project operation.
Noxious Weeds	
NW-1	Weed control on disturbed areas within the limits of the ROW shall be implemented and the appropriate agency shall be contacted regarding planning acceptable weed control measures on noxious and invasive weed infestations within the limits of the ROW.
NW-2	To minimize introduction and spread of noxious weed seed sources to the project area the following measures shall be performed: All heavy equipment utilized during construction will be washed prior to departure from the equipment storage facility. Washing of equipment prior to transport from one work site to another is not recommended, as on-site washing of equipment increases the chance of weed seed dispersal by drainage of water off of the site, across an area greater than the size of the work site. Equipment will have accumulations of mud removed instead. This method promotes containment of weed seeds on the work site; all seed mixes and mulch used for reclamation will be certified weed-free.

Table 2-3 Committed Environmental Protection Measures, continued

Category	Description
NW-3	In order to prevent the spread of noxious weeds from the ROW, noxious weed populations that have resulted from project construction shall be annually monitored and treated, as required by the appropriate agencies or the property owner. This will include weed treatments of access routes along the power line ROW. The use of herbicides and pesticides shall comply with federal and state laws governing their proper use, storage, and disposal, and any limitations imposed by state or federal regulations.
Soils and Geology	
S-1	The Contractor shall mitigate soils compacted by movement of construction vehicles and equipment, by loosened and leveled harrowing or disking to approximate pre-construction contours and reseeded with certified weed-free grasses and mulched (except in cultivated fields). The specific seed mix(s) and rate(s) of application will be determined in coordination with specific landowners.
S-2	Movement of construction vehicles and equipment shall be limited to the ROW and approved access routes.
S-3	Excavated material not used in the backfilling of poles shall be spread around each pole, evenly spread on the access routes in the immediate vicinity of the pole structure, or transported off site to approved fill sites or a Tri-State approved disposal location. Disturbed areas shall then be regraded to approximate pre-construction contours and reseeded, as specified in EPM S-1.
S-4	Topsoil shall be removed, stockpiled, and re-spread at temporarily disturbed areas not needed for maintenance access.
Transportation	
T-1	The Contractor shall make all necessary provisions for conformance with federal, state and local traffic safety standards and shall conduct construction operations so as to offer the least possible obstruction and inconvenience to public traffic.
Threatened, Endangered, and Special Status Species	
T&E-1	Per the U.S. Fish and Wildlife's (USFWS) requirements under section 7 of the ESA, Tri-State contracted with a qualified botanist to conduct sensitive species surveys for the federally listed Ute ladies'-tresses orchid and Colorado butterfly plant in suitable habitat in the project area. The habitat surveys were completed in 2012, and in 2013 rare plant surveys were conducted within suitable habitat along the Preferred Route. No plants were observed for the Preferred Route alignment, and a "No Effect" determination was issued by the USFWS (Appendix D). If United Power's burial of the existing 12.47-kV distribution line extends beyond the 75-foot-wide ROW for the 115-kV transmission line or if Alternatives A and B are chosen (Wetland W14), Tri-State would contract with a qualified botanist to conduct presence/absence surveys prior to construction within any suitable habitat crossed in these areas. If the plant was found in these areas, RUS would re-initiate Section 7 consultation with the USFWS.

Table 2-3 Committed Environmental Protection Measures, continued

Category	Description
T&E-2	If project construction were to occur between March 15 and October 31 within black-tailed prairie dog colonies, burrowing owl surveys shall be conducted to determine if an active nest occurs within 150 feet of proposed construction activities. This survey would focus on the prairie dog colony located near the Bromley Substation where owls were observed in 2007. If present, Tri-State shall avoid human encroachment within 150 feet of an active burrowing owl nest site from March 15 through October 31 or an Environmental Monitor would be present at all times to ensure eggs or young are not lost.
Vegetation Management	
VEG-1	Vegetation shall be preserved and protected from damage by construction operations to the maximum extent practicable. Removal of trees will be limited to those necessary for construction of the line and/or pose a threat to the safe and reliable operation and maintenance of the line, or as otherwise determined by Tri-State and the affected landowner. Within the boundaries of wetlands or other Waters of the U.S. (WOUS), tree stumps will be left in place unless otherwise requested by the landowner and approved by the U.S. Army Corps of Engineers (USACE). In all areas of the ROW, stumps will be cut off to ground level, and the stumps and roots will be left to minimize ground disturbance unless otherwise requested by the landowner/manager. No material will be permitted to be spread or placed into areas delineated as wetlands or other WOUS.
VEG-2	Upon completion of construction, work areas, except any permanent access roads/trails or wetland crossings, shall be regraded, as required, so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate natural revegetation, provide for proper drainage, and prevent erosion.
VEG-3	Disturbed areas where vegetation has been removed by construction activities to the extent that the potential for soil erosion is increased to a detrimental level shall be subject to seedbed preparation techniques, reseeded to an approved seed mixture, and mulched, if necessary, during a recognized planting season. Mulching shall be applied only to those areas where potential erosion will prohibit vegetation establishment and growth. All seed mixes and mulch used for reclamation will be certified weed-free.
VEG-4	All construction materials and debris shall be removed from the project area.
Visual Resources	
VR-1	The Contractor shall exercise care to preserve the natural landscape and shall conduct construction operations so as to prevent unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the work. Except where clearing is required for permanent works, approved temporary or permanent construction roads, staging areas, or excavation operations, vegetation shall be preserved and shall be protected from damage by the Contractor's construction operations and equipment. Any unauthorized damage shall be repaired by the Contractor to the satisfaction of Tri-State.
VR-2	All construction materials, waste, and debris shall be removed from the project area in a timely manner. Burning or burying of waste materials on the ROW or at the construction site will not be allowed. All materials resulting from the Contractor's clearing operations shall be removed from the ROW.

Table 2-3 Committed Environmental Protection Measures, continued

Category	Description
VR-3	Structures shall be located and designed to conform with the terrain and to minimal visual impacts whenever possible. Leveling and benching of the structure sites will be done to the minimum necessary to allow structure assembly and erection.
Wetlands and other Waters of the U.S.	
WET-1	Wetlands and other WOUS boundaries have been surveyed and mapped for the Preferred, Alternative A and B Routes. Final access road and TUA locations are to be determined and shall be surveyed for wetlands and other WOUS by a qualified wetlands scientist prior to construction. If United Power's burial of the existing 12.47-kV distribution line extends beyond the areas surveyed for jurisdictional wetlands or other WOUS, the applicable wetland delineation surveys would be conducted, where warranted. In addition, wetlands and other WOUS boundaries shall be mapped with GIS sub-foot accuracy and flagged in the field prior to construction. Permanent impacts to surface waters, wetlands, and riparian areas shall be avoided, unless authorized under a NWP 12 issued by the USACE. Tri-State plans to span wetlands, when possible, and impacts to surface waters, wetlands, and riparian communities will be minimized to the greatest extent feasible, and all stipulations of the NWP will be followed. Temporary impacts would be restored, and any fill material would be regulated under Section 404 of the CWA.
WET-2	Access routes through wetlands would be authorized under a NWP 12 for Utility Line Activities. Wetland mats shall be required at all temporary wetland crossings unless soils are protected by snow cover, or soils are dry or frozen and acceptable for overland access. If excavation work is required in wetland areas, the top 12 inches of soil would be removed at the excavation location, and excavated material would not be stockpiled or deposited within 100 feet of delineated wetlands or other WOUS (see EPM WQ-3). Upon completion of construction at that location, wetland mats and other temporary fill will be removed and topsoil will be redistributed on the wetland. Temporary impacts will be restored per USACE guidelines.
WET-3	Access routes through wetlands would be authorized under a NWP 12 for Utility Line Activities. In lieu of permanent access, wetland mats shall be required at all wetland crossings unless soils are protected by snow cover, or soils are dry or frozen and acceptable for overland access. If excavation is required in wetland areas, the top 12 inches of soil would be removed at the excavation location, and excavated material would not be stockpiled or deposited within 100 feet of delineated wetlands or other WOUS (see EPM WQ-3). Upon completion of construction at that location, wetland mats and other temporary fill will be removed and removed topsoil will be redistributed on the wetland. Temporary impacts will be restored per USACE guidelines.

Table 2-3 Committed Environmental Protection Measures, continued

Category	Description
Water Quality	
WQ-1	Construction activities will utilize methods that prevent entrance or accidental spillage of solid matter, contaminants, debris, and other pollutants and wastes into flowing streams or dry water courses, lakes and underground water sources. Pollutants and wastes include, but are not restricted to, refuse, garbage, cement, concrete, sanitary waste, industrial waste, radioactive substances, oil and other petroleum products, aggregate processing tailings, mineral salts and thermal pollution.
WQ-2	If required, dewatering work for structure foundations or earthwork operations adjacent to or encroaching on streams or water courses shall be conducted in a manner to prevent muddy water, eroded materials, and sediment from entering the streams or watercourses. Best Management Practices (BMPs) will be implemented to prevent erosion and control sediment such as barriers, preservation of vegetative buffers, interception ditches, bypass channels, settling ponds, etc. All work would comply with Section 401 of the Clean Water Act.
WQ-3	Excavated material or other construction materials shall not be stockpiled or deposited within 100 feet of delineated wetlands or other WOUS. In situations in which the 100-foot buffer cannot be maintained or topography and slope augment the potential for stormwater runoff or equipment encroachment into water bodies, sufficient stormwater BMP's (i.e., fencing, wattles, straw bales) will be installed to protect the resource.
WQ-4	Borrow pits shall be so excavated that water will not collect and stand therein. Before being abandoned, the sides of borrow pits will be brought to stable slopes, with slope intersections shaped to carry the natural contour of adjacent, undisturbed terrain into the pit or borrow area, giving a natural appearance. Waste piles will be shaped to provide a natural appearance.
WQ-5	If ground disturbance will exceed 1 acre, Tri-State will acquire a stormwater permit from the CDPHE. The supporting Stormwater Management Plan (SWMP) will address all construction and reconstruction activities, and will meet or exceed all CDPHE requirements.
WQ-6	Any water required for construction, revegetation, or dust suppression will be purchased from a municipal source or construction water provider with a private well. No water will be withdrawn from surface water resources.
Wildlife Resources	
WR-1	In order to minimize avian collision risk, Tri-State shall implement measures outlined in the company's Avian Protection Plan (APP) (EDM International, Inc. [EDM] 2012a), which encompasses the: (1) APP Guidelines published April 2005 (Avian Power Line Interaction Committee [APLIC] and USFWS 2005); (2) standards developed by APLIC to minimize effects to birds from power line operation in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006); (3) suggested practices developed by APLIC to minimize collision risks to birds from overhead lines in *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC 2012); and (4) NESC requirements, which specify electric conductor clearances.

Table 2-3 Committed Environmental Protection Measures, continued

Category	Description
WR-2	An avian collision risk assessment was conducted by certified avian specialists (EDM 2012b) to determine if or where collision deterrents were warranted to minimize impacts to avian species during project operation, based on habitats, bird use, and at-risk species present. Based on the avian collision risk assessment, Tri-State would choose the applicable avian marking device, based on engineering requirements (e.g., ice and wind loading) and installation approach. The avian marking devices shall be installed on the transmission line OPGW for the Preferred Route from Prairie Center Substation to the crossing of I-76 at Bromley Lane to minimize the risk of avian collisions. For Alternative A, line marking would be completed from Prairie Center Substation to the crossover segment of Alternative B from the Preferred Route and over the small wetland located at the intersection of Buckley Road and I-76. For Alternative B, line marking would coincide with Alternative A from Prairie Center Substation to the crossover segment and coincide with the Preferred Route from the crossover segment north to the crossing of I-76 at Bromley Lane. The OPGW will be marked per the APLIC guidelines with marking devices installed every 5 meters (15 feet).
WR-3	Project construction near known raptor nests is proposed to occur outside the avian breeding season. However, if construction were to extend from October 15 (bald eagles) through July 31, raptor nest clearance surveys shall be conducted prior to construction occurring in those areas. If active raptor nests occur within 0.25 to 0.5 mile (species dependent) of construction areas, nest protection measures would be developed, ranging from installing an Environmental Monitor to establishing a restricted buffer area around the nest site until the young have fledged, depending on site-specific variables. Breeding burrowing owls have a different breeding season and nest buffers, as compared to other raptor species, and are discussed in EPM T&E-2. The recommended breading seasonal restriction for bald eagles in Colorado is October 15-July 31. The National Bald Eagle Management Guidelines show eagles nesting in the northern U.S. including Colorado from December 15 through August. If construction should extend into mid- to late October or November, a qualified biologist would conduct a nesting survey before work would be permitted to continue, and an Environmental Monitor would be present to monitor bald eagle behavior, if warranted. If construction would not impact eagle breeding and nesting, construction activities would be allowed to continue. Seasonal restrictions and buffers, including those developed by the CPW (2008) are meant to be a guide for protecting raptor species and can be modified to account for various factors such as weather, raptor behavior, topography, existing disturbances, etc. The applicable buffer area will be determined on a site-specific basis, as warranted by the species involved, nest location, vegetative buffering, type of activity planned, and line-of-sight to construction activities or personnel.

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3.0 AFFECTED ENVIRONMENT

The affected environment and analysis area (hereafter defined as the Project Area) for the EA varies by resource topic, but generally includes the proposed transmission ROW for all alternatives and associated ancillary facilities. The following resource sections describe the existing human and natural environments associated with the proposed Bromley-Prairie Center Project.

3.1 Air Quality

National Ambient Air Quality Standards (NAAQS) for six "criteria" pollutants are established by the U.S. Environmental Protection Agency (EPA) and administered within the state by CDPHE. The project area currently is in attainment with all of the NAAQS except ozone. The Denver-Boulder-Greeley-Fort Collins Eight-hour Ozone Control Area was formally designated in 2012 due to marginal exceedances of the NAAQS eight-hour ozone standard. The area must meet the NAAQS eight-hour ozone standard by 2015, or new requirements may be imposed (CDPHE 2012).

Portions of the Denver metro area previously comprised a non-attainment area for carbon monoxide (CO) and particle pollution (particles less than 10 microns in diameter, also known as PM_{10} or fugitive dust). In 2002, the Denver metro area was re-designated as an attainment/maintenance area for both parameters.

Colorado has developed a federally-required Regional Haze Plan for the Front Range area. The Regional Haze Plan was approved by the EPA in September 2012. The plan focuses on minimizing emissions from coal-fired power plants.

The Clean Air Act defined 156 "Areas of Great Scenic Importance" as Class I areas. The Class 1 areas closest to the proposed Bromley-Prairie Center Project are Rocky Mountain National Park, 43 miles northwest, and the Eagles Nest Wilderness, 72 miles southwest (National Park Service Air Resources Division 2008). Neither area is within the airshed of the project area.

3.1.1 Proposed Action

The Proposed Action is located in the Denver-Boulder-Greeley-Fort Collins Eight-Hour Ozone Control Area.

3.1.2 Alternative A

With respect to air quality, Alternative A is the same as that described for the Proposed Action.

3.1.3 Alternative B

With respect to air quality, Alternative B is the same as that described for the Proposed Action.

3.2 Geology and Minerals

3.2.1 Proposed Action

The project is located within the Denver-Julesburg Basin, which covers 60,000 square miles in northeastern Colorado, southeastern Wyoming, and western Nebraska (Volk 1972). This asymmetric basin contains 13,000 feet of sedimentary rocks along its axis, trending from Denver, Colorado to Torrington, Wyoming. The sedimentary deposits within the Denver-Julesburg Basin range in age from Paleozoic to Recent.

The project area is located within bedrock formations of Upper Cretaceous and Tertiary age. These formations consist of sedimentary rocks composed of sandstone, siltstone, shale, and coal, most notably the Laramie Formation, Denver Formation, and Lower Dawson Arkose (Tweto 1979). The project area is in close proximity to areas of unconsolidated Quaternary surface deposits that include alluvium of varying age and eolian sand deposits (Green 1992, Madole 1995, Madole et al. 2005), generally stabilized by vegetation (Figure 3-1). The two units crossed by the Proposed Action are Tkdl, Tertiary-Cretaceous sandstone and shale, and Qe, Quaternary dune sand and silt.

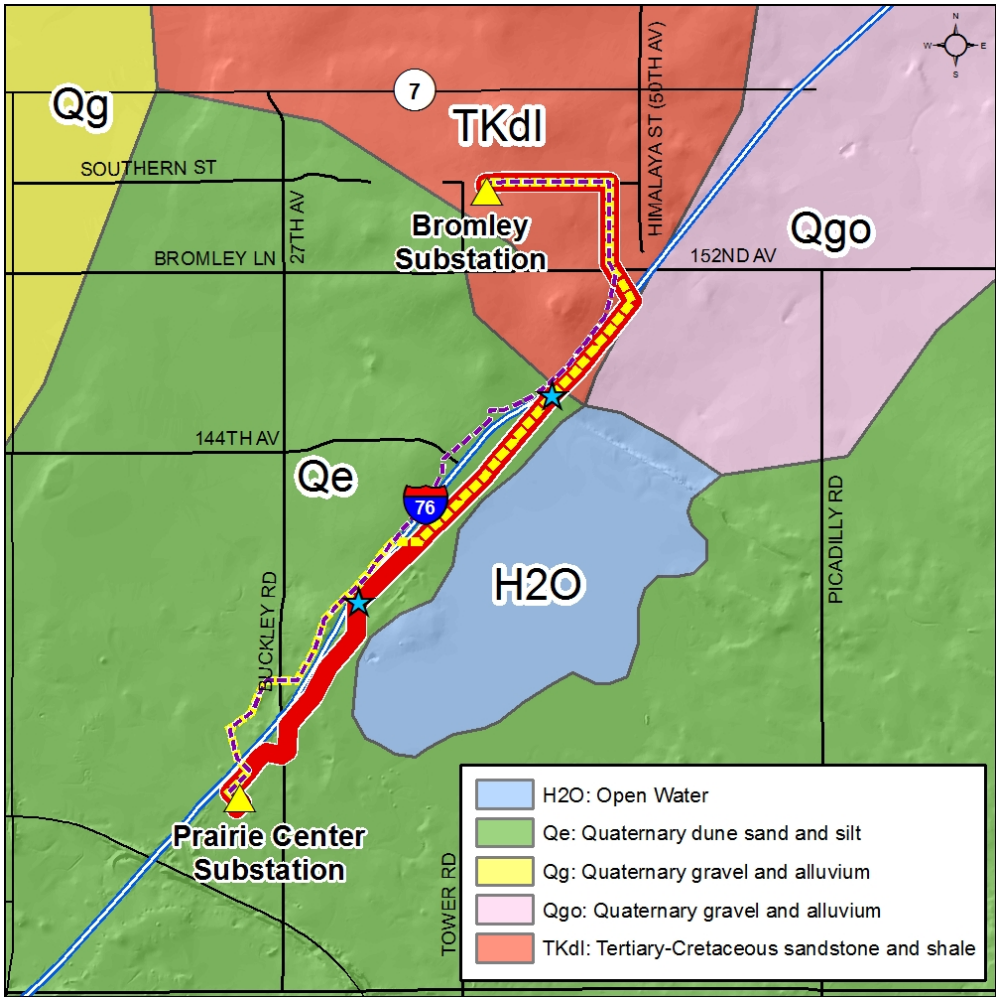


Figure 3-1 Geologic Units in Project Vicinity

3.2.2 Alternative A

The geology for Alternative A is the same as described for the Proposed Action.

3.2.3 Alternative B

The geology for Alternative B is the same as described for the Proposed Action.

3.3 Soils

The primary soil units underlain by the project area were determined using a soil mapping GIS database for Adams County (Natural Resources Conservation Service [NRCS] 2009, 2012) (Figure 3-2). The soil mapping has an accuracy of 1:24,000 and contains database attributes pertaining to soil map unit descriptions, soil texture, pH, erosion potential, drainage, flooding potential, and other physical and chemical parameters. Table 3-1 summarizes the physical and chemical properties of the soil units crossed by the project.

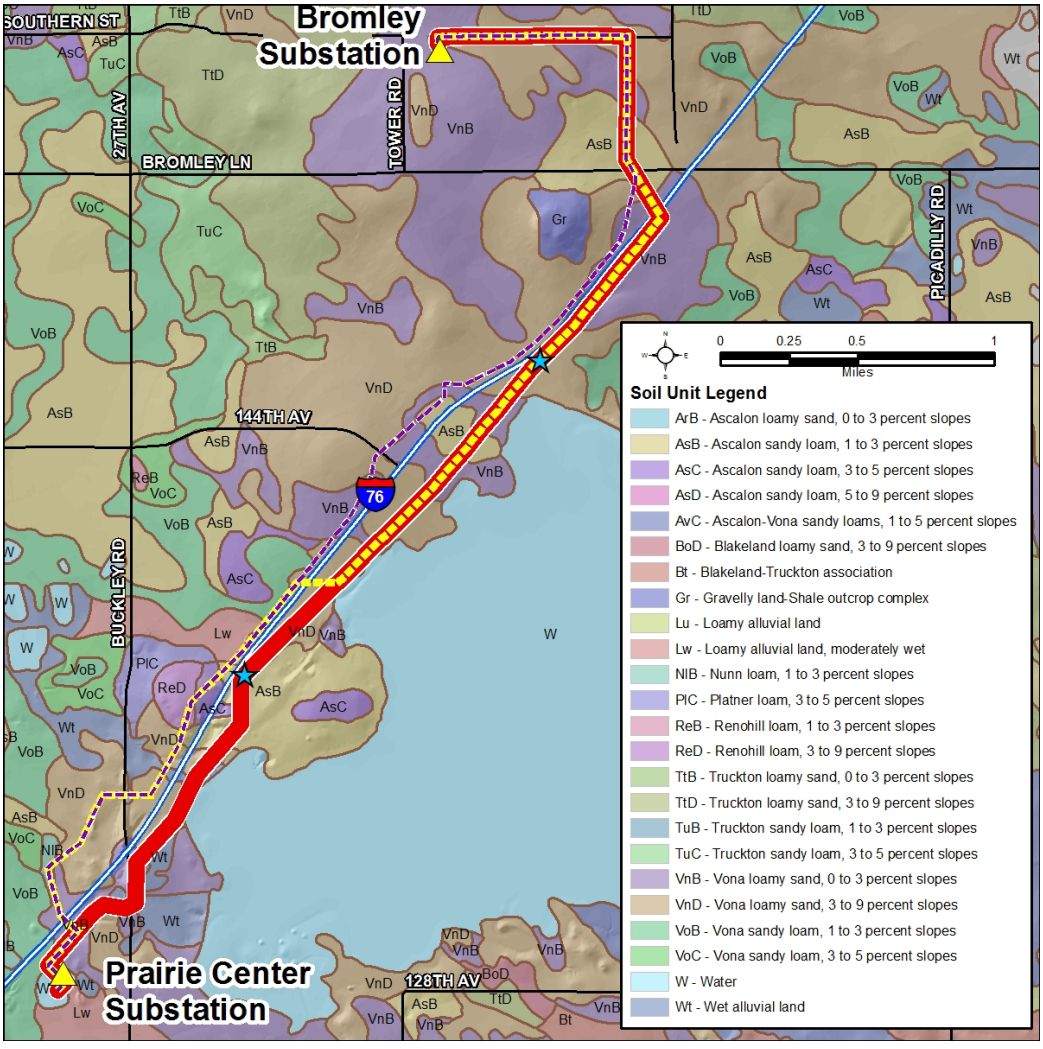


Figure 3-2 Soil Units in Project Vicinity

Table 3-1 Soil Baseline Characteristics

Unit	Description	Parent Material	Prime Farmland	Landform (Slope %)	Depth (inches)	Surface Texture (pH Range)	Subsurface Texture (pH Range)	Available Water Capacity	Drainage Class	Erodibility (Water/Wind)
AsB	Ascalon sandy loam, 1 to 3% slopes	Eolian deposits	If irrigated (and the product of I (soil erodibility) x C (climate factor) does not exceed 60)	Plains (1-3)	60	Sandy loam (6.6-7.8)	Sandy clay loam-sandy loam (6.6-.9.0)	Moderate (~7.1 in)	Well drained	0.20-0.28/86
AsC	Ascalon sandy loam, 3 to 5% slopes	Eolian deposits	If irrigated (and the product of I (soil erodibility) x C (climate factor) does not exceed 60)	Plains (3-5)	60	Sandy loam (6.6-7.8)	Sandy clay loam-sandy loam (6.6-9.0)	Moderate (~7.1 in)	Well drained	0.20-0.28/86
Lw	Loamy alluvial land, moderately wet	Alluvium		Drainageways (0-1)	60	Variable (7.4-8.4)	Stratified loam/clay loam-sand (7.4-8.4)	Low (~6.0 in)	Somewhat poorly drained	0.05-0.32/48
NlB	Nunn loam, 1 to 3% slopes	Alluvium	If irrigated	Terraces (1-3)	60	Loam (6.6-7.8)	Clay-silt loam (6.6-8.4)	High (~9.6 in)	Well drained	0.20-0.43/48
ReD	Renohill loam, 3 to 9% slopes	Residuum weathered from shale		Plains (3-9)	32	Loam (6.6-7.8)	Clay-clay loam-unweathered bedrock (6.6-8.4)	Low (~4.8 in)	Well drained	0.20-0.28/48
VnB	Vona loamy sand, 0 to 3% slopes	Eolian sands	Farmland of statewide importance	Plains (0-3)	60	Loamy sand (6.6-7.8)	Sandy loam-loamy sand (6.6-9.0)	Low (~5.8 in)	Well drained	0.17-0.28/134
VnD	Vona loamy sand, 3 to 9% slopes	Eolian sands		Plains (3-9)	60	Loamy sand (6.6-7.8)	Sandy loam – loamy sand (6.6-9.0)	Low (~5.8 in)	Well drained	0.17-0.28/134
VoB	Vona sandy loam, 1 to 3% slopes	Eolian sands	If irrigated (and the product of I (soil erodibility) x C (climate factor) does not exceed 60)	Plains (1-3)	60	Sandy loam (6.6-7.8)	Sandy loam-loamy sand (6.6-9.0)	Moderate (~6.3 in)	Well drained	0.24-0.28/86

Table 3-1 Soil Baseline Characteristics, continued

Unit	Description	Parent Material	Prime Farmland	Landform (Slope %)	Depth (inches)	Surface Texture (pH Range)	Subsurface Texture (pH Range)	Available Water Capacity	Drainage Class	Erodibility (Water/Wind)
W	Water – Barr Lake									N/A
Wt	Wet alluvial land	Alluvium		Floodplains (0-1)	60	Variable (6.6-7.8)	Stratified sandy loam/clay-sand (7.4-8.4)	Low (~4.8 in)	Poorly drained	0.10-0.20/0

Soil Erosion Factor (Water) defined by Kw (0-0.17 – low; 0.2-0.37 = medium; 0.43-0.64 = high)
Soil Erodibiilty (Wind) defined by Wind Erodibility Index (WEI) (0-56 = low; 86 = medium; 134-310 = high)

3.3.1 Proposed Action

Parent materials are somewhat varied, ranging from alluvium to eolian deposits and sands. Typical soils overlying the project area are nearly level to moderately sloping (0 to 9%) are deep and well-drained, with two exceptions (Lw = associated with drainageways and Wt = wet alluvial land associated with floodplains). Available water capacity, a factor supporting plant growth, ranges from "low" to "moderate" for the dominant soils proposed to be crossed. Wind and water erosion potentials are primarily rated as low to medium.

Type VnB (Vona loamy sand, 3 to 9% slopes) is considered a soil of statewide importance. Type AsB (Ascalon sandy loam, 1 to 3% slopes) is considered "prime farmland if irrigated, with good climate and low erosion." However, none of these lands are currently irrigated or in production where the Proposed Action would cross them.

Soil pH values across the ROW typically range from 6.6 up to 9.0 throughout the profile. The primary soils along the ROW are non-saline and non-sodic exhibiting few, if any, constraints to revegetation in terms of chemistry.

3.3.2 Alternative A

Soils for Alternative A would be similar to those discussed for the Proposed Action.

3.3.3 Alternative B

Soils for Alternative B would be similar to those discussed for the Proposed Action.

3.4 Water Resources

The project area lies within the South Platte Watershed. According to the U.S. Geological Survey (USGS) National Hydrography Dataset (NHD) (2011), surface water features in the project area (Figure 3-3) include Barr Lake; Burlington Ditch; Brighton Lateral Ditch; and a number of small ponds, wetlands (see Section 3.6 *Wetlands*), and floodplains (see Section 3.5 *Floodplains*). The Burlington Ditch transports surface water diverted from the South Platte River and also treated effluent from the Denver Metro Wastewater Reclamation District to Barr Lake.

Barr Lake stores water for downstream irrigation and for secondary recreation purposes. It is classified by the state as supporting warm water Class 2 aquatic life, Class E recreation, public water supply, and agriculture (Barr-Milton Watershed Association 2011a). Due to high pH, Barr Lake was included on the state's 2002 303(d) list of waters not achieving their designated use (Patten 2009). Dissolved oxygen levels in Barr Lake also are a concern, but have not reached actionable levels (Barr-Milton Watershed Association 2011b).

The pH threshold for warm water Class 2 aquatic life is 9.0. Barr Lake pH exceedances are a result of excessive nutrient loading from point and nonpoint sources. Nutrients such as phosphorus and nitrogen cause severe algal blooms from July through October. The growth and decay of these algal blooms causes high pH.

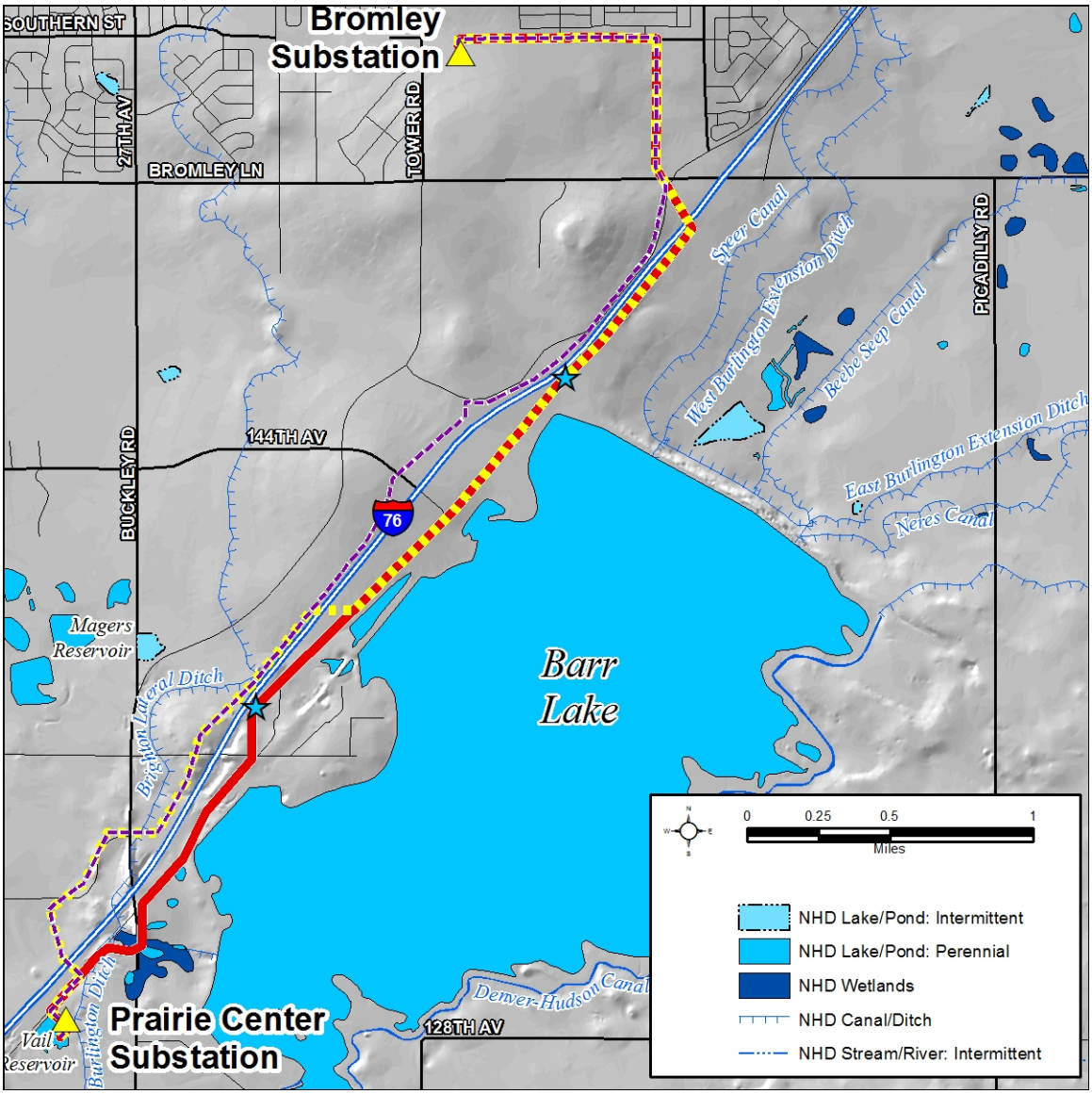


Figure 3-3 Surface Water Features

A Total Maximum Daily Load (TMDL) analysis has been completed for Barr Lake with the goal of reducing pH to levels meeting the class of use standard (Barr-Milton Watershed Association 2011a). Reduction in pH will be closely linked to phosphorus inputs, which are associated most closely with wastewater treatment plants. Although there currently is no state standard for nitrogen or phosphorus, nutrients standards are in development (Patten 2009).

Groundwater in the area is contained in the Denver Basin aquifer system, which underlies an area of approximately 7,000 square miles extending from Greeley south to near Colorado Springs and from the Front Range east to near Limon. This aquifer system supplies water to rural and suburban residents of much of the plains area along the eastern front of the Rocky Mountains in northeastern Colorado (USGS 1995).

3.4.1 Proposed Action

The Proposed Action would cross the Burlington Ditch at a location along Cameron Drive, approximately 0.4 mile north of the Prairie Center Substation (Figure 3-3). The Proposed Action also would cross an unchannelized wetland that conveys Burlington Ditch flows 0.2 mile northeast of the initial crossing. The transmission line would span the Burlington Ditch and associated wetland, and no structures would be located within surface waters. The Proposed Action would not cross any other surface waters. The burial of United Power's existing undergrounded distribution line would not require the crossing of any surface waters.

3.4.2 Alternative A

Alternative A would cross the Brighton Lateral Ditch at a location just east of Buckley Road south of a residential community. The Alternative A alignment would run tangent to the Brighton Lateral at a location approximately 0.3 mile north of East 136th Avenue (Figure 3-3). The transmission line would span the Brighton Lateral, and no structures would be located in surface waters. Alternative A would not cross any other surface waters.

3.4.3 Alternative B

With respect to water resources, Alternative B would be identical to Alternative A.

3.5 Floodplains

Executive Order (EO) 11988, "Floodplain Management," directs federal agencies to avoid actions that would result in facilities located in the 100-year floodplain, where practicable alternatives exist. New facilities can increase flooding risk or frequency if they obstruct flows, trap dam-forming debris, or alter the volume of storm runoff by substantially increasing a watershed's impervious area.

Adams County also has a Flood Control Master Plan that regulates construction in the 100-year floodplain. A permit is issued when a building, utility, or other infrastructure is built within a floodplain as designated by Federal Emergency Management Agency (FEMA).

Floodplains were mapped using FEMA Flood Insurance Rate Map (FIRM) data. The 100-year floodplains near the preferred and alternative routes are shown in Figure 3-4. FEMA has not delineated 500-year floodplains in the area.

3.5.1 Proposed Action

The Proposed Action would not intersect any FEMA-delineated floodplains.

3.5.2 Alternative A

Alternative A would be identical to the Proposed Action; no FEMA-delineated floodplains would be intersected.

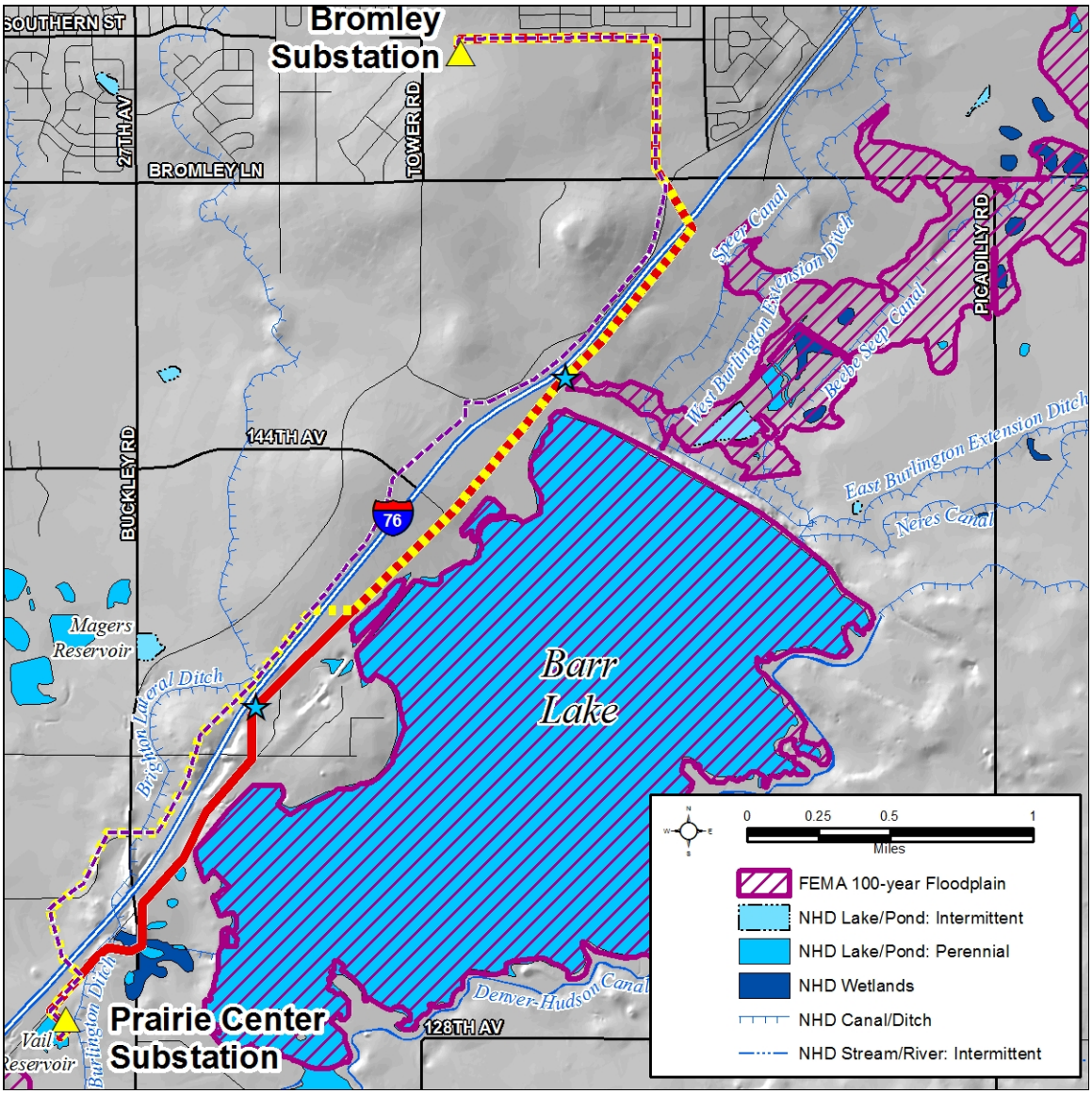


Figure 3-4 Floodplains

3.5.1 Alternative B

Alternative B would be identical to the Proposed Action; no FEMA-delineated floodplains would be intersected.

3.6 Wetlands

3.6.1 Proposed Action

Wetland delineations were completed along the Proposed Action in October 2011 and May 2012. Details on the wetland delineation completed for the Proposed Action are available in the *Wetland Delineation Report, Bromley-Prairie Center, 115-kV Transmission Line Project*

(EDM 2012c). Nine palustrine wetlands and three irrigation ditches with palustrine emergent wetland fringes were identified in the vicinity of the Preferred Route.

Table 3-2 summarizes information regarding the wetlands identified during the surveys.

Table 3-2 Wetlands Associated with the Proposed Action

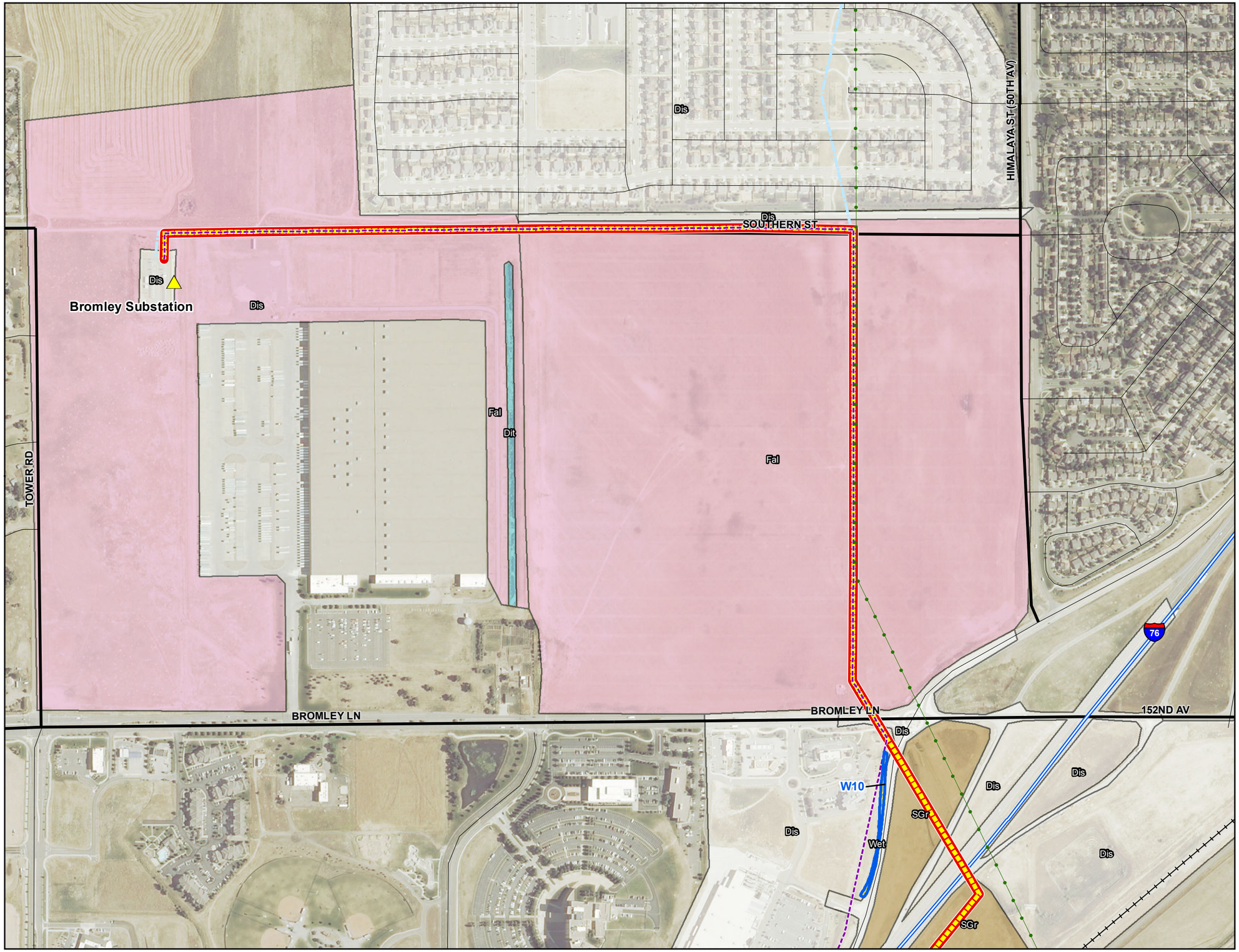
Site ID	Wetland Type	Habitat Characteristics
W1 (Prairie Center Substation)	Palustrine Emergent Wetland	Tall, dense (80-90% cover) vegetation includes dogbane, reed canarygrass. Site has been modified. Ringed by cottonwood trees.
W2	Irrigation Ditch (Unnamed)	Dense vegetation (90% cover). Manmade irrigation ditch. Not crossed by ROW, but lies within 80 feet.
W3	Irrigation Ditch (branch of the Burlington Ditch)	Tall, dense vegetation (90% cover). Manmade irrigation ditch.
W4	Palustrine Emergent Wetland	Wet meadow with dense cover (90%).
W4A	Palustrine Emergent Wetland	Wet meadow with dense cover adjacent to Barr Lake. Variety of species including milkweed, Baltic rush, verbena.
W5	Palustrine Emergent Wetland	Dense, tall vegetation (95% cover). Cattail monoculture. Riparian area with cottonwoods and elm on northwest corner.
W6	Palustrine Emergent Wetland	Dense, tall vegetation (75% cover). Cattails. Stormwater catchment.
W7	Palustrine Emergent Wetland	Manmade wetland mitigation site (80% cover). Tall vegetation. Not crossed by ROW, but lies within 20 feet.
W8	Palustrine Forested Wetland	Riparian; vegetation includes cottonwoods (70% cover). Lies within 50 feet of Preferred Route. Limited wetland understory.
W9	Palustrine Forested Wetland	Riparian; vegetation includes cottonwoods (70% cover). Lies within 50 feet of proposed ROW. Limited wetland understory.
W10	Palustrine Emergent Wetland	Drainage ditch associated with commercial development. 80-90% cover. Cattails, sedges. Not crossed by ROW, but lies within 30 feet.
W13	Irrigation Ditch (Burlington Ditch)	Manmade irrigation ditch; dense vegetation (90% cover).

Wetlands and irrigation ditches in the area are assumed to be under the U.S. Army Corps of Engineers (USACE) jurisdiction due to their connection to Barr Lake and the South Platte River. All wetlands associated with the Proposed Action are labeled and located on Figure 3-5.

Bromley-Prairie Center 115kV Transmission Line Project

Figure 3-5
Wetlands and Vegetation Communities

Sheet 1 of 4



N

0 250 500 1,000 Feet

1:6,000 1 inch = 500 feet

- Wetland Delineation (2011/2012)

Vegetation Communites

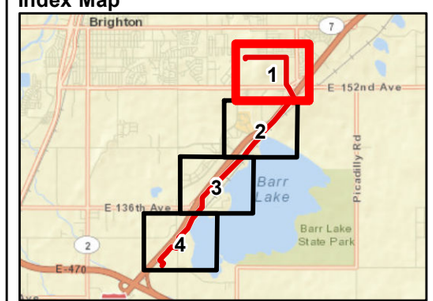
- Ag: Agriculture
- Dis: Disturbed
- Dit: Ditch
- Fal: Fallow
- Wat: Open Water
- Rip: Riparian
- Sgr: Shortgrass
- Shr: Shrub
- Wet: Wetland

Project Facilities

- Substation
- Start/End Point: Distribution Line Underground
- Preferred Route
- Alternative A
- Alternative B
- Existing Tri-State Lines
- Existing Gas Pipeline
- Barr Lake State Park

Imagery: NAIP 2013
Source: Ecosphere 2012, EDM 2012c

Index Map



Sheet 1 of 4

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Bromley-Prairie Center 115kV Transmission Line Project

Figure 3-5
Wetlands and Vegetation Communities

Sheet 2 of 4

N

0 250 500 1,000 Feet

1:6,000 1 inch = 500 feet

Wetland Delineation (2011/2012)

Vegetation Communites

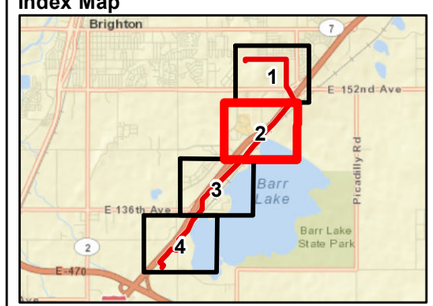
- Ag: Agriculture
- Dis: Disturbed
- Dit: Ditch
- Fal: Fallow
- Wat: Open Water
- Rip: Riparian
- Sgr: Shortgrass
- Shr: Shrub
- Wet: Wetland

Project Facilities

- Substation
- Start/End Point: Distribution Line Underground
- Preferred Route
- Alternative A
- Alternative B
- Existing Tri-State Lines
- Existing Gas Pipeline
- Barr Lake State Park

Imagery: NAIP 2013
Source: Ecosphere 2012, EDM 2012c

Index Map



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Bromley-Prairie Center 115kV Transmission Line Project

Figure 3-5
Wetlands and Vegetation Communities

Sheet 3 of 4

N

0 250 500 1,000 Feet

1:6,000 1 inch = 500 feet

Wetland Delineation (2011/2012)

Vegetation Communites

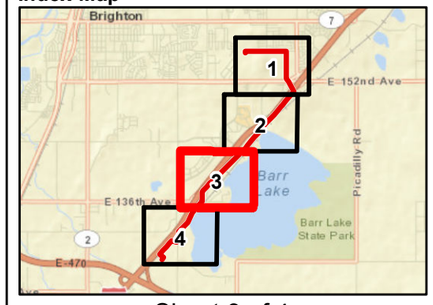
- Ag: Agriculture
- Dis: Disturbed
- Dit: Ditch
- Fal: Fallow
- Wat: Open Water
- Rip: Riparian
- Sgr: Shortgrass
- Shr: Shrub
- Wet: Wetland

Project Facilities

- Substation
- Start/End Point: Distribution Line Underground
- Preferred Route
- Alternative A
- Alternative B
- Existing Tri-State Lines
- Existing Gas Pipeline
- Barr Lake State Park

Imagery: NAIP 2013
Source: Ecosphere 2012, EDM 2012c

Index Map



Sheet 3 of 4

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Bromley-Prairie Center 115kV Transmission Line Project

Figure 3-5
Wetlands and Vegetation Communities

Sheet 4 of 4

N

0 250 500 1,000 Feet

1:6,000 1 inch = 500 feet

Wetland Delineation (2011/2012)

Vegetation Communites

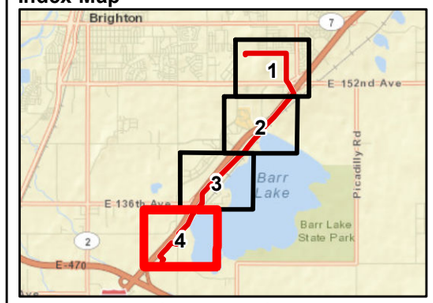
- Ag: Agriculture
- Dis: Disturbed
- Dit: Ditch
- Fal: Fallow
- Wat: Open Water
- Rip: Riparian
- Sgr: Shortgrass
- Shr: Shrub
- Wet: Wetland

Project Facilities

- Substation
- Start/End Point: Distribution Line Underground
- Preferred Route
- Alternative A
- Alternative B
- Existing Tri-State Lines
- Existing Gas Pipeline
- Barr Lake State Park

Imagery: NAIP 2013
Source: Ecosphere 2012, EDM 2012c

Index Map



Sheet 4 of 4

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Barr Lake State Park

Prairie Center Substation

BUCKLEY RD

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Fringe wetlands associated with irrigation ditches were typically 3 to 4 feet wide and bounded both sides of the ditch. Dominant wetland vegetation recorded included broadleaf cattail (*Typha latifolia*), reed canarygrass (*Phalaris arundinacea*), Baltic rush (*Juncus balticus*), curly dock (*Rumex crispus*), and stinging nettle (*Urtica dioica*). Dominant palustrine emergent wetland species observed included reed canarygrass, broadleaf cattail, showy milkweed (*Asclepias speciosa*), cow parsnip (*Heracleum maximum*), common 3-square bulrush (*Schoenoplectus americanus*), hardstem bulrush (*Schoenoplectus acutus*), softstem bulrush (*Schoenoplectus tabernaemontani*), foxtail barley (*Hordeum jubatum*), and Baltic rush. The palustrine forested wetlands included plains cottonwood (*Populus deltoides*), peach-leaf willow (*Salix amygdaloides*), and Russian olive (*Elaeagnus angustifolia*).

The percent of dominant species that were rated obligate, facultative wet, or facultative (USFWS 1996) at wetlands sample points in wetlands associated with the Proposed Action was 100%, fulfilling the hydrophytic vegetation component required for wetland indicators.

Palustrine wetlands delineated along the Proposed Action are fed by a high groundwater table adjacent to Barr Lake and by connections to the irrigation ditches that eventually flow into the adjacent Barr Lake, which is connected to the South Platte River. Wetland W10 is supported by stormwater drainage from an adjacent commercial area. Wetland hydrology was evident in the delineated wetlands and irrigation ditches. Primary hydrologic indicators at the wetland sample point locations included hydrogen sulfide odor, water marks, iron deposits, water stained leaves, and drift deposits. Hydric soil indicators recorded during wetland delineations included low chroma or gleyed matrix, redox dark surface, black organic streaking, mottling, and sulfidic odor.

3.6.2 Alternative A

Wetlands identified along Alternative A are similar in vegetative makeup and hydrological and soils characteristics to those identified for the Proposed Action. Table 3-3 identifies the six palustrine emergent wetlands (two of which contain shrubby components) and three irrigation ditches with wetland fringes that are either crossed by Alternative A or occur within 20 feet of this ROW.

Table 3-3 Wetlands Located in the Vicinity of Alternative A

Site ID	Wetland Type	Habitat Characteristics
W1 (Prairie Center Substation)	Palustrine Emergent Wetland	Tall, dense (80-90% cover) vegetation includes dogbane, reed canarygrass. Site has been modified. Ringed by cottonwood trees.
W2	Irrigation Ditch (Unnamed)	Dense vegetation (90% cover). Manmade ditch.
W3	Irrigation Ditch (branch of the Burlington Ditch)	Tall, dense vegetation (90% cover). Manmade ditch.
W4	Palustrine Emergent Wetland	Wet meadow with dense cover (90%).
W10	Palustrine Emergent Wetland	Drainage ditch associated with commercial development. 80-90% cover. Cattails, sedges. ROW does not cross wetland, but lies within 15 feet.

Table 3-3 Wetlands Located in the Vicinity of Alternative A, continued

Site ID	Wetland Type	Habitat Characteristics
W11	Palustrine Emergent/Shrub Scrub Wetland	Stormwater catchment basin and manmade wetland mitigation site. Includes saplings and shrubby components. Cattails, cottonwood, elm, and coyote willow. ROW does not cross wetland, but lies within 15 feet.
W12	Palustrine Emergent/Shrub Scrub Wetland	Stormwater catchment basin. Dense, tall vegetation includes cattails, willow, and cottonwood saplings.
W13	Irrigation Ditch (Burlington Ditch)	Manmade irrigation ditch; dense vegetation (90% cover).
W14	Palustrine Emergent Wetland	Wet meadow with dense vegetation (90%). Rushes, milkweed, and curly dock.

3.6.3 Alternative B

Wetlands identified along Alternative B also are similar in vegetation, hydrology, and soils characteristics to those identified for Alternative A and the Proposed Action. Table 3-4 identifies the seven palustrine emergent wetlands and three irrigation ditches with wetland fringes that are either crossed by Alternative B or occur within 50 feet of this ROW. Two of the wetlands, W8 and W9, contain forested wetland elements.

Table 3-4 Wetlands Located in the Vicinity of Alternative B

Site ID	Wetland Type	Habitat Characteristics
W1 (Prairie Center Substation)	Palustrine Emergent Wetland	Tall, dense (80-90% cover) vegetation includes dogbane, reed canarygrass. Site has been modified. Ringed by cottonwood trees.
W2	Irrigation Ditch (Unnamed)	Dense vegetation (90% cover). Manmade ditch.
W3	Irrigation Ditch (branch of the Burlington Ditch)	Tall, dense vegetation (90% cover). Manmade ditch.
W4	Palustrine Emergent Wetland	Wet meadow with dense cover (90%).
W7	Palustrine Emergent Wetland	Manmade wetland mitigation site (80% cover). Tall vegetation. Not crossed by ROW, but lies within 20 feet.
W8	Palustrine Forested Wetland	Riparian; vegetation includes cottonwoods (70% cover). Lies within 50 feet of ROW. Limited wetland understory.
W9	Palustrine Forested Wetland	Riparian; vegetation includes cottonwoods (70% cover). Lies within 50 feet of proposed ROW. Limited wetland understory.
W10	Palustrine Emergent Wetland	Drainage ditch associated with commercial development. 80-90% cover. Cattails, sedges. Not crossed by ROW, but lies within 15 feet.
W13	Irrigation Ditch (Burlington Ditch)	Manmade irrigation ditch; dense vegetation (90% cover).

Table 3-4 Wetlands Located in the Vicinity of Alternative B, continued

Site ID	Wetland Type	Habitat Characteristics
W14	Palustrine Emergent Wetland	Wet meadow with dense vegetation (90%). Rushes, milkweed, and curly dock.

3.7 Vegetation Resources

3.7.1 Proposed Action

3.7.1.1 Vegetation

Six vegetative communities were identified during a September 2012 field survey completed for the Proposed Action. These communities are mapped on Figure 3-5 and summarized in Table 3-5.

Table 3-5 Vegetation Communities Recorded Along the Proposed Action

Vegetation Community Type	Habitat Characteristics	Dominant Plant Species	Approximate Cover Density (%)
Disturbed	Roadways, railway grades, buildings, graveled or bulldozed areas, vacant lots with prior ground disturbance.	Weedy species; kochia (*Kochia scoparia*), cheatgrass (*Bromus tectorum*)	20-30
Agriculture	Pastures and hayfields with mixed native and non-native perennial grasses and forbs.	Smooth brome (*Bromus inermis*), timothy (*Phleum spp.*), orchard grass (*Dactylis spp.*), western wheatgrass (*Pascopyrum smithii*), bluegrass (*Poa spp.*) species	60-80
Fallow	Previously farmed agricultural fields that are currently not in use.	Weedy species, such as kochia	20-40
Western Great Plains Shortgrass Prairie	Occurs primarily on flat to rolling uplands with loamy soils ranging from sandy to clayey. Discontinuous herbaceous layer dominated by short perennial grasses. Blue grama grass is the typical dominant species.	Blue grama (*Bouteloua gracilis*), sideoats grama (*Bouteloua curtipendula*), hairy grama (*Bouteloua hirsuta*), needle-and-thread (*Hesperostipa comate*), western wheatgrass, buffalograss (*Bouteloua dactyloides*)	60-70

Table 3-5 Vegetation Communities Recorded Along the Proposed Action, continued

Vegetation Community Type	Habitat Characteristics	Dominant Plant Species	Approximate Cover Density (%)
Great Plains Herbaceous Vegetation Wetland	Part of the Great Plains Wet Meadow, Wet Prairie & Marsh classification. Alluvial soils and periodic, intermediate flooding (every 5 to 25 years). Associated with the Platte River system. Includes forested and wet meadow wetlands.	Cattail, bulrush, Baltic rush, saltgrass (*Distichlis spicata*), foxtail barley, reed canarygrass, spikerush (*Eleocharis spp.)*	70-90
Western Great Plains Riparian Woodland	Less developed floodplains; may dry up completely for some portion of the year. Often groundwater-fed. Dominant vegetation similar to generally drier portions of larger floodplain systems. Overall vegetation abundance is generally low.	Plains cottonwood, willow species, Russian olive	60-80

Source: U.S. National Vegetation Classification 2012

The 5.2-mile-long, 75-foot-wide Proposed Action encompasses approximately 47 acres, of which 5 acres encompass the underground distribution portion, dominated by fallow farm fields, pastureland, and developments that include I-76, residential and commercial areas, and the BNSF Railway ROW. Approximately 72% of the proposed transmission line ROW for the Proposed Action has been previously disturbed, is fallow, or is in agriculture. These estimates include:

- 21 acres (44%) in previously disturbed areas
- 11 acres (23%) in fallow fields, primarily in the area around the Bromley Substation
- 2 acres (5%) associated with agricultural use or hay pastures

Native vegetation that has not been previously disturbed is limited along the Proposed Action, but does occur in small areas scattered within the central and northern portions of the route, generally in association with the western boundaries of Barr Lake State Park. Native vegetation communities found along the Proposed Action include Western Great Plains Shortgrass Prairie, Great Plains Herbaceous Vegetation Wetland, and Western Great Plains Riparian Woodland as described in Table 3-5 and identified on Figure 3-5.

These native community types are designations identified in the U.S. National Vegetation Classification (USNVC) system (USNVC 2012).

An estimated 9.4 acres or 20% of the acreage located within the proposed transmission line alignment of the Proposed Action remains in relatively undisturbed native vegetation communities of Western Great Plains Shortgrass Prairie. These areas are generally found within 500-800 feet of Barr Lake State Park.

Wetlands, irrigation ditches, and riparian areas account for 3.4 acres or 8% of the acreage identified within the Preferred Route alignment that includes Great Plains Herbaceous Vegetation Wetland and Western Great Plains Riparian Woodland. Great Plains Herbaceous Vegetation Wetland areas are associated with Wetlands W1, W2, W3, W4, W4A, W6, W7, and W10, while Western Great Plains Riparian Woodland areas occur within Wetlands W5, W8, and W9 (see Figure 3-5 and Section 3.6 *Wetlands*).

A list of plant species considered noxious in Colorado and in Adams County was obtained from the Colorado Department of Agriculture. The county list included 11 forb species and one tree species (salt cedar or tamarisk). The state list provided annotations for each weed species regarding frequency of occurrence and county and control requirements (Colorado Department of Agriculture 2012).

Noxious weed populations were noted along the Proposed Action during the September 2012 field surveys and included whitetop or hoary cress (*Lepidium draba*) and Canada thistle (*Cirsium arvense*). These species were primarily located in conjunction with wetland and riparian areas and particularly in association with the Bromley-Prairie Center Substation (see Figure 3-5). Both species are classified as Colorado List B Species under the Colorado Noxious Weed Act and are designated by Colorado Department of Agriculture for development and implementation of noxious weed management programs designed to stop the continued spread of these species. Under the Act, both hoary cress and Canada thistle are required to be either eradicated, contained, or suppressed depending on the local infestations (Colorado Department of Agriculture 2012).

Cheatgrass (*Bromus tectorum*), common mullein (*Verbascum thapsus*), and field bindweed (*Convolvulus arvensis*) are also present in the area and are generally ubiquitous along the Proposed Action alignment. These species are designated as a “List C” species on the Colorado Noxious Weed Act list. Due to their ubiquitous nature, the Colorado Department of Agriculture does not recommend complete eradication, but recommends facilitation of effective integrated weed management. Field bindweed and Canada thistle also are identified as noxious species on the Adams County weed list (Colorado Department of Agriculture 2012).

3.7.2 Alternative A

3.7.2.1 Vegetation

The 5.3-mile-long, 75-foot-wide Alternative A encompasses approximately 48 acres. Vegetation community characteristics for Alternative A are generally similar to those identified for the Proposed Action; however, a greater percentage (85%) crosses disturbed areas, fallow fields, or areas previously disturbed by agriculture. These estimates include:

- 23 acres (48%) in fallow fields, typically associated with the pending development of the Bromley-Prairie Center commercial and residential development project

- 15 acres (31%) located within disturbed areas, including roadways, commercial developments, and vacant lots

- 3 acres or 6% in agriculture

Wetlands, riparian areas, and irrigation ditches comprise 2.2 acres or about 4% of the acreage included within the Alternative A alignment. Only 5 acres, or about 10% of Alternative A, are located within undisturbed native vegetation communities of Western Great Plains Shortgrass Prairie. Native grassland areas along this alternative are generally centered on the southern portion of the route (see Figure 3-5).

Weed populations along the alignment of Alternative A are generally similar to those described for the Proposed Action. In addition to cheatgrass, common mullein, Canada thistle, whitetop, and field bindweed, Scotch thistle (*Onopordum acanthium*) also was observed along Alternative A, particularly near Wetland W14 and north of Wetland W11 adjacent to the frontage road (see Figure 3-5). Scotch thistle is designated as a "List B" species in the Colorado Noxious Weed Act list. It is required to be eradicated, contained, or suppressed depending on the local infestations (Colorado Department of Agriculture 2012).

3.7.3 Alternative B

3.7.3.1 Vegetation

The 5.4-mile-long, 75-foot-wide Alternative B encompasses approximately 49 acres. Vegetation found along the Alternative B alignment is generally similar in composition to that identified for the Proposed Action and Alternative A. Fallow fields, disturbed areas, and agricultural fields comprise the greatest percentage (approximately 79%) of vegetative community types associated with this alternative, including:

- 18 acres (36%) in fallow fields, primarily associated with areas located within the pending Bromley-Prairie Center commercial and residential development project

- 18 acres (36%) located within disturbed areas, including roadways, commercial developments, and vacant lots

- 3.2 acres (7%) in agriculture

Wetlands, riparian areas, and irrigation ditches make up 1.5 acres or about 4% of the acreage included within the Alternative B alignment. Section 3.6 provides additional information on wetlands and riparian areas associated with this alternative. Approximately 9 acres (about 18%) of Alternative B are located within undisturbed native vegetation communities of Western Great Plains Shortgrass Prairie. Native grassland areas along this alternative, like those for Alternative A, also are generally centered on the southern portion of the route (see Figure 3-5).

Weed populations identified along the Alternative B alignment are generally similar to those identified for Alternative A and include Scotch thistle, Canada thistle, whitetop, cheatgrass, common mullein, and field bindweed. Weed population locations associated with this alternative were usually associated with wetland and riparian areas and roadside disturbance locations.

3.8 Wildlife Resources

The project area encompasses a mosaic of habitats for area wildlife, ranging from native to disturbed (e.g., commercial, industrial). Disturbed areas primarily encompass existing transportation corridors (e.g., I-76, BNSF Railway, industrial infrastructure), commercial businesses, and services (e.g., hospital facilities), which all limit wildlife use in these areas to more common species tolerant of human use, presence, and noise. The native habitats are primarily associated with the Barr Lake State Park to the east and with smaller, more discrete areas located along the middle and northern portions of the project area. The native plant communities are described in Section 3.7 *Vegetation Resources*. As compared to the more disturbed communities, these small, native areas primarily located adjacent to Barr Lake support a number of more unique wildlife species that use the lake and surrounding habitats.

None of the project alternatives cross water resources that would support aquatic wildlife species. Barr Lake is the closest water feature to the project area and lies to the southeast of all project alternatives. Barr Lake supports a wide variety of amphibians and fish species. The CPW stocks Barr Lake, including species such as channel catfish, smallmouth and largemouth bass, rainbow trout, walleye, bluegill, and wiper (CPW 2006, 2009). Other fish species occurring in Barr Lake include yellow perch, black crappie, and flathead catfish (CPW 2006, 2009).

Terrestrial species found in the upland habitats would include more common species, such as coyote; red fox; a number of small mammals, including black-tailed prairie dog; and common songbirds and raptors (e.g., western meadowlark, house finch, red-tailed hawk, northern harrier). The Barr Lake State Park supports a greater diversity and number of wildlife species yearlong. These include both mule deer and white-tailed deer concentration areas; bald eagle summer and winter use; American white pelican, great blue heron, black-crowned night heron, double-crested cormorants, Canada goose, other waterbird and waterfowl species; nesting raptors; and a number of songbird species.

3.8.1 Proposed Action

The plant communities in the native habitats along the Proposed Action encompass the Western Great Plains Shortgrass Prairie, Great Plains Herbaceous Vegetation Wetland, and the Western Great Plains Riparian Woodland. Other habitat types used by area wildlife include disturbed areas, agricultural fields, and fallow fields, as described in Section 3.7 *Vegetation Resources*.

Both white-tailed deer and mule deer occur in the project area. Figure 3-6 depicts the white-tailed deer concentration and use areas and mule deer concentration, winter range, and use areas (CPW 2013). The Proposed Action travels adjacent to a Mule Deer Concentration Area along the northwest flank of Barr Lake State Park and intersects a small portion of a White-tailed Deer Concentration Area along the southwest portion of the lake. The Proposed Action also intersects with the western perimeter of established Mule Deer Winter Range that surrounds the lake and State Park (Figure 3-6).

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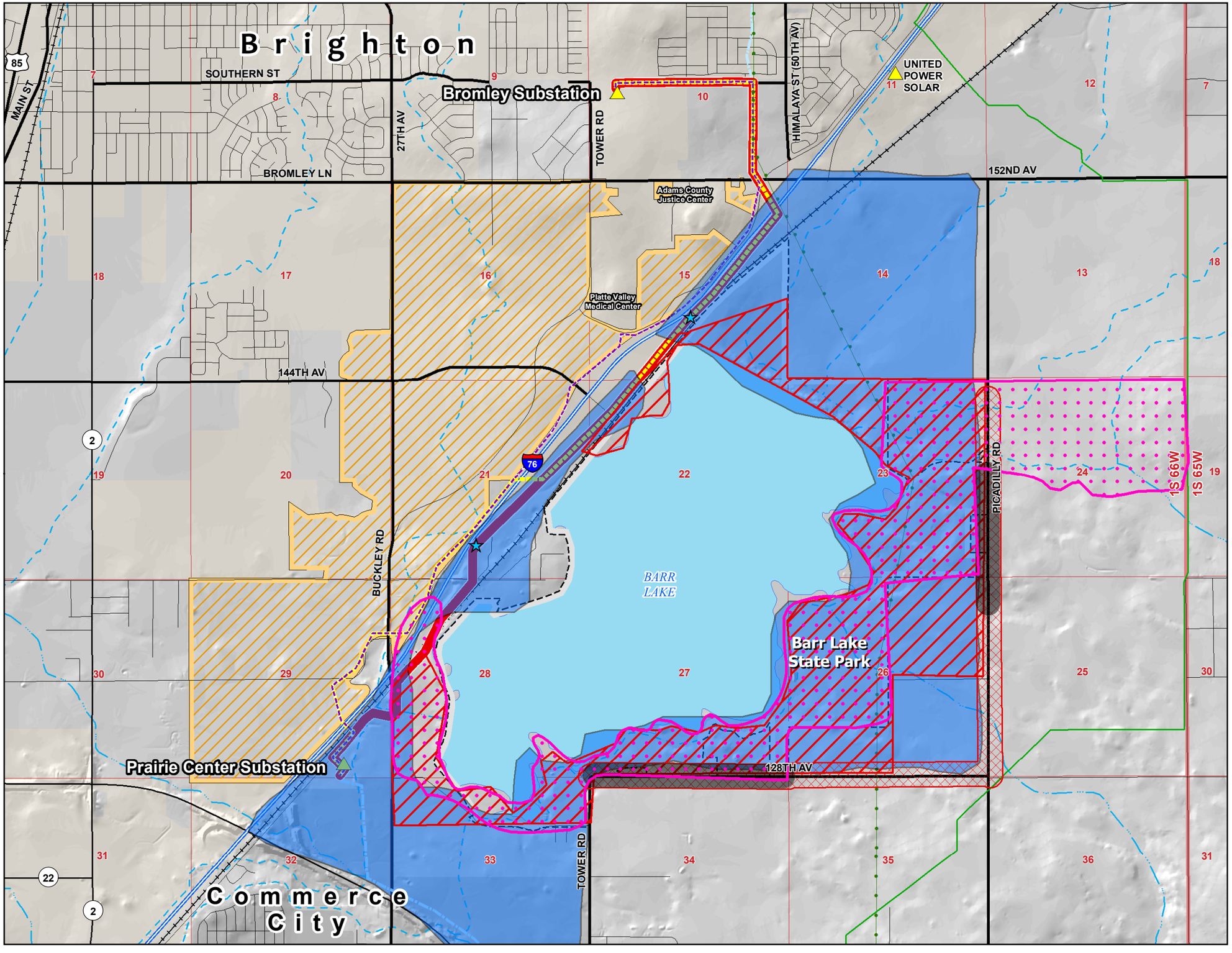
Bromley-Prairie Center 115kV Transmission Line Project

Figure 3-6

Big Game Species



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1 inch = 2,500 feet

N

Project Facilities

- Substation
- Start/End Point: Distribution Line Underground
- Preferred Route
- Alternative A
- Alternative B
- Existing Gas Pipeline
- Existing Tri-State Line

Jurisdiction

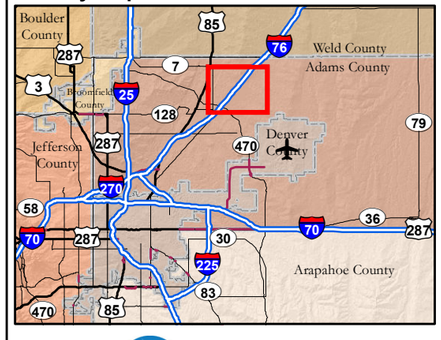
- City of Brighton
- Commerce City
- Barr Lake State Park
- Prairie Center Development

Wildlife

- White-tailed Deer Concentration Area
- White-tailed Deer Highway Crossing
- Mule Deer Highway Crossing
- Mule Deer Concentration Area
- Mule Deer Winter Range

Source: CPW 2013

Vicinity Map



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Although some deer use may occur along the proposed ROW alignment, the primary high-value habitat for area deer is associated with Barr Lake and the State Park to the east.

Figure 3-7 delineates the black-tailed prairie dog colonies mapped September 2012 (Ecosphere 2012). These locations reflect the most current data for these colony boundaries. The Proposed Action intersects or parallels an expanse of colonies located along I-76 and parallel to the BNSF Railway and a small segment near the Bromley Substation. Approximately 50% of the colonies located along the highway and railway corridor are currently intersected by the existing United Power distribution line.

Barr Lake State Park is a recognized Important Bird Area (IBA) by the Rocky Mountain Audubon Society, based on the species diversity, number of species present, and the habitats the area provides to these bird species. Several bird species nest in the Barr Lake area, taking advantage of the natural habitats surrounding the lake. Relative to raptor species (i.e., birds of prey), breeding great horned owls, red-tailed hawks, Swainson's hawks, and bald eagles are known to nest along the lake margin.

Barr Lake State Park provided raptor nest locations for the lake region during the city of Brighton and Adams County public hearings in early 2013. Table 3-6 summarizes the nest locations closest to the project alternatives. Exact raptor nest locations are not shown or mapped in this EA to protect potentially active nest sites during the breeding season. In addition to those nest sites listed in Table 3-6, other raptor nests are associated with Barr Lake State Park, but occur farther from the route along the northern, eastern, and southern reaches of the lake (Barr Lake State Park 2013a, 2013b). The age and recent status of all of these nest sites are unknown and may change annually. Bald eagles are discussed in Section 3.9 *Special Status Species*.

A number of waterbird and waterfowl species also occur along Barr Lake. Figure 3-8 summarizes use areas by waterbird and waterfowl species common to Barr Lake, as recorded by CPW (2013). The Proposed Action alignment parallels the western perimeter of established Canada Goose Production areas and Canada Goose Brood Concentration areas (Table 3-6) (Audubon 2012, Barr Lake State Park 2013a, 2013b) (see Figure 3-8).

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Bromley-Prairie Center 115kV Transmission Line Project

Figure 3-7
Black-tailed Prairie Dog

0 1,250 2,500 5,000 Feet

1:30,000

1 inch = 2,500 feet

N

Project Facilities

- Substation
- Start/End Point: Distribution Line Underground
- Preferred Route
- Alternative A
- Alternative B
- Existing Gas Pipeline
- Existing Tri-State Line

Jurisdiction

- City of Brighton
- Commerce City
- Barr Lake State Park
- Prairie Center Development

Wildlife

- Black-tailed Prairie Dog Colonies

Source: Ecosphere 2012

Vicinity Map

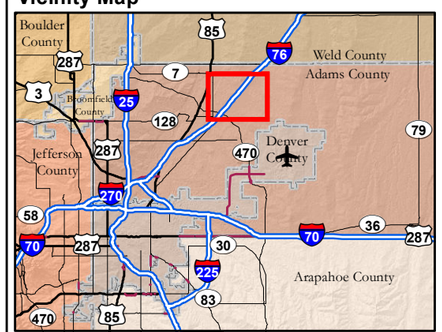

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Table 3-6 Raptor and Waterbird Nesting Comparison among Alternatives

Raptor Species	Number of Nests or Rookeries	Distance to Preferred Route	Distance to Alternative A	Distance to Alternative B
Great Horned Owl	3	250 feet 360 feet 0.4 mile	0.1 mile 0.2 mile 0.5 mile	250 feet 360 feet 0.4 mile
Red-tailed Hawk	2	0.2 mile 0.2 mile	0.3 mile 0.4 mile	0.2 mile 0.3 mile
Swainson's Hawk	1	0.3 mile	0.4 mile	0.4 mile
Canada Goose Production Area	1	Adjacent to and intersects habitat	No intersection	Adjacent to
Canada Goose Brood Concentration Area	1	Adjacent to and intersects habitat	No intersection	Adjacent to
Great Blue Heron Rookery	1	0.2 mile	0.3 mile	0.3 mile
Double-crested Cormorant Rookery	1	0.3 mile	0.5 mile	0.5 mile

3.8.2 Alternative A

Wildlife habitats occurring along Alternative A reflect a higher degree of human use and infrastructure than those occurring along the Preferred Route, with a greater percentage located in disturbed areas, commercial land uses, fallow fields, and other agricultural fields (see Section 3.7 *Vegetation Resources)*.

No aquatic wildlife resources occur in the vicinity of the Alternative A alignment. Terrestrial wildlife resources associated with Alternative A would be similar to those described for the Proposed Action; however, Alternative A is effectively separated by I-76, which decreases the habitat value along this ROW alignment. Distance to raptor nests, waterfowl breeding areas, and waterbird rookeries are summarized in Table 3-6 (Barr Lake State Park 2013a, 2013b).

3.8.3 Alternative B

Alternative B is a compilation of both the Preferred Route and Alternative A. Wildlife habitats intersected by Alternative B are the most similar to those described for Alternative A, with a greater percentage located in disturbed areas, commercial land uses, fallow fields, and other agricultural fields (see Section 3.7 *Vegetation Resources)*. No aquatic wildlife resources occur in the vicinity of the Alternative B alignment. Alternative B would intersect with or parallel a greater degree of mule deer winter range and concentration areas than Alternative A, but a lesser extent than the Preferred Route (Figure 3-6). Distance to raptor nests, waterfowl breeding areas, and waterbird rookeries are summarized in Table 3-6 (Barr Lake State Park 2013a, 2013b).

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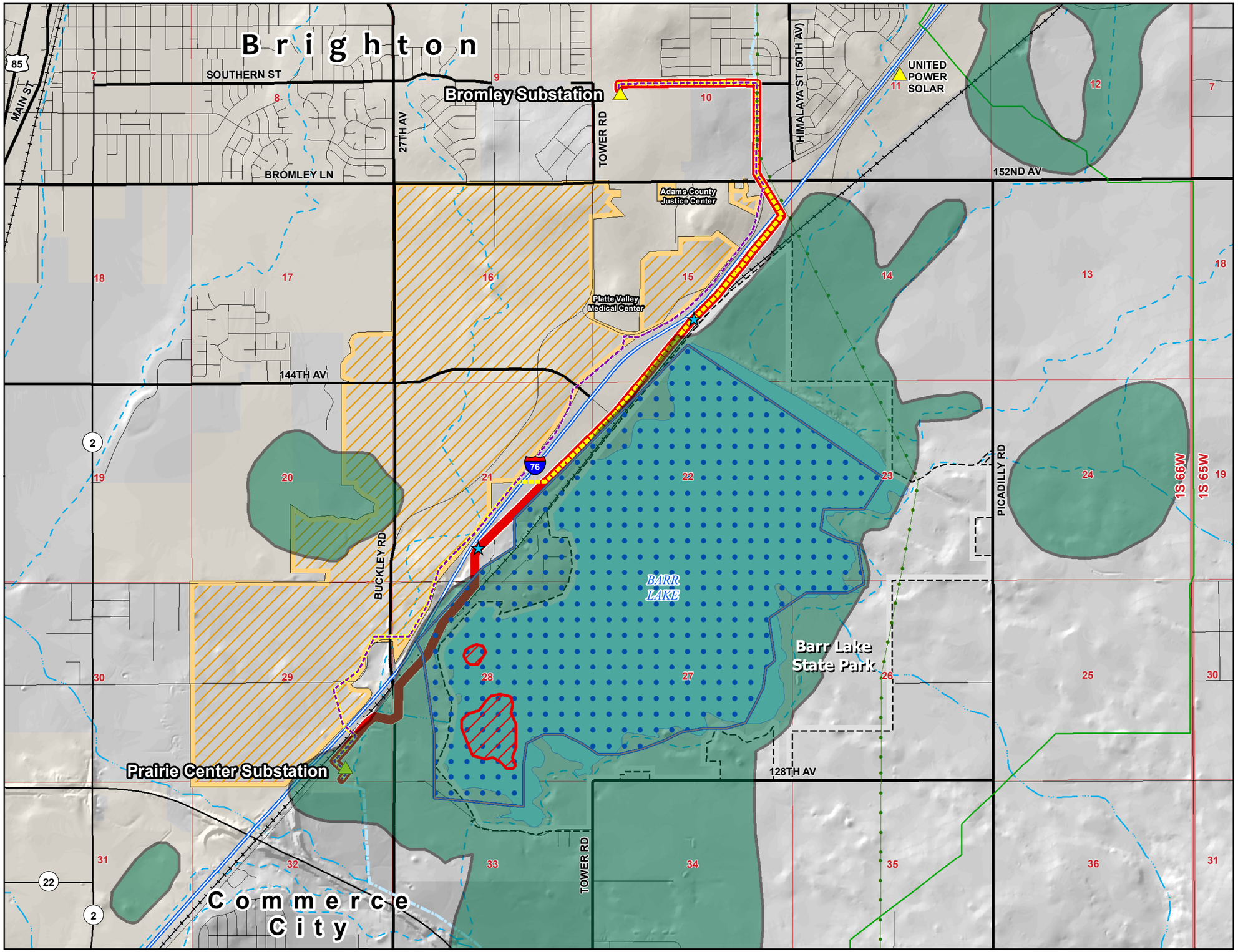
Bromley-Prairie Center 115kV Transmission Line Project

Figure 3-8

Waterbird and Waterfowl Species



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1 inch = 2,500 feet

N

Project Facilities

- Substation
- Start/End Point: Distribution Line Underground
- Preferred Route
- Alternative A
- Alternative B
- Existing Gas Pipeline
- Existing Tri-State Line

Jurisdiction

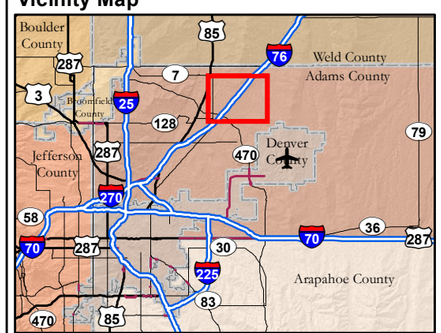
- City of Brighton
- Commerce City
- Barr Lake State Park
- Prairie Center Development

Wildlife

- Heron and Cormorant Rookery
- Canada Goose Brood Concentration
- Canada Goose Production Area

Source: CPW 2013, Barr Lake State Park 2013a, 2013b

Vicinity Map



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3.9 Special Status Species

For purposes of this analysis, special status species include those that are federally listed, state listed, species of special federal or state concern, and those protected under the Bald and Golden Eagle Protection Act (BGEPA). Table 3-7 lists the special status species identified for the proposed Bromley-Prairie Center Project.

Correspondence on federally listed species and species of federal concern was initiated with the USFWS on March 15, 2011 and revisited on June 3, 2011 and October 12, 2012, when the project was more defined, in accordance with section 7 of the Endangered Species Act (ESA). A notice that federal concurrence was pending was received from the USFWS on October 30, 2012 (Misztal 2012), and the final procedural concurrence documentation was received on November 8, 2012. The final USFWS concurrence for federally listed plants was received on August 27, 2013. This federal documentation is contained in Appendix D.

State correspondence pertaining to a request for species information and habitat concerns was received from the Colorado Division of Wildlife (now Colorado Parks and Wildlife [CPW]) on July 21, 2004 with a follow-up confirmation letter sent to the CPW on January 18, 2010. The State replied on February 8, 2010 with information pertaining to sensitive species in the Barr Lake area. This state documentation is contained in Appendix D.

Table 3-7 Special Status Species Identified for Proposed Project

Group	Common Name	Scientific Name	Federal Status	State Status
Birds	Least tern (interior population)	*Sterna antillarum*	Endangered MBTA	Endangered
	Piping Plover	*Charadrius melodus*	Threatened MBTA	Threatened
	Burrowing owl	*Athene cunicularia*	MBTA	Threatened
	Bald Eagle	*Haliaeetus leucocephalus*	BGEPA MBTA	State Species of Special Concern Threatened
Flowering Plants	Ute ladies'-tresses	*Spiranthes diluvialis*	Threatened – ESA	—
	Colorado butterfly plant	*Gaura neomexicana*	Threatened – ESA	—
Mammals	Preble's meadow jumping mouse	*Zapus hudsonius preblei*	Threatened - ESA	Threatened

MBTA=Migratory Bird Treaty Act
BGEPA=Bald and Golden Eagle Protection Act
ESA=Endangered Species Act

3.9.1 Proposed Action

3.9.1.1 Plants

Based on informal consultation with the USFWS and habitat evaluations completed in September 2012, two special status plant species, Ute ladies'-tresses orchid (*Spiranthes diluvialis*) and the Colorado butterfly plant (*Gaura neomexicana*), were identified as potentially occurring in suitable habitat in the Proposed Action area. Both the Ute ladies'-tresses orchid and Colorado butterfly plant are federally listed threatened plant species associated with floodplains and wet meadows.

The Ute ladies'-tresses orchid typically blooms from late July through August, with the main blooming season typically ending around mid-August along the Front Range of Colorado (Reidel 2012). Depending on population locations and climatic conditions, it may bloom in early July or still be in flower as late as early October. The USFWS protocol indicates that surveys for the orchid can be conducted only until August 31 unless it can be identified that populations are still blooming in the region. This orchid is endemic to sub-irrigated alluvial soils along streams, open wet meadows in floodplains, moist soils near wetland meadows, springs, lakes, and perennial streams where it colonizes early successional point bars or sandy edges. The elevation range for this species is typically 4,200 to 7,000 feet above sea level. Ute ladies'-tresses orchid generally occurs in fine silt/sand, gravels and cobbles, and highly organic and peaty soil types. It is not commonly found in clay soils or in extremely saline or alkaline soils. It is also primarily found in areas where vegetation is open and relatively short, without dense vegetative cover (USFWS 2012). The species is not tolerant of long-term standing water and would not successfully compete with species that form tall, dense monocultures, such as cattails (*Typha spp*.) and reed canarygrass (*Phalaroides arundinacea).* It rarely occurs in deep shade, preferring open glades or wet pastures and meadows in full sunlight (USFWS 2012).

The Colorado butterfly plant is a short-lived perennial species endemic to moist soils in wet meadows of floodplain areas. These plants are often found on low, alluvial ridges at the interface with wet meadows and drier upland grasslands, in low depressions, or along bends in wide, meandering stream channels upslope of the actual channel. It occurs at elevations ranging from 5,000 to 6,400 feet above sea level (USFWS 2000). Habitat for the Colorado butterfly plant is typically open, without dense or overgrown vegetation. It is found on soils derived from conglomerates, sandstones, mudstones and siltstones of the Tertiary White River, Arikaree, and Ogallala Formations. The blooming period for this species is generally from June through September (USFWS 2012, Spackman et al. 1997).

Wetland areas identified during previous wetland delineations completed in the Proposed Action area (EDM 2012c) were evaluated in September 2012 for habitat suitability for both Ute ladies'-tresses orchid and Colorado butterfly plant (USFWS 2012). Input from local orchid experts, regarding whether plant populations could still be blooming for both plant species at the time of the surveys, was still pending at the time the plant habitat studies were conducted on September 3, 2012. Given the limited survey window for these species, the decision was made to complete 100% pedestrian presence/absence surveys in suitable habitat within the Proposed Action area at the time of the habitat studies (Ecosphere 2012).

Suitable habitat for the orchid and butterfly plant species was identified in Wetlands W4 and W4A located along the Proposed Action (see Figure 3-5 for wetland locations). These two sites included open wet meadows with vegetation species typically associated with these sensitive

plants, such as milkweed and verbena. No Ute ladies'-tresses orchids or Colorado butterfly plants were observed at either of these locations at the time of the September 2012 survey. However, observations made during the surveys and responses received after the studies from local botanists familiar with the orchid and butterfly plant indicated that drought conditions, occurring along the Front Range at the time of the survey, may have affected growth and blooming success for these species (Reidel 2012, Strouse 2012). Because of this, species' absence in the surveyed areas in the Proposed Action area could not be confirmed for either the Ute ladies'-tresses orchid or the Colorado butterfly plant in 2012.

Per EPM T&E-1, Tri-State contracted with a qualified botanist to conduct sensitive species surveys for the federally listed Ute ladies'-tresses orchid and Colorado butterfly plant in two wetlands along the Proposed Action (Wetlands W4 and W4-A), which contained suitable habitat in the project area. Because of the drought in 2012, species' absence in these wetland areas could not be confirmed for either the Ute ladies'-tresses orchid or the Colorado butterfly plant during the 2012 field surveys. Therefore, additional presence/absence surveys were conducted in 2013. These field surveys were completed in August, which coincided with the appropriate local blooming periods for these two plant species (i.e., late July to early August for the orchid and June through September for the butterfly plant). Neither species was recorded during the August 2013 surveys (EDM 2013). Because of the no finding and the minimal impact expected to the potentially suitable habitat, further sensitive plant surveys are not recommended for the Proposed Action. Final USFWS concurrence documentation stating "No Concerns" was received on August 27, 2013 (see Appendix D).

3.9.1.2 Animals

Habitat screening to determine which special status wildlife species would likely occur in or near the project area was based on data and communication with the USFWS, CPW, and habitat reviews conducted in the field.

Those species identified as having suitable habitat across the range of project alternatives include:

- Preble's meadow jumping mouse (*Zapus hudsonius preblei*)
- Interior population of the Least Tern (*Sternula antillarum*)
- Great Plains population of the piping plover (*Charadrius melodus*)
- Western burrowing owl (*Athene cunicularia*)
- Bald eagle (*Haliaeetus leucocephalus*)

3.9.1.2.1 Preble's Meadow Jumping Mouse (Federally and State Threatened)

The Preble's meadow jumping mouse occurs only along the Front Range from Wyoming to Colorado Springs, including known occurrences in Weld County, Elbert County, and north-central El Paso County. Suitable habitat includes multi-storied riparian vegetation often adjacent to relatively undisturbed grassland communities and a water source. Critical habitat was designated for the Preble's meadow jumping mouse in 2010, but no critical habitat was designated within Adams County. Habitat in the project area is marginal and there are no records of this species occurring in the Barr Lake area.

Based on the historical occurrence reviews, habitat types in the project area, and discussions with the USFWS in the Lakewood, Colorado Ecological Services Office (Plage 2012, pers.

comm.), it was determined the Preble's meadow jumping mouse would not occur in the project area.

3.9.1.2.2 Least Tern (Federally and State Endangered)

The interior least tern is a casual nonbreeding summer visitor and casual to very rare spring and fall migrant on the northeastern plains (Andrews and Righter 1992). The least tern is listed as a very rare migrant in the Barr Lake State Park area (Barr Lake State Park 1998). Although the flat, barren, and sandy lake shoreline would provide suitable habitat for this bird species, the species does not nest in this area of Colorado (Nelson 1998). Any occurrences of the least tern in the project area would be incidental during migration (Plage 2012, pers. comm.)

3.9.1.2.3 Piping Plover (Federally and State Threatened)

The piping plover also is listed as a very rare migrant on the eastern plains (Andrews and Righter 1992). This bird commonly uses shorelines around small lakes, large reservoir beaches, river islands, sand pits, and beaches on large lakes for breeding. However, this bird species does not nest in this area of Colorado and may only occur rarely during migration (Nelson 1998). Any occurrences of the piping plover in the project area would be incidental during migration (Plage 2012, pers. comm.)

3.9.1.2.4 Western Burrowing Owl (State Threatened)

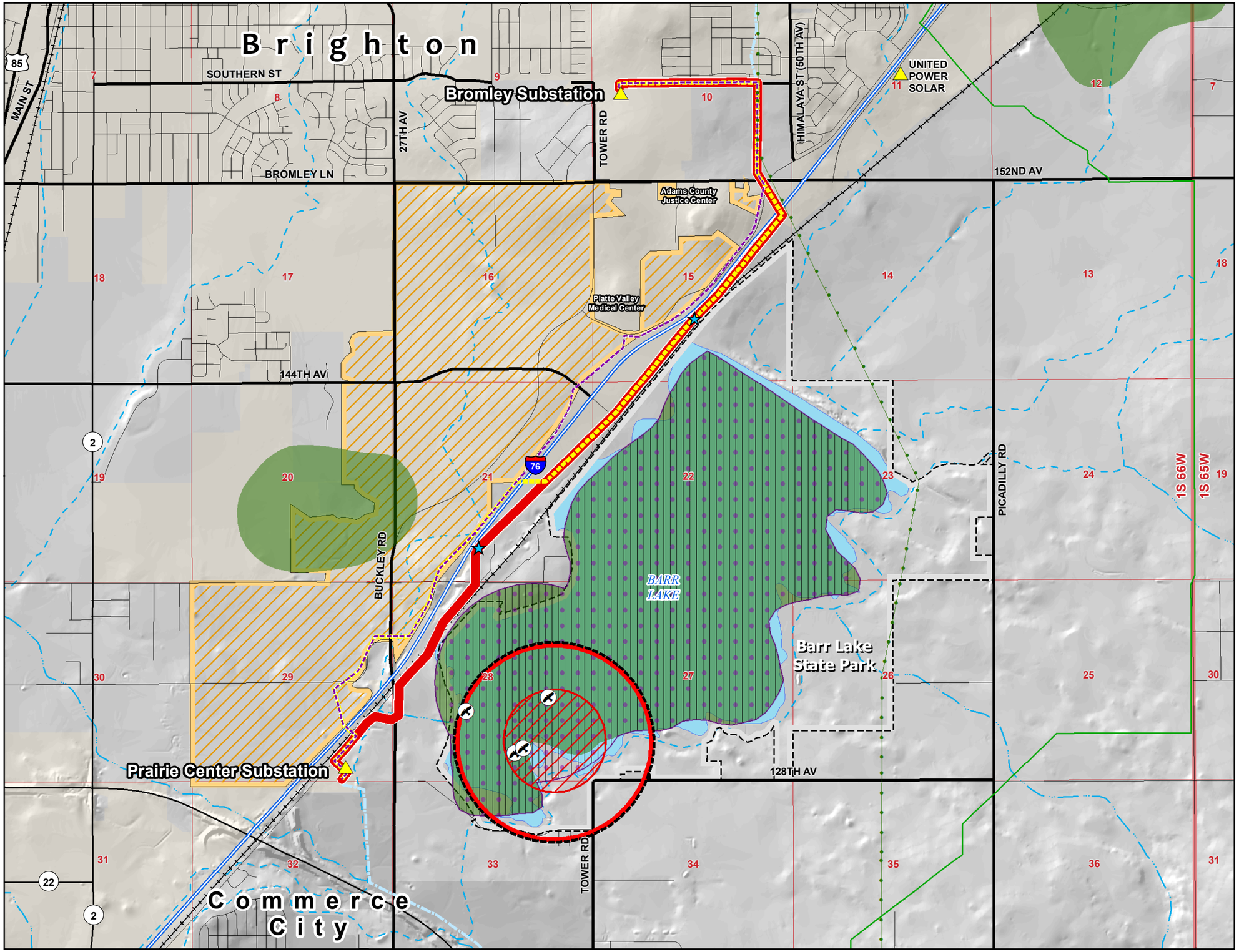
Review of habitat types and the CPW State Threatened and Endangered Species List indicated the state-threatened burrowing owl has suitable habitat in the project area, and one individual was documented in 2007. Figure 3-7 depicts the locations of the black-tailed prairie dog colonies mapped along the Proposed Action (EDM 2007). Although the state-listed burrowing owl is typically associated with prairie dog colonies and is known to occur within the boundaries of the Barr Lake State Park (CPW 2013), the level of human activity, traffic, and proximity to commercial infrastructure would reduce the chance of nesting burrowing owls occupying the prairie dog colonies located along the I-76 corridor. However, during the 2007 field surveys (EDM 2007), one burrowing owl was documented in a prairie dog colony near the Bromley Substation. No nest burrow was recorded at that time.

3.9.1.2.5 Bald Eagle (Federally Protected under BGEPA, State Species of Concern)

The bald eagle is protected under the federal MBTA and BGEPA and is a state species of concern in Colorado. The bald eagle is known to nest and roost at Barr Lake State Park (see Appendix D). Specifically, Barr Lake supports a number of wintering bald eagles, and breeding eagles have nested along the southern end of the lake since the mid-1980s, fledging over 40 eaglets. Figure 3-9 summarizes bald eagle use areas associated with Barr Lake (CPW 2013; G. Craig pers. comm. 2013; Barr Lake State Park 2013a, 2013b).

Bromley-Prairie Center 115kV Transmission Line Project

Figure 3-9
Bald Eagle



0 1,250 2,500 5,000 Feet

1:30,000

1 inch = 2,500 feet

N

Project Facilities

- Substation
- Start/End Point: Distribution Line Underground
- Preferred Route
- Alternative A
- Alternative B
- Existing Gas Pipeline
- Existing Tri-State Line

Jurisdiction

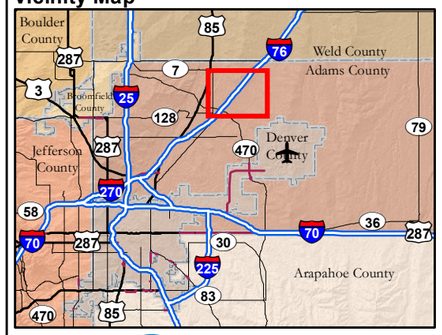
- City of Brighton
- Commerce City
- Barr Lake State Park
- Prairie Center Development

Wildlife

- Bald Eagle Historic Nest Sites (prior to 2003)
- Bald Eagle Active Nest (2003-2013) (0.5-mile buffer)
- Bald Eagle Winter Roost (0.25-mile buffer)
- Bald Eagle Summer Forage
- Bald Eagle Winter Concentration
- Bald Eagle Winter Forage and Winter Range

Source: CPW 2013, G. Craig 2013, Barr Lake State Park 2013a, 2013b

Vicinity Map



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The Proposed Action parallels but does not intersect any bald eagle seasonal ranges or their associated buffer areas. Figure 3-5 depicts the Proposed Action location relative to designated Bald Eagle Summer Forage, Winter Concentration, and Winter Forage and Winter Range areas. As shown, the Proposed Action alignment also is located outside the 0.25-mile buffer surrounding the eagle winter roost site at Barr Lake and outside the 0.5-mile buffer surrounding the eagle nest site that has been active from 2003 through 2013 (CPW 2013, G. Craig pers. comm. 2013).

Historically, bald eagles have nested along the southern end of Barr Lake. Although Figure 3-9 depicts a number of historic nest sites, the following is the status of these sites provided by G. Craig (pers. comm. 2013):

- Nest tree used in 1989-91, 1996, 1998, and 1999; nest tree subsequently fell
- Nest tree used in 1992, 1994, and 1995; nest tree subsequently fell
- Nest tree used in 1993 fell
- Nest used in 2000-02 disintegrated and nest tree ultimately fell
- Nest used from 2003-2013 is the only active bald eagle nest in this area and is located in an artificial nest basket. It is likely the pair of eagles will continue to use this site as long as the artificial support is secure in the tree (G. Craig pers. comm. 2013).

Typically, eagle use would be concentrated on the lake and its associated aquatic and upland habitats. However, some eagles move between Barr Lake and the Bald Eagle Winter Forage and Winter Range located to the west of the project area (see Figure 3-9). The nesting season may begin as early as mid- to late October, when bald eagles begin to establish their nesting territory and perform maintenance on their nest, which they re-use from year to year. The wintering season extends from November 15 through March 15.

3.9.2 Alternative A

3.9.2.1 Plants

Special status plant species potentially associated with Alternative A are similar to those discussed for the Proposed Action. Wetlands W4 and W14 located along the Alternative A alignment are identified as containing suitable habitat for the Ute ladies'-tresses orchid and the Colorado butterfly plant (see Figure 3-5). As discussed for the Proposed Action, species' absence for the Ute ladies'-tresses orchid and the Colorado butterfly plant could not be confirmed during the September 2012 surveys, because of regional drought conditions. However, neither species was observed during follow-up presence/absence surveys in August 2013 at Wetland W4. A "No Concerns" determination was issued by the USFWS on August 27, 2013 (see Appendix D) for Wetland W4. Presence/absence species surveys were not conducted within Wetland W14. Although Tri-State plans to span Wetland W14, one structure would be placed on the edge of its boundaries. Presence/absence surveys would be recommended prior to any disturbance activity (see EPM T&E-1).

3.9.2.2 Animals

Figure 3-7 depicts the locations of the black-tailed prairie dog colonies mapped along Alternative A (EDM 2007). Black-tailed prairie dog colonies shown on Figure 3-7 may provide habitat for the burrowing owl. The burrowing owl documented in 2007 in the vicinity of the Bromley Substation is the same vicinity of both Alternative A and the Proposed Action. The Alternative A alignment is located outside the 0.25-mile buffer surrounding the bald eagle winter roost site and outside the 0.5-mile buffer surrounding the eagle nest site that has been active from 2003 through 2013 (CPW 2013, G. Craig pers. comm. 2013). Alternative A is located west of I-76 and, therefore, closer to the bald eagle winter forage and winter range located west of Buckley Road (see Figure 3-9).

3.9.3 Alternative B

3.9.3.1 Plants

Baseline data regarding special status plant species along the Alternative B alignment is identical to that identified for Alternative A. Wetlands W4 and W14 located along the Alternative A and B alignments are identified as containing suitable habitat for the Ute ladies'-tresses orchid and the Colorado butterfly plant (see Figure 3-5). As discussed for the Proposed Action, species' absence for the Ute ladies'-tresses orchid and the Colorado butterfly plant could not be confirmed during the September 2012 surveys, because of regional drought conditions. Surveys were conducted again in 2013 for the Proposed Action. Neither species was observed during follow-up presence/absence surveys in August 2013 at Wetland W4. If Alternatives A or B are selected an additional survey would be completed for Wetland W14. If either species is found, RUS would re-initiate consultation with the USFWS.

A "No Concerns" determination was issued by the USFWS on August 27, 2013 (see Appendix D) for Wetland W4.

3.9.3.2 Animals

Figure 3-7 depicts the locations of the black-tailed prairie dog colonies mapped along Alternative B (EDM 2007). The proximity of the 2007 documented occurrence of a burrowing owl in the vicinity of the Bromley Substation would be the same as for the Proposed Action. The Alternative B alignment relative to bald eagle use areas would be the same as the Proposed Action for both the Summer Forage and Winter Forage and Winter Range seasonal habitats located along the northern portion of the route, and it would be the same as Alternative A relative to the bald eagle winter roost and nesting associated with the southern portion of Barr Lake. Specifically, Alternative B is located outside the 0.25-mile buffer surrounding the bald eagle winter roost site and outside the 0.5-mile buffer surrounding the eagle nest site that has been active from 2003 through 2013 (CPW 2013, G. Craig pers. comm. 2013). Alternative B also is located west of I-76 and, therefore, closer to the bald eagle winter forage and winter range located west of Buckley Road (see Figure 3-9), as compared to the Proposed Action (see Figure 3-9).

3.10 Cultural Resources

A file search (Class I cultural resource investigation) was conducted through the Colorado Historic Society/Office of Archaeology and Historical Preservation (OAHP) Compass online

database on February 28, 2011. The area of interest reviewed in the Class I cultural resource investigation includes all sections crossed by the preferred and alternative routes, and all sections within 1 mile of the preferred and alternative routes.

The Compass database includes records of all archaeological investigations that have been conducted and all cultural resources (prehistoric and historic archaeological sites) that have been recorded previously in the project area. Included are records of National Register of Historic Places (NRHP) properties. The Bureau of Land Management General Land Office (GLO) records also were reviewed to determine if vestiges of trails, transportation routes, homesteads, or other resources may be present.

The Class I research revealed that 14 prior investigations have been undertaken within the project section boundaries and 36 cultural resources (8 prehistoric and 28 historic) have been recorded. The previous investigations consist primarily of Class III inventories (intensive pedestrian surveys) for a variety of proposed projects, including linear surveys for E-470 construction, transmission lines, road widening and maintenance, and pipelines. It should be noted that while a number of investigations have been conducted, there also are large portions of the Class I study area where no prior surveys had been completed.

Sites are locations of past human activity exhibiting clusters or scatters or artifacts (usually five or more) and may include one or more features, defined as fixed facilities or structures such as hearths, stone circles, buildings, and ditches. Isolated finds (IFs) represent short-term activity and consist of individual or small clusters of artifacts with no associated features. A site is considered to be “eligible” if it meets one or more of the four eligibility criteria of the NRHP and also exhibits integrity of location, design, setting, materials, workmanship, feeling, and association.

Of the 36 previously recorded cultural resources located within or near the project area, seven are prehistoric IFs. All of the IFs (5AM615 through 5AM620 and 5AM395), with the exception of 5AM395, have not been assessed for NRHP eligibility. However, IFs are generally considered not eligible because they rarely contribute important archaeological or historical information. IF 5AM395 is assessed as “field not eligible,” meaning it was assessed by the recorder in the field as not NRHP-eligible. The lone prehistoric site (5AM614) consists of an open lithic scatter and is assessed as “officially not eligible,” meaning the site has been determined by the Colorado State Historic Preservation Office (SHPO) to be not eligible for the NRHP

The remaining 28 previously recorded cultural resources consist of historic homesteads, canals and ditches, railways, bridges, and farms. Several of the sites in this group have been determined “officially eligible” for the NRHP by the Colorado SHPO or are assessed as “field eligible” (assessed by the recorder as NRHP-eligible but lacking an official determination) or “officially needs data” (regarded by the SHPO as unevaluated with respect to NRHP eligibility). These sites are listed in Table 3-8. No sites were identified that are listed on the NRHP. One site, the Emil Bruderlin Homestead (also referred to as the Bruderlin Stone House, and currently the offices of the Rocky Mountain Bird Observatory (RMBO) at Barr Lake State Park), has been determined “officially eligible” for the NRHP and is listed on the State Register of Historic Places.

Table 3-8 NRHP- Eligible and Potentially Eligible Sites in the Project Vicinity

Site	Time Period	Site Type and/or Site Name	NRHP Eligibility
5AM62	Historic	Water control feature	Field eligible
5AM140	Historic	Emil Bruderlin Homestead	Officially eligible; listed on State Register of Historic Places
5AM465.10	Historic	Burlington Ditch segment	Officially eligible
5AM465.2	Historic	Burlington Ditch segment	Officially eligible
5AM465.3	Historic	Burlington Ditch segment	Field eligible; within potential NRHP District
5AM1453.1	Historic	Beebe Seep Canal	Officially needs data
5AM477.1	Historic	O'Brian Canal segment	Officially eligible
5AM477.11	Historic	O'Brian Canal segment	Officially eligible
5AM477.2	Historic	O'Brian Canal segment	Officially eligible
5AM515	Historic	Speer Canal segment	Officially eligible
5AM517	Historic	Denver Hudson Canal segment	Officially eligible

The Area of Potential Effect (APE) is defined as a corridor 100 feet wide, or 50 feet to either side of the Preferred Route centerline. A Class III inventory of the APE was conducted in April 2012. The area surveyed totaled 53.68 acres. The inventory resulted in the identification of four historic sites (5AM139, 5AM464.18, 5AM465.15, 5AM2827) and one historic IF (5AM.2828). No prehistoric cultural resources were found.

The sites consist of a schoolhouse, a railway segment, ditch segment, and trash scatter; the IF is an abandoned plow remnant. Site 5AM139 had been recorded previously, while the remaining sites and the IF are newly recorded. Cultural resources identified as a result of the Class III inventory are listed in Table 3-9. Two of the sites (5AM139 and 5AM2827) and the single IF (5AM2828) are assessed as not eligible for inclusion in the NRHP based on one or more factors including absence of integrity, limited potential to yield subsurface cultural materials that would contribute substantially to an understanding of the region's history, and limited contribution to the economic development of the greater Platte River drainage basin of Colorado. Site 5AM464.18, a segment of the BNSF Railway, is assessed as eligible for inclusion on the NRHP under Criterion A because of its important contribution to transportation and settlement within Adams County. Site 5AM.465.15, a segment of the Burlington Ditch, is assessed as eligible under Criterion A as an excellent example of an early historic agricultural water conveyance system that contributed to the economic development and growth of the region.

Table 3-9 Class III Inventory Results: Cultural Resources Recorded for Proposed Project

Site	Time Period	Site Type	NRHP Eligibility (Field Assessment)
5AM139	Historic	Barr City Schoolhouse	Field Not Eligible
5AM464.18	Historic	BNSF Railway segment	Field Eligible
5AM465.15	Historic	Burlington Ditch segment	Field Eligible
5AM2827	Historic	Trash scatter	Field Not Eligible
5AM2828	Historic	Isolated Find (plow)	Field Not Eligible

3.10.1 Proposed Action

Four sites fall within the APE of the Proposed Action. Sites 5AM 464.18 (BNSF Railway segment), 5AM465.15 (Burlington Ditch segment), and 5AM2827 (trash scatter) would be spanned by the proposed transmission line. Site 5AM139 (Barr City Schoolhouse) is bisected by the APE boundary but would not be crossed by the line. The BNSF Railway segment has been assessed as "field eligible" for the NRHP. The Burlington Ditch has been determined "officially eligible" for NRHP listing, and segment 5AM465.15 is assessed as "field eligible." Segment 5AM465.15 lies adjacent to (and also would be spanned by) the Preferred Route. The Preferred Route would be located 700 feet northwest (at its closest point) of site 5AM140, the Emil Bruderlin Homestead, a State Register-listed and NRHP "officially eligible" site that occurs within Barr Lake State Park. The proposed burial of United Power's existing distribution line is assumed to fall within the surveyed APE of the 115-kV Preferred Route. No cultural resources were recorded along this segment of the Preferred Route (see Figure 1-1).

3.10.2 Alternative A

Alternative A would parallel and cross site 5AM465.15, the Burlington Ditch segment, at the same location as the Preferred Route, and would cross an unrecorded segment of 5AM464, the BNSF Railway. It is possible the route also would cross site 5AM1458, a previously recorded historic farmstead that has been determined "officially not eligible" for the NRHP. However, Alternative A was not examined by a Class III inventory in its entirety, and the exact location of the site with respect to the alternative route has not been ascertained. No other sites are known to occur in the immediate vicinity of Alternative A. Alternative A would be located 1,000 feet northwest of site 5AM140, the Emil Bruderlin Homestead.

3.10.3 Alternative B

Alternative B would parallel and cross site 5AM465.15, the Burlington Ditch segment, at the same location as the Preferred Route, and would cross an unrecorded segment of 5AM464, the BNSF Railway. No other sites are known to occur in the immediate vicinity of Alternative B, although this route was not subjected to Class III inventory in its entirety. Alternative B would follow the Preferred Route where it passes 5AM140, the Emil Bruderlin Homestead, and would therefore be located 700 feet northwest (at its closest point) from that site.

3.11 Transportation

3.11.1 Proposed Action

3.11.1.1 Aviation Facilities

There are two aviation facilities in the proposed project ara: the Platte Valley Medical Center heliport and the Brighton Van Aire Estates Airport.

The Platte Valley Medical Center heliport is located in the northeast corner of the hospital property (see Figure 1-1). The alignment of the Proposed Action is located 2,125 feet southeast of the helipad at its nearest point. While privately owned, the heliport has been officially registered with the Federal Aviation Administration (FAA) as a heliport within the National Airspace System. For heliports in the National Airspace System, and for purposes of notification, the FAA has created an obstacle identification surface, which extends at a radius of

5,000 feet from a heliport take off area. Because the preferred and alternative routes are located in close proximity to the heliport, Tri-State commissioned a height limitation study (JViation 2012) to assess the maximum allowable heights of transmission structures along the preferred and alternative routes. The study concluded that structures along the Proposed Action must be less than 278 feet tall to remain clear of any departure/arrival surface of the hospital heliport.

The Brighton Van Aire Estates Airport is a privately-owned, privately-operated airstrip associated with a fly-in neighborhood east-northeast of the project area (see the project vicinity map [Figure 4-4 in Chapter 4.0]). The airport runway is located 2.5 miles east of the nearest point on the transmission line route, which is on Southern Street where all three action alternatives would turn south. The runway is oriented northwest-southeast (heading 12/30) between 160th Street and 156th Street. The traffic pattern for the airport is northeast of the runway.

3.11.1.2 Roads and Railways

I-76 and the BNSF Railway form a major transportation corridor through the project area that runs northeast to southwest, connecting the Denver metro area to rural communities in the northeast portion of the state. Local streets and roads cross I-76 or are located adjacent to it, forming a section line grid pattern with infill streets, depending on the state of development. Local roads on the west side of I-76 primarily serve commercial and service centers and residential areas. Local roads on the east side of I-76 primarily serve local residents, farms, and Barr Lake State Park. There are grade-separated diamond interchanges with I-76 on 1-mile spacing at Bromley Lane (152nd Avenue), considered a “gateway” to the city of Brighton, 144th Avenue and 136th Avenue.

The Preferred Route is located between two existing linear transportation features: I-76 and the BNSF Railway, for approximately half of its length (2.7 miles). The Preferred Route would be located adjacent to Southern Street, I-76, Lark Bunting Lane, Telluride Street, Buckley Road, and Cameron Drive for most of its length. The Preferred Route would cross Bromley Lane, North Frontage Road, I-76, Eagle Boulevard, East 136th Avenue, and Buckley Road (see Appendix C).

The Preferred Route would be located adjacent to the I-76 ROW, but not within the ROW except where it crosses I-76, just south of the Bromley Lane interchange. A Utility/Special Use Permit from CDOT would be required for this crossing.

The Preferred Route would be located on the northwest side of the BNSF Railway for the majority of its length, crossing to the southeast side of the railway between East 136th Avenue and Buckley Road. A Wire Line Crossing or Longitudinal permit from the BNSF Railway would be required for this crossing.

Average annual daily traffic volumes on I-76 range from 29,000 vehicles per day (vpd) to 30,000 vpd through the area where the proposed transmission line would parallel the interstate highway (CDOT 2013).

3.11.2 Alternative A

3.11.2.1 Aviation Facilities

Potentially affected transportation facilities would be essentially the same for Alternative A as for the Proposed Action (i.e., Preferred Route). Because of its location on the northwest side of the interstate highway, Alternative A would be the closest alternative to the Platte Valley Medical Center heliport at a distance of approximately 1,700 feet. At this distance, the tallest structures associated with Alternative A would be limited to not more than 217 feet tall to remain clear of any departure/arrival surfaces associated with the heliport (JViation 2012).

3.11.2.2 Roads and Railways

Alternative A would be located adjacent to the northwest boundary of the I-76 ROW for over 3 miles of its length, crossing I-76 and the BNSF Railway half way between 132nd Avenue and the Prairie Center Substation. A Utility/Special Use Permit from CDOT and a Wire Line Crossing or Longitudinal permit from the BNSF Railway would be required for this crossing.

3.11.3 Alternative B

3.11.3.1 3.11.3.1 Aviation Facilities

Potentially affected transportation facilities would be essentially the same for Alternative B as for the Proposed Action and Alternative A. Because of its location between I-76 and the BNSF Railway, Alternative B would be in the same location as the Proposed Action at its closest point to the Platte Valley Medical Center heliport. Consequently, the tallest structures associated with Alternative B would be restricted to the same 278-foot-tall limit as the Proposed Action (JViation 2012).

3.11.3.2 Roads and Railways

Alternative B would be located similarly to the Proposed Action for most of its length and similarly to Alternative A for the remainder of its length. It would cross I-76 three times and the railway once, needing three Utility/Special Use Permits from the CDOT and one Wire Line Crossing or Longitudinal permit from the BNSF Railway.

3.12 Land Use

The proposed Bromley-Prairie Center Project would be located partially in the city of Brighton and partially in unincorporated Adams County, Colorado. In general terms, the transmission line would follow a major transportation corridor containing I-76 and the BNSF Railway for approximately three-quarters of its 5.2- to 5.4-mile length (i.e., depending on the alternative). Current land use activities are regulated by the Adams County Development Standards and Regulations (Adams County 2007) and by the Brighton Land Use and Development Code (Brighton 2012a). Future land use patterns are guided by the Adams County Comprehensive Plan, the latest version of which was adopted in 2012 (Adams County 2012a), and the Brighton Comprehensive Plan (Brighton 2009).

Existing land use in the vicinity of the proposed Bromley-Prairie Center Project is in the process of transitioning from agriculture, the historic use pattern, to urban, the likely future land use for most of the area. At present, the major I-76/BNSF transportation corridor is a division line between urban and urbanizing land to the west and still predominantly rural land to the east. (There are residential developments east of the corridor, but they're typically islands among the agricultural lands.) The corridor also represents the dividing line between the city of Brighton and unincorporated Adams County, for the most part, although there are unincorporated areas remaining to the west as well. Much of the land for over 1 mile west of the corridor is currently still undeveloped, but at least 2,000 acres (3 square miles) is part of a master-planned community known as Prairie Center (see Figure 4-4 in Chapter 4.0).

Prairie Center currently hosts a community shopping center, the Platte Valley Medical Center, the Adams County Judicial Center, the Brighton Sports Park, and a number of other uses. There are approximately 127 residences within 500 feet of all three action alternative routes for the proposed transmission line. A majority of the residence are located in the neighborhood north of Southern Street within 500 feet of the existing Henry Lake to Bromley 115-kV Transmission Line alignment where all three action alternatives share a common alignment and where the project conductors would be appended to the existing structures. The remaining residences are located in or near the Barr Lake neighborhood, which is located on a peninsula in Barr Lake at the end of 136th Avenue.

Both the Brighton and Adams County comprehensive plans indicate projected land use for the area east of the transportation corridor will continue to be predominantly agricultural for the foreseeable future. Brighton's comprehensive plan illustrates a multi-use urban development in Prairie Center, west of I-76, including large commercial areas, a "town center" in the vicinity of the existing Adams County and medical center facilities, parks and open space, and 3,000 residences.

One of the most prominent features in both the existing and future land use patterns is Barr Lake State Park adjacent to the east side of corridor, parallel to much of the project area (see Section 3.13 *Recreation*). None of the three action alternatives would enter state park land.

Both the city of Brighton and Adams County employ zoning ordinances to regulate land uses. All of the area in Brighton potentially crossed by one of the three action alternatives is zoned Planned Unit Development (PUD). The PUD zone district is open to a broad range of uses, but the use pattern is subject to explicit approval by the city. For example, the entire Prairie Center development, with its multiple commercial, residential and recreational uses, is part of a city approved PUD. Transmission lines may be included in a PUD zone, but they require city approval like any other use.

The Adams County zoning pattern in the paths of the three action alternative transmission line routes is more complex. Five zone districts are represented in and close by the Barr Lake neighborhood: A-1, A-2, R-1-C, C-2, and C-5. The rest of the area both northeasterly and southwesterly from the neighborhood is zoned A-3. The A-1 and A-2 districts, though nominally "agricultural," are for rural residences and subdivisions. A-3 is a true farming and ranching district. The R-1-C district is intended for "smaller" single family homes. The C-2 and C-5 districts are for commercial activities. All of the potentially affected Adams County zoning districts permit transmission lines as "conditional uses," meaning they must go through a permitting review process and receive specific approval for construction, recognizing that there may be reasons to evaluate them individually.

In any agricultural area, there is concern for preservation of prime and unique farm lands to protect their valuable productive capacity. Prime farmland is defined as land that has the best combination of physical and chemical characteristics for the production of crops. Farmland of statewide importance is land other than prime farmland that has a good combination of physical and chemical characteristics for the production of crops. Section 3.3 *Soils* illustrates locations and types of potential prime farmland in the project area. From a land use standpoint, the potentially prime farmlands in the area require irrigation to be considered prime. Currently these farmlands are not irrigated.

3.12.1 Proposed Action

The 5.2-mile-long Proposed Action alignment occurs within Brighton for approximately 44% of its length (2.3 miles) and in Adams County for the remaining 56% (2.9 miles).

The route of the Proposed Action and Alternatives A and B would follow the same alignment from the Bromley Substation east along Southern Street and then south along an existing pipeline through a quarter section of land zoned A-3 by Adams County. This Adams County parcel is an island surrounded by the city of Brighton and would likely be annexed to the city, where it would be zoned PUD, before being developed. Brighton has designated the area for future development as mixed use and commercial adjacent to the Kmart distribution center on the west. After crossing Bromley Lane and I-76, the Preferred Route would follow the city-county boundary along the southeast side of I-76 and then adjacent to the BNSF Railway before turning slightly to the right, parallel to Telluride Street, through the Barr Lake neighborhood. At the west edge of the neighborhood, it would depart from the city and then rejoin the railway ROW for most of the distance to the Prairie Center Substation.

In addition to the zoning noted above, the Preferred Route would briefly enter a Natural Resource Conservation Overlay (NRCO) Zone district in Adams County. The NRCO was established to protect important wildlife areas, designated floodplains and associated riparian areas, and important reservoir sites to provide wetlands and other habitats. Regulations for the overlay district do not prohibit the construction or operation of transmission lines, but would require a conditional use permit according to the underlying zoning requirements to proceed.

3.12.2 Alternative A

The Alternative A alignment is 5.3 miles long, with approximately 60% of the route located in Brighton and 40% located in unincorporated Adams County. Alternative A would follow the Preferred Route to Bromley Lane, as noted above. From Bromley Lane it would follow the northwest edge of the I-76 ROW almost to Buckley Road, passing in and out of small areas of unincorporated Adams County. At Buckley Road, it would cross out of Brighton and divert westerly around a small pond and wetland before crossing I-76 and rejoining the Preferred Route for the short distance to the Prairie Center Substation. Most of the unincorporated areas that would be crossed by Alternative A are zoned A-3, except for small segments of A-2 north of Buckley Road. Most of the route of Alternative A in Brighton is designated for various types of commercial development on Brighton's future land use map; all of it is currently zoned PUD by the city.

3.12.3 Alternative B

The Alternative B alignment is 5.4 miles long; approximately 48% in the city of Brighton and 52% in unincorporated Adams County. Alternative B would follow the same route as the Proposed Action as far as the north edge of the Barr Lake neighborhood. It would then cross over to the west side of I-76 where it would follow the same route as Alternative A for the rest of the distance to the Prairie Center Substation.

3.13 Recreation

Avoidance of parks and other recreational lands was one criterion in the routing study for the proposed Bromley-Prairie Center Project. The nearest existing or proposed park facility to all three route alternatives would be Barr Lake State Park, followed by the Brighton Sports Complex approximately 0.5 mile from the alternative alignments (Figure 3-10). Barr Lake State Park accommodates in excess of 100,000 visitors per year. The sports complex has four ball diamonds and a skate park. All three action alternative alignments would be located entirely outside the boundaries of the state park and all county or municipal local parks.

The portion of the transmission line route that is common to all three action alternatives would cross an existing street-side trail on the south side of Bromley Lane (E 152nd Avenue). All three action alternatives would cross several proposed trails: a trail paralleling I-76, trails connecting to the Barr Lake Loop trail from 144th Avenue and from 136th Avenue, and a trail along Buckley Road. The proposed transmission line alignment parallel to the existing gas pipeline between Southern Street and Bromley Lane also is proposed for a future trail. Figure 3-10 illustrates the locations of existing and proposed trails.

Essentially the entire alignments for all three action alternatives would be located in disturbed landscapes, which encompass existing transmission lines, a natural gas pipeline, a major interstate highway (I-76), frontage roads, the BNSF Railway, overhead electric distribution lines, and vertical structures such as light poles and communications towers.

3.13.1 Proposed Action

The route alignment of the Proposed Action would be the closest transmission line alignment to Barr Lake State Park at approximately 150 feet from the boundary along the northwesterly edge of Barr Lake, where the alignment is coterminous with Alternative B, and southwest of the Barr Lake neighborhood, where the alignment would be unique to the Proposed Action. United Power owns and operates an existing 12.47-kV overhead distribution line in or adjacent to the Proposed Action alignment from a point opposite the Barr Lake dam to a point approximately 800 feet north of E. 136th Avenue (see Figure 3-10). The BNSF Railway is between the Proposed Action and Barr Lake State Park all along the shore of Barr Lake. Park facilities nearest the boundary in these areas include the park perimeter trail and the RMBO, headquartered at the Bruderlin Stone House.

3.13.2 Alternative A

At its nearest point, the Alternative A alignment would be approximately 350 feet farther from the Barr Lake State Park boundary than the Proposed Action would be. In all other respects, the proximity to existing and proposed recreation resources would be essentially the same as the Proposed Action.

Bromley-Prairie Center 115kV Transmission Line Project

Figure 3-10
Recreation

N

0 1,250 2,500 5,000 Feet

1:30,000

1 inch = 2,500 feet

Project Facilities

- Substation
- Start/End Point: Distribution Line Underground
- Preferred Route
- Alternative A
- Alternative B
- Existing Gas Pipeline
- Existing Tri-State Line

Jurisdiction

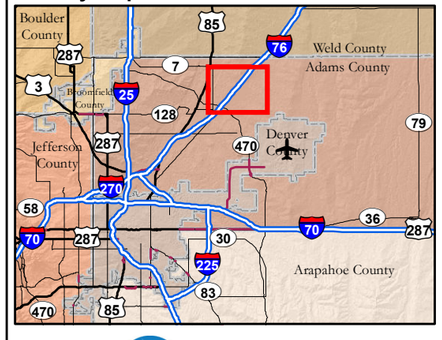
- City of Brighton
- Commerce City
- Barr Lake State Park
- Prairie Center Development

Recreation Data

- Existing Trails
- Future Trails
- Open Land, Adams County
- Open Land, Colorado
- Open Land, Brighton
- Park Land, Brighton

Source: Adams County 2012, City of Brighton 2012b

Vicinity Map



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3.13.3 Alternative B

The Alternative B alignment would be coterminous with the Proposed Action alignment northeast of the Barr Lake neighborhood, as noted above, having the same relationship to Barr Lake State Park. For the remainder of its alignment, it would be essentially the same as Alternative A.

3.14 Visual Resources

Visual or aesthetic resources are defined as the natural and man-made features of a landscape. Landscape character includes the distinctive qualities and arrangement of the features of a landscape, such as land, water, vegetation, and structures. All three action alternatives share a common visual environment with limited differences in minor, localized details.

Terrain in the project area is essentially flat with minimal relief. The man-made grade separations for I-76 interchanges are the most prominent vertical terrain features in the area. Most of the land in the area is ground that has been disturbed for various purposes over many years. Early disturbance was for cultivation; more recently development of the railroad, interstate highway (i.e., I-76), the 12.47-kV overhead distribution line, residential subdivisions, and commercial developments have been added to the mix.

Figure 3-5 depicts the overall vegetation pattern in the project area. Most of all three alternative routes cross disturbed ground with short grasses as the dominant ground cover. After exiting the Bromley Substation, there is a common route traveling east along Southern Street between the back of a Kmart distribution center and a residential subdivision called The Village. From there it would turn south paralleling an existing gas pipeline across an open, grassy field and then follow the I-76 and BNSF Railway corridor en route to the Prairie Center Substation. The three action alternatives follow slightly different paths to the substation, but all are adjacent to road or railway ROW borrow pits with coarse grass vegetation. There are a few sparse groves of deciduous trees and large shrubs south of 136th Avenue, but very few such plant types elsewhere along the transmission line corridor alternatives.

The most important visual feature in the project area is Barr Lake. Barr Lake was a historic buffalo wallow – a natural depression that was an ephemeral water feature – that has been progressively developed and enlarged over more than 100 years into its current 1,900-acre form. Barr Lake is co-managed for irrigation and recreation so the water level varies seasonally, showing substantial perimeter mud flats in late summer, particularly in dry years. The north half is open for boating and fishing, while the southern half is a wildlife refuge with restrictions on active recreation activities. Barr Lake is the focal point of Barr Lake State Park, managed by CPW. Much of the northwest shore of Barr Lake is lined with deciduous trees.

Colors in the landscape of the project area vary seasonally. In spring and early summer, the predominant colors are various shades of green. Where irrigation is employed, the greens persist into late summer; elsewhere the colors fade to beiges and browns. Groves of trees typically retain their medium to dark green colors until fall turns them to yellow and gold. Winter is a time of tan and brown vegetation except when there is snow cover. The deciduous trees shed their green massed forms and become dark brown skeletal forms.

The most prominent structures in the project vicinity are large, rectangular, flat-roofed commercial buildings, including the Kmart distribution center and numerous “big box” retail

buildings associated with the Prairie Center shopping center. The Platte Valley Medical Center and the Adams County Judicial Center are architecturally more complex and interesting than other buildings in the vicinity; they also are taller, demonstrating more vertical forms. Residential neighborhoods contain smaller, clustered, mostly gable-roofed residential structures. There are also vertical light pole and electric distribution system pole structures along the I-76-BNSF corridor. Structural colors tend to be beiges, tans and orange-browns. Both the medical center and the judicial center have prominent glass features in their facades, which tend to reflect blues and grays from the sky, depending on sky conditions. Finally, the interstate highway is a very prominent horizontal, mildly sinuous ribbon structure through the corridor that all three action alternatives would follow. The four-lane divided interstate highway presents shades of gray as the predominant color scheme.

As a general characterization of the landscape, I-76 divides the project area into two distinctly different landscape types. Land on the west side of I-76 can be characterized as urbanizing, where formerly rural land has been or is currently being developed into commercial, industrial, and residential areas that are distinctly man-made. Land east of I-76 has retained its more natural appearing rural character largely because development is limited by the presence of Barr Lake State Park. Scattered rural residences and a rural neighborhood (Barr Lake neighborhood) are located on the east side of the highway.

Sensitivity of viewers is an important consideration in evaluating visual resource impacts. Travelers on I-76 represent the largest numbers of potential viewers of the proposed Bromley-Prairie Center Project by a substantial margin. However, most interstate highway travelers are likely moving rapidly through the area on the way to or from work or on similar purpose bound trips. They are not likely to be highly sensitive to modifications in the landscape. Visitors to Barr Lake State Park, on the other hand, are most likely there for recreational purposes and are thus likely to have a higher sensitivity to visual conditions. Similarly, residents of the area are likely to be moderately to highly sensitive to the visual environment because they experience their viewing perspectives over long periods of time, day-to-day and season-to season.

3.14.1 Proposed Action

The distinctive feature of the Proposed Action is its location between the BNSF Railway and I-76 for much of its alignment. The route is characterized by the dominance of the transportation infrastructure and its proximity to both the park perimeter trail and the Barr Lake neighborhood.

3.14.2 Alternative A

Alternative A would be from 300 feet to greater than 1,000 feet farther from the more natural landscape of the state park compared with the Proposed Action. The Alternative A route would be more ingrained in the urbanizing development pattern of the Prairie Center development.

3.14.3 Alternative B

The route of Alternative B would be a combination of the Proposed Action and Alternative A: relatively close to the northwest edge of state park, but slightly farther removed from the Barr Lake neighborhood.

3.15 Noise

Describing the environment potentially affected by noise from the proposed Bromley-Prairie Center Project involves identifying noise-sensitive receptors and existing noise sources in the project vicinity, characterizing terrain features that may affect noise transmission, and determining existing noise levels in the area.

Most of these factors are essentially the same for the three action alternatives. Noise sensitive receptors include approximately 127 residences; 120 are located in the neighborhood north of Southern Street and east of Himalaya Street (50th Avenue), the rest are located in the Barr Lake neighborhood east of the I-76 interchange at 136th Avenue or dispersed along the Preferred Route. The nearest permanent residences to all three action alternatives would be those on the north side of Southern Street, which are approximately 200 feet from the existing transmission line structures that would be utilized for the proposed transmission line. There also is an RV park and campground on 136th Avenue between Buckley Road and I-76. A residence and the nearest RV sites would be approximately 85 feet from the alignments of Alternatives A and B in this vicinity. Recreationists at Barr Lake State Park also would be considered noise sensitive, particularly trail users along the northwest side of Barr Lake and visitors to the RMBO.

The most prominent existing sources of noise in the area are traffic noise from approximately 30,000 vehicles per day on I-76 in addition to periodic train noise from more than 25 trains per day on the BNSF Railway tracks that parallel the interstate highway and bisect the Barr Lake neighborhood. Additional noise sources include heavy truck operations from the Kmart distribution center between Bromley Lane and Southern Street, just east of the Bromley Substation, and seasonal agricultural equipment operations in portions of the area that are still under cultivation in the path of increasing urbanization.

Terrain in the project area is not an important factor in noise propagation; the terrain is essentially flat with only minimal relief, primarily at grade-separated I-76 interchanges.

Existing noise levels for the project area were estimated based on land use patterns and traffic levels. Field measurements for existing noise levels were not considered necessary based on the type and scale of the proposed Bromley-Prairie Center Project.

3.15.1 Proposed Action

Table 3-10 summarizes typical values of sounds levels for commonly experienced noise levels. Existing noise levels along the Proposed Action vary according to location. Noise levels in the area north of Bromley Lane are estimated to average in the range of 40 to 50 decibels, A-weighted (dBA). Day-night average noise levels (L_{dn}) within 500 feet to 1,000 feet of I-76 are estimated to range from approximately 65 dBA at 1,000 feet to nearly 70 dBA at 500 feet, based on traffic volumes and the mix of trucks in the traffic flow through the area. Essentially all of the transmission line alignment south of Bromley Lane would fall within 1,000 feet of I-76 under the Proposed Action. Train traffic on the BNSF Railway periodically would raise area noise levels.

Table 3-10 Typical Values of Sound Levels for Common Noise Environments

Common Noise Environments	Typical Noise Levels 50 feet from Source[1]
Rural area during daytime	40 dBA
Residential area during daytime	50 dBA
Normal conversation at 6 feet	55–65 dBA
Train locomotive at 100 feet[2]	95 dBA
City traffic	80 dBA
Lawn mower	90 dBA

dBA=decibels on the A-weighted scale
[1] U.S. Department of Transportation (USDOT) 2006, except as noted.
[2] USDOT 2012

3.15.2 Alternative A

Existing noise levels along the alignment for Alternative A would be the same as for the Proposed Action north of Bromley Lane. They would be higher for most of the rest of the alignment because all but 0.5 mile would be within 500 feet or less of I-76.

3.15.3 Alternative B

Existing noise levels along the alignment for Alternative B would be the same as for the Proposed Action north of Bromley Lane. They would be the same as the Proposed Action for approximately 2 miles south of Bromley Lane and would be the same as Alternative A for the remainder of the route to the Prairie Center Substation.

3.16 Social and Economic Values

3.16.1 Proposed Action

The Proposed Action transmission line corridor would be located partially in the city of Brighton and partially in unincorporated Adams County. These two jurisdictions have been identified as the study area for social and economic values for the project area. This section describes the relevant social and economic characteristics, including population, employment, income, and to a minor degree, community services. The study area is the same for the Proposed Action and both Alternative A and Alternative B; therefore, the data and discussion are presented once for all three action alternatives.

3.16.2 Population

Adams County had a population of 441,603 in 2010, representing 8.8% of the total Colorado population (Table 3-11). Adams County's population grew at an average annual rate of 2% from 2000 to 2010, the 10th highest growth rate among Colorado's 64 counties, and higher than the state's 1.6% rate. The Colorado Demography Office (2013) estimates that in 2013 Colorado's population has grown to approximately 5,267,800. Adams County's population has grown to approximately 467,000; and Adam's County's population is projected to grow at a 2% annual rate through 2025, before slowing to 1.4% per year through 2040. The resulting county population would be nearly 730,000 by 2040 if the projections are accurate. The city of Brighton, starting from a much smaller base, grew at a rapid 4.8% per year average rate through the decade, indicative of its location in the path of growth for metropolitan Denver.

Table 3-11 Population Characteristics

Jurisdiction	Population		Percent Change 2000-2010	
	2000	2010	Average Annual (%)	Total (%)
Brighton	20,905	33,352	4.8	59.5
Adams County	363,857	441,603	2.0	21.4
Colorado	4,301,261	5,029,196	1.6	16.9

Source: Colorado Demography Office (2011)

3.16.3 Employment

Adams County has an estimated 237,788 individuals in its civilian labor force, 8.5% of Colorado's total. As of August 2013, 17,067 were estimated to be unemployed representing a 7.2% unemployment rate. This was notably higher than the state's 6.7% rate (Table 3-12), but it was a substantial improvement from the 8.7% rate for 2012 (Colorado Department of Labor and Employment 2012).

Table 3-12 Labor Force and Employment – August 2013 Preliminary Data

Jurisdiction	Civilian Labor Force	Employed	Unemployed	Unemployment Rate (%)
Adams County	237,788	220,721	17,067	7.2
Colorado	2,781,249	2,595,837	185,412	6.7

Source: Colorado Department of Labor & Employment (2013)

Adams County's economy benefits from a substantial degree of diversity. Table 3-13 illustrates the comparison between the county and the state of Colorado in employment and payrolls by major industry classification. As Table 3-13 indicates, based on comparative employment concentrations, Adams County is notably stronger than the state average in construction, wholesale trade, and transportation and warehousing.

In contrast, the county has less strength in finance and insurance; professional, scientific, and technical services; management; and arts and entertainment. The top five industry sectors leading employment in Adams County include health care, retail trade, construction, wholesale trade, and transportation and warehousing. These five together employ almost 60% of the total county employment.

Major employers in the project area include the Prairie Center development retail businesses, the Adams County Justice Center, and the Platte Valley Medical Center. The Medical Center currently employees over 500 and reports over a half a million visitors each year. Both the Medical Center and the Justice Center complex are reported to have plans for expansion. When complete, the Justice Center would employ over 1,400 people and host over 2,000 visitors each day.

Table 3-13 2011 County Business Patterns

Major Industry[1]	Employment				Payroll			
	Adams County		Colorado		Adams County		Colorado	
	Number	%	Number	%	($1,000)	%	($1,000)	%
Agriculture, Forestry, Fishing and Hunting	a	NA	1,758	0.1	$343	0.0	$50,973	0.1
Mining, Quarrying, and Oil and Gas Extraction	298	0.4	25,006	1.3	$21,903	0.4	$2,588,203	2.8
Utilities	g	NA	8,969	0.5	D	1.8	$756,520	0.8
Construction	14,746	11.2	115,615	5.9	$711,682	12.9	$5,893,288	6.4
Manufacturing	9,090	6.9	117,810	6.0	$444,353	8.1	$6,379,010	6.9
Wholesale Trade	14,747	11.2	90,442	4.6	$829,026	15.0	$5,995,267	6.5
Retail Trade	16,665	12.7	242,477	12.3	$466,465	8.5	$6,433,792	6.9
Transportation and Warehousing	12,234	9.3	59,932	3.0	$544,711	9.9	$2,582,318	2.8
Information	3,986	3.0	78,188	4.0	$182,228	3.3	$5,956,568	6.4
Finance and Insurance	2,163	1.6	92,251	4.7	$93,113	1.7	$6,763,283	7.3
Real Estate and Rental and Leasing	2,442	1.9	40,022	2.0	$88,639	1.6	$1,580,987	1.7
Professional, Scientific and Technical Services	5,145	3.9	170,484	8.6	$304,179	5.5	$12,662,709	13.7
Management of Companies and Enterprises	1,045	0.8	44,857	2.3	$65,449	1.2	$5,178,750	5.6
Administrative and Support, and Waste Management and Remediation Services	9,009	6.8	206,447	10.5	$323,764	5.9	$8,970,280	9.7
Educational Services	1,789	1.4	44,308	2.2	$57,453	1.0	$1,322,834	1.4
Health Care and Social Assistance	18,796	14.3	257,481	13.1	$919,178	16.7	$11,474,948	12.4
Arts, Entertainment and Recreation	852	0.6	50,935	2.6	$15,843	0.3	$1,390,584	1.5
Accommodation and Food Services	12,183	9.2	228,341	11.6	$188,243	3.4	$3,902,378	4.2
Other Services (Except Public Administration)	5,354	4.1	96,949	4.9	$152,639	2.8	$2,767,531	3.0
Industries Not Classified	a	NA	302	0.0	$176	0.0	$4,919	0.0
Total for All Sectors	**131,739**	**100.0**	**1,972,271**	**100.0**	**$5,409,387**	**100.0**	**$92,655,142**	**100.0**

[1]North American Industry Classification System Code; a=0-19; g=1,000-2,499; D=Withheld to prevent individual company disclosure.
NA=not available
Source: U.S. Census Bureau 2011

The Prairie Center development is a 2,000 acre master-planned community designed for nearly 2 million square feet of retail space and 3,000 residences of various types at completion. Most of this planned development is yet to be realized.

3.16.4 Income

Table 3-14 illustrates employment and income growth for Adams County in comparison with the state of Colorado from 1990 to 2011. Total employment in Adams County nearly doubled between 1990 and 2011, growing at an average rate of 2.9% per year, compared with its 2.0% per year population growth rate. Per capita income grew at a rate of 3.6% annually (in current dollars), notably faster than the state's 2.8% annual rate. Nevertheless, Adams County's per capita income continues to lag behind the state level by nearly 25%.

Table 3-14 Project area Employment and Income Growth[1] – 1990-2011

Description	1990	1995	2000	2005	2011
Adams County					
Personal income (1,000)	$4,236,925	$6,236,212	$9,985,797	$12,044,664	$14,925,051
Per capita personal income	$15,891	$19,896	$27,210	$30,304	$33,061
Total employment	121,587	150,405	188,736	203,157	219,613
Colorado					
Personal income	$94,038,952	$147,055,760	$179,695,454	$205,437,450	$225,410,479
Per capita personal income	$24,575	$33,986	$38,795	$41,317	$44,053
Total employment	2,424,617	2,926,410	3,031,024	3,166,769	3,200,028

Source: Bureau of Economic Analysis 2012, 2013
[1]Employment and income figures are more broadly based than the data for the county business patterns in Table 3-13.

3.16.5 Public Facilities and Services

The type, relatively small scale, and short construction time frame for the proposed Bromley-Prairie Center Project dictates that it would generate little or no demand for public facilities or services beyond existing levels. Should services be required, they would most likely be emergency services needed for response to a possible, if unlikely, construction accident or medical emergency. The following discussion is based on these factors.

The proposed Bromley-Prairie Center Project is located within the Greater Brighton Fire Protection District. The fire district protects the city of Brighton, Wattenburg, Henderson, and unincorporated areas of Adams and Weld counties. The service area consists of 165 square miles protected from five fire stations. Portions of the transmission line route would be located in

emergency response districts 2 and 3, with primary service from fire stations 52 and 53, respectively. The entire proposed route would be within less than 3 road miles of one or both fire stations. The Brighton Police Department serves over 34,000 residents within the 27 square miles of the Brighton city limits, encompassing the project area. The Platte Valley Medical Center, a level IV trauma center, is located less than 1 mile from the Preferred Route alignment. The medical center is the ambulance and EMS provider for the project area; it also has a helipad for critical emergencies.

3.17 Alternative A

Information regarding population, employment and income, housing, community services and infrastructure for Alternative A is the same as that for the Proposed Action.

3.18 Alternative B

Information regarding population, employment and income, housing, community services and infrastructure for Alternative B is the same as that for the Proposed Action.

3.19 Environmental Justice

3.19.1 Proposed Action

The environmental justice analysis addresses the potential for the Proposed Action to adversely affect minority or low income populations to a disproportionate degree, relative to their representation in the larger population. The relevant study area for the Proposed Action is Adams County and three census tracts within 1 mile of the proposed transmission line corridor. No distinction is made for the three separate action alternatives in the identification of possible minority or low income populations because they all share the same socioeconomic analysis area.

Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" was issued February 11, 1994 (59 Federal Register 7629). EO 12898 "is intended to promote nondiscrimination in Federal programs substantially affecting human health and the environment, and to provide minority communities and low-income communities access to public information on, and an opportunity for participation in, matters relating to human health and the environment." It requires each federal agency to achieve environmental justice as part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects, including social and economic effects, of its programs, policies, and activities on minority and low-income populations.

Pursuant to EO 12898, the President's Council on Environmental Quality (CEQ) prepared *Environmental Justice: Guidance Under the Environmental Policy Act* (1997) to assist Federal agencies with their NEPA procedures "… so that environmental justice concerns are effectively identified and addressed."

CEQ guidelines for evaluating potential adverse environmental justice effects indicate minority populations should be identified when either: (1) a minority population exceeds 50% of the population of the affected area, or (2) a minority population represents a "meaningfully greater increment" of the affected area population than the population of some appropriate larger

geographic unit, as a whole, which has been identified for the proposed Bromley-Prairie Center Project as the state of Colorado.

Low-income populations are those communities or sets of individuals whose median income is below the current poverty level of the general population. Table 3-15 illustrates the white population is the largest in each of the identified geographic areas of interest. With reference to the CEQ guidelines, no minority group in any of the geographic areas makes up more than 50% of the population. However, the Hispanic/Latino population represents 34.1% of the total population in census tract 85.43 and 38.0% of the total population of Adams County. These would be considered "meaningfully greater" than the 20.7% Hispanic/Latino population state-wide. On this basis, a minority population is identified in the study area.

The census tracts include portions of Brighton directly adjacent to the alternative routes. County are State data were used for environmental justice analysis.

Table 3-15 2010 Race and Ethnicity

	Census Tract			Adams County	Colorado
	85.23	85.42	85.43		
Total population (number)	7,586	7,036	6,935	441,603	5,029,196
White	85.1%	83.6%	82.1%	73.3%	81.3%
Minority (Total Non-white)	14.9%	16.4%	17.9%	26.7%	18.7%
Minority (Non-white and Hispanic-white)	27.3%	28.9%	37.4%	46.8%	30.0%
Black or African American	1.2%	1.2%	0.8%	3.1%	4%
American Indian and Alaska Native	1%	0.8%	1.2%	1.3%	1.1%
Asian	1.2%	2.5%	1%	3.6%	2.8%
Native Hawaiian and Other Pacific Islander	0%	0.1%	0.1%	0.1%	0.1%
Some Other Race	8.7%	7.2%	11.6%	14.6%	7.2%
Two or More Races	2.8%	4.5%	3.3%	4%	3.4%
Hispanic or Latino (of any race)	22.8%	22%	34.1%	38%	20.7%
Not Hispanic or Latino	77.2%	78%	65.9%	62%	79.3%

Source: U.S. Census Bureau 2010a

The three census tracts identified near the project area have per capita incomes higher than the average per capita income in Adams County. However, the per capita incomes in two of the tracts are notably lower than the state as a whole. Median household incomes, however, are substantially higher than median household incomes in Adams County and the state of Colorado. The poverty data for the relevant census tracts indicate the percent of population below the poverty level are notably lower than for either Adams County or the state (Table 3-16). On this basis, it is determined that a low income population does not exist in the study area for purposes environmental justice analysis.

Table 3-16 Income and Poverty Levels (2006-2009 Estimates)

Location	Per Capita Income	Median Household Income	Percent Below Poverty Level
Census Tracts			
85.23	$33,888	$84,511	3.5
85.42	$28,174	$83,581	2.2
85.43	$25,829	$67,317	8.1
Adams County	$23,999	$54,666	13.9
Colorado	$30,151	$56,456	12.2

Source: U.S. Census Bureau 2010a

3.19.2 Alternative A

As stated, the socioeconomic analysis area for Alternative A coincides with that for the Proposed Action and Alternative B. Therefore, the affected environment for this project alternative would be the same as that described for the Proposed Action.

3.19.3 Alternative B

The socioeconomic analysis area for Alternative B also coincides with that for the Proposed Action and Alternative A. Therefore, the affected environment for this project alternative would be the same as that described for the Proposed Action.

3.20 Hazardous Materials or Solid Waste

3.20.1 Proposed Action

Materials that could be considered hazardous, which are expected to be used during construction of the transmission line and ancillary facilities, would include fuels, motor oil, grease, various lubricants, solvents, soldering equipment, and glues. Solid waste products would include those generated during project construction or occurring within the work areas, including packing, paper, plastic, and metal.

3.20.2 Alternative A

Potentially hazardous materials and solid waste associated with project construction of Alternative A would be the same as that described for the Proposed Action.

3.20.3 Alternative B

Potentially hazardous materials and solid waste associated with project construction of Alternative A would be the same as that described for the Proposed Action.

3.21 Public Health and Safety

3.21.1 Proposed Action

3.21.1.1 Public Safety

Tri-State electric facilities are designed, constructed, operated, and maintained to meet or exceed applicable standards of design and performance set forth in the National Electrical Safety Code (NESC). Tri-State also complies with applicable state standards for public health and safety, environmental protection, and siting, construction, operation, and maintenance if these standards are more stringent than federal standards for similar projects.

The Proposed Action is located within the Greater Brighton Fire Response Protection District, which would respond in case of an emergency. The Platte Valley Medical Center is located between Prairie Center Parkway and North Frontage Road, less than 5 miles from the Preferred Route.

3.21.1.2 Electrical and Magnetic Fields

Electric transmission lines produce electric and magnetic fields (EMF) when they are in operation. These fields are caused by different aspects of the operation of a transmission line and can be evaluated separately.

Electric fields are produced whenever a conductor is connected to a source of electrical voltage. An example of this is the plugging of a lamp into a wall outlet in a home. When the lamp is plugged in, a voltage is induced in the cord of the lamp, which causes an electric field to be created around the cord.

Electric fields decrease in strength with distance from the source and are shielded or weakened by materials such as a building and trees. Electric fields are measured in units of volts/meter (V/m) or kilovolts per meter (kV/m).

Magnetic fields are produced whenever an electrical current flows in a conductor. In the lamp example, if the lamp is turned on allowing electricity to flow to the lamp, a magnetic field is created around the lamp cord in addition to the electric field. Magnetic fields are typically measured in units of milligauss (mG).

Unlike electric fields, which are easily shielded by common conductive objects, magnetic fields cannot easily be shielded. Most materials (such as those that make up buildings, trees, and the ground) do not effectively shield magnetic fields. Certain ferromagnetic materials (i.e., those containing iron, nickel, or cobalt) have a property that, when in proper orientation and location, can shield magnetic fields. Eddy currents are induced in highly conducive metals used in conductive shielding and cancel the imposed magnetic field.

EMF extends outward from the conductors and decreases rapidly with distance from the source (National Institute of Environmental Health Sciences 2002). Electric and magnetic fields extend out from the conductors (transmission line spanning between transmission structures) and decrease rapidly with distance from the transmission line. Existing sources of 60-Hertz (Hz) electric and magnetic fields in the project area include existing transmission and distribution lines, substations, electrical wiring, and appliances used in homes and businesses.

Considerable research and study have been done to investigate potential health effects of EMF from high-voltage transmission lines.

Modeling Methodology

The Bromley-Prairie Center Project was modeled for its resulting EMF using EMF Workstation: ENVIRO (Version 3.52), a Windows-based model developed by the Electric Power Research Institute (EPRI). It is a program that predicts the electric and magnetic fields produced by linear transmission lines.

To perform this modeling, detailed information on the design of the line, which included projected electrical power flows, operating voltage, tower configuration, conductor size and type, the height and horizontal location of each conductor, conductor sag, and conductor phasing was collected. The modeling was conducted with a maximum load power flow for a new 115-kV single-circuit transmission line on a 75-foot-wide ROW.

These data were input into the ENVIRO program, which produced the lateral profiles of the electric and magnetic fields out to 250 feet on each side of the ROW centerline. These profiles were then plotted to produce the graphs presented as Figure 3-11 and Figure 3-12. The profiles were calculated with the lowest phase conductor at 28 feet above the ground, the minimum ground clearance per the National Electric Safety Code (NESC), which coincides with the lowest point of conductor sag, providing the most conservative results. The calculations are computed at a height of 1 meter (3.3 feet) above the ground.

Modeling Results

The Bromley-Prairie Center 115-kV transmission line was modeled as a single-circuit steel monopole structure (delta configuration). The electric results are presented in Figure 3-11. The magnetic field results are presented in Figure 3-12 for the typical and peak load. The transmission line ROW would be 75 feet wide, 37.5 feet on each side of the centerline, which is shown as vertical dashed lines in Figure 3-11 and Figure 3-12.

The results of the electric field modeling plotted in Figure 3-11 show that on the left edge of the ROW the electric field would be an estimated 0.27-kV/m. On the right edge of the ROW the electric field would be an estimated 0.30-kV/m. The maximum electric field within the ROW would be approximately 1.15-kV/m. A detailed discussion of the results for electric and magnetic field modeling are presented in Appendix E.

Figure 3-12 shows the results of the magnetic field modeling with a typical current of 600 amps, and a peak current of 1,167 amps. For typical current, on the left edge of the ROW the magnetic field would be an estimated 21.6 mG. On the right edge of the ROW the magnetic field would be an estimated 27.9 mG. The maximum magnetic field within the ROW would be approximately 60.8 mG. For peak current, on the left edge of the ROW the magnetic field would be an estimated 42.0 mG. On the right edge of the ROW the magnetic field would be an estimated 54.2 mG. The maximum magnetic field within the ROW would be approximately 118.3 mG.

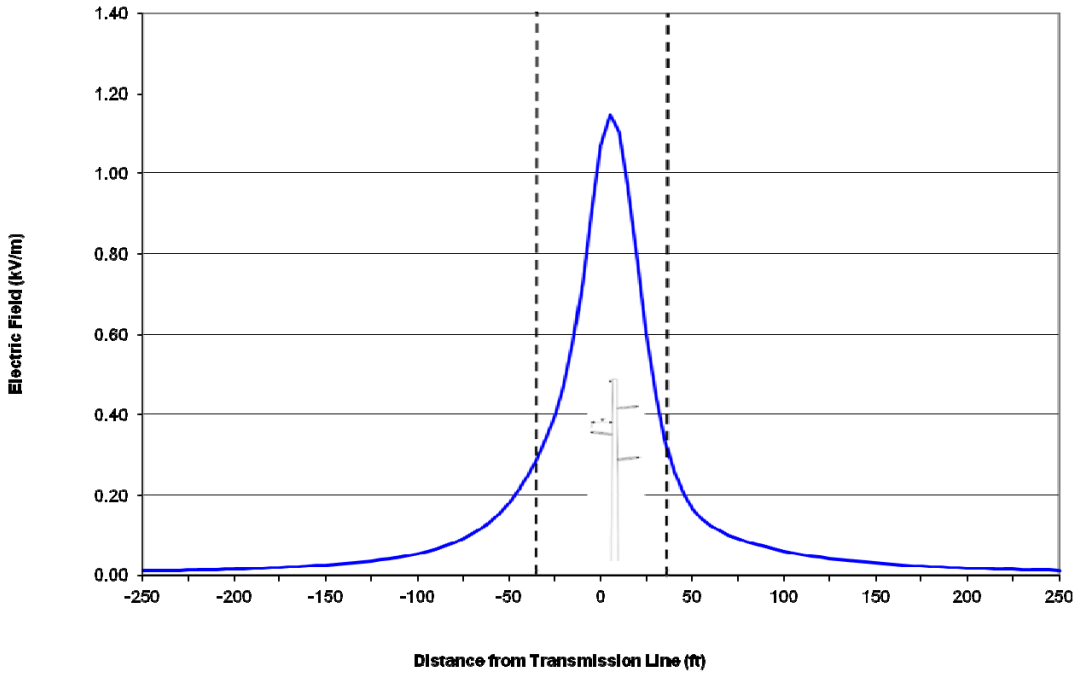

Figure 3-11 Electric Field Modeling Results for 115-kV Single-Circuit Pole Delta Configuration

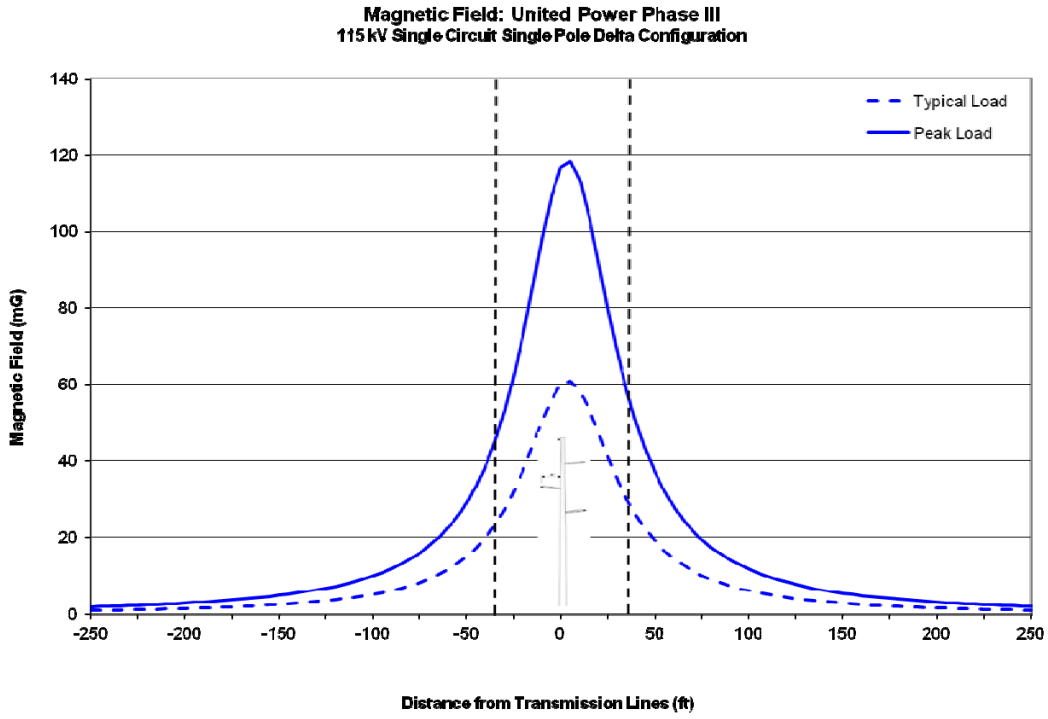

Figure 3-12 Magnetic Field Modeling Results at Typical and Peak Load

3.21.1.3 Corona Characteristics

Corona is the electrical ionization of the air that occurs near the surface of the energized conductor and suspension hardware due to very high electric field strength. Corona may result in audible noise being produced by the transmission lines.

The amount of corona produced by a transmission line is a function of the voltage of the line, the diameter of the conductors, the locations of the conductors in relation to each other, the elevation of the line above sea level, the condition of the conductors and hardware, and the local weather conditions. Power flow does not affect the amount of corona produced by a transmission line. Corona typically becomes a design concern for transmission lines at 345-kV and above and is less noticeable from lines that are operated at lower voltages.

The electric field gradient is greatest at the surface of the conductor. Large-diameter conductors have lower electric field gradients at the conductor surface and, hence, lower corona than smaller conductors, everything else being equal.

Irregularities (such as nicks and scrapes on the conductor surface or sharp edges on suspension hardware) concentrate the electric field at these locations and thus increase the electric field gradient and the resulting corona at these spots. Similarly, foreign objects on the conductor surface, such as dust or insects, can cause irregularities on the surface that are a source for corona.

Corona also increases at higher elevations where the density of the atmosphere is less than at sea level. Audible noise will vary with elevation with the relationship of A/300 where A is the elevation of the line above sea level measured in meters (EPRI 2005). Audible noise at 600 meters (656 yards) elevation will be twice the audible noise at 300 meters (328 yards), all other things being equal.

Precipitation, (e.g., rain, snow), fog, hoarfrost, and condensation accumulated on the conductor surface also are sources of surface irregularities that can increase corona. During fair weather, the number of these condensed water droplets or ice crystals is usually small and the corona effect also is small. However, during wet weather, the number of these sources increases and corona effects are, therefore, greater. During wet weather conditions, the conductor will produce the greatest amount of corona noise. However, during heavy rain the noise generated by the falling rain hitting the ground will typically be greater than the noise generated by corona and will mask the audible noise from the transmission line.

Modeling Methodology

The audible noise from the proposed 115-kV transmission line was estimated using EMF Workstation: ENVIRO (Version 3.52), a Windows-based model developed by the EPRI. The data presented in this EA were input into the ENVIRO program to calculate corona audible noise, with the addition of elevation of the line above sea level. The Bromley-Prairie Center Project transmission line was modeled with an elevation of 5,000 feet. A detailed discussion of the modeling methodology for corona noise is presented in Appendix E.

Modeling Results

The proposed 115-kV transmission line was modeled as a single-circuit steel monopole structure (delta configuration) at an elevation of 5,000 feet (Figure 3-13). The transmission line

ROW would be 75 feet wide, 37.5 feet on each side of the centerline, which is shown as vertical dashed lines in Figure 3-13. The figure shows two conditions, fair and rain, which exhibits the range in corona effects from changing weather.

Figure 3-13 shows across the ROW the audible noise would be negligible in fair weather. In wet weather, the audible noise would be an estimated 16.3 dBA on the left ROW edge and 16.5 dBA on the right ROW edge. The maximum noise that would occur on the ROW would be approximately 18.7 dBA in wet weather.

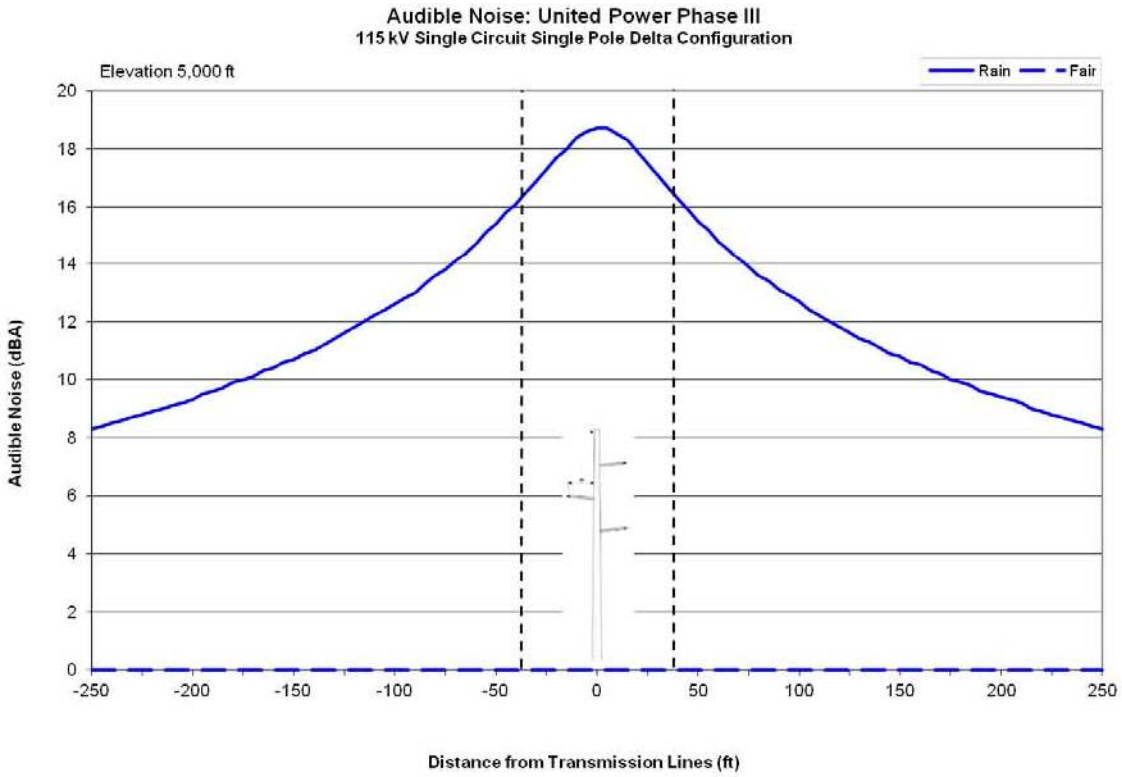

Figure 3-13 Corona Audible Noise Modeling Results

3.21.2 Alternative A

The description of the existing environment with respect to public safety for Alternative A is the same as that for the Proposed Action.

The electrical characteristics of electrical and magnetic fields of Alternative A would be the same as those described for the Proposed Action.

3.21.3 Alternative B

The description of the existing environment with respect to public safety for Alternative B is the same as that for the Proposed Action.

The electrical characteristics of electrical and magnetic fields of Alternative B would be the same as those described for the Proposed Action.

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4.0 ENVIRONMENTAL IMPACTS

This chapter evaluates potential environmental impacts that may result from the Proposed Action, Alternative A, Alternative B, and the No Action Alternative (see Section 2.1.1, Section 2.1.2, Section 2.1.3, and Section 2.1.4, respectively) addressing each respective resource. Associated EPMs committed to by Tri-State (see Table 2-3) for project construction, operation, and maintenance are referenced, where applicable. Cumulative impacts are discussed by resource, addressing past, present, and reasonably foreseeable future actions in the project area.

NEPA requires environmental documents disclose the environmental impacts of a proposed federal action, reasonable alternatives to that action, and any adverse environmental effects that cannot be avoided. The following resource assessments include the following impacts analyses:

Direct or Indirect Impacts:

- *Direct Impacts* would be an effect that is caused by an action and occurs at the same time and place.
- *Indirect Impacts* would be an effect that is caused by an action but is later in time or farther removed in distance, but still reasonably foreseeable.

Context

- *Local impacts* would generally be those that occur within the immediate vicinity of the proposed Bromley-Prairie Center Project (i.e., project area).
- *Regional impacts* would be those that occur within the greater area surrounding the project and its alternative alignments.

Duration

- *Short-term* impacts are temporary, transitional, or construction-related impacts associated with project activities.
- *Long-term* impacts last several years or more or would be permanent.

Intensity

- *Negligible* impacts would not be detectable and would have no discernible effect.
- *Minor* impacts would be slightly detectable, but would not be expected to have an overall effect.
- *Moderate* impacts would be clearly detectable and could have an appreciable effect.
- *Major* impacts would have a substantial, highly noticeable effect.

Type of Impact

- *Beneficial impacts* would improve resources/conditions.
- *Adverse impacts* would deplete or negatively alter resources/conditions.
- *Cumulative Impacts* are defined as “the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR §1508.7).

4.1 Air Quality

4.1.1 Proposed Action

Because the Proposed Action would disturb less than 25 acres of land for a duration of less than 6 months, the Proposed Action would not require an Air Pollution Emissions Notice or an emissions permit from CDPHE. Tailpipe emissions of CO and ozone precursor pollutants from construction vehicles and equipment associated with the Proposed Action would represent a temporary, small, and incremental increase over existing vehicle emissions in the I-76 corridor. The Proposed Action is anticipated to have no impact or negligible impact on ozone levels in the short term, during construction. Tri-State has committed to repair any vehicles and equipment showing excessive emission of exhaust gases due to poor engine adjustments or other inefficient operating conditions to minimize potential effects to area air quality (see EPM AQ-3 in Table 2-3).

Fugitive dust from soil disturbance and soil stockpiles could temporarily increase fugitive dust, especially if unusually high winds occurred during construction. During construction, Tri-State has committed to control fugitive dust by employing construction practices such as: speed limits for construction vehicles; water application to disturbed areas, access roads, and soil stockpiles; erosion control techniques; and revegetation of ground disturbance following construction with a native, drought tolerant seed mix (see EPMs AQ-1, AQ-2, AQ-4, G-4, S-4, and VEG-3 in Table 2-3). Based on the small scale of the project and brief construction period, potential impacts and net effect of the Proposed Action on fugitive dust during construction are expected to be negligible and short term.

No project-related air quality impacts from fugitive dust would be anticipated following post-construction revegetation. Given the small number of vehicles sporadically used for line inspection and maintenance, potential air quality impacts during project operation would be similar, although sporadic and infrequent, shorter in duration, and even smaller in magnitude than construction impacts. Therefore, maintenance activities could result in negligible, short-term effects during project operation. The Proposed Action would not affect the region's air quality regulatory status relative to ozone, particulate matter/fugitive dust, or haze.

4.1.2 Alternative A

Anticipated air quality impacts would be similar to those described for the Proposed Action. Under Alternative A, potential air quality impacts during construction also would be negligible and short-term, but would be even lower intensity than the Proposed Action due to less ground disturbance and fewer construction vehicles. Potential air quality impacts during operation and maintenance activities would be similar to those described for the Proposed Action.

4.1.3 Alternative B

Under Alternative B, potential air quality impacts would be the same as those described for Alternative A.

4.1.4 No Action Alternative

Under the No Action Alternative, no short-term, incremental air quality impacts would occur due to construction, and air quality parameters would remain at baseline levels during the

approximate 3-month construction period. No infrequent, short duration, and exceedingly small magnitude air quality impacts associated with project operation and maintenance would occur.

4.2 Geology and Minerals

4.2.1 Proposed Action

No direct, indirect, or residual site-specific geologic impacts would be anticipated for the Proposed Action. Potential impacts to the project during long-term operation were assessed, based on historic geological information and current topography and slopes. No geologic hazards were identified, including no impacts to project infrastructure from slope instability or faulting would be anticipated. This assessment is based on the moderate to flat topography, limited surface disturbance proposed for the project, and the nature of the power line construction project.

4.2.2 Alternative A

No direct, indirect, or residual site-specific geologic impacts would be anticipated for Alternative A, as described for the Proposed Action.

4.2.3 Alternative B

No direct, indirect, or residual site-specific geologic impacts would be anticipated for Alternative B, as described for the Proposed Action.

4.2.4 No Action Alternative

No impacts to area infrastructure would occur.

4.3 Soils

4.3.1 Proposed Action

Potential impacts to soil resources are expected to be limited in scope. The potential for direct impacts including soil compaction from machinery traversing the ROW during project construction (including the removal and burying of 1.6 miles of United Power's existing 12.47-kV distribution line) would be minor and short term, given Tri-State's committed EPM to restrict vehicle use to the existing ROW easements, approved access routes, and the existing road system (see EPM S-2 in Table 2-3), as well as the commitment to eliminate compaction and seed the disturbed areas to approved seed mixtures (see EPM S-1).

Tri-State has committed to several EPMs to minimize the potential for the indirect loss of soil through erosion or off-site soil transport during construction (see EPMs S-1 through S-4 in Table 2-3). This approach is supported by the fact that low to medium water erosion values are common to the soils crossed by the Proposed Action. Although, the potential for wind erosion is moderately high for the two soil units (VnB and VnD, Vona loamy sand, 0-3% and 0-9% slopes, respectively) that comprise that majority of the ROW, the committed EPMs outlining erosion control, site reclamation, and project revegetation would minimize potential impacts during project construction (see EPMs G-4, AQ-2, AQ-4, S-1, S-3, S-4, VEG-2, VEG-3, and VEG-4 in

Table 2-3). Long-term loss of soils during the distribution line burial and transmission line construction (including pole installation) would be negligible. Long-term, permanent surface disturbance would be limited to the transmission structure footprints.

Soil unit VnB (Vona loamy sand, 3 to 9% slopes) is considered a soil of statewide importance. Soil unit AsB (Ascalon sandy loam, 1 to 3% slopes) is considered "prime farmland if irrigated, with good climate and low erosion." Direct, short-term, minor impacts would be expected for approximately 1.25 acres of soil unit VnB and approximately 0.5 acre of soil unit AsB during the removal and burying of United Power's distribution line. However, none of these lands intersected by the transmission line route or undergrounded distribution line is currently in production or irrigated.

4.3.2 Alternative A

Anticipated direct and indirect effects to soils along the Alternative A alignment would parallel those discussed for the Proposed Action. Long-term direct soil loss from structure placement would be negligible. The same approaches and committed EPMs discussed for the Proposed Action would apply to this alternative to maximize revegetation success and minimize potential soils erosion hazards.

Similar to the Proposed Action, none of the lands are currently in production or irrigated where the Alternative A route would cross either Type VnB (Vona loamy sand) or AsB (Ascalon sandy loam).

4.3.3 Alternative B

Anticipated direct and indirect effects to soils along the Alternative B alignment would parallel those discussed for the Proposed Action. Long-term soil loss from structure placement would be negligible. The same approaches and committed EPMs discussed for the Proposed Action would apply to this alternative to maximize revegetation success and minimize potential soils erosion hazards.

Similar to the Proposed Action, none of the lands are currently in production or irrigated where the Alternative B route would cross either Type VnB (Vona loamy sand) or AsB (Ascalon sandy loam).

4.3.4 No Action Alternative

Under the No Action Alternative, no direct, indirect, or cumulative impacts to area soils from project construction would occur.

4.4 Water Resources

4.4.1 Proposed Action

No direct impacts to Barr Lake, the most prominent water resource in the project area, would occur from implementation of the Proposed Action. As discussed in Section 3.4 *Water Resources*, phosphorus and nitrogen are the contaminants of greatest concern in the project area, as nutrients associated with wastewater treatment increase the algal blooms that lead to pH exceedances in Barr Lake. No effects from project construction or operation/maintenance

activities would contribute to these nutrient releases. Relative to other compounds potentially affecting area water quality, EPMs HM-1 through HM-3 and WQ-1 are all measures designed to ensure hazardous materials such as fuels, lubricants, and solvents are not released into nearby water sources, including Barr Lake.

EPMs WQ-2 through WQ-4 also are designed to minimize indirect effects including potential increases in runoff or sediment during storm events and prevent exceedances of relevant water quality standards from site runoff. These measures include commitments for: (1) implementation of stormwater Best Management Practices (BMPs), (2) construction practices protective of water resources, (3) materials/topsoil storage practices protective of water resources, and (4) treatment of construction waste waters. Burying 1.6 miles of United Power's existing distribution line would result in 4.8 acres of additional surface disturbance. Since this action would exceed the 1-acre threshold for stormwater permitting through CDPHE, Tri-State has committed to implementing EPM WQ-5, which would require a stormwater permit and associated Stormwater Management Plan (SWMP).

Because the project's EPMs protect water quality, no measurable direct or indirect impacts to surface water quality would be anticipated, including Barr Lake. If any water quality impacts were to unexpectedly occur, they would be negligible in intensity, localized in context, and short-term, occurring during construction only.

Neither the morphology of surface water features, nor hydrologic flow patterns of either surface water or groundwater would be impacted by the Proposed Action. No direct disturbance of surface water features would be associated with the project. Disturbed areas would remain pervious during construction, so no change to surface runoff or groundwater recharge would be anticipated during this project phase. The long-term increase in impervious area would be less than 0.05 acre, comprised of structures, structure foundations, and surface splice boxes for the underground distribution line. Therefore, the increase in impervious area would be negligible and surface runoff and groundwater recharge would not be measurably impacted.

No impacts to the water supply would be anticipated from the Proposed Action. Any water required for construction, revegetation, or dust suppression would be purchased from a municipal source or a construction water provider with a private well; therefore, no water would be withdrawn from local water resources (see EPM WQ-6). No water would be required for the transmission line operation.

4.4.2 Alternative A

Under Alternative A, potential water resources impacts would be similar to those described for the Proposed Action. A SWMP and stormwater permit may not be required, based on the limited surface disturbance with no distribution line burial.

4.4.3 Alternative B

Under Alternative B, potential water resources impacts would be as described for Alternative A.

4.4.4 No Action Alternative

Under the No Action Alternative, water resources would remain at baseline conditions.

4.5 Floodplains

4.5.1 Proposed Action

Because the Proposed Action would not intersect any FEMA-delineated floodplains, no direct adverse floodplain impacts would be anticipated. Additionally, no floodplains-related permits would be required at the federal, state, county, or municipal level. The long-term increase in impervious area would be less than 0.05 acre, which would be partially offset by the removal of the existing distribution line. The 0.05 acre is too small to affect the volume of storm runoff or the extent of standing water during an extreme precipitation event, and no indirect adverse floodplain impacts would be anticipated.

4.5.2 Alternative A

Under Alternative A, potential floodplain impacts would be similar to those described for the Proposed Action.

4.5.3 Alternative B

Under Alternative B, potential floodplain impacts would be similar to those described for the Proposed Action.

4.5.4 No Action Alternative

Area floodplains would be unaffected by the No Action Alternative.

4.6 Wetlands

As discussed in Section 3.6 *Wetlands*, the three action alternatives would intersect several wetland features, although Tri-State plans to span wetlands whenever feasible, as stated in EPM WET-1 in Table 2-3. Table 4-1 identifies the acreage intersected by each route. Refer to Section 3.6 *Wetlands* and Figure 3-5 for description and locations of wetlands by identification number.

Table 4-1 Wetlands Intersected by the Three Action Alternatives

Wetland ID	Preferred Route		Alternative A (Acres)	Alternative B (Acres)
	Total	Underground Distribution Line		
W1	0.20	0.00	0.20	0.20
W2	0.00	0.00	0.02	0.02
W3	0.02	0.00	0.02	0.02
W4	0.84	0.00	0.36	0.36
W4a	0.51	0.00	0.00	0.00
W5	0.83	0.00	0.00	0.00
W6	0.76	0.44	0.00	0.00
W7	0.02	0.00	0.00	0.02
W8	0.01	0.00	0.00	0.01

Table 4-1 Wetlands Intersected by the Three Action Alternatives, continued

Wetland ID	Preferred Route		Alternative A (Acres)	Alternative B (Acres)
	Total	Underground Distribution Line		
W9	0.15	0.00	0.00	0.15
W10	0.00	0.00	0.08	0.00
W11	0.00	0.00	0.00	0.00
W12	0.00	0.00	0.80	0.00
W13	0.08	0.00	0.06	0.06
W14	0.00	0.00	0.67	0.67
Totals	**3.41**	**0.44**	**2.21**	**1.51**

4.6.1 Proposed Action

The Proposed Action would intersect a total of 3.41 acres of wetlands as indicated in Table 4-1. Temporary direct disturbance to wetlands is expected during construction to provide access to structure sites and to provide workspace for structure placement. Along the Proposed Action, equipment access would be temporarily required across three wetland areas (W4, W4A, and W5) to erect power line structures (see Figure 3-5). Tri-State intends to use temporary overland travel and matting, where necessary, to allow construction equipment to cross wetlands W4, W4A, W5 and W6 and to place structures (see EPMs WET-2 and WET-3 in Table 2-3). Crossings would be limited in width to approximately 10 to 12 feet to avoid unnecessary disturbances. Temporary access routes through wetlands have yet to be identified; however, Tri-State would abide by Clean Water Act (CWA) Section 404 regulations for any temporary or permanent fill material placed within wetlands or other Waters of the U.S. (see EPM WET-1).

Wetlands W4 and W4A would have one structure each permanently placed within their boundaries resulting in minor direct impacts. If these structures were directly embedded, permanent disturbance associated with structure placement would be approximately 7 square feet at each of the two structures located in wetlands for a total of 14 square feet or less than 0.001 acre of total permanent disturbance in wetlands from permanent structure placement along the Proposed Action. If these structures required larger concrete foundations, permanent disturbance associated with structure placement would be approximately 40 square feet at each of the two structures located in wetlands for a total of 80 square feet or less than 0.001 acre of total permanent disturbance. This minor long-term impact would be permitted under NWP 12 (Utility Line Activities), and EPMs WET-1 and WET-2 would ensure minimal impacts to wetlands.

The distribution line burial associated with the Proposed Action, encompassing a 25-foot construction ROW, traverses Wetland W6 for 935 feet, covering an area of 0.44 acre within the boundaries of Wetland W6. The 5-foot x 4-foot trench would result in 4,675 square feet of short-term disturbance caused by trenching operations designed to bury the cable beneath the wetland substrate. Through EPM WET-3, United Power has committed to preserving the wetland sod mat during excavation for direct replacement following trenching operations. In addition, temporary work space and access to the trench may require timber mats. These short-term impacts would be permitted under the USACE NWP 12 for Utility Line Activities. The incorporation of EPMs WET-1, WET-2, and WET-3 (see Table 2-3) would minimize potential impacts and ensure that short-term disturbances would be restored to pre-construction productivity. If United Power's burial of the existing 12.47-kV distribution line extends beyond

the areas surveyed for jurisdictional wetlands or other WOUS, the applicable wetland delineation surveys would be conducted, where warranted (see EPM WET-1).

All remaining wetland areas located in the vicinity of the Proposed Action are proposed to be spanned (see EPM WET-1) and are not expected to be crossed to access construction locations along the ROW. Additionally, no permanent structures are expected to be located within these areas. Tri-State would obtain authorization under the appropriate NWP from the USACE prior to commencing work in any wetland areas, per EPM WET-1. The general conditions of the NWP would be followed during the course of wetland crossing and structure installation.

Potential direct impacts to wetlands from construction associated with the Proposed Action would be minor and should be reduced to acceptable limits with implementation of the conditions of EPMs WET-1 through WET-3. Disturbance in wetland areas would result in some minor loss of vegetative productivity until reclamation has been completed, as directed in EPMs VEG-1, VEG-2, and VEG-3. However, removal of selected trees in wetland areas, particularly in Wetland W5, would result in a long-term minor loss of this vegetation type during the life of the project. No indirect impacts are anticipated as a result of construction activity in or adjacent to wetlands.

To minimize potential construction impacts to wetlands and other WOUS, Tri-State would use an environmental monitor to ensure the project complies with conditions of the applicable NWP (see EPM G-2 in Table 2-3). In addition and prior to construction, supervisory construction personnel would be trained in avoidance and minimization techniques to reduce potential effects to wetlands and other WOUS (see EPMs G-1 in Table 2-3).

In areas where construction may occur near but not within wetlands, such as Wetlands W7 and W10, and no permanent or temporary effects are planned or permitted under a USACE permit in these areas, buffers/fencing/staking would be created to protect these resources from sedimentation and erosion effects (see EPMs G-4, WET-2, and WQ-1 through WQ-4 in Table 2-3). Barriers would be placed as necessary to delineate buffer boundaries.

4.6.2 Alternative A

Although exact placement locations for structures along Alternative A have not been identified at this time, it is estimated the alignment would intersect a total of 2.21 acres of wetlands, as indicated in Table 4-1 It is assumed that any point of intersection along the proposed Alternative A route that is associated with a wetland would require permanent structure placement and temporary access to place the structures. Using that assumption, three points of intersection were identified along Alternative A in Wetlands W4, W12, and W14 (see Figure 3-5). The Proposed Action would intersect a total of 2.21 acres of wetlands as indicated in Table 4-1. The estimated permanent disturbance and direct impact associated with structure placement in these three locations would be approximately 0.003 acre or less. This minor, long-term impact would be permitted under NWP 12 (Utility Line Activities), and EPMs WET-1 and WET-2 would minimize potential impacts. All remaining wetland areas located within the vicinity of Alternative A are proposed to be spanned and, therefore, no further direct impacts would be expected.

Short-term effects associated with wetland crossings under Alternative A would be similar to those identified for the Proposed Action with the exception of trenching for distribution line burial

designed only for the Proposed Action. Temporary access routes through wetlands have yet to be identified; however, Tri-State would abide by CWA Section 404 regulations for any temporary or permanent fill material placed within wetlands or other Waters of the U.S. The incorporation of EPMs WET-1, WET-2, and WET-3 would minimize potential impacts and ensure that any short-term disturbance be restored to pre-construction productivity.

All other potential effects and protection measures identified for Alternative A would be the same as those described for the Proposed Action. In addition, no indirect impacts are anticipated as a result of construction activity in or adjacent to wetlands under Alternative A.

4.6.3 Alternative B

Although exact placement locations for structures along Alternative B have not been identified at this time, it is estimated the alignment would intersect a total of 1.51 acres of wetlands, as indicated in Table 4-1. Potential effects to wetlands under Alternative B would be similar to those discussed for Alternative A. Temporary equipment access and permanent structure placement estimated for Alternative B could occur in Wetlands W4 and W14 (see Figure 3-5) based on point of intersection locations along this alternative. One structure would be placed within the boundaries of W4 and W14, resulting in direct impacts to wetlands of less than 0.002 acre. This minor, direct, long-term impact would be permitted under NWP 12 (Utility Line Activities), and EPMs WET-1 and WET-2 would ensure minimal impacts. All remaining wetland areas located within the vicinity of Alternative B are proposed to be spanned and, therefore, no further direct impacts are expected.

Short-term effects associated with wetland crossings under Alternative B would be similar to those identified for Alternative A. Temporary access routes through wetlands have yet to be identified; however, Tri-State would abide by CWA Section 404 regulations for any temporary or permanent fill material placed within wetlands or other Waters of the U.S. The incorporation of EPMs WET-1, WET-2, and WET-3 would minimize potential impacts and ensure that any short-term disturbance be restored to pre-construction productivity.

All other potential effects and protection measures identified with the Proposed Action would be the same for Alternative B. In addition, no indirect impacts are anticipated as a result of construction activity in or adjacent to wetlands under Alternative B.

4.6.4 No Action Alternative

Under the No Action Alternative, no incremental, short-term effects to wetlands or other WOUS would occur. No power line structures would be placed in wetlands in the long-term, avoiding a permanent loss of approximately 0.001 acre of wetlands.

4.7 Vegetation Resources

As discussed in Section 3.7 *Vegetation Resources*, botanists identified six vegetative communities in the project area. Table 4-2 lists these vegetative communities and associated acreage by each action alternative.

Table 4-2 Vegetation Types Crossed by the Three Action Alternatives

Vegetation Type	Preferred Route (acres)		Alternative A (acres)	Alternative B (acres)
	Total	Underground Distribution Line		
Disturbed	20.66	4.36	14.77	17.60
Agricultural	2.22	0	3.11	3.20
Fallow	10.82	0	22.75	17.65
Shortgrass prairie	9.38	0	5.01	8.56
Wetland (palustrine)	3.15	0.44	2.12	1.25
Wetland (riparian)	1.12	0	0.56	0.72
Total Acreage	**47.35**	**4.8**	**48.32**	**48.98**

4.7.1 Proposed Action

The 75-foot-wide construction ROW along the Preferred Route encompasses 47 acres of vegetative communities, as detailed in Table 4-2. Vegetation would be temporarily affected during construction by vehicles and equipment traveling overland to access structure placement locations. Vegetative productivity in agricultural and native vegetation areas may be reduced in the short-term; however, approximately 72% of the Proposed Action alignment is located within previously disturbed, fallow, or agricultural pasture lands containing a majority of non-native grasses. Therefore, disturbance of good to high quality native vegetation communities, including wetlands and native shortgrass prairie, would generally be limited. Placement of structures and temporary access routes in wetland vegetation areas associated with Wetlands W4, W4A, W5, and W6 are anticipated under the Proposed Action and are expected to result in less than 0.002 acre of total direct impacts in wetland communities from permanent structure placement. Temporary access routes outside of the ROW have yet to be identified; however, Tri-State would abide by CWA Section 404 regulations for any temporary or permanent fill material placed within wetlands or other WOUS (see Section 4.6 *Wetlands*).

Potential long-term direct impacts would be limited to the removal of small areas of vegetation at each structure site. This permanent loss of vegetation would be considered minor, due to the small size of the anticipated impacts and overall vegetation types affected.

Anticipated short-term and long-term effects to vegetation would be minimized by Tri-State's committed protection measures to regrade, if necessary, and revegetate with approved native seed mixtures. The burial of the existing distribution line would involve temporarily digging a 5-foot wide by 4-foot deep trench and replacing the topsoil and vegetation within 2 days of installation of the buried cable. EPMs G-3, G-4, S-1, VEG-1, VEG-2, VEG-3 and WET-3 are listed in Table 2-3 and encompass site-specific measures designed to minimize short-term effects of vegetation removal and damage and soil compaction, while ensuring appropriate reclamation techniques are implemented, such as sod replacement, seedbed preparation, seeding, and mulching.

Tree removal would be limited to the wetland/riparian area associated with Wetland W5 (see Figure 3-5). Isolated trees may need to be removed or trimmed along the transmission line spans to ensure safe line construction, operation, and maintenance activities. Tree removal and trimming would be conducted in accordance with the applicable landowner. Anticipated direct,

long-term impacts to trees and understory vegetation would be minimal, due to the area affected in relation to the stand of trees, and impacts would be reduced by Tri-State's committed EPM VEG-1 in Table 2-3 to minimize ground disturbance.

The primary indirect effect to vegetation resources is the potential increase in noxious or invasive weed populations within the alignment of the Proposed Action as a result of project construction, which would be minimized by Tri-State's reclamation measures and specifically committed EPMs designed to prevent the spread of noxious weeds (NW-1 through NW-3 in Table 2-3). Tri-State's commitment to use only clean equipment, remove accumulated mud prior to moving between construction or maintenance areas, incorporate weed suppression activities (if warranted), and to implement reclamation measures as described in the EPMs would aid in preventing or minimizing weed expansion.

4.7.2 Alternative A

The 75-foot-wide construction ROW along Alternative A encompasses 48 acres of vegetative communities, as detailed in Table 4-2. Potential effects to vegetation under Alternative A would generally be similar to those identified for the Proposed Action with the exception of the underground trenching portion to bury the existing distribution line. Under Alternative A, there would be no trenching operations; and, therefore, a lower short-term impact in comparison to the Proposed Action. In addition, under this alternative a larger portion (85%) of the transmission line alignment would be located in previously disturbed, fallow, and agricultural lands. This would result in fewer potential effects to native grassland communities. Similar to the Proposed Action, direct impacts to vegetation are expected to be minimal due to the small area impacted in relation to the surrounding vegetative communities in addition to the incorporation of EPMs G-3, G-4, S-1, VEG-1, VEG-2, and VEG-3 designed to minimize short-term effects of vegetation removal and damage and soil compaction, while ensuring appropriate reclamation techniques are implemented, such as seedbed preparation, seeding, and mulching.

Under Alternative A, placement of structures and access routes would be anticipated in wetland vegetation associated with Wetlands W4, W12, and W14. These placements in the three wetlands are expected to result in a direct impact of approximately 0.003 acre in comparison to the direct impact of 0.002 acre caused by structure placement in two wetlands under the Preferred Route (see Section 4.6.2 *Wetlands, Alternative A*).

Because Alternative A would not include the additional 4.8 acres of surface disturbance from the proposed trenching operations for distribution line burial, noxious weed spread is expected to be slightly less under Alternative A. To minimize the indirect effect of potential increases in invasive weed populations that could occur as a result of project construction, weed control measures would be the same as those described for the Proposed Action (EPMs NW-1 to NW-3). Consequently, an increase in invasive weed populations along Alternative A would be prevented or minimized in the short and long term.

4.7.3 Alternative B

The 75-foot-wide construction ROW along Alternative B encompasses 49 acres of vegetative communities, as detailed in Table 4-2. Potential direct short- and long-term impacts to vegetation under Alternative B would be similar to those identified for Alternative A. Under this alternative, 79% of the transmission line alignment would be located in previously disturbed, fallow, and agricultural lands. This would result in fewer potential effects to native grassland

communities and wetland and riparian areas than anticipated under the Proposed Action or Alternative A.

Under Alternative B, placement of structures and access routes would be anticipated in wetland vegetation associated with Wetlands W4 and W14. These placements in the two wetlands are expected to result in a direct impact of approximately 0.002 acre or less of total permanent disturbance from permanent structure placement (see Section 4.6.3 *Wetlands, Alternative B*).

Similar to Alternative A, Alternative B would not include the additional 4.8 acres of surface disturbance from the proposed trenching operations for distribution line burial; therefore, noxious weed spread is expected to be slightly less under Alternative B. However, the potential increase in noxious weed populations from project construction would be minimized by Tri-State's reclamation measures and specifically committed EPMs designed to prevent the spread of noxious weeds (NW-1 through NW-3 in Table 2-3). Consequently, an increase in invasive weed populations along Alternative B would be prevented or minimized in the short and long term.

4.7.4 No Action Alternative

Under the No Action Alternative, no vegetation would be removed or disturbed by proposed construction activities and no structures would be placed in the limited native vegetation communities or specific wetlands. No incremental loss of vegetative productivity would occur and no permanent loss of vegetation acreage would result from structure placement. In addition, no potential increase in invasive weed species would occur from project construction. However, existing weed populations would likely continue to expand in the area if control methods are not implemented.

4.8 Wildlife Resources

The impacts assessments common to all alternatives include the following resource discussions.

No fisheries or aquatic habitats would be affected by any project alternative, given the lack of surface water resources crossed by any of the project alternatives and the EPMs developed to prevent potential indirect impacts to surface water from runoff into surrounding areas (see Section 4.4 *Water Resources*).

Potential direct and indirect impacts and net effects to terrestrial wildlife habitat would primarily encompass those species more commonly associated with habitats affected by human use (pasture, fallow fields, active agricultural areas, infrastructure, and commercial development). Potential direct, indirect, short-term, and long-term effects to native wildlife habitat would be minimized by the committed EPMs G-2, G-4, NW-1, VEG-1, VEG-2, VEG-3, WET-1, WET-2, and WQ-1 through WQ-4 structured to limit long-term effects to upland habitats, minimize weeds, and prevent long-term impacts to wetlands and wet meadows.

Given the proposed construction schedule in environmentally sensitive areas (e.g. adjacent to Barr Lake), no impacts to breeding animals are expected to occur. Potential direct, short-term impacts to terrestrial wildlife from increased noise and human presence along the ROW alternatives during line construction would vary based on the species potentially present along the project ROW during the fall and early winter period. Individual animals may avoid the project

areas until construction was completed, returning to the project area and adjacent habitats upon completion of project construction.

Proposed project construction could result in direct mortality of a few small, less mobile mammals within the corridor, but impacts would be minor as overall disturbance would be small and short term. Many of these smaller mammal species have high reproductive potential, including the black-tailed prairie dog. Table 4-3 summarizes the extent of black-tailed prairie dog colonies crossed by each action alternative. No operational effects to area mammals would be anticipated, since none of the project alternatives bisects important habitat or use areas.

Black-tailed prairie dogs occur within the Project Study Area. Table 4-3 summarizes the length and acreage of colonies impacted by alternative.

Table 4-3 Black-Tailed Prairie Dog Colonies Crossed by the Action Alternatives

Project Action Alternative	Mapped Prairie Dog Colonies Crossed (feet or miles)	Potential Acreage Affected
Preferred Route (United Power Distribution Underground)	1.9 miles (1 mile)	17.3 acres (3.0 acres)
Alternative A	124 feet	0.2 acre
Alternative B	1.7 miles	15.5 acres

Table 4-4 provides a summary of regional bird nesting seasons for the project area, based on recommended CPW nesting restrictions (CDOW 2008), the National Bald Eagle Management Guidelines (USFWS 2007), Kingery (1998), and G. Craig, pers. comm. (2013). “Seasonal buffer” is a term for an area where seasonal restrictions for “human encroachment” are recommended in proximity to active nests or bald eagle winter roosts during certain seasons. The distance and timing of seasonal buffers are tailored to each species and sensitivity to disturbance.

No impacts to nesting birds from project construction would be anticipated. Construction during the fall and early winter period would avoid the breeding seasons shown in Table 4-4. In the event, construction activities were to extend into the breeding season for raptor species known to occur in the project area, Tri-State has committed to an EPM to protect nesting raptors (see EPM WR-3 in Table 2-3). This measure would be in accordance with the recommended seasonal restrictions for nesting birds developed by the CPW (CDOW 2008), the National Bald Eagle Management Guidelines (USFWS 2007), Kingery (1998), and G. Craig (pers. comm. 2013).

No concentrations of wintering birds occur in the project area. The bald eagle winter concentration and winter roost associated with Barr Lake State Park are discussed further in Section 4.9.1.2 *Animals, Special Status Species*.

Table 4-4 Regional Bird Species Breeding Seasons and Recommended Seasonal Buffers

Bird Species	Seasonal No Human Encroachment Buffer													
	Buffer Distance	***Breeding Season***	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Bald Eagle	1/2 mile (active nest)[a]	Oct 15 - Jul 31	■	■	■	■	■	■	■			■	■	■
	1/2 mile (active winter night roost)[b]	Nov 15-Mar 15	■	■	■								■	■
Red-tailed Hawk	1/3 mile (active nest)[a]	Feb 15-Jul 15		■	■	■	■	■	■					
Swainson's Hawk	1/4 mile (active nest)[a]	Apr 1-Jul 15				■	■	■	■					
Great Horned Owl	1/8 mile (active nest)[c]	Jan 1-Jun 30[d]												
Burrowing Owl	150 feet (active nest)[a]	Mar 15-Oct 31				■	■	■	■	■	■	■		
Canada Goose	N/A	Mar 30-Aug 15[e]												
Great Blue Heron	1/5 mile (active nest/rookery)[e]	Feb 1-Jul 31[d]		■	■	■	■	■	■					
Double-breasted Cormorant	N/A	Jun 1-Jul 15[e]												

[a]CPW 2008
[b]Within direct line-of-sight
[c]G. Craig 2013 pers. comm.
[d]Kingery 1998 and G. Craig 2013 pers. comm.
[e]Kingery 1998 and Andrews and Righter 1992

The potential risk of birds colliding with overhead power lines depends on a number of factors. Although birds often exist near power lines without substantive collision risks, problems can emerge in localized areas where certain risks occur. Avian collision risks vary as a function of line design, adjacent land cover (habitat), local avian populations, and weather (APLIC 2012, Bevanger and Brøseth 2001, Mojica et al. 2009, Rollan et al. 2010). Specifically, utility structure type and location; habitat use near power lines; and bird size, maneuverability, and flight behavior, are particularly important in evaluating a species' vulnerability to colliding with power lines (APLIC 2012, Jenkins et al. 2011).

Since Barr Lake State Park attracts a variety of resident and migratory bird species, Tri-State requested EDM conduct an avian collision risk assessment for the proposed Bromley-Prairie Center Project (EDM 2012b). EDM specializes in assessing potential bird and power line interactions. Based on the concern identified during the public information process, a summary of this risk assessment is outlined for each action alternative and the final Avian Collision Risk Assessment (EDM 2007) is provided in Appendix F.

An EDM biologist conducted an initial field-based environmental review in May 2007 to identify potential project impacts (EDM 2007) for all project alternatives. In 2012, EDM overlaid the project with habitats identified during the initial 2007 surveys, landscape features, nest sites (CPW 2012, Barr Lake State Park 2013a and 2013b, G. Craig pers. comm. 2013), and Google Earth aerial imagery, converting GIS files of the three action alternatives and associated habitats to Google Earth KMZ format using the ArcGIS "Layer to KML" geoprocessing tool. EDM then conducted an updated field assessment in 2012 along the three action alternatives, based on the following factors:

- Areas of interest identified during the 2007 site reconnaissance.
- Proximity to Barr Lake and potential flight patterns.
- Wetland feature locations relative to route segments.
- Habitat and land use.
- Historical raptor, waterfowl, and waterbird nesting.
- Line configuration and height.

Collision risks emerge primarily in localized areas, most often where overhead wires, high quality habitats, and species with poor maneuverability co-occur. The proximity of power lines to locations where birds are landing and taking will affect avian collision risk (Stehn and Wassenich 2005), particularly during inclement weather and low-light conditions (APLIC 2012). A power line bisecting concentrated use areas (e.g., a line located between a feeding area and a roosting site of wetland birds) can be problematic, especially when only a short distance separates the use areas, resulting in birds making a short flight at the critical height. Birds crossing power lines at low altitudes several times a day makes them more susceptible to collision, as does flying in low light. The timing and duration of inclement weather and low-light conditions also affect bird collision rates (APLIC 2012).

On transmission structures, the smaller diameter of the OHS reduces the line profile, making the OHS more difficult to see and increasing the collision risk, as compared to the electrical

conductors (APLIC 2012, Pandey et al. 2007). Based on published field observations, birds that collide with power lines are generally thought to see the larger diameter energized lines. Birds adjust their flight altitude upward to avoid the energized lines (Pandey et al. 2007, Murphy et al. 2009, Martin and Shaw 2010) and have subsequently collided with the smaller diameter OHS. The avian collision

4.8.1 Proposed Action

Specific to the Proposed Action, mule and white-tailed deer moving into their winter ranges may avoid construction activities along the western edge of this range, west of Barr Lake (see Figure 3-6); however, the location of the project alignment does not bisect winter range integral to either species of deer. Habitat quality along the I-76 corridor and BNSF Railway is marginal for wintering deer, and line construction along the deer winter range perimeter would not affect habitat quality in the short or long term, based on the short construction period and the Proposed Action's reclamation measures (see Table 2-3).

Potential long-term direct and indirect effects to area wildlife during project operation also were examined. The addition of the proposed 115-kV transmission line would incrementally increase human-related infrastructure to the area, but restricting the corridor alignment along the I-76 and BNSF Railway corridors helps to co-locate utilities and minimize impacts to regional wildlife, as compared to directly bisecting high-value habitats.

The Proposed Action would intersect with 1.9 miles of black-tailed prairie dog colonies (see Table 4-3). Of those 1.9 miles, 1 mile would be located along the distribution line underground area (see Table 4-3). Although a total of 17.3 acres could be affected in the short term, limited direct disturbance to prairie dogs from project construction would be anticipated within the 75-foot-wide ROW along the 115-kV transmission line. Some burrowing animals might be lost from construction activities, including vehicle access; however, impacts would be considered negligible, based on the limited areas accessed for transmission line construction, short-term and small nature of this project, and high reproductive potential of this species of burrowing mammal. Along the 1-mile segment of the distribution line burial, a maximum of 3 acres of prairie dog burrows could be impacted within the 25-foot-wide construction ROW. The direct impacts to burrowing prairie dogs could encompass loss of animals and crushing of burrows from burial procedures and vehicle access. This potential impact to this colony would be considered to be minor, based on the short-term and small project and the reproductive capabilities of this species.

One beneficial, direct, long-term impact from implementation of the Proposed Action is the proposed burial of United Power's existing wood-pole 12.47-kV distribution line. As discussed above for all action alternatives, the operation of the 115-kV transmission line would not pose an electrocution risk to birds, based on the safety clearances required for a line of this voltage and size. However, for the lower distribution voltages, APLIC (2006) recommends 60 inches of horizontal and 40 inches of vertical clearances. Burying United Power's existing distribution line with limited phase-to-phase and phase-to-ground clearances would result in a long-term beneficial impact to area raptors, including bald eagles given the location of the distribution line in proximity to bald eagle use areas (see Figure 3-9). This distribution line currently presents a minor to moderate electrocution risk to eagles, hawks, and owls, depending on the structure configuration and type of equipment on the poles. Burying this distribution line would result in the electrocution risk to area birds dropping to none for the Proposed Action.

As discussed in general above for all project alternatives and in detail in Appendix F, the avian collision risk with an overhead power line is based on a number of variables, including line design, habitat, local bird use, bird species potentially present, and weather. Pertaining to assessing the potential avian collision risk along the Preferred Route alignment, Figure 4-1 depicts how vegetation screening could reduce collision risks to area birds. Tree placement as a form of vegetation screening with a height at or above the height of the power line can reduce avian collision risk, as the trees provide a visible tree line, forcing the birds to gain altitude over the trees and nearby power line conductors or OHS (APLIC 2012).

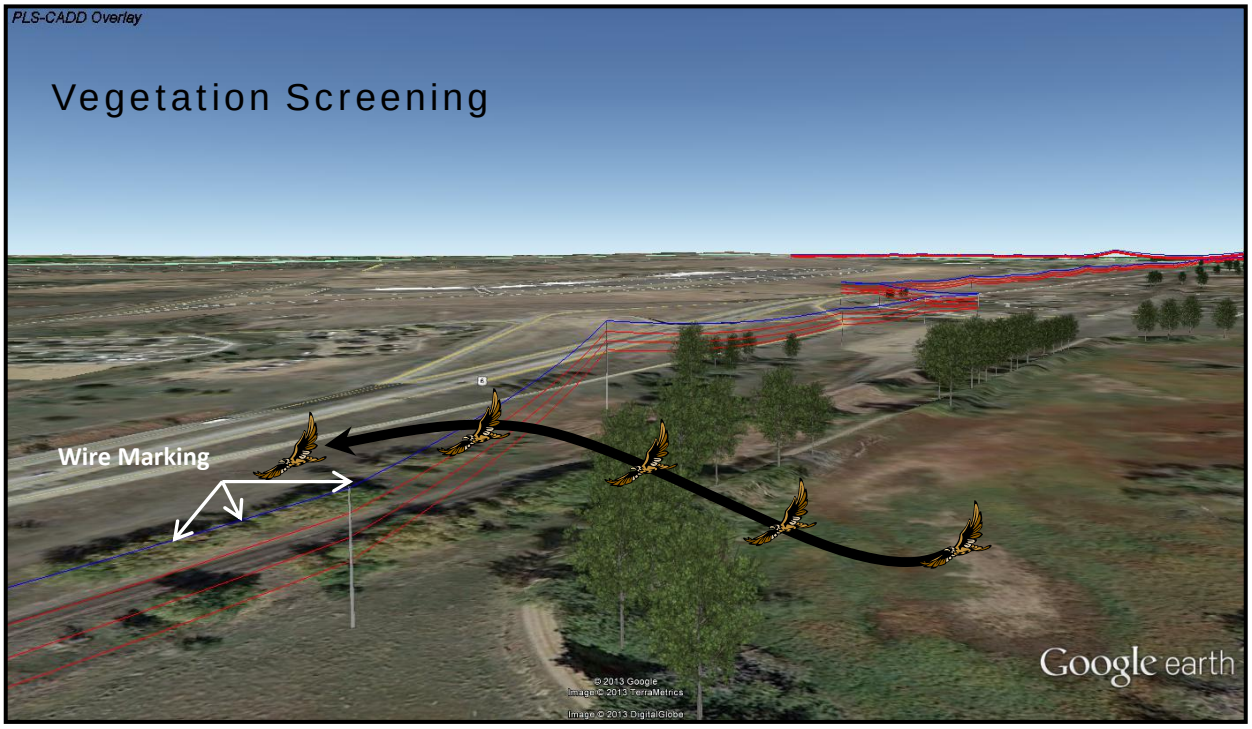


Figure 4-1 Example of how Vegetation Screening can Reduce Avian Collision Risk

Birds moving around the Barr Lake area may fly at lower altitudes, increasing the collision risk if a power line bisects daily movement corridors. The Preferred Route, parallel to the lake, is not bisecting known and established bird concentrations or movement corridors, which would aid in minimizing avian collision risk. However, given the resource sensitivity for area birds, the EDM collision risk assessment (EDM 2012b) used a conservative approach and identified the risk of bird collisions to be low (minor) to moderate, depending on line location relative to native bird use areas, with the line segments located east of I-76 considered slightly higher in risk than those located west of the I-76 corridor. The terminology used in the risk assessment included the term “low,” which is defined as “minor” in this EA. Both are used when referencing the avian collision risk assessment.

The line segments east of I-76 are located closer to Barr Lake and nesting and wintering birds, particularly at the southern end of the Proposed Action. The ROW alignment for the segments north of the Prairie Center Substation parallel to the railway track are buffered somewhat by a vegetative screen and some residential housing. At the north end of the lake, the bird movement is primarily to the northeast (parallel to the proposed line), reducing the chance of bird collisions.

Tri-State is proposing to use an OPGW instead of just an OHS. OPGW provides a greater diameter than OHS; therefore, it also increases line profile and visibility for birds. The avian collision risk assessment (EDM 2012b) identified a low (i.e., minor) to moderate risk of avian collisions with the OPGW along the Proposed Action during project operation, depending on the location of the route to native bird use areas, as depicted in Figure 3-8 and Figure 3-9 (also see Appendix F). The route alignment along the edge of Barr Lake State Park and within the I-76 and BNSF Railway corridors helps to co-locate utilities and minimize avian collision risk, as compared to directly bisecting high-value bird habitats.

Based on this risk, EDM (2012b) recommended marking the OPGW along specific line segments (approximately 4 miles) of the Proposed Action from the Prairie Center Substation to the crossing of I-76 and Bromley Lane.

Figure 4-2 and Figure 4-3 show the recommended marking areas relative to both summer and winter use areas for the bald eagle and for area waterbirds and waterfowl, respectively.

Tri-State has committed to installing the applicable avian marking devices (based on engineering review and requirements) on the OPGW along this 4-mile segment. The devices would be installed on the OPGW wire per the installation recommendations outlined in APLIC (2012) to minimize the risk of avian collisions from possible east-west bird movement from Barr Lake (see EPM WR-2 in Table 2-3). Marking the OPGW with an appropriate marking device developed specifically for birds (e.g., Swan Flight Diverters [SFDs]) would increase the line profile and reduce potential collision risks in the long term. Other transmission OHS lines in the Barr Lake area have been strategically marked with SFDs on previously constructed United Power System Improvement Projects, and no collisions have been detected to date. Marking the OPGW of the Proposed Action would decrease the potential direct, long-term adverse effects to area birds from moderate to minor.

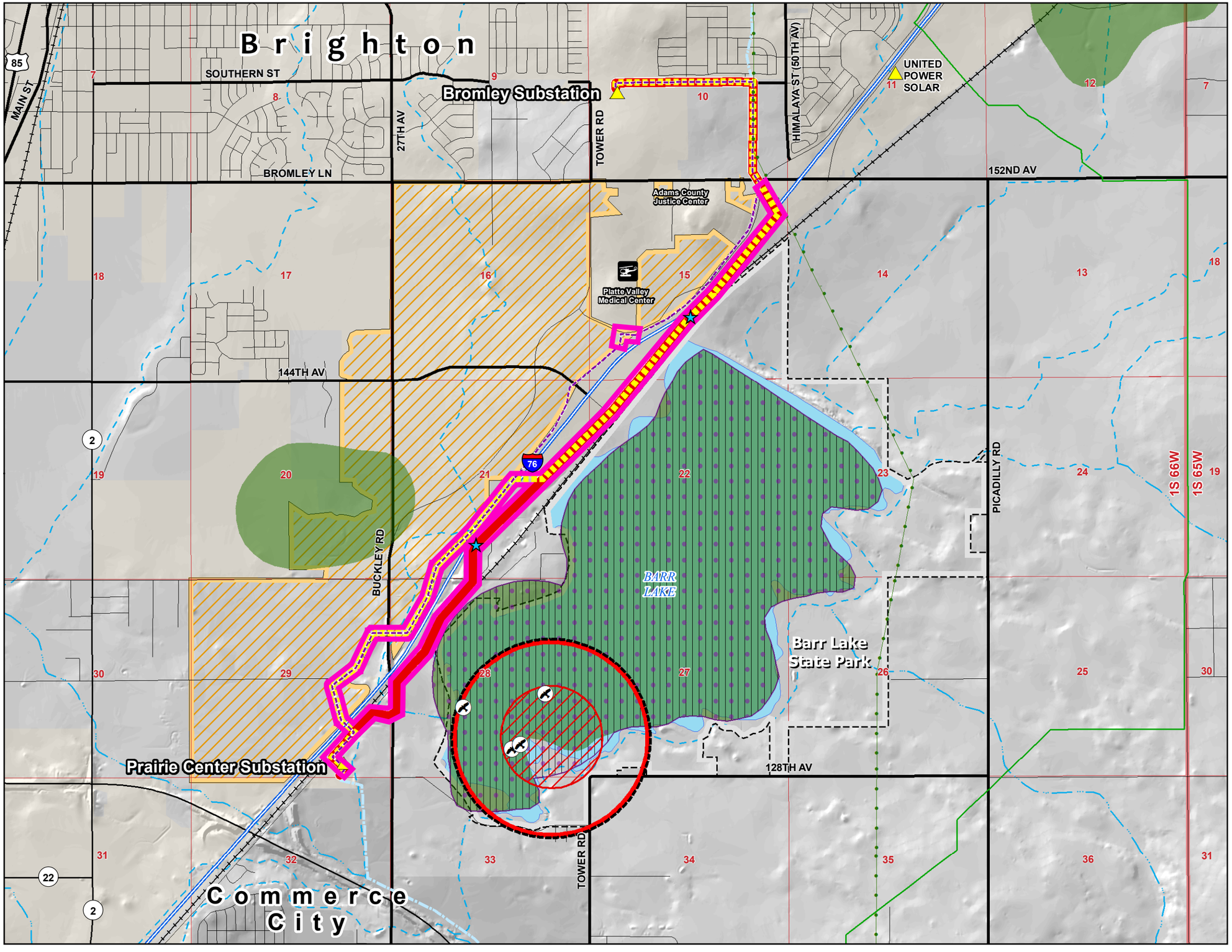
Potential impacts to area wildlife from periodic project maintenance activities along the Proposed Action would be limited to a short-term increase in human presence and equipment use along the ROW during these inspections. However, given the short-term and localized nature of these activities, the vegetative buffering in specific areas along the alignment, and the type of maintenance activities (which would be similar to existing vehicle and train traffic along highway and railway corridors, respectively), no long-term impacts to area wildlife from project maintenance would be anticipated. Periodic maintenance also would inspect the avian marking devices and any damaged devices would be replaced, as warranted.

In summary, the Preferred Route alignment's location between the I-76 and BNSF Railway corridors traveling west of the Barr Lake State Park perimeter would aid in co-locating the power line along established infrastructure, disturbed areas, and commercial development. Additional EPMs listed in Table 2-3 have been developed to minimize potential effects for residual issues.

Bromley-Prairie Center 115kV Transmission Line Project

Figure 4-2

Proposed OHS Marking Relative to Bald Eagle Use Areas



0 1,250 2,500 5,000 Feet

1:30,000

1 inch = 2,500 feet

N

Project Facilities

- Substation
- Start/End Point: Distribution Line Underground
- Preferred Route
- Alternative A
- Alternative B
- Existing Gas Pipeline
- Existing Tri-State Line
- Collision Assessment Areas to be Marked

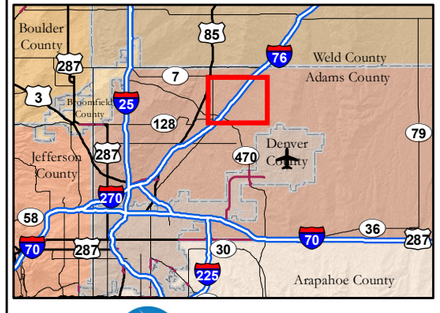
Jurisdiction

- City of Brighton
- Commerce City
- Barr Lake State Park
- Prairie Center Development

Wildlife

- Bald Eagle Historic Nest Sites (prior to 2003)
- Bald Eagle Active Nest (2003-2013) (0.5-mile buffer)
- Bald Eagle Winter Roost
- Bald Eagle Summer Forage
- Bald Eagle Winter Concentration
- Bald Eagle Winter Forage and Winter Range

Source: CPW 2012, EDM 2012b, G. Craig 2013, Barr Lake State Park 2013a, 2013b



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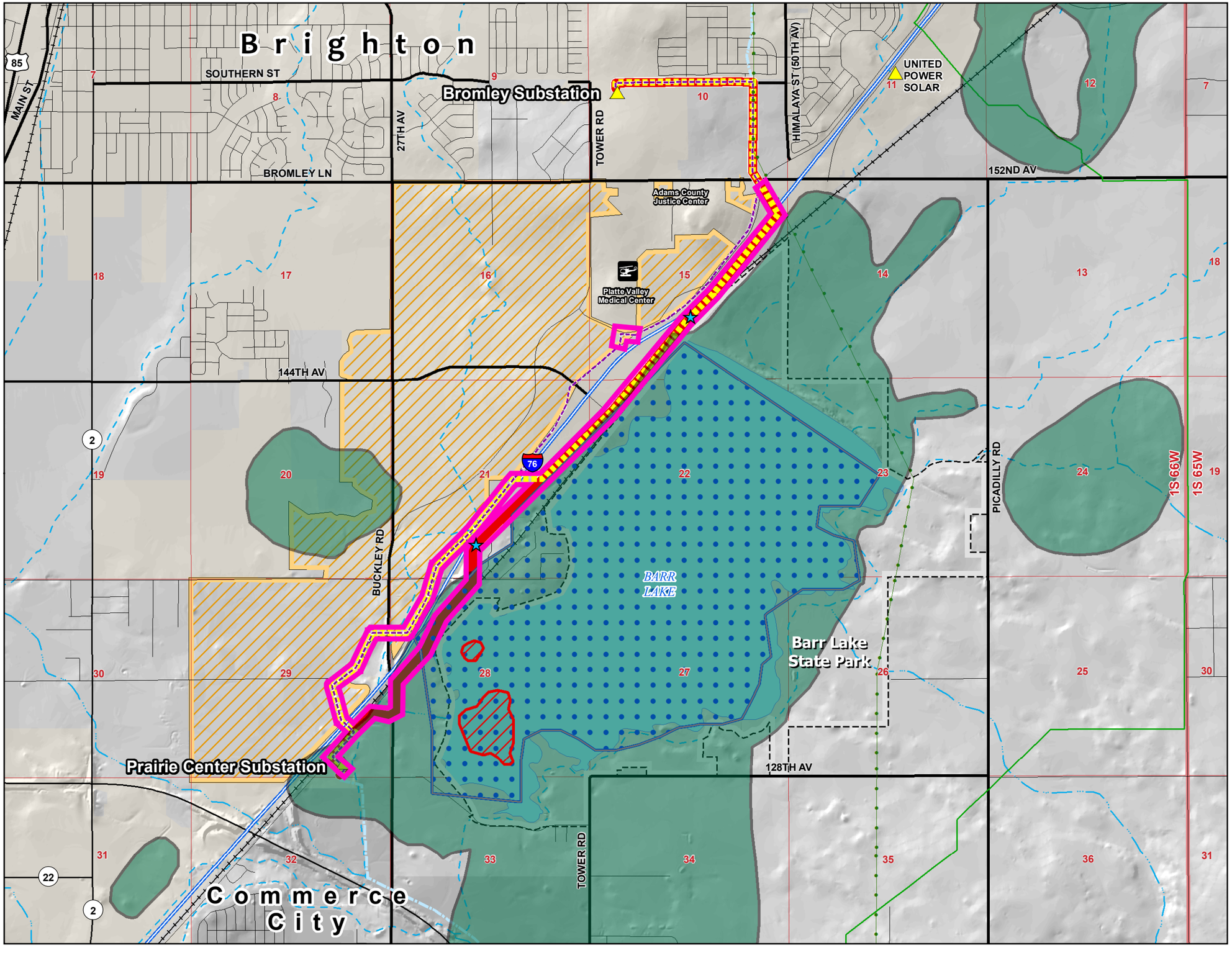
Bromley-Prairie Center 115kV Transmission Line Project

Figure 4-3
Proposed OHS Marking Relative to Waterbird and Waterfowl Use Areas



0 1,250 2,500 5,000 Feet

1:30,000

1 inch = 2,500 feet

N

Project Facilities

- Substation
- Start/End Point: Distribution Line Underground
- Preferred Route
- Alternative A
- Alternative B
- Existing Gas Pipeline
- Existing Tri-State Line
- Collision Assessment Areas to be Marked

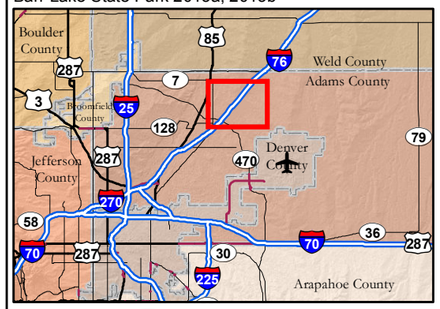
Jurisdiction

- City of Brighton
- Commerce City
- Barr Lake State Park
- Prairie Center Development

Wildlife

- Heron and Cormorant Rookery
- Canada Goose Brood Concentration
- Canada Goose Production Area

Source: CPW 2012, EDM 2012b, Barr Lake State Park 2013a, 2013b



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4.8.2 Alternative A

Impacts common to all action alternatives are previously discussed. Similar to the Proposed Action, the addition of the proposed 115-kV transmission line along the Alternative A alignment would incrementally increase human-related infrastructure to the area. Alternative A, being located west of I-76 and incrementally farther west of the Barr Lake State Park, would reduce potential effects to area wildlife species.

Specifically, Alternative A would intersect only small portions of the western perimeter of mule deer winter range and white-tailed deer concentration area in three locations (see Figure 3-6). As discussed for the Proposed Action, habitat quality along the I-76 corridor and BNSF Railway corridors is marginal for wintering deer, and line construction along the deer winter range perimeter would not directly affect habitat quality in the short or long term, based on the short construction period and the proposed reclamation measures (see Table 2-3).

Alternative A would intersect only 124 feet (0.2 acre) of black-tailed prairie dog colonies near the Bromley Substation (see Figure 3-7 and Table 4-3). Limited direct disturbance to prairie dogs would be anticipated for the 115-kV transmission line construction in this area, where some burrowing animals might be lost from construction activities, including vehicle access. However, impacts would be considered negligible and short term, based on the limited area, short-term and small nature of this project, and high reproductive potential of this species of burrowing mammal. Colonies located between I-76 and the BNSF Railway would not be impacted by Alternative A.

Under Alternative A, United Power's existing distribution line located west of Barr Lake along the I-76 and railroad corridor would remain aboveground. Therefore, the potential for avian electrocution would remain, resulting in a long-term, indirect minor to moderate electrocution risk to area raptors (including bald eagles, hawks, and great horned owls), depending on the structure configuration and type of equipment on the poles.

Relative to potential collision risk to local birds during project operation, the west side of I-76 is being rapidly developed, particularly along the northern portion of the alignment. However, Alternative A bisects bird use areas in two primary locations. First, a wetland located at the intersection of Buckley Road and I-76 supports emergent vegetation, and breeding Canada geese and yellow-headed blackbirds were document during the 2007 field review (EDM 2007). The alignment travels between shortgrass prairie and fallow agricultural fields and a series of small wetlands (see Sheet 4 of 4 in Figure 3-5). Secondly, similar to the Proposed Action, Alternative A occurs between two large use areas for both waterfowl and bald eagles (see Figure 3-8 and Figure 3-9), which encompass Canada goose production areas and bald eagle winter forage areas. Similar to the Proposed Action, the avian collision risk along Alternative A would be low (minor) to moderate, depending on line location relative to native bird use areas. The collision risk in the area between the small wetlands would be considered moderate. The collision risk in the larger area between waterfowl and eagle use areas would range from low (minor) to moderate (see Appendix F). Although Alternative A is located farther west of the state park, it still bisects bird use areas and line marking would be prudent in these areas.

Suggested marking of the OPGW along Alternative A would include from the Prairie Center Substation north to where the Alternative B line segment crosses over from the Proposed Action and over the small wetland located at the intersection of Buckley Road and I-76 (see Figure 4-2 and Figure 4-3). Recommended line marking protocol would be the same as that discussed for the Proposed Action. Tri-State has committed to installing the applicable avian marking devices

on the OPGW along these segments (see EPM WR-2 in Table 2-3). Marking the OPGW with an appropriate marking device developed specifically for birds would increase the line profile and reduce potential collision risks in the long term. Marking the OPGW of Alternative A would decrease the potential direct, long-term adverse effects to area birds from moderate to minor.

Potential impacts to area wildlife from periodic project maintenance activities along Alternative A would be similar to those described for the Proposed Action. These potential direct effects would be limited to a short-term increase in human presence and equipment use along the ROW during periodic inspections. However, these effects would be negligible in the long term during project operation. Periodic maintenance also would inspect the avian marking devices and any damaged devices would be replaced, as warranted. Additional EPMs listed in Table 2-3 have been developed to minimize potential effects for residual issues.

4.8.3 Alternative B

Similar to the analyses for the Proposed Action and Alternative A, the addition of the proposed 115-kV transmission line along Alternative B would incrementally increase human-related infrastructure to the area. No impacts to aquatic species or fisheries would occur, and since Alternative B is a combination of both the Preferred Route and Alternative A, potential short- and long-term effects to terrestrial species would be the same as the respective alignments.

Specifically, Alternative B would intersect portions of mule deer winter range and white-tailed deer concentration area in four locations (see Figure 3-6). As discussed for the Proposed Action and Alternative A, habitat quality along the I-76 corridor and BNSF Railway corridors is marginal for wintering deer, and line construction along the deer winter range perimeter would not directly affect habitat quality in the short or long term, based on the short construction period and the proposed reclamation measures (see Table 2-3).

Alternative B would intersect 1.7 miles of black-tailed prairie dog colonies near the Bromley Substation and a portion of the colonies located between I-76 and the BNSF Railway (see Figure 3-7 and Table 4-3). As discussed for the Proposed Action, although a total of 15.5 acres could be affected in the short term along Alternative B, limited direct disturbance to prairie dogs from project construction would be anticipated along the 115-kV transmission line.

Some burrowing animals might be lost from construction activities, including vehicle access, but impacts would be considered negligible and short term, based on the limited area, short-term and small nature of this project, and high reproductive potential of this species of burrowing mammal.

Under Alternative B, United Power's existing distribution line located west of Barr Lake along the I-76 and railroad corridor would remain aboveground; therefore, the potential for avian electrocution would remain as under current conditions, resulting in a long-term, indirect minor to moderate electrocution risk to area raptors (including bald eagles, hawks, and great horned owls), depending on the structure configuration and type of equipment on the poles.

Relative to avian collision risk, Alternative B bisects the same bird use areas as the Preferred Route and Alternative A. As stated for these other two alignments, the avian collision risk along Alternative B would be low (minor) to moderate, depending on line location relative to native bird use areas. Suggested marking of the OPGW for Alternative B would coincide with Alternative A from Prairie Center Substation to the crossover segment and coincide with the Preferred Route

from the crossover segment north to the crossing of I-76 at Bromley Lane (see Figure 4-2 and Figure 4-3). Recommended line marking protocol would be the same as that discussed for the Proposed Action.

Tri-State has committed to installing the applicable avian marking devices on the OPGW along this approximate 4-mile segment (see EPM WR-2 in Table 2-3). Marking the OPGW with an appropriate marking device developed specifically for birds would increase the line profile and reduce potential collision risks in the long term. Marking the OPGW of Alternative B would decrease the potential direct, long-term adverse effects to area birds from moderate to minor.

Potential impacts to area wildlife from periodic project maintenance activities along Alternative B would be the same as those described for the Proposed Action and Alternative A. The potential direct effects would be limited to a short-term increase in human presence and equipment use along the ROW during periodic inspections. However, these effects would be negligible in the long term during project operation. Periodic maintenance also would inspect the avian marking devices and any damaged devices would be replaced, as warranted. Additional EPMs listed in Table 2-3 have been developed to minimize potential effects for residual issues.

4.8.4 No Action Alternative

Under the No Action Alternative, no incremental impacts to terrestrial wildlife would occur, as described for the three action alternatives' construction. Loss of burrowing mammals and disturbance to more mobile species would not occur from vehicle and equipment access and increased noise and human presence along the ROW alignments. No minor to moderate increase in avian collision risks from the 115-kV transmission line would occur in the long term. However, the potential for avian electrocution on United Power's existing distribution line located west of Barr Lake along the I-76 and railroad corridor would remain as under current conditions, resulting in a minor to moderate risk to area raptors, including bald eagles.

4.9 Special Status Species

4.9.1 Proposed Action

4.9.1.1 Plants

As discussed in Section 3.9.1.1 *Special Status Species, Plants*, suitable habitat for the Ute ladies'-tresses orchid and the Colorado butterfly plant was identified in two wetlands along the Proposed Action (Wetlands W4 and W4A), and associated presence/absence surveys were conducted to determine if either plant species could be present (per EPM T&E-1). Project construction in these wetland areas is proposed to occur in late August through October of 2014 or 2015.

As part of the August 2013 field surveys, Tri-State's contractors surveyed the entirety of wetlands W4 and W4A to capture a much larger survey area and consequentially include any potential access routes and temporary use areas located within and adjacent to the Preferred Route alignment. Neither species was recorded during the August 2013 surveys (EDM 2013). Because of the no finding and the minimal impact expected to the potentially suitable habitat, further sensitive plant surveys are not recommended for the Proposed Action. However, if United Power's burial of the existing 12.47-kV distribution line extends beyond the 75-foot-wide ROW for the 115-kV transmission line, the applicable rare plant surveys would be conducted

within any suitable habitat crossed (see EPM T&E-1). Final USFWS concurrence documentation stating "No Concerns" was received on August 27, 2013 (see Appendix D). In summary, because special status plant species were not observed within the suitable habitat, Tri-State has committed to EPM T&E-1 to protect these two federally listed plants, and the USFWS issued a "No Concerns" documentation for this approach, no short- or long-term direct or indirect impacts to special status plants species would occur.

4.9.1.2 Animals

Table 4-5 summarizes the special status wildlife species assessed for this project with the applicable effects determination for each species. Section 3.9.1.2 *Special Status Animals* details the potential for each species to occur in the project area. The USFWS concurred with the "no effect" determinations under section 7 of the ESA (see Appendix D; Plage 2012, pers. comm.)

Table 4-5 Special Status Species Identified for Proposed Project

Group	Common Name	Scientific Name	Federal Status	State Status	Potential Effects Determination
Birds	Least tern (interior population)	*Sterna antillarum*	Endangered MBTA	Endangered	No Effect – Does not breed; potential incidental occurrence only
	Piping plover	*Charadrius melodus*	Threatened MBTA	Threatened	No Effect – Does not breed; potential incidental occurrence only
	Burrowing owl	*Athene cunicularia*	MBTA	Threatened	No Effect – EPM T&E-2 developed to protect nest sites and young; no collision risk
	Bald eagle	*Haliaeetus leucocephalus*	BGEPA MBTA	State Species of Special Concern Threatened	No Effect – Breeding birds Project timing; EPM WR-3 developed to protect nest sites and young No Effect – Wintering birds Project timing; distance and buffering would protect wintering birds Minor Effect – Collision Risk
Mammals	Preble's meadow jumping mouse	*Zapus hudsonius preblei*	*Threatened - ESA*	Threatened	No Effect – Does not occur

The potential effects analyses for special status animal species encompassed the state-listed burrowing owl and the state species of special concern, the bald eagle. The bald eagle also is protected under the BGEPA, and both species are protected under the Migratory Bird Treaty Act (MBTA).

As discussed in Section 3.9 *Special Status Species*, burrowing owls may nest within the black-tailed prairie dog colony near the Bromley Substation and are known to occur within Barr Lake State Park. Proposed construction periods from August through October in 2014 and 2015 would overlap with this owl species' breeding season. In order to ensure the project does not impact burrowing owls, Tri-State has committed to conducting burrowing owl surveys to determine if an active nest site occurs within 150 feet of proposed construction activities between March 15 and October 31. If present, Tri-State also has committed to avoid human encroachment within 150 feet of an active burrowing owl nest site or an Environmental Monitor would be present at all times to ensure eggs or young are not lost (see EPM T&E-2 in Table 2-3).

Bald eagles have historically nested at Barr Lake. Figure 3-9 depicts the currently active nest area with a 0.5-mile buffer applied. Several inactive historic nest sites also are shown, scattered along the lake's southern perimeter. The National Bald Eagle Management Guidelines (USFWS 2007) state that after 5 years of continuous disuse of a nest, the Guidelines' protections "…may be no longer be warranted." Additionally, these historic sites are no longer present, given the nests either deteriorated or the nest trees have blown down.

Parallel to the general bird species discussion in Section 4.8 *Wildlife Resources*, no impacts to breeding birds (including the bald eagle) from project construction would be anticipated, based on the proposed fall and early winter construction period. In the event, construction activities were to extend into the eagle's breeding season (October 15 through August 31), Tri-State has committed to EPM WR-3 in Table 2-3 to protect nesting bald eagles. A qualified biologist would conduct a pre-construction nesting survey and an Environmental Monitor would be present to monitor bald eagle behavior, if warranted. If an active bald eagle nest were to occur within 0.5 mile of construction areas, nest protection measures would be developed, ranging from establishing a restricted buffer area around the nest site until the young have fledged to having an Environmental Monitor present to ensure the nest, eggs, young, and adults are protected. This measure also is in accordance with the recommended seasonal restrictions for nesting raptors developed by the CPW (2008).

Relative to wintering bald eagles at Barr Lake, the proposed construction schedule would avoid the bald eagle winter concentration period, which extends from November 15 through March 15. If construction were to extend into the winter season for area eagles, construction would occur during daylight hours when eagles are typically foraging away from the roost. Construction typically would not occur during inclement weather when eagles may be present at the communal roost sites during daylight hours. Additionally, the distance and vegetative buffering between the Preferred Route alignment and eagle use areas would collectively minimize exposure to increased noise levels and human presence from the short-term construction activities during this early period. Therefore, no impacts to wintering eagles or their winter roost sites would be anticipated.

Section 4.8 *Wildlife Resources* provides a detailed analysis of the avian collision risk assessment conducted for project operation (EDM 2012b). The avian collision risk for the Preferred Route was assessed to be low (minor) to moderate during project operation, depending on the location of the route to native bird use areas. Pertaining to the bald eagle and

burrowing owl, potential collision risk with the OPGW would only apply to the bald eagle. The flight characteristics of the burrowing owl do not present a risk of colliding with overhead lines.

The location of the alignment parallel to the lake and within the I-76 and BNSF Railway corridors helps to co-locate utilities and minimize avian collision risk, as compared to directly bisecting high-value bird habitats. However, given the resource sensitivity for area birds, the collision risk assessment (EDM 2012b) used a conservative approach, and proposed line marking of the OPGW was recommended from the Prairie Center Substation to the crossing of I-76 and Bromley Lane.

Historically, raptors have been considered to be at relatively low risk of colliding with power lines, as compared to other species, such as cranes. Bald eagles and other diurnal raptors are mobile during the daylight hours and generally fly during times of good visibility. Literature shows that birds of prey have acute eyesight, are good fliers, have the ability to avoid obstacles, and are not prone to collisions. However, raptors may still be at risk, depending on line orientation to use areas (Mojica et al. 2009). Therefore, protection measures have been developed to minimize this risk.

Tri-State has committed to installing the applicable avian marking devices (based on engineering review and requirements) on the OPGW along a 4-mile segment, per the installation recommendations outlined in APLIC (2012). Figure 4-2 shows the recommended marking areas relative to both summer and winter use areas for the bald eagle. Marking the OPGW with an appropriate marking device developed specifically for birds would increase the line profile and reduce potential collision risks in the long term, particularly for possible east-west bird movement from Barr Lake (see EPM WR-2 in Table 2-3). Marking the OPGW of the Preferred Route would decrease the potential long-term effects to area birds from moderate to minor.

No impacts to nesting or wintering bald eagles or breeding burrowing owls from periodic project maintenance activities would be anticipated. This assessment is based on the short-term and localized nature of these activities, vegetative buffering minimizing any line-of-sight or increased noise effects to bald eagle use areas, and the type of maintenance activities would be similar to existing vehicle and train traffic along highway and railway corridors, respectively. Periodic maintenance also would inspect the avian marking devices and any damaged devices would be replaced, as warranted.

4.9.2 Alternative A

4.9.2.1 Plants

Wetlands W4 and W14 located along the Alternative A alignment are identified as containing suitable habitat for the Ute ladies'-tresses orchid and the Colorado butterfly plant. Neither species was observed during presence/absence surveys in August 2013 at Wetland W4. A "No Concerns" determination was issued by the USFWS on August 27, 2013 (see Appendix D) for Wetland W4. Presence/absence species surveys were not conducted within Wetland W14. Per EPM T&E-1, if any disturbance is anticipated within W14, Tri-State would contract with a qualified botanist to conduct presence/absence surveys prior to construction. Because of the "No Concerns" documentation from the USFWS for W4 and due to the incorporation of EPM T&E-1 for W14, no short- or long-term direct or indirect impacts to special status plants species would be anticipated under Alternative A.

4.9.2.2 Animals

Potential effects to the burrowing owl and bald eagle under Alternative A would parallel that discussed for birds under the Proposed Action. No impacts to breeding burrowing owls or bald eagles from project construction would be anticipated, based on the proposed fall and early winter construction period. Additionally, committed EPMs have been developed to protect nesting raptors in the event the construction season extended into the breeding season (see EPMs T&E-2 and WR-3 in Table 2-3).

The potential for bald eagle electrocutions would remain as under current conditions along United Power's existing distribution line located west of Barr Lake along the I-76 and railroad corridor (see Figure 4-2), resulting in a minor to moderate risk to eagles, depending on the structure configuration and type of equipment on the poles. The potential collision risk to bald eagles along Alternative A during project operation would be the same as discussed in Section 4.8.2 *Wildlife Resources, Alternative A*. Suggested marking of the OPGW along Alternative A would include from the Prairie Center Substation north to where the Alternative B line segment crosses over from the Preferred Route and over the small wetland located at the intersection of Buckley Road and I-76 (see Figure 4-2 and Figure 4-3). Tri-State has committed to installing the applicable avian marking devices on the OPGW along these segments (see EPM WR-2 in Table 2-3). Marking the OPGW of Alternative A would decrease the potential long-term, indirect effects to breeding and wintering bald eagles from moderate to minor. No overhead collision risks to the burrowing owl would result from project operation along this alternative alignment, based on the owl's basic flight characteristics.

4.9.3 Alternative B

4.9.3.1 Plants

Baseline data regarding special status plant species along the Alternative B alignment is identical to that identified for Alternative A. Wetlands W4 and W14 located along the Alternative B alignment are identified as containing suitable habitat for the Ute ladies'-tresses orchid and the Colorado butterfly plant. Neither species was observed during presence/absence surveys in August 2013 at Wetland W4. A "No Concerns" determination was issued by the USFWS on August 27, 2013 (see Appendix D) for Wetland W4. Presence/absence species surveys were not conducted within Wetland W14. Per EPM T&E-1, if any disturbance is anticipated within W14, Tri-State would contract with a qualified botanist to conduct presence/absence surveys prior to construction. Because of the "No Concerns" documentation from the USFWS for W4 and due to the incorporation of EPM T&E-1 for W14, no short- or long-term direct or indirect impacts to special status plants species would be anticipated under Alternative B.

4.9.3.2 Animals

Potential effects to the burrowing owl and bald eagle under Alternative B would parallel that discussed for birds under the Proposed Action and Alternative A. No impacts to breeding burrowing owls or bald eagles from project construction would be anticipated, based on the proposed fall and early winter construction period. Committed EPMs have been developed to protect nesting raptors in the event the construction season extended into the breeding season (see EPMs T&E-2 and WR-3 in Table 2-3).

As discussed for Alternative A, the existing distribution line would remain aboveground and there would continue to be a minor to moderate risk of avian electrocution, depending on the structure configuration and type of equipment on the poles. The potential collision risk to bald eagles along Alternative B during project operation would same as discussed in Section 4.8.3 *Wildlife Resources, Alternative B*. Alternative B bisects the same bird use areas as the Preferred Route and Alternative A. As stated for these other two alignments, the avian collision risk along Alternative B would be low (minor) to moderate, depending on line location relative to native bird use areas. Suggested marking of the OPGW for Alternative B would coincide with Alternative A from Prairie Center Substation to the crossover segment and coincide with the Preferred Route from the crossover segment north to the crossing of I-76 at Bromley Lane (see Figure 4-2 and Figure 4-3). Marking the OPGW of Alternative B would decrease the potential direct, long-term adverse effects to area birds from moderate to minor.

Suggested marking of the OPGW for Alternative B would coincide with Alternative A from Prairie Center Substation to the crossover segment and coincide with the Preferred Route from the crossover segment north to the crossing of I-76 at Bromley Lane (see Figure 4-2). Tri-State has committed to installing the applicable avian marking devices on the OPGW along this approximate 4-mile segment (see EPM WR-2 in Table 2-3). Marking the OPGW with an appropriate marking device developed specifically for birds would increase the line profile and reduce potential collision risks in the long term for breeding and wintering eagles from moderate to minor. No overhead collision risks to the burrowing owl would result from project operation along this alternative alignment, based on the owl's basic flight characteristics.

4.9.4 No Action Alternative

4.9.4.1 Plants

Under the No Action Alternative, no vegetation would be removed or disturbed by proposed construction activities, and no structures would be placed in suitable sensitive plant habitat in wetlands located in the project area. Consequently, no potential temporary or permanent effects to suitable habitat for either the Ute ladies'-tresses orchid or the Colorado butterfly plant would occur under the No Action Alternative.

4.9.4.2 Animals

Under the No Action Alternative, no low (minor) to moderate risk of increased avian collisions for area bald eagles would occur in the long term. However, the potential for bald eagle electrocution on the existing distribution line located west of Barr Lake along the I-76 and railroad corridor would remain as under current conditions, resulting in a long-term minor to moderate risk to both breeding and wintering eagles, depending on the structure configuration and type of equipment on the poles.

4.10 Cultural Resources

Table 4-6 summarizes the four historic sites located within the APE for all three action alternatives. Appendix G contains the cultural resources communications with SHPO for the project.

Table 4-6 Summary of Potential Impacts to Cultural Sites

Site	Time Period	Site Type	NRHP Eligibility (Field Assessment)	Preferred Route	Alternative A (acres)	Alternative B (acres)
5AM139	Historic	Barr City Schoolhouse	Field Not Eligible	Route is near but does not cross site; no direct impact	Route is 275 meters (301 yards) from site; no direct impact	Route is 275 meters (301 yards) from the site; no direct impact
5AM464.18	Historic	BNSF Railway segment	Field Eligible	Route spans railway; no direct impact	Route spans unrecorded segment of railway; no direct impact	Route spans unrecorded segment of railway; no direct impact
5AM465.15	Historic	Burlington Ditch segment	Field Eligible	Route spans ditch; no direct impact	Route spans ditch; no direct impact	Route spans ditch; no direct impact
5AM2827	Historic	Trash scatter	Field Not Eligible	Route spans site; no direct impact	Route is 275 meters (301 yards) from site; no direct impact	Route is 275 meters (301 yards) from site; no direct impact

4.10.1 Proposed Action

Four sites, all historic, lie within the APE of the Proposed Action (Table 4-6). No direct or indirect impacts to these cultural resources would occur. The Proposed Action would be located approximately 700 feet from the Emil Bruderlin Homestead (site 5AM140) at Barr Lake State Park, which is listed on the Colorado State Register of Historic Places and has been determined "officially eligible" for the NRHP. The Proposed Action is separated from 5AM140 by the BNSF Railway and an existing distribution line, and therefore indirect, visual impacts would be minor.

Tri-State has committed to instructing all construction personnel on protection of cultural resources (EPM CR-1); has committed to avoiding known eligible cultural resources during construction, operation, and maintenance (EPM CR-2); has committed to a protocol for addressing discoveries of previously undocumented cultural resources (EPM CR-3), and has committed to conducting Class III cultural clearance surveys if the distribution ROW were to extend beyond the cultural clearance areas completed to date (CR-4). Based on these committed measures, known eligible cultural resources would be protected and unanticipated

discoveries would be managed in such a way that impacts of any type would be minimized and full compliance with federal historic preservation law would be achieved.

4.10.2 Alternative A

One recorded site and one unrecorded site occur along the Alternative A alignment; impacts are summarized in Table 4-6. Alternative A would be located approximately 1,000 feet from the Emil Bruderlin Homestead (site 5AM140), but would be separated from the site by the BNSF Railway, I-76, and an existing distribution line. Therefore, indirect, visual impacts would be considered minor. No other eligible cultural resources are known to occur in the immediate area of Alternate A, although the route in its entirety has not been subjected to a Class III inventory.

4.10.3 Alternative B

One recorded site and one unrecorded site occur along the Alternative B alignment; impacts are summarized in Table 4-6. Alternative B would be located approximately 700 feet from the Emil Bruderlin Homestead (site 5AM140), but would be separated from the site by the BNSF Railway and an existing distribution line. Therefore, indirect, visual impacts would be considered to be minor. No other eligible cultural resources are known to occur in the immediate area of Alternate B, although the route in its entirety has not been subjected to Class III inventory.

4.10.4 No Action Alternative

Under the No Action Alternative, no short- or long-term impacts to cultural resources, either previously recorded or undocumented, would occur.

4.11 Transportation

4.11.1 Proposed Action

4.11.1.1 Aviation Facilities

The Brighton Van Aire Estates Airport is located approximately 2.5 miles from the Preferred Route alignment. The line location, combined with the airport's northeasterly traffic pattern indicates there would be no adverse effects on the airport from the Proposed Action.

The Proposed Action would have a negligible effect on air traffic associated with the Platte Valley Medical Center. The Proposed Action would be located on the opposite side of I-76 from the Platte Valley Medical Center heliport. Transmission line structures would typically be 75 to 95 feet tall with a limited number up to 110 feet tall at crossings for I-76 and the BNSF Railway. These structures would be well below half the maximum 278 feet height deemed acceptable for the Preferred Route by the height limitation study for the heliport (JViation 2012). The location of the transmission line under the Proposed Action is the most advantageous from the perspective of heliport safety because of the distance from the heliport (JViation 2012).

Construction of the Proposed Action would require filing of *Form 7460-1 Notice of Proposed Construction* to the FAA, but transmission line structures on the Preferred Route would not penetrate the requisite airspace for the heliport. Therefore, any potential effects to air traffic at the medical center would be negligible.

4.11.1.2 Roads and Railways

Construction of the Proposed Action would result in minor, short-term effects on the existing transportation network. Construction would require access to the ROW via existing city and county streets and roads, possibly resulting in short-term delays, but all such delays would be temporary and there are alternate routes available for public traffic detours. Stringing of conductors and other activities may require brief traffic interruptions on I-76. Where construction activity for the Proposed Action would occur in a public road ROW, or would cause traffic interruptions, the construction Contractor would be required to provide necessary traffic controls according to city of Brighton, Adams County, and Colorado Department of Transportation standards (see EPM T-1 in Table 2-3).

A Utility/Special Use Permit Application to CDOT would be required for permission to construct the transmission line across I-76. As part of that application, a Traffic Control Plan that conforms to CDOT's *Manual of Uniform Traffic Control Devices for Streets and Highways* would be completed and submitted.

Construction of the Proposed Action would generate a small amount of traffic on local streets and highways. The effects would be minimal, as construction crews would typically comprise 15 or fewer individuals at one time. Some heavy truck traffic would be required to deliver structure and conductor materials. This traffic would be dispersed along the Proposed Action and would have minimal effects on traffic at any particular location.

Short-term effects could occur where proposed transmission line would need to cross the BNSF Railway. Stringing conductors over railway tracks may require short-term delays in rail operations. Any such activities would be coordinated with the BNSF Railway to minimize scheduling disruptions.

Routine operation and maintenance of the transmission line would have no anticipated effects on transportation or access in the project area. Personnel would use light-duty trucks on public roads and overland travel in the ROW to conduct inspections and to provide maintenance or repairs at individual transmission structures.

4.11.2 Alternative A

4.11.2.1 Aviation Facilities

The effects on aviation from construction and operation of Alternative A would be similar to those described for the Proposed Action. No effects on the Brighton Van Aire Estates Airport would be expected.

Potential effects on the Platte Valley Medical Center heliport would be essentially the same as those described for the Proposed Action. Alternative A would be slightly closer to the heliport so the maximum allowable structure height would be 217 feet for this alternative, rather than the 278 feet that would be acceptable for the Proposed Action (JViation 2012). This height restriction would still be well above the highest structure anticipated for the project and more than double the 95- to 110-foot height potentially used on the route nearest the heliport. Consequently, Alternative A would not result in any penetration of the requisite airspace for the heliport any adverse effects on the heliport would be negligible.

4.11.2.2 Roads and Railways

Effects on roads and the BNSF Railway from Alternative A would be essentially the same as from the Proposed Action, except that they would occur on the northwest side of I-76 rather than on the southeast side. Alternative A would not be adjacent to the railway ROW so there would be slightly less coordination required with railway operations during project construction. As for the Proposed Action, effects of Alternative A would be minor and short-term in nature.

4.11.3 Alternative B

4.11.3.1 Aviation Facilities

Effects on aviation from construction and operation of Alternative B would be the same as described for the Proposed Action, because the alignment of the transmission line nearest the Platte Valley Medical Center would be the same for both alternatives.

4.11.3.2 Roads and Railways

Alternative B would have essentially the same effects on roads and the BNSF railway as the Proposed Action and Alternative A, except that Alternative B would require three crossings of I-76 rather than a single crossing. The effects would be slightly greater than for the other two alternatives, but still minor and short-term in nature.

4.11.4 No Action Alternative

The No Action Alternative would have little or no discernible effect on transportation in the study area.

4.12 Land Use

4.12.1 Proposed Action

Effects on land use resulting from construction, operation, and maintenance of the Proposed Action would be minor. Tri-State has committed to four EPMs that would minimize both short-term and long-term effects on use and productivity of potentially affected lands (see EPM LU-1 through LU-4 in Table 2-3).

The Proposed Action would closely follow existing transportation corridors for essentially its entire length. It would utilize existing Henry Lake to Bromley 115-kV transmission structures for the first 0.7 mile paralleling Southern Street. It would then collocate with a subsurface gas pipeline for the next 0.5 mile south to Bromley Lane. From Bromley Lane to the termination point at the Prairie Center Substation the Proposed Action would be adjacent to ROWs for I-76, the BNSF Railway, Telluride Street, Buckley Road, and Cameron Street the entire way. In addition to the surface transportation infrastructure, there is an existing electric distribution line between I-76 and the railway that would be buried prior to construction of the Proposed Action (Figure 1-1).

The land area committed to permanent use for the proposed transmission line would be negligible. There would be approximately 50 new structures required for the project, with directly

embedded structures requiring approximately 7 square feet of land following reclamation and structures with concrete foundations requiting an estimated 40 square feet of land in the long term. A small number of access points along the Proposed Action may be required for project construction and operations for those few locations where direct adjacent road access would not be possible.

All current uses of the lands that the Proposed Action would cross could return after completion of successful reclamation on all but the few square feet permanently dedicated to the structures. Considering the low current productivity of most of the areas proposed for disturbance, the loss of utility for such a small land area would be very minor. The most productive land crossed by the Proposed Action would likely be the agricultural land located immediately northeast of the Prairie Center Substation (Figure 3-5). Considering the proposed alignment of the transmission line across the agricultural land and assuming structure spacing of 500 to 600 feet, there could be as many as five structures on the agricultural land. Assuming these five structures would be directly embedded, this would result in a permanent loss of approximately 35 square feet, or less than 0.001 acre of agricultural land, which would be a very minor effect.

Potential use conflicts between the Proposed Action and existing adjacent land uses would be minimal. There would be no identifiable conflict with the surface streets or the railway that the transmission line would parallel. Direct, short-term, minor impacts would be expected for approximately 0.5 acre of prime farmland during the removal and burying of United Power's distribution line (see Section 4.3 *Soils*). However, none of these lands intersected by the transmission line route or undergrounded distribution line is currently in production or irrigated. The Proposed Action would not intersect with Barr Lake State Park

Construction, operation, and maintenance of the Proposed Action would comply with applicable zoning regulations for both Adams County and the city of Brighton. County and city approvals that are required prior to construction for compliance with zoning regulations have been obtained by Tri-State. The Proposed Action would not conflict with future land use goals for the area as detailed in the Adams County or city of Brighton comprehensive plans. Providing the proposed redundant power loop would support development of the Prairie Center PUD by providing more reliable power for area businesses and residents.

Burial of the existing 1.6-mile 12.47-kV distribution line would have minimal effects on land use. The potential alignment is located on mostly previously disturbed lands (see Section 4.7 *Vegetation Resources*). No changes in long-term land use would result from the distribution line burial.

4.12.2 Alternative A

Alternative A would have essentially the same effects on land use as the Proposed Action. The route for Alternative A would remain on the northwest side of I-76 for most of its length, staying adjacent to the highway ROW except for a small deviation to avoid an existing oil well and another to cross Buckley Road at a more favorable location.

Alternative A would be approximately 0.1 mile longer than the Proposed Action. This would result in possibly 1 or 2 additional structures and commensurately more permanent disturbance; although the long-term land commitment would still be very minor. Alternative A would cross slightly more agricultural land than the Proposed Action (Figure 3-5). Using the assumptions noted above, there could be as many as six structures on the agricultural land. Assuming these

five structures would be directly embedded, this would result in a permanent loss of approximately 35 square feet, or less than 0.001 acre of agricultural land, which would be a very minor effect.

Compliance with city and county zoning requirements and comprehensive plans would be the same as for the Proposed Action.

4.12.3 Alternative B

The effects of Alternative B on land use would be similar to those described for the Proposed Action and for Alternative A. Alternative B would be an amalgam of the other two action alternatives, following the same route as the Proposed Action for approximately 60% of its length and following the route of Alternative A for the remainder of the distance to the Prairie Center Substation. Combining parts of the two other alternative routes would result in a length of 5.4 miles, 0.2 mile and 0.1 mile longer than the Preferred Route and Alternative A, respectively. It also would require three crossings of I-76, with their attendant taller structures, rather than a single crossing for each of the other two action alternatives. The long-term land commitment would still be very minor. Alternative B would cross the same amount of agricultural land as Alternative A (Figure 3-5), resulting in as many as six structures on the agricultural land. Assuming these five structures would be directly embedded, this would result in a permanent loss of approximately 35 square feet, or less than 0.001 acre of agricultural land, which would be a very minor effect.

Compliance with city and county zoning requirements and comprehensive plans would be the same as for the Proposed Action.

4.12.4 No Action Alternative

Under the No Action Alternative, the transmission line would not be built. Power supply security would not be enhanced. There could be minor adverse effects on plans to complete development of the Prairie Center PUD if a reliable power source is not available.

4.13 Recreation

The following discussion would apply to all three action alternatives. Overall, the project would have minor effects on recreation opportunities in the project area. Although the transmission line would be visible from certain points inside Barr Lake State Park, particularly along the perimeter trail, it would not substantially degrade the quality of recreational opportunities and experience because of the proposed line's location in an already disturbed landscape along I-76 and the BNSF Railway. Some park users may find the visual intrusion offensive; others may not notice the transmission line in the context of more attractive views internal to the park, the previously disturbed environment, and the major transportation corridor where the transmission line would be located.

The transmission line would not interfere with use or enjoyment of the existing or proposed trails, as the conductors would be well above the ground at trail crossings. If the proposed Bromley-Prairie Center Project were successfully completed, the combined pipeline-transmission line corridor between Southern Street and Bromley Lane would provide a potential opportunity for a joint use trail connection that is included in the proposed trail system according to the Brighton Greenways and Trails Master Plan (Brighton Parks and Recreation 2004).

Although it is included in Master Plan, it is uncertain whether the trail will be built since the surface is privately owned and a trail connection would require agreement by the property owner. However, the existing trail in the combined pipeline-transmission line ROW to the north of Southern Street provides a template for continuing the trail.

4.13.1 Proposed Action

The Proposed Action may be slightly more obtrusive to recreational visitors to the Barr Lake State Park than other alternatives because the visual feature would be closer to the state park over more of its length than for either Alternative A or Alternative B. The overall effect would be considered minor and there would be no physical interference with use or enjoyment of the park. Burial of the existing distribution line would have no effect on recreation opportunities or facilities.

4.13.2 Alternative A

Alternative A would be slightly less obtrusive to use and enjoyment of the state park than the Proposed Action and Alternative B, because the transmission line would be from 300 feet to over 1,000 feet, respectively, farther from the park for its entire distance along the northwest side of the park.

4.13.3 Alternative B

Alternative B would be a “middle ground” between the Proposed Action and Alternative A: closer than Alternative A to the state park north of the Barr Lake neighborhood and farther away than the Preferred Route south of the neighborhood. The differences in distance would range from 300 feet to slightly over 1,000 feet, but they would be noticeable to careful observers.

4.13.4 No Action Alternative

The No Action Alternative may reduce the likelihood of the city of Brighton establishing a future recreational trail between Southern Street and Bromley Lane, as compared with any of the action alternatives. However, the difference is speculative and unlikely to be definitive. No other effects on recreation opportunities would be likely.

4.14 Visual Resources

Potential effects of a proposed activity on visual resources are commonly evaluated based on the degree of contrast with the existing visual environment that would be introduced by the action. The evaluations are conducted from key observation points (KOPs) that are selected to represent particularly sensitive viewing perspectives, based on a combination of the numbers of potential viewers and the reason for them to be in a position to view the proposed activities. For this project, five KOPs were selected: (1) on I-76 representing the large numbers of travelers on the interstate highway; (2) at the Barr Lake State Park visitor center vicinity; (3) at the northwest corner of the Barr Lake perimeter trail, representing the nearest point in the park to the proposed Bromley-Prairie Center Project; (4) at the Bruderlin Stone House; and (5) at a spot in the Barr Lake neighborhood, representing potential views of the proposed Bromley-Prairie Center Project from the residences in the neighborhood. KOP #1 was selected based primarily on the large number of viewers even though they wouldn’t be expected to be particularly sensitive to changes in the visual environment, which is in the process of substantial change

especially on the northwest side of the highway. The other four were selected based on the sensitivity of park users and residents to the visual environment, even though the numbers of viewers would be much smaller.

Three committed EPMs have been designed to minimize the potential adverse visual effects of the proposed Bromley-Prairie Center Project (EPMs VR-1 through VR-3 in Table 2-3). In general, the EPMs commit the construction Contractor to minimize disturbance to the existing landscape, to clean up after construction is completed, and to repair any damage to the visual environment as expeditiously as possible. These EPMs would apply to all three action alternatives.

The structure design proposed for the Bromley-Prairie Center Project is described in Chapter 2.0 *Project Description*. The structures would be galvanized gray, single steel poles. All three action alternatives for the proposed Bromley-Prairie Center Project would be constructed in essentially open country. As a result, the structures would primarily be viewed against the backdrop of the sky, as opposed to a dense forest, for example. The light gray color would tend to blend better and contrast less with the medium blues and pale grays of the sky than would a darker structure color.

4.14.1 Proposed Action

The Proposed Action would be adjacent to I-76, between the railroad and the highway, for approximately 0.75 mile south of Bromley Lane and would parallel the highway separated from it by the railroad, for an additional 0.75 mile north of the Prairie Center Substation (see Appendix C). While physically close to the I-76 viewers (KOP #1), and readily visible, the visual effect would be minor because of the location in the transportation corridor, which visually is dominated by the highway and railroad (see visual simulation for Photo Point Number 38 in Appendix H). Also, travelers on I-76 are typically headed to or from work, or similarly purpose-oriented, rather than driving for recreation or sight-seeing, and are moving down the highway at approximately 75 miles per hour. At high rates of speed, a motorist's visual focus is narrowed primarily to the road in front rather than to the broader landscape context where the transmission line would be located.

KOP #2 is located approximately 1.3 miles from the Preferred Route alignment. At this distance, the visual effect would be minor to minimal. Views from this location would be dominated in the foreground by Barr Lake and in the background by the sweeping Front Range foothills of the Rocky Mountains. From over a mile away, the proposed transmission line would appear quite small and generally transparent; it would not attract the attention of the viewer (see visual simulation for Photo Point Number PP31 in Appendix H).

KOP #3 is located on the Barr Lake perimeter trail near the northwest corner of the lake. The transmission line would be approximately 150 feet from the trail in this vicinity. At this close range, the visual effect would depend on the angle of view and the location of the viewer relative to a transmission line structure. With a structure in close perspective, the visual affect would be moderate, although the effect would be less between structures. With structure spacing at approximately 600 feet, a viewer looking perpendicularly toward the transmission line would only see one structure, at most, at the close distance of 150 feet while other structures would be out of view from a single perspective. Visual impact would be minor to moderate looking at an angle down the trail with more structures in view, but at greater distances (see visual simulation for Photo Point Number 013 in Appendix H). An additional factor serving to mitigate the visual

effect of the Proposed Action from this KOP would be the removal and burial of an existing distribution line currently running parallel to the proposed route, but slightly closer to the perimeter trail viewer. The existing wooden distribution structures are approximately 35 to 40 feet tall. They are smaller than the proposed transmission structures that would replace them, but their darker color contrasts to a somewhat greater degree with the background sky than the proposed steel structures. Additionally, fewer steel transmission structures would be required as compared to the existing number of wooden distribution line structures.

KOP #4 is at the Bruderlin Stone House, headquarters of the RMBO. The house is approximately 600 feet from the proposed transmission line alignment. At this distance, the visual effect would be minor to moderate. In addition to the distance between the Bruderlin house and the proposed transmission line, the middleground landscape from this perspective, which includes the Platte Valley Medical Center and the multi-story Adams County Justice Center, is more complex than some others in the area. The complex backdrop distracts the eye from concentrating on the transmission line, which would appear relatively transparent. (No simulation is available from this KOP.)

KOP #5 is located at the intersection of Lake Avenue and East 136th Avenue. Visual effects on this viewpoint from the Proposed Action would be minor (see visual simulation for Photo Point Number 002 in Appendix H). There are numerous existing electric distribution line poles in the viewshed and the railroad runs between the KOP and the proposed transmission line route. While the existing poles are smaller than the proposed structures, some are dark brown colored, exhibiting somewhat stronger visual contrast in silhouette with the sky than the proposed gray structures. Regardless of color, the existing poles add complexity to the viewshed that would mask the visual effects of the proposed transmission line to some degree. Also, a number of trees occur throughout the neighborhood that would provide visual screening between many of the homes and the proposed transmission line. Several homes are in the Barr Lake neighborhood, some northwest of the railroad and closer to the proposed transmission line route than KOP #5 and several at a similar distance from the route or farther away. KOP #5 illustrates a representative example, but no single point can accurately represent each individual residence. For the homes closest to the proposed route, the visual effects would be more like those described for KOP #3 than what is described here for KOP #5 and would be classified as moderate. For the homes farther from the proposed route, the visual effects are likely to be minimal to minor, depending on the degree of screening provided by existing trees and other vegetation.

Burial of the existing distribution line would create a minor surface disturbance, but it would be a short duration effect. Overall, burying the 12.47-kV distribution line would result in a minor long-term beneficial effect, particularly from KOP #2 on the Barr Lake trail and from KOP #1 representing vehicle occupants traveling along I-76. Burying the existing distribution line would, to a small degree, offset the visual effect of the Proposed Action.

4.14.2 Alternative A

Alternative A would follow the northwest edge of the I-76 highway ROW for almost its entire length with only minor diversions (see Appendix C). For most of the length of the alternative south of Bromley Lane, this would result in the transmission line being approximately 125 feet from the southwest-bound travel lanes, except where it would deviate around the on and off ramps. This alternative would place the transmission line closer to the Prairie Center PUD

development, but there are no KOPs identified in the PUD area because there are no visually sensitive areas near I-76 in the development.

Views from KOP #1 would be essentially the same as described above for the Proposed Action, except that the transmission line would be on the opposite side of I-76 and it would parallel the highway for approximately 3.5 miles instead of the 1.5 mile in two segments described above.

Views of Alternative A from KOP #2 would be essentially the same as those described for the Proposed Action except that the transmission line would be between 350 feet and 1,400 feet farther from the KOP location and the grade separations at interchanges would provide a small degree of additional screening. Visual effects would be minimal.

Visual effects on KOP#3 on the Barr Lake perimeter trail from Alternative A would be minor. The transmission line would be approximately 650 feet from the trail and both the BNSF Railway and I-76 would be between the trail and the transmission line. Viewers on the trail would be far enough from the transmission line that it would not likely attract their attention and the intervening heavy traffic flows and associated noise would be an added distraction that would likely encourage them to focus in toward Barr Lake and away from the transmission line view. Under Alternative A, the existing 12.47-kV distribution line would remain in place and would be an additional visual distraction for viewers from the Barr Lake trail and I-76.

Visual effects of Alternative A on KOP #4 at the Bruderlin Stone House would be minor. The effects would be similar to those described for the Proposed Action, but reduced by greater distance and the addition of I-76 between the viewer and the transmission line as described for KOP #3.

Visual effects on KOP #5 and the Barr Lake neighborhood would be minimal to minor for Alternative A. The distance from the transmission line to neighborhood residences would be from 400 feet to 800 feet greater than for the Proposed Action. The previously described complexity of the foreground landscape and the existing screening from vegetation would still apply, abetted by the greater distance and the addition of I-76 between the viewer and the transmission line.

4.14.3 Alternative B

Alternative B is visually a hybrid of the Proposed Action and Alternative A. Alternative B would follow the alignment of the Proposed Action from Bromley Lane to just north of the Barr Lake neighborhood. From there, it would cross over I-76 and join the alignment of Alternative A the rest of the way to the Prairie Center Substation.

Visual effects on KOP #1 would be minor as described above for the Proposed Action and Alternative A.

Visual effects of Alternative B on KOPs #2and #4 would be the same as described for the Proposed Action.

Visual effects of Alternative B on KOP #4 on the Barr Lake trail would be exacerbated by the continuation of the existing distribution line in essentially the same ROW. The visual effect of the existing distribution with the proposed transmission lines would constitute the most obtrusive visual effect of any of the three action alternatives on Barr Lake trail viewers.

Visual effects of Alternative B on KOP #5 would be the same as described for Alternative A.

4.14.4 No Action Alternative

Under the No Action Alternative, the proposed Bromley-Prairie Center Project would not be built and changes to the existing landscape character would be limited to a continuation of those related to the urbanization of western Adams County.

4.15 Noise

Noise impacts are commonly judged according to two criteria: the extent to which a project would exceed noise regulations or the estimated degree of disturbance to people (i.e., sensitive receptors). Both state and municipal regulations apply to the proposed Bromley-Prairie Center Project, which provide the appropriate guidance.

Colorado Revised Statutes (C.R.S.) 25-12-103 sets maximum permissible noise levels for residential, commercial, light industrial, and industrial zones. Sound levels of noise radiating from a property line at a distance of 25 feet or more in excess of the levels listed in Table 4-7 are considered a public nuisance. No noise limits are provided for agricultural zones.

Table 4-7 State of Colorado Noise Thresholds

Zone	7:00 a.m.–7:00 p.m.	7:00 p.m.–7:00 a.m.
Residential	55 dBA	50 dBA
Commercial	60 dBA	55 dBA
Light Industrial	70 dBA	65 dBA
Industrial	80 dBA	75 dBA

Source: C.R.S.25-12-103

Construction projects are subject to the maximum permissible noise levels specified for industrial zones (i.e., 80 dBA) (C.R.S. 25-12-103 (5)). In addition, the statute permits an increase of up to 10 dBA for up to 15 minutes in any 1-hour period between 7:00 a.m. and 7:00 p.m., which would permit levels of up to 90 dBA from construction for brief periods during daytime hours (CRS 25-12-103).

The Brighton Municipal Code (BMC) (Article 8-32) is not as explicit as the state statute. It prohibits construction noise that is “plainly audible” at a distance of 400 feet from the property line of the noise source. Noise levels up to this standard are permitted for construction between 6:00 a.m. and 9:00 p.m. To be in violation, a prohibited noise must be “continual or essentially uninterrupted for at least 3 minutes, or must persist for at least a total of 5 minutes in any 10-minute period of time” (BMC Article 8-32). It is essentially impossible to evaluate expected noise against the standard in this regulation because it would depend on the particular nature of the noise emission and the ambient noise existing at the time of the purported violation. Consequently, this evaluation employed the state standard noted above.

Construction Noise

Noise from heavy machinery would be the primary source of project-related noise during construction of the proposed transmission line. Representative noise emission levels for a range

of construction equipment types that may be employed for the proposed Bromley-Prairie Center Project are shown in Table 4-8.

Table 4-8 Typical Noise Emissions from Construction Equipment

Equipment	Typical Noise Levels 50 feet from Source[1]
Trucks	75 dBA
Air compressor	81 dBA
Backhoe	80 dBA
Concrete mixer	85 dBA
Mobile crane	83 dBA
Rotary drilling rig[2]	87 dBA
Peak combined equipment[3]	89 dBA

[1] USDOT 2006, except as noted.
[2] Yantak, et al 2007
[3] U.S. Department of Energy 2002

Under peak conditions, with the loudest construction equipment operating simultaneously, the highest average expected equivalent continuous sound level (L_{eq}) would be estimated to be 89 dBA at a reference distance of 50 feet (U.S. Department of Energy 2002). This noise level is approximately equivalent to noise experienced on a sidewalk next to a busy urban street. Noise decreases with distance at a rate of approximately 6 dBA per doubling of distance. A noise level of 89 dBA at 50 feet would attenuate to approximately 71 dBA (approximately equivalent to a vacuum cleaner at 10 feet) at a distance of 400 feet. The maximum noise levels would only occur for brief periods at any particular location.

The highest construction noise emissions would not impact all of the noise sensitive receptors identified in Section 3.15 because the segment of the proposed transmission line paralleling Southern Street would be appended to existing pole structures. Consequently, the construction activities would be limited to stringing of conductors and would not include building new power line structures, which would require the noisiest complement of heavy equipment. The nearest residences to all action alternatives would be in this area on the north side of Southern Street, approximately 200 feet from the existing transmission line structures. Assuming the unlikely event that the residences in this location would experience peak noise levels, even for brief periods, the noise level at 200 feet from the source would be approximately 77 dBA, below the 80 dBA construction standard in the state statute and well below the permissible, short duration maximum of 90 dBA.

Operations Noise

During long-term project operation, noise emissions would be limited to low level corona noise and occasional maintenance activities, generally conducted via pickup trucks. Noise levels from such activities would be low and would not exceed state standards. Corona noise from an overhead electric transmission line is caused by the ionization of the air at the surface of the energized conductor and suspension hardware. The potential effects from corona are discussed in detail in Section 4.19.1.2 *Corona Audible Noise*.

4.15.1 Proposed Action

In addition to the noise sensitive receptors north of Southern Street that are common to all action alternatives, the Proposed Action would be the nearest alternative to residences along

Telluride Street in the agriculturally zoned Barr Lake neighborhood and, together with Alternative B, the nearest to the state park trail on the northwest side of Barr Lake. Applying the residential statutory noise standards to the agricultural zone district – a most stringent potential interpretation – brief duration peak construction noise level would be approximately 84 dBA in the Barr Lake neighborhood. This would comply with the statutory limit.

The statute doesn't specify acceptable noise levels for recreation areas. However, the transmission line would be approximately 150 feet from the Barr Lake Trail at the nearest point near the northwest corner of Barr Lake. At this distance, the peak noise from construction would be approximately 79 dBA, which would comply with the statutory construction standard for residential areas. In addition, the BNSF Railway would be located between the transmission line and the trail in Barr Lake State Park; the railway generates much greater noise levels than the expected construction noise when trains are present.

Based on the worst case scenario of all major equipment operating simultaneously for brief periods, maximum construction noise levels would only occur for brief periods at any particular location. Consequently, the potential noise effects of the Proposed Action would comply with the standards of C.R.S. 25-12-103. Construction noise may create short-term annoyance for some residents and recreationists near the Preferred Route, but construction activities would only occur for a few days at any particular location and would only reach peak levels for brief periods. Consequently, it is expected that noise effects from the Proposed Action would be minor and short-term.

Tri-State has committed to minimize the noise effects by ensuring construction vehicles and equipment are maintained in proper operating condition and equipped with manufacturer's standard noise control devices or better (e.g., mufflers, engine enclosures) (see EPM N-1 in Table 2-3).

Burial of the existing 12.47-kV distribution line would have minimal effect on noise in the project vicinity. Construction would be accomplished with a ditcher or backhoe, tamping equipment and a small number of light to medium duty trucks. In addition, the line segment being buried would not be located near noise sensitive receptors. Under this scenario, there would be little to no adverse short-term noise effects from construction. Additionally, no long-term noise effects would occur during line operation.

4.15.2 Alternative A

Alternative A would run on the northwest side of I-76 after departing from the alignment of the Proposed Action just south of Bromley Lane. It would be separated from the Barr Lake neighborhood and from Barr Lake State Park by the interstate highway. It would, however, be immediately adjacent to the Barr Lake RV Park and Campground, where it would be within approximately 85 feet of the on-site residence and the nearest campsites. At this distance, the peak construction noise levels would be approximately 84 dBA. Applying the statutory "25 feet inside a residential zone" standard, the noise would exceed the acceptable level at approximately 95 dBA, although the area is zoned PUD for a commercial campground so the applicability of the standard is uncertain. Also, as noted above, construction would only occur in this particular area for a few days and the peak noise levels would only occur for brief periods during those days.

Construction noise effects from Alternative A may create short-term annoyance for some residents and campers near the alternative alignment, but construction activities would only occur for a few days at any particular location and would only reach peak levels for brief periods. It is expected that noise effects from Alternative A would be moderate, but short-term in nature.

Tri-State would help to minimize noise effects by ensuring construction vehicles and equipment are maintained in proper operating condition and equipped with manufacturer's standard noise control devices or better (e.g., mufflers, engine enclosures) (see EPM N-1 in Table 2-3).

4.15.3 Alternative B

Alternative B would be coterminous with the Proposed Action to a point north of the Barr Lake neighborhood. At that point, it would cross to the northwest side of I-76 where it would join the alignment of Alternative A for the remainder of the distance to the Prairie Center Substation. Noise effects from Alternative B would be the same as the Proposed Action up to and including the Barr Lake Trail effects, but it would not affect the Barr Lake Neighborhood. Noise effects would be the same as Alternative A on the Barr Lake RV Park and Campground.

Construction noise effects from Alternative B may create short-term annoyance for some residents, recreationists on Barr Lake Trail, and campers near the alternative route, but construction activities would only occur for a few days at any particular location and would only reach peak levels for brief periods. It is expected that noise effects from Alternative B would be moderate, but short-term in nature.

Tri-State would help to minimize the noise effects by ensuring construction vehicles and equipment are maintained in proper operating condition and equipped with manufacturer's standard noise control devices or better (e.g., mufflers, engine enclosures) (see EPM N-1 in Table 2-3).

4.15.4 No Action Alternative

Under the No Action Alternative, there would be no new noise effects related to transmission lines in the vicinity of the proposed Bromley-Prairie Center Project.

4.16 Social and Economic Values

The proposed Bromley-Prairie Center Project would be built by one or more power line construction contractors over two to three months (beginning in late August with completion scheduled by November 1) in 2014 and 2015. It is estimated that between 30 and 40 contract construction and related workers would be required during significant construction activities. An additional 4 to 6 workers would be required for burial of the existing 12.47-kV distribution line in late summer and early fall of 2014.

4.16.1 Proposed Action

4.16.1.1 Population

The Proposed Action would not be likely to affect the population of Adams County or city of Brighton. The small workforce required and the short duration of project construction activities

over the two brief construction seasons make it unlikely that any workers would be inclined to relocate to the area because of the project.

4.16.1.2 Employment

The Proposed Action would employ a peak contract workforce of up to 40 individuals for up to 2 months at a time, generating approximately 60 to 80 person-months of employment. Forty workers would be less than 0.5% of construction workers in Adams County, alone, and a much smaller percentage of the construction workers in the Denver metro area. It also would be less than 0.2% of the unemployed workforce in Adams County. Consequently, the Proposed Action would not measurably affect employment or unemployment rates in the area and it should be possible to obtain the necessary contract workers locally without difficulty.

The Proposed Action would not result in the employment of any additional long-term workers as current staff would be adequate to operate and maintain the proposed transmission line segment.

4.16.1.3 Income and Economy

The Proposed Action would have a small, but positive, effect on the Adams County and Colorado economy. The project would employ an estimated 30 to 40 contract construction and related workers, who may or may not come from Colorado. The construction sector provides above average wages in both Adams County and Colorado, and the utilities sector provides above average wages in Colorado (Adams County utilities' sector data were withheld to prevent individual company disclosure) (see Table 3-12).

The effect on the local economy would depend to a degree on the location of the Contractor(s) selected to construct the transmission line. Some portion of the wages paid to workers would likely be spent in Adams County for food, fuel, and other goods, regardless of whether the Contractors are from the local area or elsewhere. Material for construction, such as concrete, also may be acquired through local sources.

Because of the short duration of construction activity, indirect and induced economic effects would be minimal and unlikely to generate any additional jobs in the area. In the longer term, however, the looped power system that the Proposed Action would complete would provide more reliable electrical service that would be beneficial for attracting continued economic growth in the area. The Proposed Action would increase electric power capacity in the project vicinity and would provide added power security by adding redundancy to the transmission system. It would thus increase the attractiveness of the area for all types of development, but particularly for industrial and commercial development. This would support Adams County's economic diversification objectives.

Public revenues also would accrue through collection of sales and use taxes and (once the project is completed) property taxes. Taxes paid by the Proposed Action would be a net benefit to the public jurisdictions, as there would be no measureable, counterbalancing demand for public services associated with the project. Adams County, the city of Brighton, Brighton School District 27J, and other local taxing districts would benefit from property tax payments.

4.16.1.4 Public Facilities and Services

No new public facilities or services would be required to support construction or operation of the Proposed Action. Any needs for emergency services would be minor and well within the capacities of existing service providers.

4.16.2 Alternative A

Social and economic effects of Alternative A would be the same as for the Proposed Action.

4.16.3 Alternative B

Social and economic effects of Alternative B would be the same as for the Proposed Action.

4.16.4 No Action Alternative

Under the No Action Alternative, none of the direct effects anticipated from the three action alternatives would occur. There could be minor adverse effects on the economic development potential of the area because of potential difficulty in maintaining a reliable power source, if the loop redundancy anticipated from the proposed Bromley-Prairie Center Project were not provided. Reduced power security could adversely affect the operations of the Platte Valley Medical Center, the Adams County Justice Center as well as commercial and residential facilities in the affected electric service area.

4.17 Environmental Justice

The screening process described in Section 3.19 *Environmental Justice* determined there was no low-income population in the project area qualifying for environmental justice analysis. The screening did, however, identify a “meaningfully greater” percentage of minority Hispanic/Latino individuals in the local population. The following discussion examines the potential for a disproportionate adverse effect from the proposed Bromley-Prairie Center Project on that population.

4.17.1 Proposed Action

The identified minority population is located in census tract 85.43, which lies west of Tower Road and north of Bromley Lane. The Proposed Action would not go through that area, so there would be no direct effect on the population. All adverse effects identified from the Proposed Action would be minor. Beneficial effects, such as increases in local expenditures and tax revenues also would be minor. Both adverse and beneficial effects, including the anticipated increase in the reliability and security of the local power supply, would be expected to affect the entire population similarly. As a consequence, no disproportionate effects on the identified minority population would be expected to occur from the Proposed Action.

4.17.2 Alternative A

Effects on the identified minority population from Alternative A would be expected to be the same as for the Proposed Action. No disproportionate adverse effects would be expected.

4.17.3 Alternative B

Effects on the identified minority population from Alternative B would be expected to be the same as for the Proposed Action. No disproportionate adverse effects would be expected.

4.17.4 No Action Alternative

Under the No Action Alternative, project-related improvements in the reliability and security of the power supply in the area would not occur. It is expected this would affect everyone in the local population is a similar fashion and would not disproportionately affect the identified minority population in the vicinity.

4.18 Hazardous Materials or Solid Waste

Potential impacts from hazardous materials or solid waste to the proposed Bromley-Prairie Center Project were assessed based on: if the project were to be located on contaminated site, the possible use of hazardous materials, the possible emissions of hazardous materials, or the project could impair implementation of an emergency response plan.

4.18.1 Proposed Action

No existing hazardous contaminated site along the Proposed Action has been identified to date.

In an effort to minimize potential contamination issues, prevent an accidental release of hazardous materials, and manage solid waste during construction, Tri-State has committed to a number of protection measures. Specifically, EPMs HM-1 through HM-3 and WQ-1 through WQ-6 in Table 2-3 reflect several of Tri-State's BMPs to minimize potential impacts from hazardous materials.

During transmission line construction, in the event a hazardous spill was to occur, the on-site Environmental Monitor would respond and notify the applicable Colorado agencies, as warranted. No potential effects from hazardous materials or solid waste management would occur during project operation. Finally, neither the construction nor operation of the Proposed Action would interfere with any emergency response plans (see Section 4.16 *Social and Economic Values*).

4.18.2 Alternative A

Potential impacts from hazardous materials and solid waste management for Alternative A would be the same as those discussed for the Proposed Action.

4.18.3 Alternative B

Potential impacts from hazardous materials and solid waste management for Alternative B would be the same as those discussed for the Proposed Action.

4.18.4 No Action Alternative

Under the No Action Alternative, no potential additional impacts to natural or human resources from hazardous materials or solid wastes would occur.

4.19 Public Health and Safety

4.19.1 Proposed Action

4.19.1.1 Public Safety

Because stringent safety measures would be implemented during project construction and operation, hazards of fire, explosion, or other danger to the health, safety, and welfare of employees, contractors, or the general public are not anticipated. Tri-State has committed to a number of EPMs list in Table 2-3 to protect both natural and human resources, including several safety measures. Specific safety measures include G-3, FP-1, FP-2, HM-1 through HM-3, and LU-4, encompassing emergency access, fire prevention, emergency response, hazardous materials restrictions, and covering foundation holes left overnight.

Emergency access would be ensured, with specific protection elements to minimize impacts during emergency actions. In addition to a focus on fire prevention during project construction (e.g., use of spark arresters), the Contractor shall maintain in all construction vehicles a current list of local emergency response providers and methods of contact/communication. Handling and use of hazardous materials are discussed in Section 4.18 *Hazardous Materials or Solid Waste*. Also, construction pits or holes for structures and the foundations would be covered when not in use and would not be left open overnight. Covers would be secured in place and would be strong enough to prevent livestock, wildlife, or the public from falling into the excavation.

Additionally, Tri-State's electric facilities are designed, constructed, operated, and maintained to meet or exceed applicable standards of design and performance set forth in the NESC. The Contractor would apply necessary mitigation to eliminate problems of induced currents and voltages on to conductive objects sharing a ROW, to the mutual satisfaction of the parties involved.

4.19.1.1 Electrical and Magnetic Fields

<u>Electrical Fields</u>

Electric and magnetic fields (EMF) are invisible lines of force associated with the generation, transmission, voltage transformation, and use of electric power, such as those associated with high-voltage transmission lines, substations, secondary power lines, home wiring and lighting, and electric appliances and tools. Because the use of electric power is so widespread, people are constantly exposed to EMF.

Concerns regarding long-term exposure to electric and magnetic fields have been tempered over the past decade because specific adverse impacts to human health have not been conclusively identified. Research into possible health impacts has been conducted using human and animal tissues and cells. The research results have been reviewed by numerous authors and scientific panels. The existence of adverse impacts, however, has not been established.

Congress commissioned two noteworthy literature reviews conducted by federal agencies. The first was conducted by the National Institutes of Environmental Health Sciences (NIEHS) in the National Institutes of Health. Following passage of the 1992 Energy Policy Act, NIEHS was instructed by Congress to perform a literature search on health effects related to EMF and to prepare a report on its findings. A conclusion of this report, *NIEHS Report on Health Effects from Exposure to Power Line Frequency Electric and Magnetic Fields*, states the "scientific evidence suggesting that (electric and magnetic field exposures) pose any health risk is weak" (NIEHS 1991).

Congress also instructed the National Research Council (NRC) to conduct a similar study following the 1992 Energy Policy. The NRC committee concluded "the results of [the program] do not support the contention that the use of electricity poses a major unrecognized public health danger" (NRC 1999). The NRC further recommended the federal government cease funding additional research on electric and magnetic fields. The federally funded research program was subsequently discontinued.

Regarding potential impacts to animals, numerous studies have investigated the impacts to livestock from the electrical environment of high-voltage transmission lines. There is no evidence exposure to electric fields beneath transmission lines affects livestock behavior or productivity.

While some studies do suggest a link, the bulk of the scientific literature on the subject of electric and magnetic fields fails to conclude that exposure is a health threat. Both the NIEHS and NAS reports support the conclusion of no conclusive link.

As corporate policy, Tri-State has adopted programs to ensure its electric facilities are designed, constructed, and operated to minimize, to the extent prudent and practicable, the level of EMF that is created. Based on this policy, the Proposed Action was modeled for its resulting EMF using EMF Workstation: ENVIRO (Version 3.52), a Windows-based model developed by EPRI (see Section 3.21.1.2). It is a program that predicts the electric and magnetic fields produced by linear transmission lines (CH2M Hill 2012).

The electric field modeling results were presented previously in Figure 3-11. The electric field associated with transmission lines varies by transmission line voltage. The results of the electric field modeling plotted show that on the left and right edges of the ROW the electric fields would be an estimated 0.27-kV/m and 0.30-kV/m, respectively. Electric fields would diminish to ambient background at approximately 250 feet from the transmission line centerline.

The maximum electric field within the ROW is approximately 1.15-kV/m. In comparison, the electric field next to an electric blanket is approximately 1 to 10-kV/m. The electric field of a typical refrigerator is approximately 0.06-kV/m. The electric fields of other common household appliances are provided in Table 4-9 for a relative comparison to the electric fields predicted from the proposed 115-kV transmission line project.

Table 4-9 Electric Field Values for Common Objects

Appliance	Electric Field Strength (kV/m)
Refrigerator	0.06
Electric blanket	1–10[1]
Broiler	0.13
Stereo	0.09
Iron	0.06
Coffee pot	0.03

[1]1 to 10-kV/m next to blanket wires (Enertech 1985).

Electric fields are a common phenomenon. When the electric field under a transmission line is sufficiently great, it can be perceived as raising the hair on a hand or arm, like the sensation of a slight breeze. It is unlikely; however, the electric field under a transmission line would be perceivable when standing on the ground. Instead, an individual may perceive skin stimulation when working on top of equipment under a transmission line. In an electric field, a conducting object will assume some voltage if the object is not grounded. These induced voltages in a transmission line ROW could cause nuisance shocks. For example, a spark discharge shock could occur when contact is made with an object, such as a vehicle, where there is an inadequate ground. This would be similar to a "carpet" shock that can occur when touching a doorknob after walking across a carpet on a dry day. This type of shock typically would occur directly under the transmission line near mid-span where the conductors are nearest to the ground.

Because carrying or handling conducting objects under a transmission line also could result in nuisance shocks, irrigation pipe should be carried as low to the ground as possible and preferably unloaded at a distance from the transmission line to eliminate nuisance shocks. The primary hazard with irrigation pipe is direct contact with the conductors. Care should be exercised when handling irrigation pipe or any metal implements around all power lines.

Normal grounding policies effectively mitigate the possibility of nuisance shocks from induced currents on stationary objects, such as fences and buildings. Since electric fields extend beyond the ROW, grounding practices also would extend beyond the ROW for very large objects or long fences. Properly applying grounding practices during and after construction would effectively mitigate the potential for shocks from stationary objects near the transmission line. Adequate grounding techniques also would apply to metal water and feed troughs for livestock. Like all conducting objects, their potential to induce nuisance shocks can be eliminated with grounding.

In addition to nuisance shocks, one historical concern regarding electric fields has been the possibility of interference with cardiac pacemakers. There are two common types of pacemakers, asynchronous and synchronous pacemakers. The asynchronous pacemaker pulses at a predetermined rate and is practically immune to interference because it has no sensing circuitry and is not complex. The synchronous pacemaker, however, pulses only when its sensing circuitry determines that pacing is necessary. Interference from a transmission line electric field could cause a spurious, or false, signal on the pacemaker's sensing circuitry. When these pacemakers detect a spurious signal, such as a 60-Hz signal, they are programmed to revert to an asynchronous or fixed pacing mode of operation and will return to synchronous operation within a specified time after the signal is no longer detected. Research and reviews indicate the risk to pacemaker wearers from transmission lines is minimal. To date, no evidence

has been found that a transmission line has caused a serious problem to the wearer of a pacemaker. In addition, pacemaker manufacturers have redesigned recent models to be less sensitive to this concern.

Lastly, it is possible for electric fields to cause minor damage to leaf tips from induced corona on the upper most parts of plants (McKee et al. 1978). The impacts are limited to corona damage at sharp terminal parts of plants at very high electric field levels. The impact generally is too limited to be noticeable under field conditions. In addition, the electric fields calculated for the Proposed Action are below levels where the leaf tip corona phenomenon has been observed. No damage or harm to crops, therefore, is expected to occur from electric fields under the proposed transmission line.

In general, the electric fields associated with the Proposed Action would be similar to household appliances at the edge of the ROW and would diminish rapidly to ambient background approximately 250 feet from the transmission line centerline. Nuisance shocks could be avoided through proper equipment handling in the transmission line ROW and through adequate grounding techniques. Potential indirect impacts to pacemakers and agricultural crops have been demonstrated in theory but have not presented adverse impacts in the field.

Tri-State has adopted, as corporate policy, programs that ensure that its electric facilities are designed, constructed, and operated in such a manner as to minimize, to the extent prudent and practicable, the level of EMF that is created (Appendix E). Normal grounding policies would effectively mitigate the possibility of nuisance shocks on stationary objects, such as fences and buildings. Because the electric fields continue (but diminish) beyond the ROW, grounding practices would extend beyond the ROW for very large objects or long fences.

Pertaining to these findings, potential direct impacts from the 115-kV transmission line's electrical fields during project operation would be anticipated to be minor in the long term.

Magnetic Fields

Magnetic fields from household appliances are comparable to, or greater than, those from transmission lines. The maximum (peak) calculated 60-Hz magnetic field for a 115-kV transmission line would be approximately 118.3 mG and would diminish to approximately 42.0 mG on the left edge of the ROW and 54.2 mG on the right edge of the ROW. In comparison, the maximum magnetic field of a clothes dryer is approximately 3 to 80 mG. The maximum magnetic field of an electric range is approximately 100 to 1,200-mG. In comparison to the magnetic fields of typical household appliances presented below in Table 4-10, the magnetic fields associated with the Proposed Action at the edge of the ROW are not considered to be severe. In addition, magnetic fields are highest closest to electrical equipment or devices and falls rapidly with distance.

Table 4-10 Typical Magnetic Field Values for Common Appliances

Appliance	Magnetic Field (mG)	
	Distance of 1 foot	Maximum
Electric Range	3–30	100–1,200
Electric Oven	2–25	10–50
Garbage Disposal	10–20	850–1,250
Refrigerator	0.3–3	4–15
Clothes Dryer	1–3	3–80
Coffee Maker	0.8–1	15–250
Toaster	0.6–8	70–150
Crock Pot	0.8–1	15–80
Iron	1–3	90–300
Vacuum Cleaner	20–200	2,000–8,000
Hair Dryer	1–70	60–20,000
Color TV	9–20	150–15,000
Fluorescent Desk Lamp	6–20	400–3,500

Source: Gauger (1985)

Table 4-11 Magnetic Field Values at Distance from Source

Source	Median Magnetic Field at distance from source (mG)			
	6 inches	1 foot	2 feet	4 feet
Coffee Maker	7	-*	-	-
Color Television	7	2	-	-
Copy Machine	90	20	7	1
Digital Clock		1	-	-
Drill	150	30	4	-
Electric Clothes Dryer	3	2	-	-
Electric Range	30	8	2	-
Fluorescent Lights	40	6	2	-
Hair Dryers	300	1	-	-
Microwave Oven	200	4	10	2
Refrigerator	2	2	1	-
Vacuum Cleaner	300	60	10	1
Washing Machine	20	7	1	-

*Dash (-) means that the magnetic field at this distance from the operating appliance could not be distinguished from background measurements taken before the appliance had been turned on.
Source: National Institute of Environmental Health Sciences, National Institutes of Health 2002

Pertaining to these findings, potential direct impacts from the 115-kV transmission line's magnetic fields during project operation would be anticipated to be negligible in the long term. The Proposed Action is not expected to cause adverse health effects related to EMF. These study results show future transmission line operation would result in generation of EMF at the edge of the ROW at levels similar to household appliances (CH2M Hill 2012). Based on these expected levels, the research from available literature, and distance to potential sensitive

receptors (e.g., homes), no health effects would be anticipated from the proposed transmission line operation in the long term. Tri-State remains sensitive to the EMF issue and responds promptly and accurately to inquiries with currently available information.

4.19.1.2 Corona Audible Noise

As discussed in Section 3.21.1.3 *Corona Characteristics*, corona from transmission lines can, under certain conditions, create audible noise (buzzing, humming, or crackling) or radio and television interference. Practicable measures for eliminating or reducing wet weather noise are generally limited to carefully handling the conductor during construction to avoid damaging the surface. The construction Contractor would be expected to treat the conductor with care to avoid creating irregularities (such as nicks, scrapes, and burrs) on the conductor surface. The Contractor would normally take such precautions because if the conductor is damaged, its physical strength and ability to transmit power also could be compromised.

The parameters of importance in measuring corona are the transmission line voltage, transmission line configuration, number and diameter of the conductors, altitude above sea level, and weather conditions. Modeling for the Proposed Action demonstrated that noise levels from the corona effect would be approximately 16.3 dBA at the left edge of the 115-kV transmission line (37.5 feet from the centerline) during wet weather and 0 dBA in fair weather (Table 4-12). Modeling at 115-kV represents the maximum expected corona for the Proposed Action. During wet weather, noise is likely to be masked by falling rain so that the noise generated by corona would be barely discernible. The noise at the edge of the ROW in fair weather conditions is comparable to a soft whisper. The corona noise shown in Table 4-12 is compared to typical noise levels encountered in daily life (Table 4-13).

Table 4-12 Projected Audible Noise Levels

Location	Fair Weather Corona (dBA)	Wet Weather Corona (dBA)
Center of ROW	0	18.7
Left Edge of ROW	0	16.3
Right Edge of ROW	0	16.5

Table 4-13 Audible Noise Decibel Ratings of Common Noises

Common Noises	Typical Decibel Level (dB)	Notes
[threshold]	0	Lowest level audible to human ear
Soft Whisper	30	Audible noise from electric transmission lines generally fall in this range
Rainfall	50	
Freeway Traffic	70	Critical level begins
Power Saw	110	Danger level
Fireworks	150	Hearing loss
Shotgun	170	

Source: American Academy of Otolaryngology (2013)

Because wet weather corona noise would be barely distinguishable from background noise levels at distances of more than 250 feet from a transmission line, potential long-term impacts from increased corona noise would not be expected to result in adverse effects to humans, wildlife, or domestic animals/livestock.

In addition to generating audible noise, corona from transmission lines can emit noise at frequencies used to transmit radio and television signals. This noise in the form of radio and television interference is recognized as static for radio reception and as "snow" for television reception. The most common radio interference is to the AM broadcast band (535 to 1,605 kilohertz [kHz]). Only AM radio receivers very near transmission lines have the potential to be affected because "amplitude modulated" transmission of radio frequencies in the 535- to 1,605-kHz broadcast band can be altered by physical features. FM transmission of radio transmission is rarely affected. Television interference from corona generally only occurs at the edge of the ROW during wet weather for transmission lines with voltages of 345-kV or higher. Television interference would only affect broadcast signals received through an antenna and would not affect cable television or digital satellite television reception. Both potential impacts to radio or television signals is expected to be negligible to minor in the long term.

Corona also can be dimly visible as bluish glow or as bluish plumes. Corona on conductors is observable only under the darkest and/or rainiest conditions when the corona is most intense. It is likely only visible with the aid of binoculars. Without intentionally looking for corona, it generally is not perceivable.

Tri-State has adopted, as corporate policy, programs that ensure its electric facilities are designed, constructed, and operated in strict accordance with the NESC and all applicable federal, state, and local regulations.

Based on these findings, potential direct or indirect impacts from corona effects on the 115-kV transmission line during project operation would be anticipated to be negligible to minor in the long term, depending on weather and location.

4.19.2 Alternative A

Potential impacts associated with public safety and electrical characteristics of EMF for Alternative A would be the same as those identified for the Proposed Action.

4.19.3 Alternative B

Potential impacts associated with public safety and electrical characteristics of EMF for Alternative B would be the same as those identified for the Proposed Action.

4.19.4 No Action Alternative

Under the No Action Alternative, no changes to public safety would occur. Potential long-term minor effects from transmission line electric fields, negligible effects from magnetic fields, and the negligible to minor effects from line corona would not occur.

4.20 Cumulative Impacts

Cumulative impacts result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions (RFFAs) regardless of who undertakes such

other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The Proposed Action is sited in an established industrial corridor that encompasses a number of past and present actions. These primarily entail the operation of I-76 and BNSF Railway corridors, the commercial and residential expansion into the area, and the use of the Barr Lake State Park for recreational pursuits. Future actions include continued expansion of commercial, industrial, and residential areas and construction of Xcel Energy's Cherokee Natural Gas Pipeline.

The following summaries of various development actions occurring and proposed provide an overview of the interrelated activities. Figure 4-4 depicts the locations of these actions identified in the project area.

Components of residential development include *Prairie Center*. Located on the north side of I-76 between E-470 and Bromley Lane in Brighton, *Prairie Center* is a new, 2,000-acre master-planned community, advertising 3,000 single-family homes, townhomes, condominiums, and apartments. *Prairie Center* also advertises over 187 acres of parks and open space, a recreation center with a pool, schools, and a 17.5-mile trail system linking trails through Brighton, the 65-acre Prairie Center Wildlife Sanctuary and Barr Lake State Park.

Municipal development has included the Adams County Justice Center complex and Platte Valley Medical Center, with future plans for expansion. The Justice Center advertises that its complex will ultimately employ over 1,400 personnel, hosting over 2,000 visitors each day. The Raptor Education Foundation also is planning a $1,000,000, 14,500 square foot permanent facility at *Prairie Center*, housing up to 50 birds of prey.

Tri-State's United Power Phase II Transmission Project was the second phase of the United Power System Improvement Project and was constructed in 2011. This line is south of the Proposed Project and connects to the existing Prairie Center Substation.

Commercial development encompasses a number of retailers in the I-76 corridor. *Prairie Center* supports a 396-acre shopping center, with four phases planned, totaling nearly 2 million square feet. A number of retail chains currently exist, with additional national and local retail businesses, restaurants, and entertainment establishments pending.

Industrial development includes two Vestas manufacturing plants, one a wind turbine blade factory and the other a nacelle manufacturing plant.

The proposed Cherokee Natural Gas Pipeline would be a 34-mile, 24-inch natural gas transmission pipeline from a new Fort Lupton gas metering facility to the Cherokee Generating Station. The pipeline would be located east of Barr Lake, approximately 3.5 miles east of the project area, coming to within approximately 1 mile of the northern end of the proposed Bromley-Prairie Center Project as the pipeline angles northwest toward Fort Lupton (see Figure 4-4). Xcel Energy is beginning to implement its Colorado Public Utilities Commission-approved Clean Air-Clean Jobs plan by retiring three of their Cherokee Generating Station's coal-fired units, adding a new natural gas plant, and switching a fourth unit to run on natural gas. A new pipeline is needed to deliver the natural gas to the Cherokee Power Plant for this conversion. Construction on the new natural gas pipeline was scheduled to begin in 2013 with an anticipated in-service date of October 1, 2014. The anticipated construction schedule is not currently known. In the project area, the pipeline route would travel north-southeast of the proposed Bromley-Prairie Center Project.

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Bromley-Prairie Center 115kV Transmission Line Project

Figure 4-4
Project Area Vicinity

N

0 2,000 4,000 8,000 Feet

1:48,000

1 inch = 4,000 feet

Project Facilities

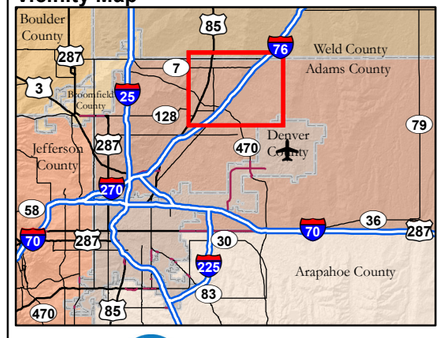
- Substation
- Start/End Point: Distribution Line Underground
- Preferred Route
- Alternative A
- Alternative B
- Existing Gas Pipeline
- Cherokee Natural Gas Pipeline
- Existing Tri-State Lines

Land Ownership

- Adams County
- City of Brighton
- State of Colorado
- Private, Unincorporated
- Private, City of Brighton
- Barr Lake State Park
- Prairie Center Development
- PVMC Heliport
- Van Aire Estates Airport

Imagery: NAIP 2013

Vicinity Map



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4.20.1 Air Quality

Because any air quality impacts associated with the Proposed Action would be negligible in scale and short-term in duration, the Proposed Action only would incrementally contribute to cumulative air quality impacts related to other past, present, and foreseeable projects in the area.

4.20.2 Geology and Minerals

The proposed Bromley-Prairie Center Project would not alter the area's geology nor would any impacts to the proposed transmission line and its ancillary facilities from geological factors be anticipated. Therefore, no cumulative impacts to geology or from geological features would occur.

4.20.3 Soils

Ground-disturbing activities (e.g., grading and excavating), movement of construction vehicles and equipment during the construction phase of the proposed Bromley-Prairie Center Project, and any improvements to existing access routes would contribute to a minor, short-term soil disturbance and soil loss due to wind erosion and soil compaction. These impacts would be incremental to other regional effects, occurring as a result of area development (e.g., construction of residential, municipal, commercial, and industrial projects), recreational users, and agricultural users. Soil movement also could result in minor amounts of fugitive dust (see Section 3.1 *Air Quality*). The proposed Bromley-Prairie Center Project would incrementally add to cumulative soil effects in the long term, which would be considered a negligible addition and cumulatively low.

4.20.4 Water Resources

No direct impacts to area water resources would be anticipated. Any indirect impacts associated with the Proposed Action would be negligible in scale and short-term in duration. Therefore, the Proposed Action only would contribute incrementally to cumulative water resources impacts related to other past, present, and reasonably foreseeable projects in the area.

4.20.5 Floodplains

The proposed Bromley-Prairie Center Project would not alter floodplain morphology nor would impacts to structures from placement in or near floodplains be anticipated. Therefore, no cumulative impacts to floodplains would occur.

4.20.6 Wetlands

Wetland areas associated with the Proposed Action along the east side of I-76 are not expected to be affected directly or indirectly by other proposed RFFAs, including the proposed *Prairie Center* commercial and residential development planned for the western side of I-76. As a result, no cumulative effects are expected in association with the Proposed Action, particularly since other future actions located in the project area are not expected to encroach into the wetland areas.

Continued development of *Prairie Center* would result in co-location with the routes identified for Alternatives A and B. As a result, permanent and indirect impacts to Wetlands W14, W13, W12, W11, and W10, as well as adjacent wetlands near W14 that are not connected with Alternative A or B, would be expected to occur in association with development of the Bromley-*Prairie Center* Project. Wetlands W10, W11, and W12 are manmade stormwater catchment basins with low to moderate quality wetland communities associated with them. Wetland W13 is an irrigation ditch, also with low to moderate quality wetlands. Wetland W14 is a moderate quality wetland that lies southwest of ponded wetland area not crossed by Alternatives A and B. Cumulative effects could include increased sedimentation potential from adjacent development, increased potential for the spread of noxious weed populations into these wetland areas, and the potential removal of these wetlands to accommodate development. Effects from activities associated with Alternative A should have no to a low effects on Wetlands W10, W11, W12, W13, and W14. Effects associated with Alternative B should have no to low effects on Wetlands W10, W13, and W14. The addition of the proposed *Prairie Center* development would increase those expected effects from moderate to high levels, if wetlands were to be removed for development.

4.20.7 Vegetation Resources

4.20.7.1 Vegetation

Vegetation associated with the Proposed Action along the east side of I-76 is not expected to be affected directly or indirectly by other RFFAs identified for the area, including the proposed *Prairie Center* development planned for the western side of I-76. As a result, no cumulative effects are expected in association with the Proposed Action, particularly since other future actions located in the immediate Proposed Action area are not expected to encroach into native vegetation and wetland areas identified along the Proposed Action's Preferred Route.

Continued development of *Prairie Center* would result in co-location with the routes identified for Alternatives A and B. As a result, cumulative permanent and indirect impacts to native vegetation and wetlands located within the proposed transmission line alignments for Alternatives A and B would be expected to occur in association with development of the Bromley-Prairie Center Project. Effects from activities associated with Alternative A should have a minor effect on vegetative communities associated with the Alternative A alignment. Effects associated with Alternative B also should have a minor effect on vegetation communities. The addition of the proposed *Prairie Center* development project would increase those expected effects from minor to both moderate and major levels for both alternative routes if native vegetation communities and wetlands were to be removed for development purposes. Finally, cumulative effects could increase the potential for the spread of noxious weed populations, while the potential removal of native vegetation communities and wetlands to accommodate development, could result in increased erosion and sedimentation potential from adjacent development.

4.20.8 Wildlife Resources

Similar to effects to terrestrial vegetation resources, the potential long-term impacts to area wildlife habitats from the past, present and reasonably foreseeable actions would continue to affect and remove wildlife use areas in the overall project area. However, the location of the *Prairie Center* development west of I-76 would primarily affect the cumulative effects for Alternatives A and B, encompassing more disturbed habitat types and upland agricultural lands.

No cumulative impacts to the native wildlife habitats located along the Barr Lake State Park would be anticipated, based on the cumulative project associations with established infrastructure.

Other cumulative effects to terrestrial wildlife habitats in conjunction with the proposed Bromley-Prairie Center Project would be minor and localized to the structure locations. Construction related impacts/disturbance would be short-term in nature and cumulatively should not result in adverse effects to wildlife resources given the extent of development in the area (I-76, rail line, and Prairie Center Development.

Cumulative impacts related to avian collisions are discussed in more detail in Section 4.20.9.2 *Animals*.

4.20.9 Special Status Species

4.20.9.1 Plants

Tri-State's contractors conducted presence/absence surveys for the Ute ladies'-tresses orchid and the Colorado butterfly plant throughout the entirety of suitable habitat identified in wetlands W4 and W4A to include any potential access routes and temporary use areas located within and adjacent to the Proposed Action ROW. Neither species was recorded during the August 2013 surveys (EDM 2013). Because of the no finding and USFWS concurrence documentation stating "No Concerns", no cumulative effects to special status plants species would occur within the Proposed Action.

Alternatives A and B contain suitable habitat for the Ute ladies'-tresses orchid and the Colorado butterfly plant within Wetlands W4 and W14. Neither species was observed during presence/absence surveys in August 2013 at Wetland W4. A "No Concerns" determination was issued by the USFWS on August 27, 2013 (see Appendix D) for Wetland W4. Presence/absence species surveys were not conducted within Wetland W14. Although Tri-State plans to span W14 should Alternatives A or B be constructed, one structure would be placed on the edge of the wetland. Per EPM T&E-1, if any disturbance is anticipated within W14, Tri-State would contract with a qualified botanist to conduct presence/absence surveys prior to construction. Because of the "No Concerns" documentation from the USFWS for W4 and due to the incorporation of EPM T&E-1 for W14, no cumulative effects to special status plants species would occur under either Alternatives A or B.

4.20.9.2 Animals

There are no federally listed species or critical habitat known to occur in the project area. Therefore, no cumulative effects to federally listed species are expected.

The anticipated expansion and current footprint of the *Prairie Center* development may incrementally impact wildlife habitat in the project area, including bald eagle use west of Barr Lake State Park. No past, present, or RFFAs would be associated with bald eagle use areas in Barr Lake State Park. It is possible that the Bromley-Prairie Center Development may result in the loss of prairie dog colonies and therefore, burrowing owl habitat in the area. The Preferred Alternative would result in minor impacts to prairie dog colonies (structure siting and access road development/use). Tri-State has committed to EPM T&E-2 to minimize/avoid direct, indirect, and cumulative impacts to burrowing owls that may occur in the area.

The Proposed Action would place a new transmission line in the area that could pose an increased collision risk for bald eagles and other migratory birds. Existing infrastructure in the area that poses cumulative risks from an avian collision perspective includes Tri-State's United Power Phase II transmission line (which was also marked with flight diverters in high risk areas), the railroad, and traffic from Interstate 76. There are no proposed new power lines in the area that may result in a cumulative collision risk to migratory birds, including bald eagles. Tri-State has committed to marking spans along the preferred route that have a moderate to high collision risk. In order to mitigate direct, indirect, and cumulative effects to bald eagles and other migratory birds, Tri-State has committed to EPM's WR-1 through WR-3. As stated for the Proposed Action, the removal and burial of the existing distribution line would result in a long-term beneficial effect to area raptors from an electrocution perspective, as compared to current conditions.

4.20.10 Cultural Resources

The South Platte Valley in Colorado has a well-documented prehistoric sequence that extends back in time for about 12,000 years, and a rich historical record that includes sites associated with the fur trade and emigration eras as well as agricultural settlements dating to the middle portion of the 19th century and later. While much archaeological and historical investigation has been accomplished in the region, systematically surveyed lands account for a relatively small proportion of the greater area. The absence of survey over large areas of the valley owes in large part to the predominance of private land where cultural resources generally are not protected by federal or state law. Degradation of sites occurs most often as a result of agricultural practices, including farming and ranching, as well as commercial and residential construction. Collection and excavation of sites by amateur archaeologists and historians also tends to diminish permanently the archaeological and historical record, as do natural processes such as soil erosion and flooding of streams and rivers.

Cumulative effects that result in overall diminution of cultural resources are likely to occur due to the processes identified above. The area has been settled and widely cultivated since the 19th century, and therefore, most impacts related to agriculture have already been incurred. However, large-scale land development plans such as the proposed *Prairie Center* development have the potential to inflict irreversible damage to the archaeological and historical record of the region in general, both because of the size of the development and because little or no legal protection will be in place. Linear projects such as pipelines and electrical lines do not typically debase cultural resources because the nature of the projects tends to limit impacts, historic preservation law applies in most cases, and most new utilities are built in existing disturbed corridors. However, relative to the proposed construction of the Bromley-Prairie Center 115-kV Transmission Line, the project would contribute little to the cumulative impacts in the area, due to the small number of important cultural resources in the area of potential effect, the very limited amount of ground-disturbing activity that is proposed, and the implementation of the committed EPMs in Table 2-3.

4.20.11 Transportation

4.20.11.1 Aviation Facilities

The proposed Bromley-Prairie Center Project would not adversely affect the Brighton Van Aire Estates Airport and neither the Cherokee Pipeline nor the *Prairie Center* development would

adversely affect operations at the Platte Valley Medical Center heliport. Consequently, no cumulative effects on aviation facilities have been identified.

4.20.11.2 Roads and Railways

Cumulative transportation effects from construction and operation of the proposed Bromley-Prairie Center Project and the Cherokee Pipeline would be negligible. The two projects are sufficiently distant from each other and of sufficiently different character that the only potential effects would be slightly increased traffic, primarily on I-76, which has sufficient capacity to accommodate it.

Cumulative effects on street traffic from the proposed Bromley-Prairie Center Project and the *Prairie Center* development could occur if the pace of development increases substantively at *Prairie Center* by the time project construction would occur in 2014. Nevertheless, the effects would likely be minor because there are sufficient alternative routes available in the vicinity to provide reasonable detours bypassing any traffic delays from construction of the proposed Bromley-Prairie Center Project transmission line. Additionally, the short project timeline would aid in minimizing future impacts.

4.20.12 Land Use

Cumulative effects on land use from development of the proposed Bromley-Prairie Center Project and the Cherokee Pipeline would be very minor to non-existent. The long-term commitment of land to the transmission line structures would be incremental and small and reclamation of both the pipeline ROW and most of the transmission line ROW would return them to the existing productivity of the land. There could be a minor positive cumulative effect of the proposed transmission line together with the *Prairie Center* development, as enhanced power supply combined with new commercial, industrial and residential developments would be attractive to some types of employers.

4.20.13 Recreation

No cumulative effects on recreation resources or opportunities have been identified. The Cherokee Pipeline is at least 1 mile distant from the proposed Bromley-Prairie Center Project. Plans for the *Prairie Center* development already include several recreation facilities, none of which would be dependent on, or in conflict with, the proposed the Proposed Action. Views of the Prairie Center development from Barr Lake State Park would be unobtrusive because structures would be more than 1,000’ from the nearest state park trail and would be low profile, largely hidden by the modestly higher elevation of the I-76 corridor.

4.20.14 Visual Resources

There would be no cumulative visual effects from the proposed Bromley-Prairie Center Project and the Cherokee Pipeline because they are sufficiently far apart that they do not share a viewshed. Cumulative visual effects between the proposed Bromley-Prairie Center Project and ongoing development for the *Prairie Center* urban development project would eventually result in a relatively dramatic alteration of the currently sparse and spotty development in the PUD, which currently still has large areas remaining vacant. As the PUD project builds out to urban/suburban density over a period of several years, it would tend to make the proposed

transmission line visually less obtrusive because of the substantial increase in structures – many of which would be large – and in human activity.

4.20.15 Noise

Cumulative noise effects from the proposed Bromley-Prairie Center Project would be minor to non-existent. There would be no cumulative noise effects between the project and the Cherokee Pipeline because the pipeline would be approximately 1 mile from the transmission line at its nearest point and more than 2 miles away for most of the remainder of the three alternative routes. Transmission line construction noise, at its peak, would be reduced to the level of background noise at any mutually affected sensitive receptors at this distance from the pipeline. There potentially could be minor cumulative noise with the *Prairie Center* urban development project because of the proximity of portions of that planned development. At present, the *Prairie Center* project is not actively under construction so the only noise is from general traffic at various parts of the existing development. In the event new construction would occur simultaneously with transmission line construction, there could be minor cumulative noise effects. Even in that circumstance, however, transmission line construction would be brief and fast moving, lasting for only a few days at any particular location.

4.20.16 Social and Economic Values

Cumulative economic and social effects of the proposed Bromley-Prairie Center Project would be minor. Construction of the Cherokee Pipeline would be winding down as project construction would be occurring. There would be minor synergistic effects with the Prairie Center PUD project as the improved reliability of the power supply in the area would be slightly more attractive to businesses that may consider locating in the area as well as to potential employers in the project area that would potentially attract more potential home buyers to the Prairie Center project.

4.20.17 Environmental Justice

No disproportionate adverse effects on the identified minority population in the project area have been identified. Consequently, there would be no cumulative, adverse environmental justice effects associated with the proposed Bromley-Prairie Center Project.

4.20.18 Hazardous Materials or Solid Waste

Cumulative impacts from potential hazardous materials or solid wastes in or near the project area from past, present, and future actions in combination with the Proposed Action would be low to none. Tri-State's committed EPMs to minimize the potential for accidental spills of hazardous materials during project construction and maintenance activities would minimize possibility for chemical exposure or contamination issues. Future maintenance activities would be required to comply with federal and state regulations, thus minimizing potential spills or exposure. Tri-State would have a Spill Prevention Control and Countermeasure Plan in place and no additional cumulative actions would result in increased cumulative effects from hazardous materials.

4.20.19 Public Health and Safety

No adverse effects on overall public safety were identified for the proposed Bromley-Prairie Center Project. Consequently, there would be no cumulative, adverse public safety effects. No cumulative EMF effects were identified, based on no new transmission line project associated with the *Prairie Center* urban development project have been identified to date that could parallel the proposed Bromley-Prairie Center Project alignment.

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5.0 CONSULTATION AND COORDINATION

Correspondence with the following federal and state resource management agencies is presented in Appendix D and Appendix G:

- U.S. Fish and Wildlife Service
- Colorado Parks and Wildlife
- Colorado Office of Archaeology and Historic Preservation

Other Permits/Approvals:

- Areas and Activities of State Interest Permit from Adams County*
- Conditional Use Permit from the city of Brighton

*Tri-State submitted an *Application for an Areas and Activities of State Interest Permit* (Application) to Adams County on November 13, 2012. Adams County was required to take final action on the Application within a specified period of time or the Application was to be "deemed approved" by Colorado statute [C.R.S. 29-20-108(2)]. Adams County did not take the required final action by the statutory deadline. Tri-State therefore filed a *Motion for Summary Judgment* in Adams County District Court on August 8, 2013 seeking a declaration that, pursuant to Colorado statute, its Application was deemed complete as a matter of law. On October 8, 2013, the District Court ordered that that Tri-State's *Motion for Summary Judgment* was granted and the Application was "deemed approved" as of February 11, 2013. On February 4, 2014, Adams County mailed a letter to "Interested Parties" acknowledging the District Court's decision (a copy of the letter was also posted on the County web site).

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6.0 LIST OF PREPARERS

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Tri-State Generation and Transmission Association, Inc.		
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Diana Leiker	Senior Transmission Siting and Environmental Planner	Environmental Compliance/NEPA
Laurie Spears	Transmission Siting and Environmental Planner	Applicant Representative
EDM International, Inc.		
Lori Nielsen	Senior Project Manager / Wildlife Biologist	EA Project Manager, Wildlife Resources, Special Status Animal Species
Melissa Landon	Project Manager / Biologist	EA Assistant Project Manager, Soils, Geology, Hazardous Materials and Solid Waste
Amy Laartz	Senior Wetlands Scientist	Wetlands, Vegetation Resources, Special Status Plant Species
Karen Caddis	Senior Biologist / Wetlands Scientist	Wetlands, Vegetation Resources, Special Status Plant Species, Field Review
Duncan Eccleston	Environmental Specialist	Water Resources, Floodplains, Air Quality
Paul Petersen	GIS Specialist	GIS and graphics
Bernie Strom	Planner	Transportation, Land Use, Recreation, Visual Resources, Noise; Economics and Social Values, Environmental Justice
Chris Zier	Cultural Resource Specialist	Cultural Resource Review and Cumulative Effects
Tetra Tech		
Jennifer Chester	GIS Manager	Visual Simulations
Amanda Herron	Cultural Resource Specialist	Cultural Resources
Stephen Anderson	Principal Investigator	Cultural Resources
CH2M Hill		
Robert Pearson, Ph.D.	Vice President	Public Health and Safety, Electrical Characteristics and EMF

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