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Southwestern Public Service Company
Environmental Assessment and Alternative Route Analysis
For the
Bailey to Curry 115kV Transmission Line Project
Bailey and Parmer Counties, Texas

Docket Number: 41921

Prepared by:

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Environmental Assessment and Alternative Route Analysis for the Bailey to Curry 115-kV Transmission Line Project, Bailey and Parmer Counties, Texas

Prepared for:

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List of Acronyms

APLIC	Avian Power Line Interaction Committee
BGEPA	The Bald and Golden Eagle Protection Act
BMP	Best Management Practices
C	Candidate
CCN	Certificate of Convenience and Necessity
CFL	Community Fishing Lake
CFR	Code of Federal Regulations
CR	County Road
DL	Delisted, Monitored
E	Endangered
EPA	Environmental Protection Agency
ESA	Endangered Species Act of 1973
ESSS	Ecologically Significant Stream Segments
°F	Degrees Fahrenheit
FAR	Federal Aviation Regulation
FCC	Federal Communications Commission
FEMA	Federal Energy Management Agency
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FR	Federal Register
BGEPA	Bald Eagle and Golden Protection Act
GIS	Geographic Information System
HPA	High Probability Area
kV	Kilovolts
L2EM	Lacustrine littoral emergent intermittently flooded
LEPC	Lesser prairie chicken
MBTA	Migratory Bird Treaty Act
MW	Megawatt
NESC	National Electric Safety Code
NPAT	National Prairies Association of Texas
NRHP	National Register of Historic Places
NRCS	Natural Resources Conservation Service
NTC	Notice to Construct
NWI	National Wetlands Inventory
PEM	Palustrine emergent
Pf	Palustrine farmed
PRPC	Panhandle Regional Planning Commission

PUC	Public Utility Commission
PURA	Public Utility Regulatory Act
PSS	Palustrine scrub-shrub
ROW	Right-of-way
RRC	Railroad Commission of Texas
S	Rare Species of Concern
SGP CHAT	Southern Great Plains Crucial Habitat Assessment Tool
SPAG	Southern Plains Association of Goverments
SPP	Southwest Power Pool
SPS	Southwestern Public Service
SSURGO	Soil Survey Geographic Database
SWPPP	Storm Water Pollution Prevention Plan
T	Threatened
T&E	Threatened and endangered
TAC	Texas Administrative Code
THC	Texas Historic Commission
TNW	Traditionally Navigable Water
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
TxDOT	Texas Department of Transportation
TXNDD	Texas Natural Diversity Database
TWDB	Texas Water Development Board
TRC	TRC Environmental Corporation
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WGA	Western Governors' Association

1.0 Description of the Proposed Project

TRC Environmental Corporation (TRC), with input from Southwestern Public Service Company (SPS), a subsidiary of Xcel Energy Inc., developed the Environmental Assessment and Routing Study for the Bailey to Curry 115 kilovolt (kV) Project (Project). The Environmental Assessment and Routing Study were conducted by the Project Team in support of SPS's application for a Certificate of Convenience and Necessity (CCN) to the Public Utility Commission of Texas (PUC). The Project Team included project management, engineering, environmental, planning, and land/real estate representatives from SPS and TRC. The analysis process began by delineating a Study Area for the proposed 115 kV Project. The boundaries of the Study Area were influenced by the location of the existing facilities (Bailey County Substation), other existing rights-of-way (ROW) (electrical transmission, roads, highways, pipelines, etc.), and existing biological and land use features. Study Area delineation required the identification of constraints in the area encompassing the existing facilities and inclusion of a large enough area within which alternative routes could be delineated to provide a geographic diversity for the analysis.

1.1 Scope of the Project

SPS proposes to construct a 115-kV electric transmission line using primarily single-circuit, monopole self-supporting steel structures. The proposed transmission line would extend between the existing Curry County Substation near Clovis in Curry County, New Mexico to the Bailey County Substation near Muleshoe in Bailey County, Texas (Figure 1.1). The Bailey County Substation will be expanded to include the new 115-kV bus upgrade. Up to five acres of property may be purchased to accommodate the expansion.

This environmental assessment and routing study addresses the Texas portion of the Project Study Area in Bailey and Parmer Counties, Texas. The alternative segments are located south of US Route 84, east of State Route 348, and north of County Road (CR) 1090. The existing Bailey County Substation is 0.2 miles south of Muleshoe, Texas on County Road 214. The proposed transmission line is estimated to be approximately 23 to 28 miles in length, depending on which alternative route is approved by the PUC.

The Environmental Assessment methodology included delineating a Study Area, collecting data (i.e., aerial photography, geographic information system [GIS] data), conducting literature reviews and records searches, conducting field observations, identifying and mapping opportunities and constraints in the Study Area, and evaluating the environmental setting of the Study Area in relation to potential Project impacts. The Routing Study included development of Preliminary Alternative Route Segments, desktop review of the Study Area's environment, solicitation of and response to public input, conducting field reconnaissance, and arriving at the Final Alternative Routes.

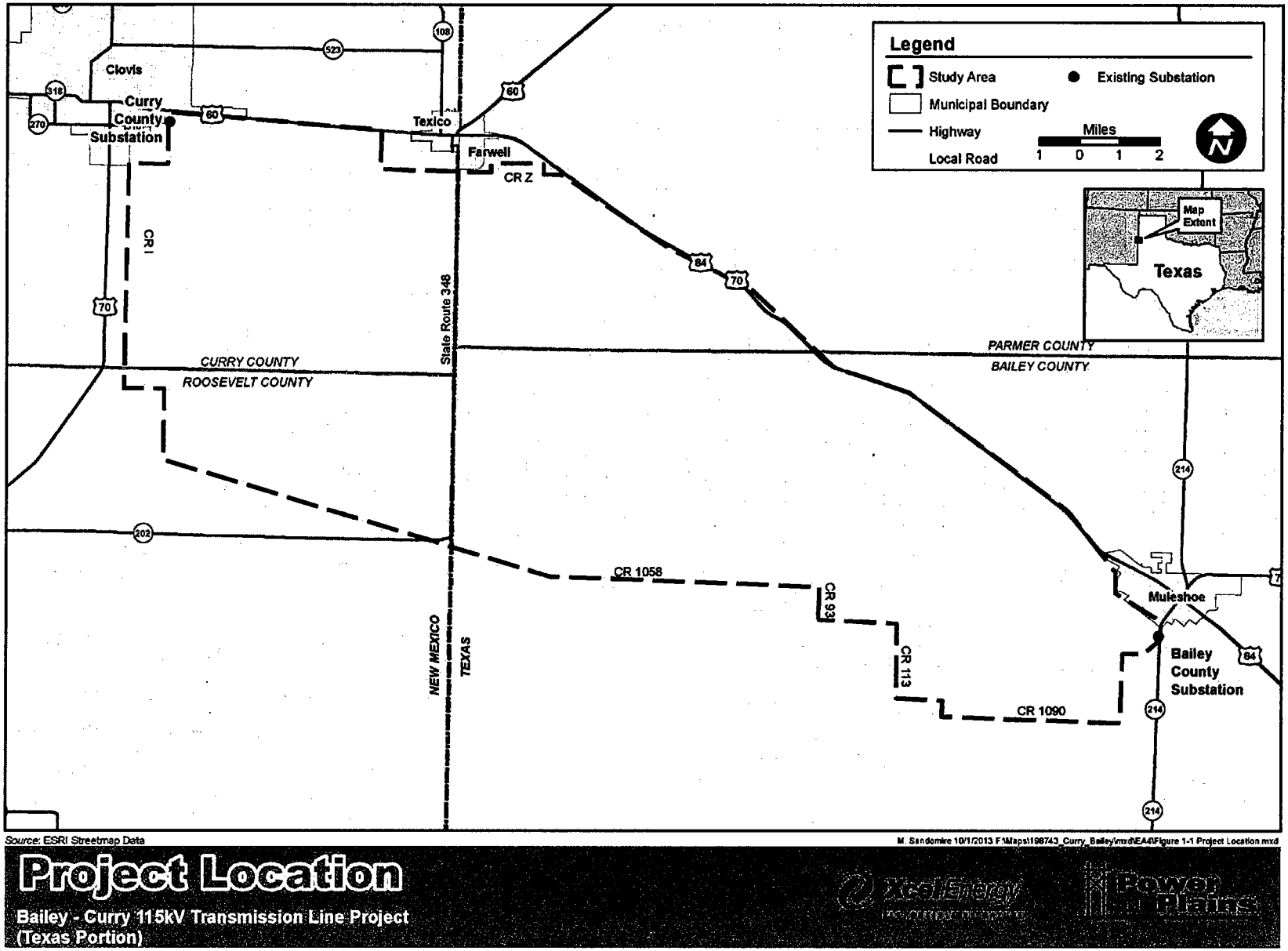

Figure 1.1 Project Location in Texas

1.2 Purpose and Need for the Project

SPS is a member of, and its entire transmission system is located within, the Southwest Power Pool (SPP). The SPP is an organization that meets the requirements of Public Utility Regulatory Act (PURA) Section 39.151 as an independent system operator. SPS does not operate in the Electric Reliability Council of Texas (ERCOT) region, and ERCOT takes no position on SPS's transmission projects.

The proposed transmission line will connect the existing Bailey County Substation in Bailey County, Texas to the existing Curry County Substation in Curry County, New Mexico. This document addresses the transmission line between Bailey County Substation and the Texas-New Mexico border. The proposed transmission line was identified by SPP as needed for reliability to address low voltage violations at the Bailey County Substation during system intact conditions. In the 2012 SPP Transmission Expansion Plan (STEP) report, which is part of the annual Regional Transmission Organization Reliability Assessment, SPP studied and analyzed reliability issues in the region and identified the proposed transmission line as a needed regional reliability upgrade.

Based on the analysis SPP performed for the STEP report, SPP determined there is a need for the proposed transmission line and issued an NTC letter to SPS. The SPP Notice to Construct (NTC) letter was sent to SPS under Project ID 461 and Network Upgrade ID number 10597 and directs SPS to build a 115-kV transmission line from the Bailey County Substation to the Curry County Substation.

1.2.1 Existing Transmission System

The existing transmission system in the SPS Clovis-Hereford Service Area consists of 269 miles of 230-kV lines, 431 miles of 115-kV lines, and 151 miles of 69-kV lines. The SPS Clovis-Hereford Service Area is fed from the north from the coal-fired SPS Harrington Plant by a 230-kV and 115-kV transmission line. The SPS Clovis-Hereford Service Area is also fed from the SPS Central Plains Service Area to the south connecting to the coal-fired SPS Tolk Plant and gas-fired SPS Plant X by three different transmission lines at the 230-kV level and one transmission line at the 115-kV level. The total nameplate generating capacity of Harrington Plant, Tolk Plant, and Plant X Generating Stations is approximately 2,524 MW.

Outside of the Clovis-Hereford Service Area, the Eddy County 345/230/115-kV Substation is fed by a 345-kV line from the Tolk Plant. The Eddy County 345/230/115-kV Substation is connected to the Chaves Substation through 230-kV lines, which feeds the Oasis 230/115-kV Substation and the Roosevelt 230/115-kV Substation in the Clovis-Hereford Service Area. The Roosevelt 230/115-kV Substation is fed by two transmission lines at 230-kV level from the Tolk Plant. The Bailey County 115/69-kV Substation and the Castro County 115/69-kV Substation are fed from Plant X. The Castro County 115/69-kV Substation, Deaf Smith 230/115-kV Substation, Hereford 115/69-kV Substation, North East Hereford 115/69-kV Substation, Curry County 115/69-kV Substation, and the Roosevelt 230/115-kV Substation are interconnected by 115-kV lines. The Deaf Smith 230/115-kV Substation is fed by a 230-kV transmission line from the south by Plant X and from the north from the Harrington Plant by a 230-kV transmission line.

An existing 230-kV transmission line is located south of the existing Bailey County Substation. The transmission line does not connect with the substation; it provides a connection between the Tolk Plant in Texas and the Roosevelt County Interchange in New Mexico. Because of the proposed transmission line and substation expansion, SPS must re-route approximately one-half mile of the 230-kV transmission line from its existing alignment to accommodate the southern expansion of the Bailey County Substation. The re-route avoids a heavily congested area to the north of the Bailey County Substation which is due to the presence of several other existing transmission lines. The costs to reroute the 230-kV transmission line are included within this project.

1.3 Description of Proposed Design/Construction

1.3.1 Design Criteria

SPS proposes to use primarily single-circuit, single-pole, self-supporting steel structures. The proposed transmission line will be built with a combination of direct burial in-line structures and drilled pier foundation corner and angle structures. Typical heights may range from 80 feet to 140 feet and actual heights are dependent on the clearance requirements to be determined, typically between 80 and 140 feet. Highway crossings will utilize structures whose heights are greater than the minimum heights required by the Texas Department of Transportation (TxDOT) and/or the National Electric Safety Code (NESC).

SPS chose single-pole steel structures over wood structures, in part, because of the low maintenance cost, strength of the line during adverse conditions, resistance to fire damage, increased span lengths, and the unavailability of wood poles in heights greater than 110 feet. Transmission lines constructed with wood poles have an estimated maintenance cost of $49,000/mile for the expected life of the line; whereas, there is no expected maintenance associated with a transmission line built with steel structures. The estimated life of a typical steel structure is approximately 20 years longer than a comparable wood structure. SPS expects a wood structure to last for 50 years and a steel structure to last for 70+ years.

In addition to the other benefits previously mentioned, wood pole lengths exceeding 110 feet capable of supporting 3-phase "IBIS" conductors at 660-foot spans are difficult to find at a comparable cost and quality to an equivalent steel structure. Steel monopoles are also typically easier to construct and cost less to transport since they are fabricated in multiple sections. Thus, the use of steel structures is not only expected to decrease costs but will also address the PUC's concern regarding storm-hardening the system.

The primarily agricultural land use and the presence of rural residential buildings in the area was an additional factor in selecting this type of structure since a single-pole steel line minimizes the impact to both farmers and landowners because it: (1) eliminates the space required by an H-frame structure as well as the need for guy wires, both of which result in a smaller footprint and (2) results in using fewer structures, making it easier to span existing irrigation systems.

The proposed 115--kV transmission line would supplement the existing 230-kV lines that currently supply electricity to the study area and the region. Once the proposed 115-kV transmission line is energized and operational, the existing 230-kV transmission lines would continue to be used.

1.3.2 Right-of-Way

The project alternatives would be constructed primarily within newly-acquired SPS ROW, although ROWs owned by others would be utilized where available and to the extent practical. The proposed 115-kV transmission line would require a 70-foot wide ROW. The ROW may be wider where the corridor makes an angled turn, right-angled turn, or at a dead-end structure. A narrower ROW width would be possible in select areas where constrained.

1.4 Permits and Approvals

The construction, operation, and maintenance of the Project will require permits and regulatory approvals from various federal, state, and local agencies. The Project Team has initiated consultation with various agencies including the United States (U.S.) Fish and Wildlife Service (USFWS), U.S. Army Corps of Engineers (USACE), Texas Parks and Wildlife Department (TPWD), and other federal and/or state wildlife management and environmental agencies. The applicable federal, state, and local permits and approvals that could be required for this Project and the corresponding responsible agencies are summarized in Table 1.1. Appendix B contains a summary of possible agency consultation and copies of pertinent agency correspondence regarding the Project.

Table 1.1 Major Permits, Approvals, and Consultations for the Project

Agency	Permit/Approval/Consultation
FEDERAL	
Advisory Council on Historic Preservation	If necessary, provide guidance and direction between SPS and the Texas Historical Commission (THC) regarding interpretation of Section 106 of the National Historic Preservation Act.
U.S. Army Corps of Engineers, Fort Worth District	Authorization to discharge dredged or fill material into waters of the U.S. under Section 404, Clean Water Act. Non-Reporting Nationwide Permit
U.S. Department of the Interior, U.S. Fish and Wildlife Service	Consultation regarding compliance with Sections 7 or 10 of the Endangered Species Act, the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and the Fish and Wildlife Coordination Act
U.S. Environmental Protection Agency	Comment on the project and its effect on Section 402, Clean Water Act, National Pollutant Discharge Elimination System (permitting authority delegated to the Texas Commission on Environmental Quality)
	Section 404, Clean Water Act (veto power for wetland permits issued by the U.S. Army Corps of Engineers)
STATE	
Public Utility Commission of Texas	Certificate of Convenience and Necessity under the Texas Public Utility Regulatory Act
Texas Commission on Environmental Quality	Section 401, Clean Water Act, Water Quality Certification
	Section 402, Clean Water Act, Texas Pollutant Discharge Elimination System Construction Storm Water Discharge Permit (General Construction Permit No. TXR150000)
Texas Historical Commission, State Historic Preservation Office	Review and comment on undertakings potentially affecting cultural resources (Section 106, National Historic Preservation Act)
Texas Parks and Wildlife Department	State-listed threatened and endangered species consultations
Texas Department of Transportation	Road crossing permits for state-maintained roads and highways
COUNTIES	
County Public Works Department	Road crossing permits for county-maintained roads

1.5 Construction Considerations

1.5.1 Clearing

Brush, trees, and groundcover within the proposed ROW will be removed if they impeded safe construction of the transmission line. Since the majority of the Project Study Area is in agricultural production or fallow, few trees exist in the ROW of the proposed routes. However, any trees located within the ROW would be cleared for construction. The upgrade proposed for the Bailey County Substation would require limited clearing and grading for perimeter fencing, facility foundations, and equipment. Brush and trees cleared from the ROW or Bailey County Substation site would be mulched and salvaged (re-used in establishing groundcover) if possible. The ROW would be used for short-term access during the construction phase, as well as long-term access for maintenance. Adjacent public roads, or, where necessary, easements through private property, would provide access to and from the ROW.

1.5.2 Construction

The proposed transmission structures would be constructed either by directly embedding a steel pole in the ground or by using concrete foundation. Concrete foundations are proposed for angle and corner

structures. All tangent structures would be directly embedded in augured holes and backfilled with native soils, crushed rock, or other appropriate backfill material. Geotechnical investigations would be performed to best determine the specific pole placement location and construction requirements.

The concrete foundations would vary in size and range from 6 feet x 12 feet to 10 feet x 20 feet, depending on soil conditions, load specifications, and angle degree. Tangent structure holes would be augured and would be approximately 4 feet in diameter and between 13 and 26 feet deep, depending on pole height and soil conditions.

After the poles are erected, the conductors and shield wires would be installed by a tensioning system. Once wires are tensioned appropriately, ends would be permanently clamped in place. Guard structures are proposed during the construction phase where the transmission line crosses existing transmission and distribution lines, telephone lines, and roadways. Once the transmission line is permanently attached, those guard structures would be removed.

Several of the proposed routes parallel or cross packed dirt roads. The roads become muddy and slick during and after precipitation events. The soil composition is conducive to moderate to severe rutting, increasing the chance of construction vehicles and machinery getting stuck. Application of mud mats that consist of pocketed, double-walled, high-strength fabric with high tensile reinforced ribs would provide structural stability over affected dirt roads. Ground disturbance and rutting from vehicle tires or tracks would be minimized and the road surface would be bladed to return it to its pre-construction condition.

1.5.3 Cleanup

Following construction, disturbed areas would be restored to preconstruction conditions where feasible and native vegetation cover or other erosion protection measures would be implemented. For agricultural lands, disturbed areas will be returned to their preconstruction agricultural use. All construction debris would be removed from within and adjacent to the ROW, as well as at the Bailey County Substation. The following measures would be incorporated into the post-construction phase as necessary:

- Sedimentation/erosion control protection measures may be used where clearing and grading have occurred. The preference is to use native vegetation everywhere possible. Gravel or rock may be used in areas where native cover is not likely to reestablish. Temporary use of fiber rolls, netting, or jute can be employed to help minimize erosion during the rainy season (typically May through August) when native cover is starting to reestablish.
- In areas where native cover does not normally reseed, hydroseeding may be employed utilizing an appropriate native seed mix.
- Temporary roads or access will be restored to preconstruction conditions.
- Temporary fencing will be removed and repairs/replacement of permanent fencing will be completed, as warranted.
- Construction waste and debris will be hauled to an approved landfill or recycling center, as warranted.

2.0 Selection and Evaluation of Alternative Transmission Line Routes

A set of preliminary route segments was developed by the Project Team during a routing workshop. The preliminary segments were linked to create routes from the Bailey County Substation to the Curry County Substation. The eight alternative routes were evaluated in accordance with Section 37.056(c)(4) of the Public Utility Regulatory Act (PURA), as referenced in PUC SUBST. R. 25.101(b)(3)(B), and with respect to applicable sections in the application for a Certificate of Convenience and Necessity for a proposed transmission line. The evaluation process encompassed consideration of environmental opportunities and constraints, the human environment and siting opportunities, information received from the public during the involvement process, and guidance and direction from SPS planning, ROW, engineering and design staff members.

Route selection was conducted in accordance with PURA, and considered various aspects of the natural and human environment including community values, recreational and park areas, historical and aesthetic values, and environmental integrity. The team involved in the Routing Study included experts in the following disciplines and areas of expertise:

- SPS – project management, environmental permitting, engineering/design, system planning, construction, operations, and maintenance;
- TRC – routing, ecology, land use, cultural resources, biological resources, engineering, GIS, database development, public involvement, and information technology; and
- Manning Land, LLC – land ownership research and landowner notification.

The process used to evaluate and select the alternative routes included the following steps:

- Study Area Delineation and Data Collection;
- Field Reconnaissance;
- Identification of Potential Route Segments;
- Identification of Preliminary Alternative Route Segments;
- Public Involvement;
- Adjustments to Preliminary Alternative Route Segments;
- Identification of Preliminary Alternative Routes; and
- Evaluation and Selection of the Recommended Alternative Route.

2.1 Objective of the Study

The objective of the study was to develop viable transmission line route alternatives utilizing criteria identified by PUC Substantive Rules, PURA, and the PUC CCN Application. An environmental assessment and alternative route analysis was undertaken to identify transmission line alternatives between the existing Bailey County Substation south of Muleshoe, Texas and the existing Curry County Substation in Clovis, New Mexico. Each alternative route was evaluated for land use conflicts, engineering and design factors, and construction costs to determine the route that best met project needs,

minimized conflicts with environmental and human factors, and minimized overall project costs related to construction and maintenance.

Each alternative route was evaluated for potential environmental effects, and the conclusions were considered in the selection of an alternative route that best meets the regulatory requirements of PURA and the PUC Substantive Rules and the needs of SPS.

2.2 Data Collection

Data was collected from a variety of sources and created a baseline from which the environmental and human characteristics of the Project Study Area could be evaluated. GIS and web-based information, consultation with agencies, and field reconnaissance were used by the Project Team to identify optimal areas for segments and the creation of alternative routes.

GIS data was collected from web-based sources and available public documents. The federal and state agency sources included the US Fish and Wildlife Service, the Federal Aviation Administration, the Federal Communications Commission, the Federal Emergency Management Agency, the Natural Resource Conservation Service, the United States Department of Agriculture (USDA) Farm Service Agency, the Texas Department of Agriculture, the Texas Parks and Wildlife Department, the Texas Natural Diversity Database, the Texas Department of Transportation, the Texas Railroad Commission, and the University of Texas at Austin. TRC performed a Class I literature review to identify previously recorded cultural resources and to determine the potential for cultural resources along each alternative route. A complete list of GIS-based references is provided in Section 8.0.

As part of the data collection effort, aerial photography was downloaded from Natural Resources Conservation Service (NRCS) Data Gateway (December 2012). The Project Team used the most recently available aerial photography, from 2010, to identify existing land uses, identify potential habitable structures, and locate existing electric transmission lines and other natural or human environmental features considered during the analysis and mapping of opportunities and constraints. This information was verified during later field reconnaissance (see Section 2.3).

TRC contacted local resources for information about the Project Study Area. Judges from Bailey County and Parmer County, the Parmer County Industrial Development Corporation, the Muleshoe Economic Development Corporation, and the cities of Muleshoe and Farwell provided information about development and other pertinent issues in the Project Study Area. The Muleshoe Independent School District and the Farwell Independent School District were contacted about school planning.

2.3 Field Reconnaissance

Several field visits were made to the Project area during December 11–14, 2012; March 27–28, 2013; April 16–20, 2013; June 11–12, 2013; and October 9–10, 2013. TRC staff that collected the field data included environmental planners and biologists with experience in transmission line routing, planning, and natural resources in Texas. TRC conducted on-the-ground field reconnaissance of the Project Study Area, with the following objectives to ensure robust data collection and analysis:

- Confirm type and location of habitable structures within 300 feet of the centerline of corridor ROWs;
- Confirm location of existing transmission lines and pipelines;
- Confirm the location of public airports and private airfields;

- Confirm the locations of electronic installations, including communication towers;
- Confirm the location of center-pivot irrigation systems and, if in active cultivation, the crop type;
- Confirm the location of irrigation wells within 200 feet of corridor ROW;
- Confirm the presence of park and recreation areas and their proximity to corridor ROW;
- Confirm the presence and/or extent of cemeteries or other historical landmarks as identified in GIS databases and other reference material;
- Confirm any sensitive biological resources and habitat; and
- Note general land uses and any additional potential constraints.

2.4 Project Study Area Delineation

The Project Team identified a Project Study Area encompassing the defined endpoints of the Bailey County Substation and the Curry County Substation. During initial planning stages the Project Study Area for the Texas portion of the Project was defined as an approximately 14-mile (north-south) by 18-mile (east-west) area south and west of Muleshoe, Texas to the Texas/New Mexico State Line. The purpose of identifying and defining the Project Study Area was to allow the team to focus efforts to identify and obtain relevant information within a defined area that could influence the route selection, including both routing opportunities and routing constraints.

2.4.1 Delineation of Alternative Route Segments

The next step in the routing process was to identify potential alternative route segments that would allow the Project Team to assemble several viable and complete transmission line route alternatives to connect the Bailey County Substation to the Curry County Substation. A web map was developed to help analyze opportunities and constraints for siting the Project; this incorporated the aerial photography, land cover, terrain, roadways, and other data collected into GIS data layers which enabled the Project Team to create "overlays" of information that enhanced alternative route comparison. The GIS data layers were used to evaluate numerous combinations of opportunities and constraints. The primary objective of this effort was to maximize use of opportunities and to avoid and/or minimize impacts to constraints or sensitive resources. This information is shown on Figure 2.1, located in a map pocket in the back of this document.

2.4.2 Constraints Mapping

Data from GIS sources, reconnaissance information from field visits, and literature reviews provided a basis for identifying opportunities or constraints. Opportunities considered during Constraints Mapping included existing infrastructure and property/tract lines.

Constraints considered include environmental, land use, and other factors that may create challenges in routing and constructing the transmission line, and potentially affecting the environment or human factors. Specific environmental constraints identified included: the presence or absence of federal or state wildlife areas, known historic or archaeological sites including those on the National Register of Historic Places, National Wetlands Inventory (NWI)-designated wetlands and playa lakes, as well as wildlife habitat identified through the Texas Natural Diversity Database and the Southern Great Plains CHAT tool.

A Texas Historical Marker identifying the first irrigation well in Bailey County was noted as well as several cemeteries. However, only one cemetery (Mt. Olivet Cemetery), is listed with the THC.

In addition to the identification of constraints, other criteria considered during the routing study include:

- Habitable structures within 300 feet of a segment centerline;
- Electronic installations, including AM towers within 10,000 feet of a segment centerline and FM, microwave, cell, and other electronic installations within 2,000 feet of a segment centerline;
- Number of transmission lines crossed;
- Number of US or state highways crossed;
- Number of county or local roads crossed;
- Length of segments using existing infrastructure ROW;
- Length of segments parallel to existing transmission lines, roads, and pipelines;
- Length of segments crossing agricultural crop land that is irrigated by a center-pivot irrigation system;
- Irrigation wells within 200 feet of a segment centerline;
- FAA- registered airports or airfields with at least one runway longer than 3,200 feet within 20,000 feet of a segment centerline;
- Parks and recreation areas within 1,000 feet of a segment centerline;
- Location of schools, nursing homes, and hospitals;
- Length of segments crossing NWI wetlands, playas, and streams;
- Special land uses;
- Recorded historic and archaeological sites; and
- Environmentally sensitive areas.

Opportunities and constraints in the Study Area are mapped and included as Figure 2.2b and Figure 6.1. Figure 2.2b is provided as an oversized map at the back of this document.

2.4.3 Preliminary Alternative Routes

An initial Project Team routing meeting was held in December 2012 and identified 99 potential segments in Texas for study. The field reconnaissance and desktop studies identified environmental resources and routing criteria along each segment. Field data were entered in the web map tool and analyzed under the considerations of the routing criteria and the opportunities and constraints.

A map depicting the preliminary alternative segments was distributed to landowners, agencies, and stakeholders prior to the March 27th and 28th public open house meetings. Comment and feedback from landowners, stakeholders, and agencies is identified in Chapter 5 and supported by the Public Meeting Summary in Appendix E.

The Project Team convened in May 2013 and conducted a routing workshop to develop preliminary alternative routes. The web map tool and large-format maps depicting preliminary alternative segments were utilized to develop alternative routes between the Bailey County Substation and the Curry County Substation. The preliminary alternative routes fan out from the Bailey County Substation across rangeland and pasture, then cross the Project Study Area following existing roadway corridors: Alternative Routes 6 and 7 cross the southern-most portion of the Project Study Area and Alternative Routes 1 and 5 generally cross the northern portion of the Project Study Area. One preliminary alternate segment was removed from analysis because it duplicated two adjacent segments in the eastern part of the Project Study Area. Table 2.1 and Figure 2.3 identify each of the eight alternative routes and the corresponding alternative route segments.

Table 2.1 Eight Alternative Routes and Associated Route Segments

Route Number	Segments	Route Length
1	JM, JK, JL, CE, CB, FS, HI, BV, FQ, DT, DS, BS, BQ, DR, BJ, BH, GM, BE, KH, GB, DQ, HJ, AP, AM, AL, FL, DN, GC	28.2
2	JM, JK, JL, CE, CB, FS, DU, KM, BX, BW, BO, BK, KI, DM, KL, DJ, AH	23.1
3	JM, JK, JL, CE, CB, FS, HI, BV, FQ, DT, BT, BP, BM, BI, BF, BE, KH, GB, BA, AX, KJ, AU, AS, AG	24.0
4	JM, JK, JL, CE, CB, FS, DU, KM, BU, FQ, BN, GI, DV, AO, FM, AN, KF, AJ, AI, AD, Y	26.1
5	JM, CD, CA, FR, DX, BW, BO, BJ, BG, BC, GK, AZ, AW, AR, AQ, AM, AK, AI, AD, Y	25.3
6	JM, JK, JL, CE, CB, FS, DU, KM, BU, FQ, BN, GI, DL, DK, KL, DJ, AH	23.1
7	JM, JK, HH, BV, FQ, BN, GI, DL, FM, AH	26.9
8	JM, JK, JL, CE, CB, FS, DU, KM, BU, BN, GI, DV, JO, JP, GB, BA, AX, KJ, AU, AS, AG	24.0

A field reconnaissance trip was conducted by TRC in June 2013. This included driving each of the eight routes, confirming data and making notes for segment descriptions prior to evaluation of alternative routes. Additionally, minor segment adjustments were made as a result of public meeting feedback, playa lake boundary confirmation, and the presence of irrigation wells. Adjustments to alternative route segments are detailed in Section 2.4.4. Additional information was collected for the purpose of developing alternative segment descriptions, as detailed below.

OVERSIZED MAP
Figure 2.3

2.4.3.1 Texas Segment Descriptions

Table 2.2 Alternative Routes and Associated Route Sections

Route Number	Segments
1	JM, JK, JL, CE, CB, FS, HI, BV, FQ, DT, DS, BS, BQ, DR, BJ, BH, GM, BE, KH, GB, DQ, HJ, AP, AM, AL, FL, DN, GC
2	JM, JK, JL, CE, CB, FS, DU, KM, BX, BW, BO, BK, KI, DM, KL, DJ, AH
3	JM, JK, JL, CE, CB, FS, HI, BV, FQ, DT, BT, BP, BM, BI, BF, BE, KH, GB, BA, AX, KJ, AU, AS, AG
4	JM, JK, JL, CE, CB, FS, DU, KM, BU, FQ, BN, GI, DV, AO, FM, AN, KF, AJ, AI, AD, Y
5	JM, CD, CA, FR, DX, BW, BO, BJ, BG, BC, GK, AZ, AW, AR, AQ, AM, AK, AI, AD, Y
6	JM, JK, JL, CE, CB, FS, DU, KM, BU, FQ, BN, GI, DL, DK, KL, DJ, AH
7	JM, JK, HH, BV, FQ, BN, GI, DL, FM, AH
8	JM, JK, JL, CE, CB, FS, DU, KM, BU, BN, GI, DV, JO, JP, GB, BA, AX, KJ, AU, AS, AG

2.4.3.1 Texas Segment Descriptions

Y

Segment Y originates in Parmer County at the intersection of Segment AD on the north side of CR DD. Segment Y extends directly west approximately 710 feet, paralleling the north side of CR DD, crossing the non-irrigated field south of a center-pivot irrigated field and an electric distribution line. Segment Y terminates at the state line of Texas and New Mexico. The total length of Segment Y is approximately 710 feet.

AD

Segment AD originates in Parmer County at the intersection with Segment AI, northwest of the intersection of CR 1 and CR DD. Segment AD extends directly west approximately 4,750 feet, paralleling the north side of CR DD, offset approximately 40 feet north of the road to avoid two center-pivot irrigated fields. The offset of approximately 40 feet from CR DD also avoids irrigation wells. Segment AD terminates at the intersection with Segment Y on the north side of CR DD. The total length of Segment AD is approximately 4,750 feet.

AG

Segment AG originates in Bailey County at the intersection of Segments AN, AS, and KF northwest of the intersection of CR 1008 and CR 14. Segment AG extends directly west approximately 2,815 feet, paralleling the north side of CR 1008, offset approximately 35 feet north of the road to avoid irrigation wells, crossing the edge of a center-pivot irrigated field, then reaching and crossing a drainage. Segment AG continues west approximately 1,600 feet, paralleling the north side of CR 1008. Segment AG then turns southwest and extends approximately 570 feet, crossing to the south side of CR 1008 to avoid a habitable structure. Segment AG then turns west, and extends approximately 220 feet, paralleling the south side of CR 1008, and crossing CR 4. Segment AG continues west, and extends approximately 1,995 feet, before terminating at the state line of Texas and New Mexico. The total length of Segment AG is approximately 7,230 feet.

AH

Segment AH originates in Bailey County at the intersection of Segments AN, DJ, and FM, northwest of the intersection of CR 14 and FM 3125. Segment AH extends directly west approximately 5,230 feet, paralleling the north side of FM 3125, reaching and crossing CR 4. Segment AH extends directly west approximately 1,920 feet, paralleling the north side of FM 3125, spanning of the edge of a center-pivot irrigated field and terminating at the state line with Texas and New Mexico. The total length of Segment AH is approximately 7,150 feet.

AI

Segment AI originates in Parmer County at the intersection of Segments AJ and AK, northeast of the intersection of CR DD and CR 1. Segment AI extends west approximately 1,930 feet, paralleling the north side of CR DD across the edge of a center-pivot field, offset approximately 90 feet north of the road to avoid a habitable structure and irrigation well, reaching and crossing the continuation of CR 1. Segment AI continues west approximately 70 feet to terminate at the intersection of Segment AD, northwest of the intersection CR DD and CR 1. The total length of Segment AI is approximately 2,000 feet.

AJ

Segment AJ originates in Parmer County at the intersection of Segment KF, northeast of the intersection of CR 1 and CR EE. Segment AJ extends directly north approximately 1,690 feet paralleling the east side of CR 1, crossing the edge of a center-pivot irrigated field. Segment AJ then turns northwest approximately 430 feet to cross CR 1, and avoiding a center-pivot irrigated field, then continues north 2,080 feet. The segment then turns northeast approximately 450 feet to cross CR 1 and avoid a habitable structure. Segment AJ proceeds directly north approximately 610 feet to the intersection of CR DD, and then continues north approximately 40 feet to terminate at the intersection of Segments AI and AK, northeast of the intersection of CR DD and CR 1. The total length of Segment AJ is approximately 5,300 feet.

AK

Segment AK originates in Parmer County at the intersection of Segments AL and AM, northwest of the intersection of CR DD and CR 2. Segment AK extends directly west approximately 3,020 feet, paralleling the north side of CR DD, offset approximately 50 feet north of the road to avoid an irrigation well, crossing the edge of a center-pivot irrigated field, before terminating at the intersection of Segments AI, and AJ, northeast of the intersection of CR DD and CR 1. The total length of Segment AK is approximately 3,020 feet.

AL

Segment AL originates in Parmer County at the intersection of Segments AK and AM, northwest of the intersection of CR DD and CR 2. Segment AL extends directly north approximately 5,610 feet, paralleling the west side of CR 2, offset approximately 50 feet west of the road to avoid an irrigation well, crossing the edges of two center-pivot irrigated fields, and reaching and crossing CR BB. Segment AL continues north approximately 90 feet to terminate at the intersection with Segment FL northwest of the intersection of CR 2 and CR BB. The total length of Segment AL is approximately 5,700 feet.

AM

Segment AM originates in Parmer County at the intersection of Segments AP and AQ, northwest of the intersection of CR DD and CR 2. Segment AM extends directly west approximately 2,100 feet, paralleling the north side of CR DD across the edge of a center-pivot irrigated field, offset approximately 50 feet north of the road to avoid irrigation wells, reaching and crossing CR 2. Segment AM extends west approximately 50 feet to terminate at the intersection of Segments AK, and AL, northwest of the intersection with CR DD and the continuation of CR 2. The total length of Segment AM is approximately 2,150 feet.

AN

Segment AN originates in Bailey County at the intersection of Segments AH, DJ, and FM, northwest of the intersection of CR 14 and FM 3125. Segment AN extends directly north approximately 5,210 feet, paralleling the west side of CR 14 to avoid an irrigation well and habitable structures, crossing a drainage, and reaching and crossing CR 1008. Segment AN continues north approximately 50 feet to terminate at the intersection of Segments AG, KF, and AS, northwest of the intersection of CR 14 and CR 1008. The total length of Segment AN is approximately 5,260 feet.

AO

Segment AO originates in Bailey County at the intersection of Segment DV and JO, northwest of the intersection of CR 1038 and CR 64. Segment AO extends directly west approximately 1,580 feet, paralleling the north side of CR 1038 and crossing a center-pivot irrigated field. It then turns northwest for approximately 690 feet to avoid habitable structures, then turns directly west approximately 760 feet, and then turns southwest for approximately 640 feet, crossing CR 1038. Segment AO extends directly west paralleling the south side of CR 1038 for approximately 2,040 feet, offset approximately 50 feet south of the road to avoid a center-pivot irrigated field. Segment AO then turns northwest for approximately 530 feet crossing CR 1038 to avoid irrigation wells. It then extends west approximately 4,440 feet, paralleling the north side of CR 1038 and crossing two center-pivot irrigated fields, reaching and crossing FM 3125. Segment AO continues west approximately 5,300 feet, crossing the edges of two center-pivot irrigated fields, to reach and cross CR 34. Segment AO continues west approximately 40 feet to terminate at the intersection of Segments DK, DL, and FM northwest of the intersection of CR 1038 and CR 34. The total length of Segment AO is approximately 16,020 feet.

AP

Segment AP originates in Parmer County at the intersection of Segment HJ on the northwest side of the intersection of CR DD and CR 5. Segment AP extends directly west approximately 2,100 feet, paralleling the north side of CR DD across the edge of a center-pivot irrigated field, offset approximately 65 feet north of the road to avoid habitable structures and irrigation wells, then reaching and crossing CR 5. Segment AP then extends west approximately 6,420 feet, paralleling the north side of CR DD to cross a larger pond. Segment AP continues west approximately 3,220 feet, paralleling the north side of CR DD, offset approximately 65 feet north of the road to avoid habitable structures and irrigation wells. Segment AP then turns southwest for approximately 560 feet, crossing CR DD to avoid a center-pivot irrigation structure, and then extends directly west approximately 710 feet. Segment AP turns northwest for approximately 570 feet to cross CR DD. Segment AP then extends directly west approximately 2,290 feet, paralleling the north side of CR DD and crossing the edge of a center-pivot irrigated field, and terminating at the intersection of Segments AM and AQ, northwest of the intersection of CR DD and CR 2. The total length of Segment AP is approximately 15,870 feet.

AQ

Segment AQ originates in Parmer County at the intersection with Segment AR, northeast of the intersection of CR 2 and CR EE. Segment AQ extends directly north approximately 2,030 feet, paralleling the east side of CR 2, offset approximately 40 feet to avoid a habitable structure. Segment AQ then turns northwest approximately 590 feet, crossing CR 2 to avoid communication tower unregistered with the FCC. It then extends directly north approximately 2,600 feet, parallel to the west side of the road, reaching and crossing CR DD. Segment AQ then extends north approximately 40 feet to terminate at the intersection of Segments AM and AP, northwest of the intersection of CR DD and CR 2. The total length of Segment AQ is approximately 5,260 feet.

AR

Segment AR originates in Parmer County at the intersection with Segment AW northeast of the intersection of CR EE and CR 3. Segment AR extends directly west approximately 120 feet and crosses CR 3. Segment AR continues west approximately 5,210 feet, paralleling the north side of CR EE, offset approximately 50 feet north of the road to avoid an irrigation well, to terminate at the intersection with Segment AQ, northeast of the intersection of CR EE and CR 2. The total length of Segment AR is approximately 5,330 feet.

AS

Segment AS originates in Bailey County at the intersection with Segment AU, northwest of the intersection of CR 1008 and CR 24. Segment AS extends directly west approximately 5,160 feet, paralleling the north side of CR 1008 across the edge of a center-pivot irrigated field, offset approximately 90 feet on the north side of the road to avoid irrigation wells, then reaching and crossing CR 14. Segment AS then extends west approximately 120 feet to terminate at the intersection of Segments AG, KF, and AN, northwest of the intersection of CR 14 and CR 1008. The total length of Segment AS is approximately 5,280 feet.

AU

Segment AU originates in Bailey County at the intersection with Segment KJ, northwest of the intersection of CR 1008 and CR 34. Segment AU extends directly west approximately 5,230 feet, paralleling the north side of CR 1008 and crossing the edge a center-pivot irrigated field, reaching and crossing CR 24. Segment AU continues west approximately 50 feet before terminating at the intersection with Segment AS, northwest of the intersection with CR 1008 and CR 24. The total length of Segment AU is approximately 5,280 feet.

AW

Segment AW originates in Parmer County at the intersection with Segment AZ, northeast of the intersection of CR EE and CR 4. Segment AW extends directly west approximately 160 feet, to reach and cross CR 4. Segment AW continues west approximately 5,170 feet, paralleling the north side of CR EE and crossing the edge of a center-pivot irrigated field, before terminating at the intersection with Segment AR, northeast of the intersection of CR EE and CR 3. The total length of Segment AW is approximately 5,330 feet.

AX

Segment AX originates in Bailey County at the intersection of Segment BA, northeast of the intersection with of CR 1008 and CR 44. Segment AX extends directly west approximately 150 feet, to cross CR 44. Segment AX continues west approximately 5,150 feet, paralleling the north side of CR 1008, and the edge of a center-pivot irrigated field, before terminating with the intersection of Segment KJ northeast of the intersection of CR 1008 and CR 34. The total length of Segment AX is approximately 5,300 feet.

AZ

Segment AZ originates in Parmer County at the intersection of Segments DQ, GK, and HJ, northwest of the intersection of CR EE and CR 5. Segment AZ extends directly west approximately 60 feet, reaching and crossing CR 5. Segment AZ continues west approximately 890 feet, offset approximately 50 feet north of the road to cross a drainage and an associated playa and freshwater emergent wetland. Segment AZ then extends approximately 4,070 feet, paralleling the north side of CR EE, and crossing the edges of two center-pivot irrigated fields, before terminating at the intersection with Segment AW, northeast of the intersection of CR EE and CR 4. The total length of Segment AZ is approximately 5,070 feet.

BA

Segment BA originates in Bailey County at the intersection of Segments DQ, and GB, northwest of the intersection of CR 1008 and CR 54. Segment BA extends approximately 2,025 feet directly west, before angling 575 feet to the southwest to avoid a habitable structure. Segment BA parallels CR 1008 for 800 feet before angling northwest 525 feet, crossing CR 1008. Segment BA then extends west approximately 1,175 feet, paralleling the north side of CR 1008 at an offset of approximately 50 feet and terminating at the intersection with Segment AX, northeast of the intersection of CR 1008 and CR 44. The total length of Segment BA is approximately 5,100 feet.

BC

Segment BC originates in Parmer County at the intersection with Segment BG, northeast of the intersection of CR EE and CR 7. Segment BC extends directly west approximately 170 feet west to cross CR 7. Segment BC then continues west approximately 4,360 feet, paralleling the north side of CR EE, offset approximately 40 feet north of the road to cross a wetland/playa, cross the edge of a center-pivot irrigated field, avoid a habitable structure and irrigation well, cross a crude oil pipeline and then a carbon dioxide pipeline. Segment BC continues west approximately 910 feet, paralleling the north side of CR EE, reaching and crossing CR 6. Segment BC continues west approximately 50 feet to terminate at the intersection with Segment GK, northwest of the intersection of CR EE and CR 6. The total length of Segment BC is approximately 5,490 feet.

BE

Segment BE originates in Bailey County at the intersection with Segment BF and GM northwest of the intersection of CR 1008 and Ranch Road 1731. Segment BE extends west approximately 540 feet, paralleling the north side of CR 1008, offset approximately 60 feet north of the road to avoid irrigation wells, and crosses a crude oil pipeline. It then continues west approximately 440 feet to cross a carbon dioxide pipeline and the edge of a center-pivot irrigated field. Segment BE then extends west approximately 3,150 feet, paralleling the north side of CR 1008. Segment BE extends southwest approximately 390 feet, crossing CR 1008, and then turning directly west approximately 330 feet and terminating at the intersection with Segment KH, southeast of the intersection of CR 1008 and CR 64. The total length of Segment BE is approximately 4,850 feet.

BF

Segment BF originates in Bailey County at the intersection of Segments BI, BK, and KI, northwest of the intersection of CR 1018 and Ranch Road 1731. Segment BF extends directly north approximately 2,530 feet, paralleling the west side of Ranch Road 1731. Segment BF then turns northeast approximately 250 feet, crosses Ranch Road 1731, and then extends directly north approximately 300 feet paralleling the east side of the road, offset approximately 40 feet east of the road, and crosses a carbon dioxide pipeline. Segment BF then continues north approximately 1,140 feet, paralleling the east side of Ranch Road 1731 to cross the edge of a center-pivot irrigated field and a crude oil pipeline. Segment BF continues north approximately 780 feet, paralleling the east side of Ranch Road 1731, then extends northwest approximately 140 feet to reach and cross Ranch Road 1731. It continues northwest 440 feet, avoiding a freshwater emergent wetland, to reach and cross CR 1008. Segment BF continues northwest approximately 40 feet to terminate at the intersection of Segments BE and GM. The total length of Segment BF is approximately 5,480 feet.

BG

Segment BG originates in Bailey County at the intersection of Segments BH and BJ, northeast of the intersection of CR 1008 and CR 83. Segment BG extends north approximately 2,050 feet across the edge of a center-pivot irrigated field, paralleling the east side of CR 83, offset approximately 40 feet east of the road. It then turns northwest 530 feet, crossing to the west side of CR 83 to avoid an irrigation well.

Segment BH then extends directly north approximately 1,180 feet, paralleling the west side of CR 83, crossing the Parmer/Bailey County Line. Segment BG continues north approximately 1,610 feet, paralleling the west side of CR 8 (that was CR 83 in Bailey County), across a center-pivot irrigated field to reach and cross Ranch Road 1731 parallel to the south side of the road. Segment BG then extends west approximately 1,010 feet, paralleling the north side of Ranch Road 1731. Segment BG turns southwest for 680 feet, crossing Ranch Road 1731 to avoid a center-pivot irrigated field, a habitable structure and irrigation well, then turns west approximately 2,580 feet, offset approximately 110 feet south of the road. Segment BG then turns northwest for approximately 650 feet, crossing the slight southwest –northeast curve of Ranch Road 1731 at the intersection with CR EE. Segment BG then extends directly west approximately 150 feet to terminate at the intersection with Segment BC, northeast of the intersection of RR 1731 and CR 7. The total length of Segment BG is approximately 10,440 feet.

BH

Segment BH originates in Bailey County at the intersection of Segments BG and BJ, northeast of the intersection of CR 1008 and CR 83. Segment BH extends directly west approximately 40 feet to reach and cross CR 83. Segment BH continues west approximately 4,330 feet, paralleling the north side of CR 1008, offset approximately 40 feet from the north side of the road, and crossing the edges of two center-pivot irrigated fields. Segment BH turns southwest approximately 460 feet across CR 1008, and then turns directly west approximately 410 feet to avoid habitable structures, terminating at the intersection with Segment GM. The total length of Segment BH is approximately 5,240 feet.

BI

Segment BI originates in Bailey County at the intersection of Segment BM on the west side of Ranch Road 1731. Segment BI extends directly north approximately 4,860 feet, paralleling the west side of Ranch Road 1731, offset approximately 80 feet west of the road to avoid a habitable structure. Segment BI then crosses the edge of a center-pivot irrigated field, reaching and crossing CR 1018. Segment BI continues north approximately 40 feet to terminate at the intersection of Segments BF, BK, and KI, northwest of the intersection of CR 1018 and Ranch Road 1731. The total length of Segment BI is approximately 4,900 feet.

BJ

Segment BJ originates in Bailey County at the intersection of Segments BK, BO, and DR, southeast of the intersection of CR 1018 and CR 83. Segment BJ extends north approximately 80 feet to reach and cross CR 1018. It continues north approximately 20 feet to cross two 69 kV electric transmission lines. Segment BJ continues directly north approximately 2,580 feet, paralleling the east side of CR 83, offset approximately 50 feet east of the road to avoid a habitable structure and irrigation well, and crossing the edge of a center-pivot irrigated fields, a playa, and a farmed wetland. Segment BJ turns northwest approximately 450 feet, crossing CR 83 and the playa and farmed wetland. Segment BJ extends directly north 1,060 feet, paralleling the west side of the road, offset approximately 40 feet west of the road to avoid an irrigation well and a center-pivot irrigated field. It then turns northeast approximately 90 feet, crossing CR 83, to avoid a habitable structure. Segment BJ then extends directly north approximately 1,200 feet to reach and cross CR 1008, and continues approximately 40 feet to terminate at the intersection of Segments BG and BH, northeast of the intersection of CR 1008 and CR 83. The total length of Segment BJ is approximately 5,500 feet.

BK

Segment BK originates in Bailey County at the intersection of Segments BJ, BO, and DR, southeast of the intersection of CR 1018 and CR 83. Segment BK extends directly west approximately 100 feet to cross CR 83 southeast of Bailey County EC # 2 Substation. Segment BK continues west approximately 700 feet, paralleling the south side of CR 1018, offset approximately 40 feet south of the road. It turns

northwest approximately 580 feet crossing CR 1018 to avoid habitable structures and irrigation wells. Segment BK extends directly west 1,550 feet, paralleling the north side of CR 1018, offset approximately 30 feet north of the road, and crossing a crude oil pipeline. Segment BK continues west approximately 700 feet to cross a carbon dioxide pipeline and the edge of a center-pivot irrigated field. Segment BK then extends west approximately 1,720 feet, still paralleling the north side of CR 1018, reaching and crossing Ranch Road 1731. Segment BK continues west approximately 100 feet to terminate at the intersection of Segments BF, BI, and KI, northwest of the intersection of CR 1018 and Ranch Road 1731. The total length of Segment BK is approximately 5,450 feet.

BM

Segment BM originates in Bailey County at the intersection of Segments BP, BQ, and DR, northeast of the intersection of FM 3125 and CR 83. Segment BM extends directly west approximately 70 feet to reach and cross CR 83. Segment BM continues west approximately 530 feet crossing a small dry retention pond to reach and cross a carbon dioxide pipeline. Segment BM then extends west approximately 4,250 feet, paralleling the north side of FM 3125, across the edge of a center-pivot irrigated field, and offset approximately 80 feet north of the road to avoid habitable structures and irrigation wells. Segment BM then turns northwest approximately 570 feet crossing Ranch Road 1731, before continuing approximately 110 feet to terminate at the intersection of Segment BI on the west side of Ranch Road 1731. The total length of Segment BM is approximately 5,530 feet.

BN

Segment BN originates in Bailey County at the intersection of Segments DT, BU and FQ, northeast of the intersection of FM 1760 and CR 113. Segment BN extends directly west approximately 100 feet to cross CR 113. Segment BN continues west approximately 5,270 feet, paralleling the north side of FM 1760 to cross two center-pivot irrigated fields, offset approximately 110 feet north of the road to avoid a habitable structure and irrigation wells, and then reaching and crossing CR 103. Segment BN extends directly west approximately 2,100 feet, paralleling the north side of FM 1760 before turning southwest to cross to the south side of the road. Segment BN continues west approximately 1,300 feet, paralleling the south side of FM 1760, offset approximately 105 feet south of the road to avoid a habitable structure before turning northwest approximately 500 feet to cross to the north side of the road, and crossing a 69 kV transmission line. Segment BN extends west approximately 530 feet reaching and crossing a crude oil pipeline, paralleling the north side of FM 1760, offset approximately 110 feet north of the road to avoid habitable structures, an irrigation well, and a carbon dioxide terminal. Segment BN continues west approximately 700 feet to cross a carbon dioxide pipeline. Segment BN then extends west approximately 350 feet to reach and cross CR 93. Segment BN continues west approximately 1,760 feet crossing the edge of a center-pivot irrigated field. It turns southwest 530 feet crossing FM 1760 to avoid a habitable structure. Segment BN extends directly west approximately 640 feet to the edge of an irrigated well buffer. It then turns northwest approximately 210 feet, crossing through the buffer and crossing FM 1760 and the 69 kV transmission line. Segment BN then extends directly west 2,250 feet, paralleling the north side of FM 1760 and crossing the edge of two center-pivot irrigated fields reaching and crossing CR 83. Segment BN then extends west approximately 5,160 feet, paralleling the north side of FM 1760 across the edges of two center-pivot irrigated fields, to terminate at the intersection of Segment GI, northeast of the intersection of FM 1760 and Ranch Road 1731. The total length of Segment BN is approximately 21,200 feet.

BO

Segment BO originates in Bailey County at the intersection with Segments BW and HK, northwest of the intersection of FM 3125 and CR 113. Segment BO extends directly north approximately 5,190 feet, paralleling the west side of CR 113 and crossing a center-pivot irrigated field, reaching and crossing CR 1018. Segment BO then turns directly west approximately 970 feet, paralleling the north side of CR 1018, offset approximately 40 feet north of the road to avoid a center-pivot irrigated field and an irrigation well.

Segment BO then turns southwest approximately 440 feet to cross CR 1018. It extends directly west 2,480 feet, paralleling CR 1018, offset approximately 40 feet south of the road to avoid center pivot irrigated fields. Segment BO then turns northwest approximately 470 feet crossing CR 1018 to avoid an irrigation well. Segment BO continues west approximately 500 feet, offset approximately 40 feet to avoid center pivot fields. It then turns southwest approximately 350 feet directly across an irrigation well to avoid a habitable structure. Segment BO extends directly west approximately 60 feet to reach and cross CR 103. Segment BO continues west 930 feet, paralleling the south side of CR 1018, offset approximately 40 feet to avoid a center-pivot irrigated field. Segment BO then turns directly north approximately 130 feet, crossing CR 1018. Segment BO then turns west for approximately 3,950 feet, paralleling the north side of CR 1018 across two center-pivot irrigated fields, offset approximately 40 feet north of the road to avoid habitable structures and irrigation wells. Segment BO then turns southwest approximately 390 feet, crossing the intersection of CR 1018 and CR 93. Segment BO continues west approximately 5,270 feet, paralleling the south side of CR 1018 across two center-pivot irrigated fields, before terminating at the intersection of Segments BJ, BK, and DR, southeast of the intersection of CR 1018 and CR 83. The total length of Segment BO is approximately 21,130 feet.

BP

Segment BP originates in Bailey County at the intersection with Segment BT, northwest of the intersection of CR 1038 and CR 93. Segment BP turns southwest approximately 560 feet crossing CR 1038, avoiding an irrigation well and a center-pivot irrigated field. Segment BP extends directly west approximately 1,500 feet, paralleling the south side of CR 1038 to cross a crude oil pipeline. Segment BP continues west approximately 320 feet, then turns northwest approximately 460 feet, crossing CR 1038, a carbon dioxide pipeline and avoiding irrigation wells. Segment BP extends directly west approximately 2,430 feet, paralleling the north side of CR 1038 reaching and crossing CR 83. Segment BP continues west for 50 feet. From here, Segment BP turns north and extends approximately 3,140 feet, paralleling the west side of CR 83. BP then turns northeast approximately 510 feet crossing CR 83, then turns north, offset approximately 40 feet east of the road to avoid a habitable structure. The segment extends directly north approximately 620 feet, paralleling the east side of CR 93, crossing carbon dioxide pipeline. Segment BP continues north approximately 1,010 feet reaching and crossing FM 3125. Segment BP continues north approximately 60 feet to terminate at the intersection of Segments BM, BQ, and DR, northeast of the intersection of CR 83 and FM 3125. The total length of Segment BP is approximately 10,610 feet.

BQ

Segment BQ originates in Bailey County at the intersection with Segment BS on the south side of FM 3125. Segment BQ extends northwest approximately 380 feet, crossing FM 3125. Segment BQ extends directly west approximately 100 feet to reach and cross CR 93. Segment BQ continues west approximately 5,140 feet, paralleling the north side of FM 3125, offset approximately 40 feet north of the road to avoid an irrigation well, habitable structures, crossing the edge of a center-pivot irrigated field, and crossing a crude oil pipeline. Segment BQ continues west approximately 50 feet to terminate at the intersection of Segments BM, BP, and DR, northeast of the intersection of FM 3125 and CR 83. The total length of Segment BQ is approximately 5,670 feet.

BS

Segment BS originates in Bailey County at the intersection of Segment HK and DS, southwest of the intersection of FM 3125 and CR 113. Segment BS extends directly west approximately 2,980 feet, paralleling the south side of FM 3125, offset approximately 70 feet south of the road to avoid habitable structures, and crossing an irrigation well. At this point, Segment BS turns northwest approximately 480 feet and crosses FM 3125, then turns directly west for approximately 1,800 feet, crossing a center-pivot irrigated field, offset approximately 35 feet north of the road to avoid habitable structures and an

irrigation well, reaching and crossing CR 103. Segment BS then extends west approximately 2,420 feet, paralleling the north side of FM 3125 and crossing a center-pivot irrigated field. It then turns southwest approximately 370 feet crossing FM 3125, and then turns west extending approximately 2,070 feet paralleling the south side of FM 3125 and crossing a center-pivot irrigated field, offset approximately 50 feet south of the road to avoid a habitable structure, crossing a center-pivot irrigated field, and terminating at the intersection with Segment BQ on the south side of FM 3125. The total length of Segment BS is approximately 10,120 feet.

BT

Segment BT originates in Bailey County at the intersection of Segments DS and DT, southwest of the intersection of CR 1038 and CR 113. Segment BT extends directly west approximately 2,280 feet, paralleling the south side of CR 1038, then turning northwest approximately 580 feet and crossing CR 1038 to avoid irrigation wells. Segment BT then turns directly west approximately 2,410 feet, paralleling the north side of CR 1038, offset approximately 40 feet north of the road to cross the edge of a center-pivot irrigated field, reaching and crossing CR 103. Segment BT continues west approximately 5,260 feet, paralleling the north side of CR 1038, and reaching and crossing CR 93. Segment BT continues west approximately 60 feet to terminate at the intersection with Segment BP, northwest of the intersection of CR 1038 and CR 93. The total length of Segment BT is approximately 10,560 feet.

BU

Segment BU originates in Bailey County at the intersection of Segments BX and KM, northwest of the intersection of FM 1760 and CR 133. Segment BU extends directly west approximately 5,180 feet, paralleling the north side of FM 1760, offset approximately 70 feet north of the road to cross the edge of one center-pivot irrigated field, and reaching and crossing CR 123. Segment BU extends directly west approximately 1,000 feet, then turns southwest approximately 740 feet, crossing FM 1760 to avoid a habitable structure. Segment BU continues west approximately 2,560 feet on the south side of FM 1760 across the edge of a center-pivot irrigated field, offset 65 feet from the road. Segment BU then extends northwest approximately 540 feet, crossing FM 1760 to avoid an irrigation well. Segment BU extends directly west 410 feet on the north side of FM 1760 before terminating at the intersection of Segments BN, DT and FQ, northeast of the intersection of FM 1760 and CR 113. The total length of Segment BU is approximately 10,430 feet.

BV

Segment BV originates in Bailey County at the intersection of Segments HH and HI, southeast of the intersection of CR 1068 and CR 113. Segment BV extends north approximately 110 feet to reach and cross CR 1068, and then continues approximately 70 feet to cross a 69 kV and a 230 kV electric transmission line. Segment BV continues directly north approximately 6,820 feet, paralleling the east side of CR 113, offset approximately 50 feet east of the road to avoid a habitable structure, and crossing CR 1058, three center-pivot irrigated fields, two drainages, and an irrigation well. Segment BV turns northwest approximately 470 feet, crossing CR 113 and continues north approximately 1,010 feet paralleling the west side of CR 113 to avoid a habitable structure. Segment BV then turns northeast approximately 410 feet, crossing CR 113 and avoiding a center pivot irrigated field. Segment BV extends directly north for approximately 1,680 feet paralleling the east side of CR 113, crossing the edge of a center-pivot irrigated field, and terminating at Segment FQ, southeast of the intersection of FM 1760 and CR 113. The total length of Segment BV is approximately 10,570 feet.

BW

Segment BW originates in Bailey County at the intersection of Segments BX and DX, northwest of the intersection of CR 1038 and CR 133. Segment BW extends directly north approximately 5,120 feet, offset approximately 60 feet west of CR 133 to avoid irrigation wells, paralleling the west side of the road

across a center-pivot irrigated field to reach the intersection of FM 3125 and CR 133. Segment BW then extends west approximately 720 feet, paralleling the south side of FM 3125, then turning north and crossing FM 3125 to avoid habitable structures. Segment BW then turns west approximately 4,560 feet, offset approximately 90 feet north of the road to avoid irrigation wells, paralleling the north side of FM 3125, reaching and crossing CR 123. Segment BW extends west approximately 5,320 feet, paralleling the north side of FM 3125 across two center-pivot irrigated fields, reaching and crossing CR 113. Segment BW extends west approximately 100 feet to terminate at the intersection of Segments BO and HK, northwest of the intersection of FM 3125 and CR 113. The total length of Segment BW is approximately 15,510 feet.

BX

Segment BX originates in Bailey County at the intersection of Segments BU and KM, northwest of the intersection of FM 1760 and CR 133. Segment BX extends directly north approximately 5,200 feet, paralleling the west side of CR 133 across a center-pivot irrigated field, offset approximately 65 feet west of the road to avoid habitable structures and irrigation wells, reaching and crossing CR 1038. Segment BX continues north approximately 60 feet to terminate at the intersection of Segments BW and DX, northwest of the intersection of CR 1038 and CR 133. The total length of Segment BX is approximately 5,260 feet.

CA

Segment CA originates in Bailey County at the intersection with Segment CD on the south side of an unnamed ranch road. Segment CA extends northeast approximately 170 feet across undeveloped open space, and then turns directly north approximately 1,320 feet. It turns northeast approximately 660 feet crossing a center-pivot irrigated field. Segment CA extends directly north 2,730 feet, then turns northwest approximately 690 feet to the south side of FM 1760 west of its intersection with US Highway 70. Segment CA then extends directly west approximately 4,830 feet, paralleling the south side of FM 1760, offset approximately 25 feet to avoid a center-pivot irrigated field and an irrigation well, and reaching and crossing CR 153. Segment CA continues approximately 100 feet west to terminate at the intersection with Segment FR, southwest of the intersection of FM 1760 and CR 153. The total length of Segment CA is approximately 10,500 feet.

CB

Segment CB originates in Bailey County at the intersection with Segment CE, approximately 1,520 feet south of a drainage. Segment CB extends west approximately 5,240 feet, paralleling the north side of a 230 kV transmission line, crossing a drainage and CR 153. Segment CB extends approximately 190 feet further west to terminate with Segment FS on the north side of CR 1068. The total length of Segment CB is approximately 5,430 feet.

CD

Segment CD originates in Bailey County at the intersection with Segment JK and JM, on the west side of Texas State Highway 214 and the west side of the Bailey County Substation. Segment CD extends directly north approximately 990 feet, paralleling the west side of Texas State Highway 214 and a 69 kV transmission line, crossing a 69 kV transmission line, and continues north approximately 50 feet to cross a second 69 kV transmission line. Segment CD continues north approximately 300 feet, then turns northwest and extends approximately 1,310 feet to cross a drainage. Segment CD continues northwest approximately 1,180 feet to cross two 69 kV transmission lines. Segment CD continues northwest approximately 5,380 feet, reaching an unnamed ranch road. Segment CD then turns west and extends approximately 920 feet, paralleling the south side of this unnamed road, before terminating at the intersection with Segment CA. The total length of Segment CD is approximately 10,130 feet.

CE

Segment CE originates in Bailey County at the intersection with Segment JL. Segment CE extends west approximately 6,490 feet, roughly parallel to but not crossing a 230 kV transmission line to the south, before terminating at the intersection with Segment CB. The total length of Segment CE is approximately 6,490 feet.

DJ

Segment DJ originates in Bailey County at the intersection with Segment KL, northwest of the intersection of FM 3125 and CR 34. Segment DJ proceeds directly west, approximately 1,280 feet, crossing a center-pivot irrigated field and paralleling the north side of FM 3125. Segment DJ turns northwest for approximately 580 feet and then turns west for approximately 610 feet and then turns southwest for approximately 650 feet to avoid a habitable structure. Segment DJ then extends directly west paralleling FM 3125 for approximately 1,740 feet crossing a drainage and reaching CR 24. Segment DJ continues west approximately 1,430 feet, paralleling the north side of FM 3125. It then turns southwest approximately 410 feet to cross FM 3125, and then extends directly west approximately 510 feet. Segment DJ then turns approximately 570 feet northwest, crossing FM 3125, and extends directly west 2,390 feet, offset approximately 60 feet to the north of the road to avoid a center-pivot irrigated field, and reaching and crossing CR 14. Segment DJ continues west approximately 40 feet before terminating at the intersection of Segments AH, AN, and FM, northwest of the intersection of CR 14 and FM 3125. The total length of Segment DJ is approximately 10,210 feet.

DK

Segment DK originates in Bailey County at the intersection of Segments AO, DL, and FM, northwest of the intersection of CR 1038 and CR 34. Segment DK extends directly north approximately 5,240 feet, paralleling the west side of CR 34, offset approximately 40 feet west of the road to avoid irrigation wells and center-pivot irrigated field. Segment DK crosses the edges of two center-pivot irrigated fields, reaching and crossing CR 1028. Segment DK continues north approximately 2,080 feet, crossing a center-pivot irrigated field and a drainage. Segment DK extends north approximately 3,100 feet, paralleling the west side of CR 34 across one center-pivot irrigated field, before terminating at the intersection of Segments KL and DM, southwest of the intersection of FM 3125 and CR 34. The total length of Segment DK is approximately 10,420 feet.

DL

Segment DL originates in Bailey County at the intersection of Segments DV and GI, northwest of the intersection of FM 1760 and CR 64. Segment DL extends directly west approximately 5,190 feet, paralleling the north side of FM 1760, offset approximately 110 feet north of the road to avoid habitable structures and irrigation wells, across the edge of two center-pivot irrigated fields, reaching and crossing CR 54. Segment DL continues west approximately 5,270 feet, paralleling the north side of FM 1760, reaching and crossing CR 44. Segment DL continues west approximately 930 feet, and turns southwest approximately 810 feet, crossing FM 1760 to avoid an irrigation well. It extends directly west approximately 620 feet, and then turns northwest approximately 520 feet, crossing FM 1760 to avoid an irrigation well. Segment DL extends directly west approximately 2,480 feet, paralleling the north side of FM 1760 and crossing a center-pivot irrigated field, reaching and crossing CR 34. From there, Segment DL turns north extending approximately 5,230 feet crossing two center-pivot irrigated fields, offset approximately 40 feet west of the road to avoid a habitable structure, reaching and crossing CR 1038. Segment DL continues north approximately 100 feet to terminate at the intersection of Segments AO, DK, and FM, northwest of the intersection of CR 1038 and CR 34. The total length of Segment DL is approximately 21,150 feet.

DM

Segment DM originates in Bailey County at the intersection of Segments JP, KI, and JO, northwest of the intersection of CR 1018 and CR 64. Segment DM extends directly west approximately 2,560 feet, paralleling the north side of CR 1018, offset approximately 40 feet north of the road to avoid an irrigation well, and crossing a drainage. Segment DM turns southwest approximately 400 feet and crosses CR 1018. Segment DM continues west approximately 810 feet, paralleling the south side of CR 1018, then proceeds northwest approximately 470 feet crossing CR 1018 to avoid an abandoned home. Segment DM proceeds west, approximately 1,030 feet, and crosses CR 54. Segment DM then proceeds west approximately 920 feet, and then turns southwest approximately 320 feet, crossing CR 1018. It then extends directly west approximately 500 feet, paralleling CR 1018, avoiding an irrigation well. Segment DM then turns northwest approximately 380 feet, crossing CR 1018. Segment DM extends directly west approximately 520 feet, and then turns southwest approximately 520 feet, crossing CR 1018. It then extends directly west approximately 1,160 feet paralleling the south side of CR 1018 to avoid a center-pivot irrigated field, then turns northwest approximately 520 feet, crossing CR 1018. Segment DM extends directly west approximately 510 feet, reaching and crossing CR 44. It continues west approximately 4,760 feet, paralleling the north side of CR 1018, which turns into FM 3125, and is offset approximately 60 feet north of the road. Segment DM then turns southwest approximately 300 feet to avoid habitable structures and an irrigation well. Segment DM proceeds directly west approximately 270 feet reaching and crossing CR 34, and continues west 50 feet to terminate at the intersection of Segments KL and DK, southwest of the intersection of FM 3125 and CR 34. The total length of Segment DM is approximately 16,010 feet.

DN

Segment DN originates in Parmer County at the intersection with Segment FL on the west side of CR 2. Segment DN extends directly west approximately 5,190 feet, threading between two pairs of center-pivot irrigated fields, before crossing CR 1. Segment DN continues west approximately 80 feet to terminate at the intersection of Segment GC on the west side of CR 1. The total length of Segment DN is approximately 5,270 feet.

DQ

Segment DQ originates in Bailey County at the intersection of Segments BA and GB, northwest of the intersection of CR 1008 and CR 54. Segment DQ extends directly north approximately 5,185 feet, paralleling the west side of CR 54, reaching and crossing CR EE. Segment DQ continues north approximately 100 feet to terminate at the intersection of Segments AZ, GK, and HJ, northwest of the intersection of CR EE and CR 5 in Parmer County. The total length of Segment DQ is approximately 5,285 feet.

DR

Segment DR originates in Bailey County at the intersection of Segments BM, BP, and BQ, northeast of the intersection of FM 3125 and CR 83. Segment DR extends northwest approximately 340 feet to cross a crude oil pipeline, and to reach and cross CR 83. Segment DR continues northwest approximately 140 feet, then turns to extend directly north approximately 2,080 feet, offset approximately 40 feet west of the road to avoid irrigation wells. Segment DR then turns northeast approximately 610 feet, crossing CR 83, then turns directly north to extend approximately 2,000 feet to terminate at the intersection of Segments BJ, BK, and BO, southeast of the intersection of CR 1018 and CR 83. The total length of Segment DR is approximately 5,180 feet.

DS

Segment DS originates in Bailey County at the intersection of Segments BT and DT, southwest of the intersection of CR 1038 and CR 113. Segment DS extends directly north approximately 90 feet to cross CR 1038. Segment DS continues north approximately 5,180 feet, paralleling the west side of CR 113

across a center-pivot irrigated field, before terminating at the intersection of Segments BS, and HK, southwest of the intersection of FM 3125 and CR 113. The total length of Segment DS is approximately 5,270 feet.

DT

Segment DT originates in Bailey County at the intersection of Segments BN, BU, and FQ, northeast of the intersection of FM 1760 and CR 113. Segment DT extends northwest approximately 290 feet crossing CR 113 to the west side of the road, and turns directly north approximately 4,870 feet, paralleling the west side of CR 113 to terminate at the intersection of Segments BT, and DS, southwest of the intersection of CR 1038 and CR 113. The total length of Segment DT is approximately 5,160 feet.

DU

Segment DU originates in Bailey County at the intersection of Segments FS and HI, north of the intersection of CR 1068 and CR 133. Segment DU extends directly north approximately 8,670 feet to reach a playa. Segment DU continues directly north, approximately 1,640 feet, crossing the playa and a center-pivot irrigated field, before terminating at Segment KM, southwest of the intersection of FM 1760 and CR 133. The total length of Segment DU is approximately 10,310 feet.

DV

Segment DV originates in Bailey County at the intersection of Segments DL and GI, northwest of the intersection of FM 1760 and CR 64. Segment DV extends directly north approximately 2,160 feet, offset approximately 60 feet west of the road to avoid an irrigation well and paralleling the west side of CR 64 across the edge of a center-pivot irrigated field, to cross a drainage. Segment DV continues north approximately 3,010 feet, paralleling the west side of CR 64 across a second center-pivot irrigated field, reaching and crossing CR 1038. Segment DV then extends north approximately 90 feet to terminate at the intersection of Segments AO and JO, northwest of the intersection of CR 1038 and CR 64. The total length of Segment DV is approximately 5,260 feet.

DX

Segment DX originates in Bailey County at the intersection with Segment FR on the north side of FM 1760. Segment DX extends northwest approximately 1,230 feet, avoiding a center-pivot irrigated field and agricultural structures and crossing CR 143. Segment DX then extends directly north approximately 4,340 feet, paralleling the west side of CR 143, then reaching and crossing CR 1038. Segment DX continues north approximately 60 feet, then turns and extends directly west approximately 5,180 feet, paralleling the north side of CR 1038, crossing a drainage and the perimeter of center-pivot irrigated field, to reach and cross CR 133. Segment DX continues west approximately 80 feet to terminate at the intersection of Segments BW and BX, northwest of the intersection of CR 1038 and CR 133. The total length of Segment DX is approximately 10,890 feet.

FL

Segment FL originates in Parmer County at the intersection with Segment AL northwest of the intersection of CR 2 and CR BB. Segment FL extends directly north approximately 5,230 feet, offset approximately 60 feet west of the road to avoid habitable structures and irrigation wells, paralleling the west side of CR 2 across the edges of two center-pivot irrigated fields, before terminating at the intersection with Segment DN on the west side of CR 2. The total length of Segment FL is approximately 5,230 feet.

FM

Segment FM originates in Bailey County at the intersection of Segments AO, DK, and DL, northwest of the intersection of CR 1038 and CR 34. Segment FM extends directly west approximately 5,060 feet,

paralleling the north side of CR 1038 across two center-pivot irrigated fields, reaching and crossing CR 24. Segment FM continues west approximately 5,300 feet, offset approximately 70 feet north of the road to avoid habitable structures and paralleling the north side of CR 1038 across two center-pivot irrigated fields, to reach and cross CR 14. It continues west approximately 50 feet to the northwest of the intersection of CR 1038 and CR 14. Segment FM then turns north and extends approximately 5,220 feet, paralleling the west side of CR 14, offset approximately 40 feet west of the road to avoid irrigation wells, a habitable structure, and center-pivot irrigation fields, and reaching and crossing CR 1028. Segment FM continues north approximately 2,470 feet to cross a playa and farmed wetland, offset approximately 40 feet to avoid center-pivot irrigated fields. Segment FM then extends north approximately 2,920 feet, paralleling the west side of CR 14, reaching and crossing FM 3125. Segment FM continues north approximately 120 feet to terminate at the intersection of Segments AH, AN, and DJ, northwest of the intersection of CR 14 and FM 3125. The total length of Segment FM is approximately 21,140 feet.

FQ

Segment FQ originates in Bailey County at the intersection with Segment BV, southeast of the intersection of FM 1760 and CR 113. Segment FQ extends directly north approximately 170 feet to cross FM 1760 before terminating at the intersection of Segments BN, BU and DT, northeast of the intersection of FM 1760 and CR 113. The total length of Segment FQ is approximately 170 feet.

FR

Segment FR originates in Bailey County at the intersection with Segment CA, southwest of the intersection of FM 1760 and CR 153. Segment FR extends directly west approximately 2,870 feet, paralleling the south side of FM 1760, offset approximately 80 feet south of the road to avoid a habitable structure, and crossing a natural gas pipeline. Segment FR turns northwest approximately 660 feet to cross FM 1760 and a second natural gas pipeline. Segment FR extends west approximately 740 feet, paralleling the north side of FM 1760, crossing the edge of a center-pivot irrigated. Segment FR then turns northwest approximately 80 feet before terminating at the intersection with Segment DX on the north side of FM 1760. The total length of Segment FR is approximately 4,350 feet.

FS

Segment FS originates in Bailey County at the intersection with Segment CB, offset approximately 185 feet north of CR 1068 to avoid an existing 230kV transmission line. Segment FS extends directly west approximately 6,510 feet, paralleling the north side of CR 1068 and a 230 kV transmission line, crossing a natural gas pipeline. Segment FS continues west approximately 470 feet to cross a second natural gas pipeline. Segment FS extends approximately 3,610 feet, paralleling the north side of CR 1068 and a 230 kV transmission, then terminating at the intersection of Segments DU and HI, northwest of the intersection of CR 1068 and CR 133. The total length of Segment FS is approximately 10,590 feet.

GB

Segment GB originates in Bailey County at the intersection with Segments KH and JP, southwest of the intersection of CR 1008 and CR 64. Segment GB extends directly west approximately 1,760 feet, paralleling the south side of CR 1008, then turns northwest crossing CR 1008 approximately 250 feet, to avoid habitable structures and an irrigation well. Segment GB then turns directly west and continues approximately 3,260 feet, crossing a drainage and the edge of a center-pivot irrigated field to reach and cross CR 54. Segment GB continues west approximately 40 feet to terminate at the intersection of Segments DQ and BA northwest of the intersection of CR 1008 and CR 54. The total length of Segment GB is approximately 5,300 feet.

GC

Segment GC originates in Parmer County at the intersection with Segment DN on the west side of CR 1. Segment GC extends west approximately 5,260 feet, crossing the edges of two center-pivot irrigated fields and terminating at the state line of Texas and New Mexico. The total length of Segment GC is approximately 5,260 feet.

GI

Segment GI originates in Bailey County at the intersection with Segment BN, northeast of the intersection of FM 1760 and Ranch Road 1731. Segment GI extends directly west approximately 110 feet to cross Ranch Road 1731. Segment GI continues west approximately 510 feet to cross a drainage. Segment GI then extends west approximately 4,770 feet, paralleling the north side of FM 1760, offset approximately 90 feet north of the road to avoid an irrigation well, reaching and crossing CR 64. Segment GI continues west approximately 90 feet to terminate at the intersection of Segments DL and DV, northwest of the intersection of FM 1760 and CR 64. The total length of Segment GI is approximately 5,480 feet.

GK

Segment GK originates in Parmer County at the intersection with Segment BC, northwest of the intersection of CR EE and CR 6. Segment GK extends directly west approximately 5,290 feet and paralleling the north side of CR EE across a center-pivot irrigated field, before terminating at the intersection of Segments AZ, DQ, and HJ, northwest of the intersection of CR EE and CR 5. The total length of Segment GK is approximately 5,290 feet.

GM

Segment GM originates in Bailey County at the intersection with Segment BH southeast of the intersection of CR 1008 and Ranch Road 1731. Segment GM extends northwest approximately 490 feet, crossing CR 1008 before terminating at the intersection with Segment BE and BF northwest of the intersection of CR 1008 and Ranch Road 1731. The total length of Segment GM is approximately 490 feet.

HH

Segment HH originates in Bailey County at the intersection of Segments JK and JL west of the Bailey County Substation. Segment HH extends southwest for approximately 470 feet to cross a 230 kV electric transmission line, then continues southwest for approximately 2,000 feet. Segment HH then turns west approximately 2,510 feet, and then turns directly south for approximately 2,820 feet reaching and crossing CR 1078 and a 230 kV transmission line parallel to the north side of the road. Segment HH continues south approximately 6,680 feet, crossing the edge of a center-pivot irrigated field, to reach CR 1090. Segment HH then turns west and extends approximately 18,930 feet, paralleling the north side of CR 1090 and the edges of three center-pivot irrigated fields to cross two natural gas pipelines. Segment HH then extends west approximately 3,660 feet, paralleling the north side of CR 1090 to the intersection of CR 1090 and CR 123. Segment HH turns north and extends approximately 2,250 feet, paralleling the east side of CR 123. Segment HH then turns west and extends approximately 1,030 feet, paralleling the north side of CR 1086, reaching and crossing CR 123. Segment HH continues west approximately 1,730 feet, paralleling the north side of CR 1086 across the edge of a center-pivot irrigated field, to cross a crude oil pipeline. Segment HH extends west approximately 1,170 feet to cross a carbon dioxide pipeline. Segment HH continues west for 1,620 feet then turns northwest for 750 feet to a point northwest of the intersection of CR 1086 and CR 113. Segment HH then turns north, offset approximately 70 feet east of the road to avoid a habitable structure, and extends approximately 3,400 feet to re-cross the carbon dioxide pipeline. Segment HH continues north approximately 500 feet reaching and crossing CR 1078 and a 230-kV transmission line. Segment HH then extends north approximately 1,050 feet, paralleling the east side of CR 113, to cross a center-pivot irrigated field and re-cross the crude oil pipeline. Segment HH continues north approximately 1,800 feet to cross a drainage. Segment HH then extends north

approximately 2,440 feet, paralleling the east side of CR 113 across a center-pivot irrigated field to terminate at the intersection of Segments BV and HI, southeast of the intersection of CR 1068 and CR 113. The total length of Segment HH is approximately 54,110 feet.

HI

Segment HI originates in Bailey County at the intersection of Segments DU and FS, north of the intersection of CR 1068 and CR 133. Segment HI extends southwest 530 feet to cross CR 1068, a 69 kV transmission line, and a 230 kV transmission line. Segment HI then extends directly west approximately 4,710 feet, offset approximately 60 feet south of the road, paralleling the south side of CR 1068, crossing the edge of a center-pivot irrigated field and avoiding an irrigation well to reach and cross CR 123. Segment HI extends west approximately 5,190 feet, paralleling the south side of CR 1068 and a 230 kV transmission line across a center-pivot irrigated field, before terminating at the intersection of Segments BV and HH, southeast of the intersection of CR 1068 and CR 113. The total length of Segment HI is approximately 10,440 feet.

HK

Segment HK originates in Bailey County at the intersection of Segments BS and DS southwest of the intersection of FM 3125 and CR 113. Segment HK extends directly north approximately 140 feet, crossing FM 3125, before terminating at the intersection of Segments BO, and BW northwest of the intersection of FM 3125 and CR 113. The total length of Segment HK is approximately 140 feet.

HJ

Segment HJ originates in Parmer County at the intersection of Segments AZ, DQ, and GK, northwest of the intersection of CR EE and CR 5. Segment HJ extends directly north approximately 5,180 feet, paralleling the west side of CR 5 across two center-pivot irrigated fields, reaching and crossing CR DD. Segment HJ continues north approximately 90 feet to terminate at the intersection of Segment AP, northwest of the intersection of CR DD and CR 5. The total length of Segment HJ is approximately 5,270 feet.

JK

Segment JK originates in Bailey County at the intersection of Segments CD and JM, southwest of the Bailey County Substation on the west side of Texas State Highway 214. Segment JK extends directly west approximately 770 feet before terminating at the intersection of Segments HH and JL. The total length of Segment JK is approximately 770 feet.

JL

Segment JL originates in Bailey County at the intersection of Segments HH and JK. Segment JL extends directly north approximately 890 feet before terminating at the intersection with Segment CE. The total length of Segment JL is approximately 890 feet.

JM

Segment JM originates in Bailey County at the intersection with Segments CD and JK, on the west side of Texas State Highway 214, south of the Bailey County Substation. Segment JM extends directly east approximately 370 feet before terminating at a node south of the Bailey County Substation. The total length of Segment JM is approximately 370 feet.

JO

Segment JO originates in Bailey County at the intersection of Segments AO and DV northwest of the intersection of CR 64 and CR 1038. Segment JO extends directly north approximately 5,230 feet to reach and cross FM 3125. Segment JO continues north approximately 5,290 feet paralleling the west side of CR 64 to the west, crossing the edge of a center-pivot irrigated field, and reaching and crossing CR 1018. It

continues north approximately 50 feet to terminate at Segments DM, JP, and KI northwest of the intersection of CR 1018 and CR 64. The total length of Segment JO is approximately 10,570 feet.

JP

Segment JP originates in Bailey County at the intersection of Segments DM, JO, and KI on the west side of CR 64 and northwest of the intersection of CR 64 and CR 1018. Segment JP extends directly north approximately 5,140 feet, paralleling CR 64 to the west, where it terminates at Segments GB and KH southwest of the intersection of CR 1008 and CR 64. The total length of Segment JP is approximately 5,140 feet.

KF

Segment KF originates in Bailey County at the intersection of Segment AG, AS, AN on the north side of CR 1008 northwest of the intersection of CR 1008 and CR 14. Segment KF proceeds north approximately 680 feet to reach and cross CR 14. It turns northeast approximately 260 feet to avoid a habitable structure. Segment KF extends directly north approximately 1,255 feet paralleling the east side of CR 14, offset approximately 40 feet east of the road to avoid two center-pivot irrigation systems, and terminating at Segment AJ northeast of the intersection of CR 1 and CR EE. The total length of Segment KF is approximately 5,320 feet.

KH

Segment KH originates in Bailey County at the intersection of Segment BE southeast of the intersection of CR 64 and CR 1008. Segment KH extends directly west approximately 110 feet, reaching and crossing CR 64, and extends an additional approximately 50 feet where it terminates at Segments GB and JP southwest of the intersection of CR 64 and CR 1008. The total length of Segment KH is approximately 160 feet.

KI

Segment KI originates in Bailey County at the intersection of BF, BI, and BK northwest of the intersection of CR 1018 and Ranch Road 1731. Segment KI proceeds directly west, approximately 2,480 feet on the north side of CR 1018. Segment KI then angles approximately 440 feet southwest across CR 1018 and then west approximately 1,320 feet to parallel CR 1018 and cross the edge of a center-pivot irrigation system. Segment KI then proceeds northwest approximately 320 feet across CR 1018 to avoid a habitable structure and irrigation well. Segment KI proceeds directly west approximately 670 feet to reach and cross CR 64, and continues approximately 40 feet to terminate at Segments DM, JO, and JP northwest of the intersection of CR 64 and CR 1018. The total length of Segment KI is approximately 5,310 feet.

KJ

Segment KJ originates in Bailey County at the intersection with Segment AX, northeast of the intersection of CR 34 and CR 1008. Segment KJ extends directly west approximately 160 feet, crossing CR 34, and extends an additional approximately 50 feet where it terminates at Segment AU, northwest of the intersection of CR 34 and CR 1008. The total length of Segment KJ is approximately 210 feet.

KL

Segment KL originates in Bailey County at the intersection of Segments DK and DM, southwest of the intersection of CR 34 and FM 3125. Segment KL extends directly west approximately 360 feet, then turns northwest approximately 50 feet. It continues northwest approximately 130 feet crossing FM 3125. It then continues approximately 130 feet northwest to terminate at Segment DJ. The total length of Segment KL is approximately 670 feet.

KM

Segment KM originates in Bailey County at the intersection with DU on the south side of FM 1760. Segment KM extends north approximately 90 feet, crossing FM 1760, and continues north approximately 60 feet to terminate at Segments BU and BX, northwest of the intersection of FM 1760 and CR 133. The total length of Segment KM is approximately 150 feet.

2.4.4 Adjustments to Alternative Route Segments

The public involvement program to review the preliminary alternative route segments resulted in several verbal and written comments. All comments received at the public open house meetings and subsequently through emails, letters, questionnaires, and phone calls were collected and reviewed with information received from federal, state, and local agencies and other non-governmental organizations.

All comments received regarding individual route segments were considered. In addition to the adjustments made to the Preliminary Alternative Route Segments after reviewing the comments, one Preliminary Alternative Route Segment was removed from consideration due to duplication and additional routing constraints. Eighteen preliminary alternative route segments were adjusted in an effort to address comments received and to address additional constraints identified by meeting participants. Further adjustments to alternative route segments were made to avoid habitable structures, and irrigation wells which had not been identified in the GIS data collection, and to cross wetlands, playas, and streams at narrow points.

2.4.5 Evaluation of Alternative Routes

All of the preliminary alternative route segments were quantitatively evaluated using a GIS opportunity and constraints model with routing criteria in accordance with the PURA and PUC Substantive Rules. The individual quantitative segment data provided additional information for alternative route segment consideration. Appendix A contains supplemental evaluation information for all of the preliminary alternative segments.

The alternative routes cross the Project Study Area in a general east to west direction with the routes geographically distributed north to south. Due to the geographic shape of the Project Study Area in the vicinity of the Bailey County Substation, several of the alternative routes share a combination of segments and therefore have similar quantitative criteria results.

Some of the routing criteria did not apply to the Project Study Area and therefore were removed from the Quantitative Comparison of the Eight Routes and the Range of Quantitative Comparison of the Eight Routes (Table 2.3 and Table 2.4). There were no oil wells or associated collection/gathering pipelines in the Project Study Area. The number of railroads crossed was removed since the Project Study Area is south of the BNSF rail line that parallels US Highway 84. There are no schools, hospitals, or nursing homes within the Project Study Area. There are no heliports or FAA-registered airports or airfields with at least one runway longer than 3,200 feet within 20,000 feet of a segment centerline. Table 2.3 presents a quantitative comparison of the eight alternative routes and Table 2.4 summarizes the range of quantitative values by presenting the high, low, and median values to present context for further evaluation and alternative route ranking. Chapter 6 describes the route selection process based upon the quantitative evaluation of routing criteria.

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OVERSIZED SPREADSHEET Table 2.3 Page 2 of 2

Table 2.4 Quantitative Range of Evaluation Criteria

Criteria	High	Low	Median
Route Length (miles)	28.16	23.08	24.65
Length parallel to linear ROWs (miles)	24.57	19.50	21.90
Total % parallel to linear ROWs	90%	81%	86%
Length parallel or adjacent to property lines (miles)	23.04	12.07	18.27
Number of transmission lines crossed	7	1	3
Number of county and local roads crossed	56	26	38
Number of US and State Highways crossed	14	5	9
Habitable structures within 300' of the centerline	45	29	37
AM Towers within 10,000' of the centerline	4	1	1
FM, microwave, cell, and other electronic installations within 2,000' of the centerline	12	4	6
FAA-registered airports with runways >3,200' within 20,000' of the centerline	0	0	0
Length within NWI wetlands (feet)	5,081	0	2,540
Length across playas (feet)	3,969	0	2,229
Length of ROW parallel (within 100 feet) to streams (miles)	0.57	0.13	0.26
Cultural resources or areas of high archaeological/historic site potential	0	0	0
Cemetery (within 1,000')	0	0	0
Length of route centerline within foreground of US and state highways (miles)	28.17	21.08	23.55
Length of route centerline within foreground of parks and recreation facilities (feet)	2,458	873	1,641
Length across cultivated crops (feet)	6.27	2.86	4.41
Number of center pivot irrigation within the ROW	36	18	28
Number of parks and recreation areas (government owned, churches, private clubs) within 1,000' of centerline	0	0	0
Construction and ROW costs (transmission and substation expansion)	$21,811,930	$17,738,848	$20,126,260

3.0 Environmental Setting

3.1 Physiography and Geology

The Bureau of Economic Geology identifies the physiographic province in which the Study Area is located as the High Plains Province, which encompasses an area of 174,000 square miles from southeastern Wyoming to the Texas Panhandle (BEG 1996). This physiographic province is itself located within the Great Plains Physiographic Province which covers an area of 450,000 square miles from the Canadian border to central Texas (BEG 1996; Vigil 2000).

3.1.1 Physiography

The project area is located within the Llano Estacado, or "Staked Plains," area at the southernmost reach of the High Plains Province. The Staked Plains were formed from uneroded late Tertiary river sediments veneered by late Pleistocene and Holocene wind-blown sand. The Staked Plains is one of the largest areas in the United States that is nearly featureless topographically. The Great Plains Physiographic Province, within which the Llano Estacado is located, consists of approximately 20 million acres of a relatively high plateau. Topographic elevations range from 2,000 to 3,800 feet, sloping gently toward the southeast (BEG 1996; Vigil 2000). The Study Area is located in an area with this typical flat topography with slight rolling terrain near draws and the many playa lakes (BEG 1996).

Playa lakes are shallow, round depressions, which also are ephemeral wetlands, characterized by clayey soils. In the Panhandle region, playa lakes cover two percent of the land surface and average fifteen acres in size. Most (87 percent) are less than thirty acres in size although one exceeds 400 acres (TPWD 2013). These playa lakes may occur wherever water periodically can collect in a surficial depression. They expand by hydrologic and geomorphic processes that include: dissolution of lithologic carbonates; downward movement of fine grained clastics and organics by infiltrating groundwater, leading to additional carbonate dissolution; and, eolian removal of clastics from the floor of the lakes when they are dry (Osterkamp and Moon 1987).

The Blackwater Draw Formation occurs through the Study Area. This topographic feature consists of grayish-red, massive textured sandstone with fine- to medium-grained quartz. The thickness is as much as 25 feet, but the formation feathers out locally due to the eolian nature of the deposition (USGS 2013). Undivided Quaternary deposits, are also present in the Study Area within Bailey County, mainly within the Blackwater Draw watershed (BEG 1992).

In the High Plains, much of the near-surface layers are comprised of caliche, a type of caprock. Caliche is formed by the leaching of carbonate and silica from surface soils and the re-deposition of the dissolved mineral layers below the surface. The hardness of caliche ranges from crumbly to very hard. As described above, this caprock is covered with sheets of extensive eolian sediment. (NPGCD 2013)

The Ogallala Formation underlies the Blackwater Draw Formation, which contains buried buff colored or pinkish unsorted gravel and sand with fine material sediments similar to Blackwater Draw. These sediments, however, are only exposed in the erosional features of the North-Central Plains (Sophocleous and Merriam 2012).

3.1.2 Mineral and Energy Resources

3.1.2.1 Non-Fuel Minerals

In 2012, Texas was a top producer of six industrial minerals: portland cement, crushed stone, construction sand and gravel, industrial sand and gravel, salt and lime (USGS 2012). The USGS Mineral Data Resource System, however, reports no active non-fuel mineral operations in the Study Area (USGS 2013).

3.1.2.2 Organic Fuel Minerals

USGS topographic maps, aerial photographs, and current data from the Railroad Commission of Texas (RRC) were reviewed to assess the extent of organic fuel extraction within the Study Area. There are three wells in the study area that are listed as "dry holes" (lacking either oil or gas) (RRC 2013). No coal- or lignite-bearing formations are present within the Study Area.

3.2 Soils

3.2.1 Soils within the Project Study Area

The Soil Survey·Geographic (SSURGO) database was reviewed and analyzed in order to assess the soils in the Study Area. SSURGO is a detailed level of soil mapping done by the NRCS. Nationally standardized field mapping methods are used to construct the soil maps in the SSURGO database. SSURGO digitizing incorporates original soil survey maps. Soil survey areas, which may consist of a county, multiple counties, or parts of multiple counties contribute to the development of a SSURGO dataset. (NRCS 2013)

The soil series described in this section occur within the project Study Area. In addition to SSURGO, the The USDA NRCS Web Soil Survey was consulted to in order to gather series' descriptions. Active sand dunes were observed in the Project Area during the December 2012 and June 2013 field visits. They are predominantly located in the southern portion of the Study Area and consist of various soils, as noted below. Figure 3.1 depicts the location of soil units within the project Study Area.

3.2.1.1 Acuff Series

The Acuff series consists of nearly level to gently sloping, well-drained, deep, fine loamy soils. These soils formed in loamy eolian sediments from the Blackwater Draw Formation of Pleistocene age. Acuff series soils are moderately permeable. Runoff is low to negligible with moderately high to high water capacity. Dry soil hues include brown loam, reddish brown sandy clay loam, pink sandy clay loam, and reddish yellow sandy clay loam. Acuff soils are mainly used for crop production. All Acuff soils, level to sloping, are considered prime farmland.

3.2.1.2 Amarillo Series

The Amarillo series consists of nearly level to gently sloping, well-drained, very deep, fine loamy soils. These soils formed in loamy eolian sediments from the Blackwater Draw of Pleistocene age. Amarillo series soils are moderately permeable. Runoff is negligible to low with a moderately high to high water capacity. Dry soil hues include brown fine sandy loam, reddish brown sandy clay loam, yellowish red sandy clay loam, pink sandy clay loam, yellowish red sandy clay loam, and reddish brown sandy clay loam. Amarillo soils are mainly used for crop production and rangeland.

3.2.1.3 Arch Series

The Arch series consists of nearly level to gently sloping, well-drained, very deep, fine loamy soils. These soils derived from calcareous, loamy eolian sediments of Holocene age. Acuff series soils moderately permeable. Runoff is none on nearly level areas with a moderately high to high water capacity. Dry soil

hues include brown fine sandy loam, and pale to very pale brown sandy clay loam. Arch soils are mainly used for grazing and can be cultivated.

3.2.1.4 Arvana Series

The Arvana series consists of nearly level to gently sloping, well-drained, moderately deep, fine loamy soils. These soils formed in loamy eolian sediments from the Blackwater Draw Formation of Pleistocene age. Arvana series soils are moderately permeable. Runoff is negligible, very low, and low, depending on slope, with a moderately low to moderately high water capacity. Dry soil hues include brown fine sandy loam, reddish brown sandy clay loam, yellowish red sandy clay loam, pink loam, and reddish yellow clay loam. Arvana soils are mainly used for crop production.

3.2.1.5 Berda Series

The Berda series consists of gently sloping to very steep, well-drained, very deep, fine loamy soils. These soils formed in loamy alluvial and colluvial sediments from the Ogallala Formation of Miocene-Pliocene age. Berda series soils are moderately permeable. Runoff varies from very low to high depending on slope with a moderately high to high water capacity. Dry soil hues include light brown loam, light reddish brown clay loam, and light reddish brown sandy clay loam. Berda soils are mainly used for livestock grazing and can be cultivated.

3.2.1.6 Bippus Series

The Bippus series consists of nearly level to very gently sloping, well-drained, very deep, fine loamy soils. These soils formed in alluvial sediments of the Ogallala Formation of Miocene-Pliocene age. Bippus series soils are moderately permeable. Runoff is negligible to very low with a moderately high to high water capacity. Dry soil hues include brown clay loam, dark grayish brown sandy clay loam, brown sandy clay loam and light yellowish brow sandy clay loam. Bippus soils are mainly used for grazing and crop production. All nearly level Bippus clay loam soils are considered prime farmland.

3.2.1.7 Brownfield Series

The Brownfield series consists of nearly level to gently sloping, very deep, well-drained loamy soils. These soils are derived from sandy eolian sediments from the Blackwater Draw Formation of the Pleistocene age. Brownfield series soils are moderately permeable. Runoff varies from negligible to low depending on slope with a moderately high to high water capacity. Dry soil hues include brown and light brown fine sand, yellowish red fine sand, and red sandy clay loam. Brownfield soils are mainly used for cropland but also used as native rangeland.

3.2.1.8 Circleback Series

The series consists of nearly level to steep sloping, excessively drained, deep, siliceous soils and are often duned. These soils formed in sandy eolian sediments. Runoff is slow and permeability rapid in Circleback soils. These soils have a high to very high water capacity. Dry soil hues include brown fine sand, reddish yellow fine sand, and light brown fine sand. Circleback soils are mainly used for grazing.

3.2.1.9 Drake Series

The Drake series consists of nearly level to steep sloping, well-drained, deep, fine loamy soils that develop on marginal dunes. These soils formed in in calcareous, loamy eolian sediments of Late Pleistocene to Holocene age. Drake series soils are moderately permeable. Runoff is medium to high depending on slope with a moderately high to high water capacity. Dry soil hues include pale brown loam, light brownish gray fine sandy loam, and loam, and light yellowish brown fine sandy loam. Drake soils are mainly used for livestock grazing.

3.2.1.10 Estacado Series

The Estacado series consists of nearly level to gently sloping, well-drained, very deep, fine loamy soils. These soils formed in calcareous moderately fine textured alluvial and eolian sediments of the Blackwater Draw Formation of Pleistocene age. Estacado series soils have moderately slow permeability. Runoff is negligible, very low and low depending on slope with a moderately high to high water capacity. Dry soil hues include dark grayish brown clay loam, brown clay loam, reddish yellow clay loam and pinkish white clay loam. Estacado soils are mainly used for crop production.

3.2.1.11 Friona Series

The Friona series consists of nearly level to gently sloping, well-drained, moderately deep, fine loamy soils. These soils formed in loamy eolian sediments of Pleistocene age. Friona series soils are moderately permeable. Runoff is slow and medium, depending on slope, with a moderately low to moderately high water capacity. Dry soil hues include brown loam, brown sandy clay loam, yellowish red sandy clay loam, pinkish white caliche and pink sandy clay loam. Friona soils are mainly used for crop production. Nearly level Friona loam is considered prime farmland.

3.2.1.12 Gomez Series

The Gomez series consists of nearly level to gently sloping, well-drained, deep, course loamy soils. These soils formed in loamy calcareous eolian sediments from the Blackwater Draw Formation of Pleistocene age. Gomez series soils have moderately rapid permeability. Runoff is negligible with a high water capacity. Dry soil hues include grayish brown loamy fine sand, pale brown fine sandy loam, pale yellow fine sandy loam, and light gray fine sandy loam. Gomez soils are mainly used for crop production and for livestock grazing.

3.2.1.13 Kimbrough Series

The Kimbrough series consists of nearly level to gently sloping, well-drained, very shallow to shallow, loamy soils. These soils calcareous, gravelly soils that formed in moderately fine textured eolian sediments of the Blackwater Draw Formation of Pleistocene age. Kimbrough series soils are moderately permeable. Runoff is low to medium depending on slope. These soils have a very low to moderately low water capacity. Dry soil hues include dark grayish brown gravelly loam, and white caliche. Kimbrough soils are nearly exclusively used for rangeland.

3.2.1.14 Likes Series

The Likes series consists of gently to moderately steep sloping, excessively-drained, very deep, loamy fine sand. These soils formed in sandy colluvium and alluvium derived from the Ogallala Formation of Miocene-Pliocene age. Likes series soils are rapidly permeable. Runoff is low to negligible, very low, and low, depending on slopes, with a high to very high water capacity. Dry soil hues include grayish brown and brown loamy fine sand, and very pale brown fine sand. Likes soils are mainly used for rangeland.

3.2.1.15 Lipan Series

The Lipan series consists of nearly level, moderately well or somewhat poorly drained, deep, fine soils. The parent material consists of calcareous, clayey lacustrine deposits of Quaternary age. Lipan series soils are and moderately permeable. Runoff is slow or ponded with a very low to moderately low water capacity. Dry soil hues include gray clay, light brownish gray clay, and pale brown clay. Lipan soils are mainly used for crop production.

3.2.1.16 Mansker Series

The Mansker series consists of nearly level to moderately sloping, well-drained, very deep, coarse loamy soils. These soils formed in calcareous eolian sediments from the Blackwater Draw Formation of Pleistocene age. Mansker series soils are moderately permeable. Runoff is negligible with a moderately high to high water capacity. Dry soil hues include brown clay loam, white loam, pink clay loam, and yellowish red clay loam. Mansker soils are primarily used for rangeland and can be cultivated.

3.2.1.17 Midessa Series

The Midessa series consists of nearly level to strongly sloping, well-drained, very deep, fine loamy soils. These soils formed in loamy eolian materials of Pleistocene age. Midessa series soils are moderately permeable. Runoff is negligible, very low, low, and medium depending on slope. Midessa series soils have a moderately high to high water capacity. Dry soil hues include brown fine sandy loam, pale and very pale brown light brown sandy clay loam. Midessa soils are mainly used for crop production.

3.2.1.18 Olton Series

The Olton Series consists of nearly level to gently sloping, well-drained, very deep, fine soils. These soils formed in loamy calcareous eolian sediments from the Blackwater Draw Formation of Pleistocene age. Olton series soils have moderately slow permeability. Runoff is negligible, very low, and low depending on slope with a moderately high water capacity. Dry soil hues include brown clay loam, reddish brown clay loam, pink loam and red clay loam. Olton soils are mainly used for crop production and nearly level Olton loam is considered prime farmland.

3.2.1.19 Patricia Series

The Patricia series consists of very gently sloping to gently sloping, well-drained, very deep, fine loamy soils. These soils formed in sandy eolian sediments from the Blackwater Draw Formation of Pleistocene age. Patricia series soils are moderately permeable. Runoff is low to negligible, very low, and low depending on slope, with a moderately high to high water capacity. Dry soil hues include yellowish red loamy fine sand, and red sandy clay loam. Patricia soils are mainly used for crop production and also for native rangeland.

3.2.1.20 Portales Series

The Portales series consists of nearly level to very gently sloping, well-drained, very deep, fine loamy soils. These soils formed in medium to moderately fine textured, calcareous, lacustrine sediments of Pleistocene age. Portales series soils are moderately permeable. Runoff is negligible and very low with a moderately high to high water capacity. Dry soil hues include dark grayish brown loam, grayish brown loam, light brownish gray loam, light gray and very pale brown clay loam. Portales soils are mainly used for dryland and irrigated crop production.

3.2.1.21 Potter Series

The Potter Series consists of very gently to steep sloping, well-drained, very deep, fine loamy-skeletal soils. These soils formed in calcareous sediments of fractured and highly weathered calcrete derived mainly from the Ogallala Formation of Miocene-Pliocene age. Potter series soils have moderately slow permeability. Runoff is moderate, high, and very high depending on slope with a moderately high to high water capacity. Dry soil hues include grayish brown gravelly loam, and very and extremely gravelly fine sandy loam. Potter soils are mainly used for livestock grazing.

3.2.1.22 Randall Series

The Randall series consists of nearly level, poorly drained, very deep, fine soils. These soils formed in clayey lacustrine sediments derived from the Blackwater Draw Formation of Pleistocene age. Randall series soils have very slow permeability. Runoff is negligible with a very low to moderately low water capacity. Dry soil hues include very dark fray clay, dark gray clay, and dark grayish brown clay. The Randall series soils are hydric soils. Randall soils are mainly used for livestock grazing and wildlife habitat.

3.2.1.23 Sharvana Series

The Sharvana series consists of nearly level to gently sloping, well-drained, very shallow and shallow, loamy soils. These soils formed in calcareous loamy eolian sediments from the Blackwater Draw Formation of Pleistocene age. Sharvana series soils are and moderately permeable and runoff is medium to high depending on slope with a moderately low to moderately high water capacity. Dry soil hues include brown fine sandy loam, dark reddish brown sandy clay loam, pink caliche, pink extremely gravelly sandy loam, and white extremely gravelly sandy loam. Sharvana soils are almost exclusively used for rangeland and wildlife habitat.

3.2.1.24 Springer Series

The Springer series consists of nearly level to sloping, well-drained, very deep, coarse loamy soils. These soils formed in eolian sediments and alluvium. Springer series soils are moderately rapid permeability. Runoff is negligible to very low, depending on slope with a moderately high to high water capacity. Dry soil hues include light brown loamy fine sand, reddish brown fine sandy loam, yellowish red fine sandy loam, and reddish yellow loamy fine sand. Springer soils are mainly used for rangeland and cropland.

3.2.1.25 Tulia Series

The Tulia series consists of very gently to moderately sloping, well-drained, very deep, fine loamy soils. These soils formed in loamy calcareous eolian sediments from the Blackwater Draw Formation of Pleistocene age. Tulia series soils are moderately permeable. Runoff is low to moderate with a moderately high to high water capacity. Dry soil hues include dark yellowish brown loam, brown loam, pink clay loam, light reddish brown clay loam, and reddish yellow sandy clay loam. Tulia soils are primarily used for rangeland.

3.2.1.26 Zita Series

The Zita series consists of nearly level to gently sloping, well-drained, deep, fine loamy soils. These soils formed in calcareous loamy eolian sediments from the Blackwater Draw Formation of Pleistocene age. Zita series soils are moderately permeable. Runoff is negligible and very low with a moderately high to high water capacity. Dry soil hues include dark grayish brown loam and clay loam, light brownish gray clay loam, white clay loam and very pale brown clay loam. Zita soils are mainly used for crop production and nearly level Zita loam is considered prime farmland.

3.2.2 Prime Farmland

As defined in the Code of Federal Regulations (CFR) § 657.5, prime farmland soils are soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Prime farmland soils could also be used for cropland, pasture, forest land, or other land, but are not urbanized/developed areas or water. These soils have the quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. In general, prime farmland soils have adequate and dependable precipitation, a favorable temperature and growing season, acceptable acidity or alkalinity, permeability to water and air, and few or no surface stones. Prime farmland soils are

not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding. Playa lakes are not included in mapped prime-farmlands.

As seen in Figure 3.1, approximately 10 percent of the soils in the Study Area meet prime farmland criteria; one soil type would meet prime farmland criteria if irrigated (approximately 0.03 acres) (USDA NRCS 2013b). The NRCS does not consider electric transmission line installation to be a conversion of prime farmlands as the lines do not significantly restrict the use of the land for agriculture (Benton 2010).

3.3 Water Resources

3.3.1 Climate

The Study Area is within the climatological steppe region, an intermediate between desert and humid climates, which extends north/south through the central-west region of the United States (Peel, Finlayson, and McMahon 2007). The closest climate and weather recording station is located in Clovis, New Mexico. The 2000 to 2012 annual average rainfall for the Clovis station is 17.69 inches with a range from 9.64 inches (2012) to 28.83 inches (2004) (National Climatic Data Center 2013). Temperatures in Muleshoe, Texas range from lows of 20°F (degrees Fahrenheit) in the winter to 90°F (WRCC 2009). Daytime temperatures during field surveys ranged from the mid-40s in December 2012 to a high of 103°F in June 2013.

3.3.2 Surface Water

The project Study Area lies within Texas-Gulf Region and Brazos Headwaters Subregion for the Blackwater Draw watershed, which drains into the North Fork Double Mountain Fork watershed (United States Evironmental Protection Agency [USEPA] 2013). Refer to Table 3.1 for the hydrologic units in the project Study Area.

Table 3.1 Hydrologic Units within the Study Area

Region	Subregion	Basin	Subbasin	Watershed	HUC 12* Features in Study Area
Texas-Gulf	Brazos Headwaters	Brazos Headwaters	Blackwater Draw	Headwaters Blackwater Draw	Soda Lake-Blackwater Draw - 120500020203 Pleasure Lake -120500020201 Blackwater Draw -120500020202 City of Texico - 120500020203 Town of Lariat-Blackwater Draw-120500020204 Progress Draw-120500020303 Birdwell Ranch -120500020112 Town of Muleshoe-Blackwater Draw - 120500020401

* Hydrologic Unit Code of 12 digits
Source: US EPA. 2013. OW/WBD_NAD83. [Mapping Service]. Available online: http://watersgeo.epa.gov/ArcGIS/rest/services

There are no major rivers within the Study Area. Intermittent streams in the Study Area include Blackwater Draw, Progress Draw, and Lariat Draw, the latter of which flow into Blackwater Draw. All streams were dry during field investigations though showed evidence of flow and pooling at impoundments after significant rain events in June 2013. Other naturally occurring water bodies within the Study Area consist of emergent wetlands, associated with playa lakes. Playa lakes are discussed in additional detail in Section 3.4. Refer to Figure 3.2 for surface water resources in the project Study Area.

OVERSIZED MAP
Figure 3.1

Texas Water Quality Standards (Title 30 Texas Administrative Code [TAC] § 307), designate the site-specific uses of classified and unclassified water bodies in Texas. The designated site-specific or beneficial uses determine the water quality criteria that apply to each water body.

There are no classified water bodies in the Study Area. Other streams in the Study Area are unclassified, meaning they are not specifically listed under the water quality standards. Unclassified water bodies by default have presumed uses of contact recreation and aquatic life (TCEQ 2004).

Perennial unclassified water bodies are afforded a high aquatic life use and intermittent or ephemeral water bodies are presumed to have limited or no aquatic life use, depending on the presence of perennial pools.

Water bodies that do not meet the state water quality criteria for their designated site-specific or beneficial uses are considered impaired. There are no impaired water bodies in the Study Area (TCEQ 2012).

The TPWD designates Ecologically Significant Stream Segments (ESSS) for waters that display unique ecological value based on biological function, hydrologic function, riparian conservation areas, water quality, aquatic life, aesthetics, or habitat for threatened or endangered species. There are no ESSS for waters within the Study Area (TPWD 2002).

There are no rivers or streams in the Study Area that are listed on the Nationwide Rivers Inventory for scenery, recreation, geologic, historic, and cultural value. The Nationwide Rivers Inventory is a designation for free-flowing river segments of the U.S. that possess one or more outstanding remarkable natural or cultural values. There are no designated Wild and Scenic Rivers in the Study Area (NPS 2011).

The Study Area includes several manmade ponds and impoundments mostly associated with dairy operations and beef feedlots.

3.3.3 Floodplains

The Federal Emergency Management Agency (FEMA) maps and delineates floodplains and determines flood risk for susceptible areas. A 100-year floodplain (FEMA Zone A) is determined based on an area with approximately one percent or greater probability of flooding per year. There are no FEMA 100-year floodplain maps available for either Parmer County or Bailey County (FEMA 2013).

3.3.4 Playa Lakes

Playa lakes are ephemeral, shallow, circular-shaped areas that are maintained by rainfall and may receive irrigation runoff and be wetlands. Typically playas are dry or shallow but can have depths up to approximately three feet. Water in playas usually evaporates but also will infiltrate through the soil to recharge underlying aquifers. Playa Lakes are discussed with additional detail in Section 3.4. There are approximately 99 playa lakes recorded throughout the Study Area with a cumulative area of 1,389 land acres.

3.3.5 Groundwater/Aquifers

A major aquifer is defined as an aquifer that supplies large quantities of water over a large area of the state. A minor aquifer supplies a large quantity of water over a small area, or small quantities over a large area (Ashworth and Hopkins 1995). The Texas Water Development Board (TWDB) identifies one major aquifer within the Study Area: the Ogallala Aquifer (major) (TWDB 2006). Figure 3.2 depicts this aquifer in the Study Area.

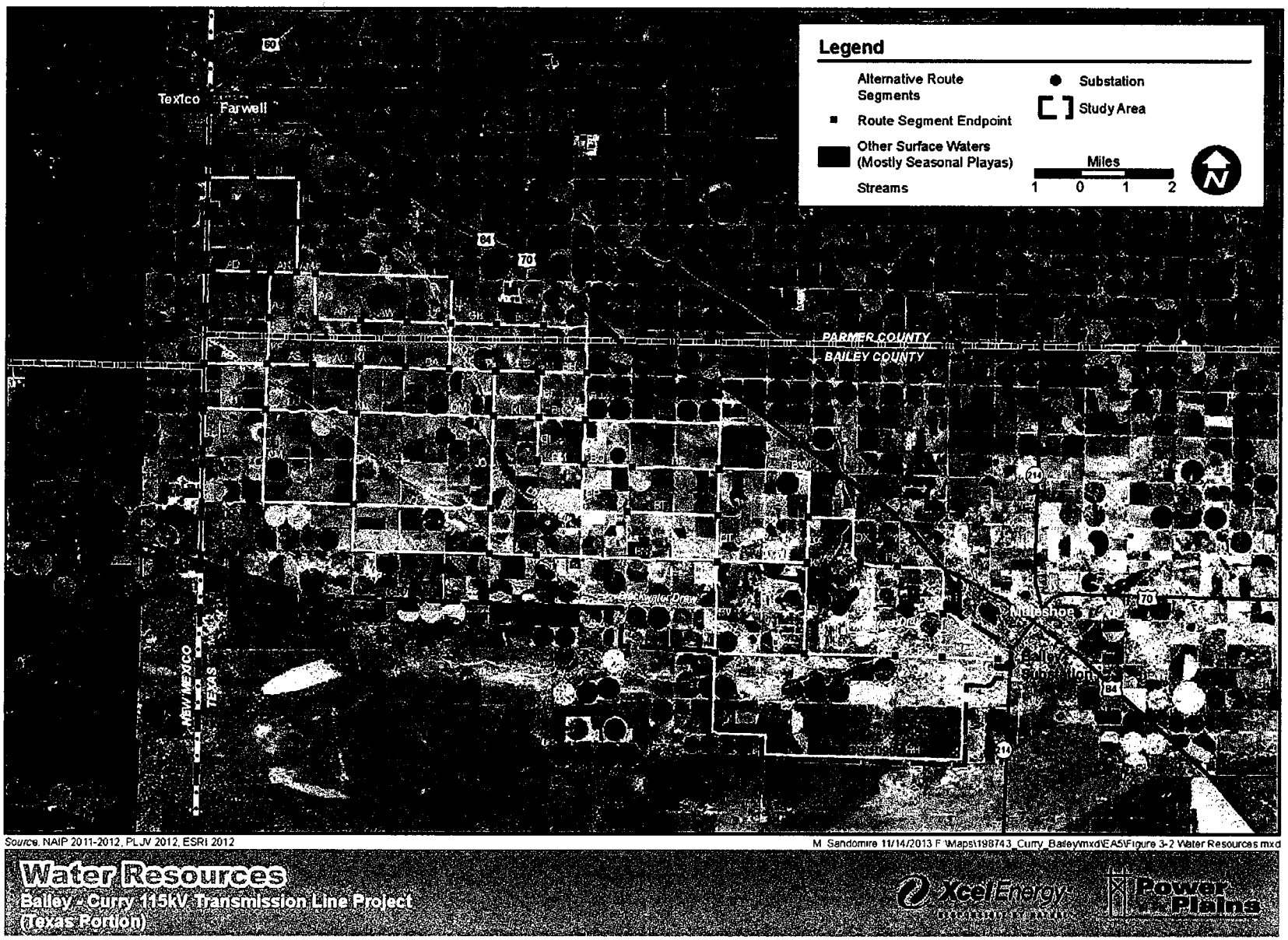

Figure 3.2 Water Resources

The Ogallala Aquifer is the largest aquifer in the United States and a major aquifer of Texas. It consists of sand, silt, clay, and gravel. In the study area approximately 95 percent of pumped groundwater is used for irrigated agriculture. Groundwater withdrawals are also used for residential, municipal, livestock, and industrial use. The water is considered drinking water quality. The typical water well depths in Bailey County range from 75 feet to under 300 feet (TWDB 2013a), and in Parmer County range from 160 to just over 500 feet, with the occasional observation well running deeper (TWDB 2013b).

The number of wells reported in the Study Area is 838 (USGS 2012, USEPA 2012). Wells that were field verified within 200 feet of a roadside paralleling a proposed segment totaled 175.

3.3.6 Wetlands

Wetlands within the Study Area may provide important functions such as flood control, sediment stabilization, erosion control, nutrient removal, and groundwater recharge. Impacts to waters of the U.S., including bordering wetlands and any other bordering or isolated waters with a significant nexus to other waterways, are under the jurisdiction of the USACE under Section 404 of the Clean Water Act.

The majority of NWI wetlands in the Study Area are small isolated, open water ponds, agricultural ponds, and other small depressional emergent wetlands. These depressional wetlands correspond to playa lakes that are seasonally dry (USFWS 2012). Playa lakes are discussed in Section 3.4.

Emergent wetlands in the Study Area occur mainly in playa lakes. Some emergent wetlands in the Study Area have been disturbed or altered by agricultural practices, or occur along man-made ditches. Emergent wetland vegetation in this area is discussed in Section 3.4.

3.4 Vegetation

3.4.1 Regional Vegetation

A biotic province is defined by one or more ecological associations (e.g., ecological climax, flora, fauna, climate, physiography, or soil) that can be differentiated with respect to adjacent provinces (Dice, 1943). The Study Area lies within the Kansan Biotic Province as mapped by Blair (1950). The Kansan Biotic Province is characterized by flat plains with occasional to infrequent valleys, canyons, buttes, and low hills. Vegetation within the Province primarily consists of short-grasses with relatively few trees; forests or groves are typically only found associated with large riverine systems.

The Study Area is located within the vegetation area referred to as the High Plains subdivision at the southern end of the Great Plains (Figure 3.3). The High Plains are separated from the adjacent Rolling Plains vegetation area by the Caprock Escarpment. Elevation ranges from 3,000 to 4,500 feet, sloping gently toward the southeast (National Prairies Association of Texas [NPAT] 2013). Topographically, the High Plains area is a relatively level plateau characterized by shallow, surface depressional playas that individually can encompass up to 695 acres. Rainfall averages 15 to 21 inches with the highest rainfall occurring from April to May and September to October. Droughts are frequent and high winds are nearly constant within this area. Playas lakes, ephemeral waterbodies that are periodically filled by seasonal thunderstorms, are common throughout the High Plains. Although short-grass vegetation associations dominated by buffalo grass (*Bouteloua dactyloides*) are the most important plant associations on the High Plains, there are distinct plant communities found on the hardlands, mixed lands, sandy lands, and caliche breaks. The area generally is free from brush, but mesquite and yucca (*Yucca* spp.) have invaded portions of the area. Areas of sand support shinnery oak (*Quercus havardii*); sand sage (*Artemisia filifolia*) and junipers (*Juniperus* spp.) have extended their range from the breaks on the plains (Hatch et al. 1990).

3.4.2 Vegetation Community Types

In 1984, the Texas Parks and Wildlife Department (TPWD) created a Vegetation Types of Texas map based upon previous classification schemes, Landsat data, computer analysis, and ground verification to illustrate vegetation types at a plant association level (McMahan et al., 1984). Within the Study Area, TPWD-identified vegetation community types primarily consist of Crops, with Sandsage-Havard Shin Oak Brush bordering the southern portion of the Study Area (Figure 3.3). A discussion of the two TPWD-identified vegetation types, including Crops, is provided below.

In addition to the two TPWD-identified vegetation community types, other vegetation communities including playa lakes also occur within the Study Area. A discussion of these communities is provided in Section 3.4.3 and Section 4.3.3. A review of available maps and aerial photography of the Study Area also reveals areas of previous disturbance including residential areas, existing utility corridors and infrastructure, roadways, cattle feedlots, dairies, and other agricultural developments.

During the April 2013 and June 2013 surveys, herbaceous and woody species were observed within the Study Area. Observed species included Rocky Mountain juniper (*Juniperus scopulorum*), eastern cottonwood (*Populus deltoides*), hackberry (*Celtis laevigata*), western soapberry (*Sapindus saponaria* var. *drummondii*), sand sagebrush (*Artemisia filifolia*), prickly pear (*Opuntia* sp.), soapweed yucca (*Yucca glauca*), Russian thistle (*Salsola tragus*), little bluestem (*Schizachyrium scoparium*), sideoats grama (*Bouteloua curtipendula*), Bermudagrass (*Cynodon dactylon*), Johnson grass (*Sorghum halepense*), devil's claw (*Proboscidea parviflora*), slimflower scurfpea (*Psoralidium tenuiflorum*), bush morning glory (*Ipomoea leptophylla*), shepherd's purse (*Capsella bursa-pastoris*), thistle (*Cirsium* sp.), and goldenrod (*Solidago* sp.). Most areas were dominated by herbaceous species. Some woody species are present near residential areas, along roadways, around undisturbed portions of playa lakes, and along the southern portion of the Study Area where sand sagebrush habitat is located.

3.4.2.1 Crops

The vegetation community type identified as Crops includes cultivated cover crops or row crops that provide food and/or fiber for humans or domestic animals. Crops represent a commercially important commodity for the area. Important crops cultivated within the Study Area include oats, wheat, corn, cotton, alfalfa, and sorghum (U.S. Department of Agriculture – Natural Resources Conservation Service [USDA – NRCS], 1963; USDA – NRCS, 1978). Most of the cropland located within the Study Area is irrigated. However, some non-irrigated crops are present. Cultivated croplands are primarily irrigated using center-pivot sprinkler irrigation systems. Irrigation farming is supported with underground water from the Ogallala Aquifer. Numerous dairies, cattle feedlots, grain silos, and other agricultural structures are located within the Study Area.

3.4.2.2 Sandsage-Havard Shin Oak Brush

The Sandsage-Havard Shin Oak Brush vegetation community type occurs on sandy soils of the High Plains and is typically characterized by sand sagebrush (*Artemisia filifolia*) and/or Havard shin oak (*Quercus havardii*). These sandy soils lie at the western edge of the High Plains where winds rising onto the plateau drop the heavier sand grains and carry the finer material further east onto the flat expanse of the plains. Other plant associates that are common in this vegetation community type include skunkbush sumac (*Rhus trilobata*), Chickasaw plum (*Prunus angustifolia*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), sand bluestem (*Andropogon hallii*), little bluestem (*Schizachyrium scoparium*), sand lovegrass (*Eragrostis trichodes*), giant sandreed (*Calamovilfa gigantea*), sideoats grama (*Bouteloua curtipendula*), hairy grama (*Bouteloua hirsuta*), sand dropseed (*Sporobolus cryptandrus*), leadplant (*Amorpha canescens*), slimflower scurfpea (*Psoralidium tenuiflorum*), slickseed bean (*Strophostyles leiosperma*), wild blue indigo (*Baptisia australis*), and bush morning glory (*Ipomoea leptophylla*) (McMahan et al., 1984).

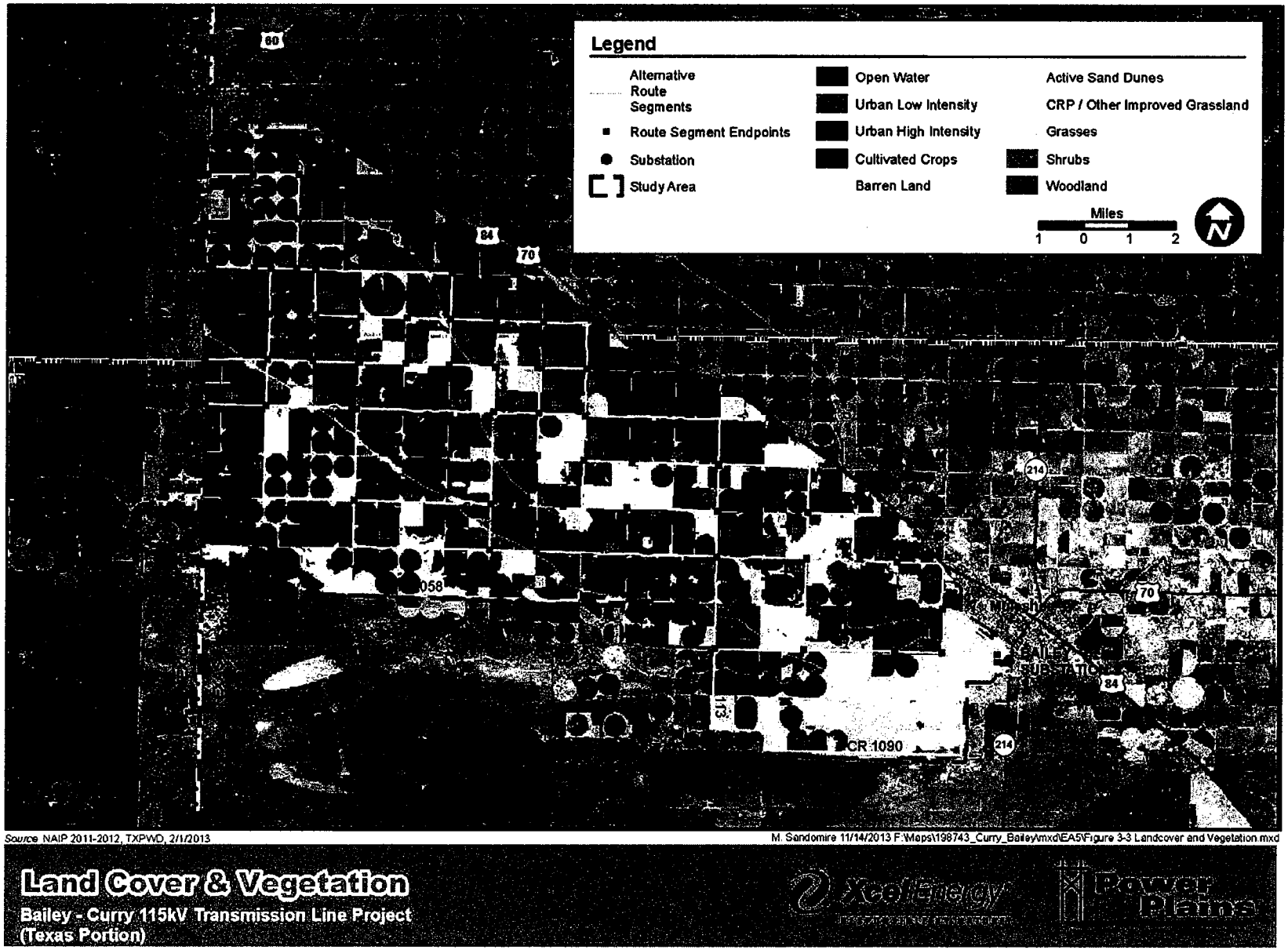

Figure 3.3 Land Cover and Vegetation

3.4.3 Important Species

Important species are defined as those that are commercially or recreationally valuable; threatened or endangered or affect the well-being of threatened or endangered species; or critical to the structure and function of the ecological system.

3.4.4 Commercially Valuable Species

Commercially important plant species within the Study Area include alfalfa, cotton, corn, sorghum, and wheat. Hay crops and grassland pastures for livestock grazing are also present within the Study Area.

3.4.5 Threatened and Endangered Plant Species

Threatened and endangered plant species are afforded federal protection under the Endangered Species Act of 1973 (ESA); 16 United States Code [USC] § 1531). Section 9 of the ESA also prohibits removing and possessing any federally endangered plant species from areas under Federal jurisdiction; maliciously damaging or destroying any such species on any such area; or removing, cutting, digging up, or damaging or destroying any such species on any other area in knowing violation of any law or regulation of any State or in the course of any violation of a State criminal trespass law. Threatened and endangered plants are also afforded state protection under Chapter 88 of the Texas Parks and Wildlife Code and Title 31 of the TAC. County lists developed by the USFWS and TPWD that are located within the Study Area were reviewed to determine which plant species may be listed as threatened or endangered and have the potential to occur within the Study Area. Currently, no plant species are federally or state-listed for Bailey or Parmer counties (USFWS, 2013a; TPWD, 2013a).

3.4.6 Ecologically Sensitive Areas/Natural Plant Communities

In general, an area may be considered ecologically sensitive if it supports a rare plant or animal community or a rare, threatened, or endangered species; it is valuable due to its maturity and the density and diversity of plants and animals it contains; or it supports a community of plants adapted to flooding and/or saturated soil conditions and dominated by species considered to be wetland indicators by a regulatory agency (i.e., USACE).

The Texas Natural Diversity Database (TXNDD), which is maintained by TPWD, was reviewed in order to assess the potential for federal and state-listed Threatened and Endangered (T&E) species to occur within the vicinity of the Project Areas. Data from the TXNDD do not provide a definitive statement as to the presence, absence, or condition of special status species, natural communities, or other significant features within a project area. The TXNDD data were received on January 24, 2013, and included the occurrence records for listed species and rare habitat within the Study Area and adjacent areas (TPWD, 2013b). No ecologically sensitive areas or rare plant communities were identified within or adjacent to the Study Area.

Numerous playa lakes (and associated wetlands), draws, and other upland drainages (i.e., swales) are located within the Study Area. Most of these features have been modified by agricultural practices, though some wetland vegetation may be present. Playa lakes are ephemeral, shallow, generally circular-shaped areas with hydrology primarily influenced by rainfall. Some playa lakes may receive irrigation runoff. During the June 2013 field visit, several playas were observed to retain water five days after a rain event.

During wet years, these features are important sources of invertebrates and seed producing plants which are food sources for seed-eating fowl and other wildlife. Similarly, playa lakes are important habitat for migratory birds. After the Gulf Coast region, the playa lakes region is the second most important habitat for migratory birds in the Central Flyway, and the High Plains of Texas has the highest density of playa lakes in North America (TPWD, 2010; Shackelford et al., 2005). Playa lakes are found across most of the

Study Area, with the majority located in the northern areas. Additional details regarding these features are provided in Section 3.4.4.

3.4.7 Wetlands

The USACE regulates waters of the United States (U.S.) and wetlands through Section 404 of the Clean Water Act. Waters of the U.S. include, but are not limited to, territorial seas, lakes, rivers, streams, oceans, bays, ponds, and other special aquatic features, including wetlands. The USACE and the U.S. Environmental Protection Agency (USEPA) jointly define wetlands as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (Cowardin et al., 1979).

Based on a review of the USFWS National Wetland Inventory (NWI) database (USFWS, 2013b), numerous isolated features including three named drainages (i.e., draws) are located throughout the Study Area. The majority of the NWI wetlands located within the Study Area are small, isolated, open water ponds, agricultural ponds, and other depressional wetlands. Most of these wetlands correspond to the playa lakes within the Study Area. According to the NWI map, five types of wetland habitats are present in the Study Area: Scrub-Shrub Wetland, Emergent Wetland, Lacustrine, and Palustrine Farmed. The NWI system further classifies features in the Study Area as "palustrine scrub-shrub (PSS)," "palustrine emergent (PEM)," "lacustrine littoral emergent intermittently flooded (L2EM), and "palustrine farmed (Pf)".

The PEM wetlands located in the Study Area are non-tidal wetlands that consist of herbaceous hydrophytic vegetation (excluding mosses and lichen) and are usually dominated by perennial plants that are present through most of the growing season. The PEM wetlands are either temporarily, seasonally, semi-permanently, or intermittently-flooded throughout the year. The PEM wetlands in the Study Area primarily occur in isolated basins and playas. Some PEM wetlands within the Study Area have been disturbed or altered by agricultural practices or occur along man-made ditches. Emergent wetland vegetation of the region typically consists of species such as saltgrass (*Distichlis spicata*), vine mesquite (*Panicum obtusum*), spreading yellowcress (*Rorippa sinuata*), spotted evening primrose (*Oenothera canescens*), alkali sacaton (*Sporobolus airoides*), switchgrass (*Panicum virgatum*), prairie cordgrass (*Spartina pectinata*), and common reed (*Phragmites australis*). Wetter areas near the edges of ponds and lakes also include sedges (*Carex* spp.), chairmaker's bulrush (*Schoenoplectus americanus*), spikerushes (*Eleocharis* spp.), crowngrasses (*Paspalum* spp.), and cattails (*Typha* spp.) (NatureServe, 2012).

The PSS wetlands located in the Study Area are non-tidal wetlands that generally consist of broadleaved deciduous shrubs and young saplings, as well as small trees and shrubs that are stunted due to environmental conditions. The PSS wetlands are often temporarily-flooded during the growing season. The PSS wetlands in the Study Area typically occur along draws or in other depressions. Scrub-shrub wetland vegetation of the region typically consists of species such as willows (*Salix* spp.), eastern cottonwood (*Populus deltoides*), salt cedars (*Tamarix* spp.), little walnut (*Juglans microcarpa*), willow baccharis (*Baccharis salicina*) and hackberry (*Celtis laevigata*) (NatureServe, 2010).

The L2EM systems in the Study Area are non-tidal wetland habitats situated in a topographic depression or dammed drainages where total surface area exceeds 20 acres and consist of herbaceous hydrophytes with vegetation present for most of the growing season (USFWS, 1983). In the L2EM wetland surface water is present for extended periods, especially early in the growing season, but is absent by the end of the growing season in most years. In this region, these systems often are artificially flooded by pumps or siphons in combination with dikes or dams (USFWS, 1983).

The Pf features in the Study Area are non-tidal wetlands where the "soil surface has been mechanically or physically altered for production of crops, but water-dependent plants will become reestablished if

farming is discontinued" (USFWS, 1983). Most of the Pf features are associated with playa lakes that have been altered by agricultural activities.

As verified during the field reconnaissance, most surface water features located within the Study Area are closed basins (including playa lakes) and livestock ponds that contain seasonal surface waters within actively farmed agricultural land and do not provide a significant nexus to traditionally navigable waters (TNWs); therefore, these features would not be considered jurisdictional by the USACE. Three named drainage features, Blackwater Draw, Lariat Draw, and Progress Draw, depicted as dashed blue lines (i.e., intermittent or ephemeral streams) on the U.S. Geological Survey (USGS) topographical maps are located within the Study Area. However, these drainage features are not continuous within the Study Area and eventually dissipate into agricultural uplands. Therefore, these drainage features lack a significant nexus to a TNW and would not be considered jurisdictional waters of the U.S. Although playa lakes share many of the same functions and features of wetlands, the USACE typically does not consider these systems as jurisdictional wetlands given their isolated nature and frequent and prolonged dry periods; however, jurisdiction for playas is made in a case-by-case basis. A formal jurisdictional determination would be made if formal wetland delineations are required prior to construction.

3.5 Wildlife

3.5.1 Wildlife Habitat and Species

As previously stated, the Study Area is located within the Kansan Biotic Province (Blair, 1950). A diversity of wildlife species are known to occur within the Kansan Biotic Province. Lists of representative amphibian and reptile, bird, and mammal species that occur in the Kansan Biotic Province and potentially occur in the Study Area are provided in Sections 3.5.2 through 3.5.4, as well as lists of species observed during the April 2013 and June 2013 surveys.

3.5.2 Amphibians and Reptiles

At least 14 species of frogs and toads and only one species of salamander, the barred tiger salamander (*Ambystoma tigrinum mavortium*), can occur within the Kansan Biotic Province (Blair, 1950; Dixon, 2000). Representative frog and toad species that likely occur in the region include the Great Plains toad (*Bufo cognatus*), red- spotted toad (*Bufo punctatus*), plains leopard frog (*Rana blairi*), American bullfrog (*Rana catesbeiana*), and plains spadefoot toad (*Spea bombifrons*). At least 14 lizard species and 31 snake species have historically occurred in the Kansan Biotic Province (Blair, 1950). One species of reptile, the Great Plains skink (*Eumeces obsoletus*), was observed during the June 2013 survey. Representative reptile species that potentially occur in the Study Area are listed in Table 3.2.

3.5.3 Birds

Avian species that may occur in the project Study Area include year-round residents and many migratory species. The Texas Panhandle is located within the Central Flyway, a migration route that generally follows the Great Plains states (Shackelford et al., 2005). The grassland habitats of the Study Area contain nesting and stop-over habitat for a number of upland migratory birds. Grassland species associated with short- and mixed-grass prairies are the most common in the general area throughout most of the year. Waterfowl and shorebirds use the playa water bodies of the region, particularly during migrations in the spring, when the playa lakes contain surface waters.

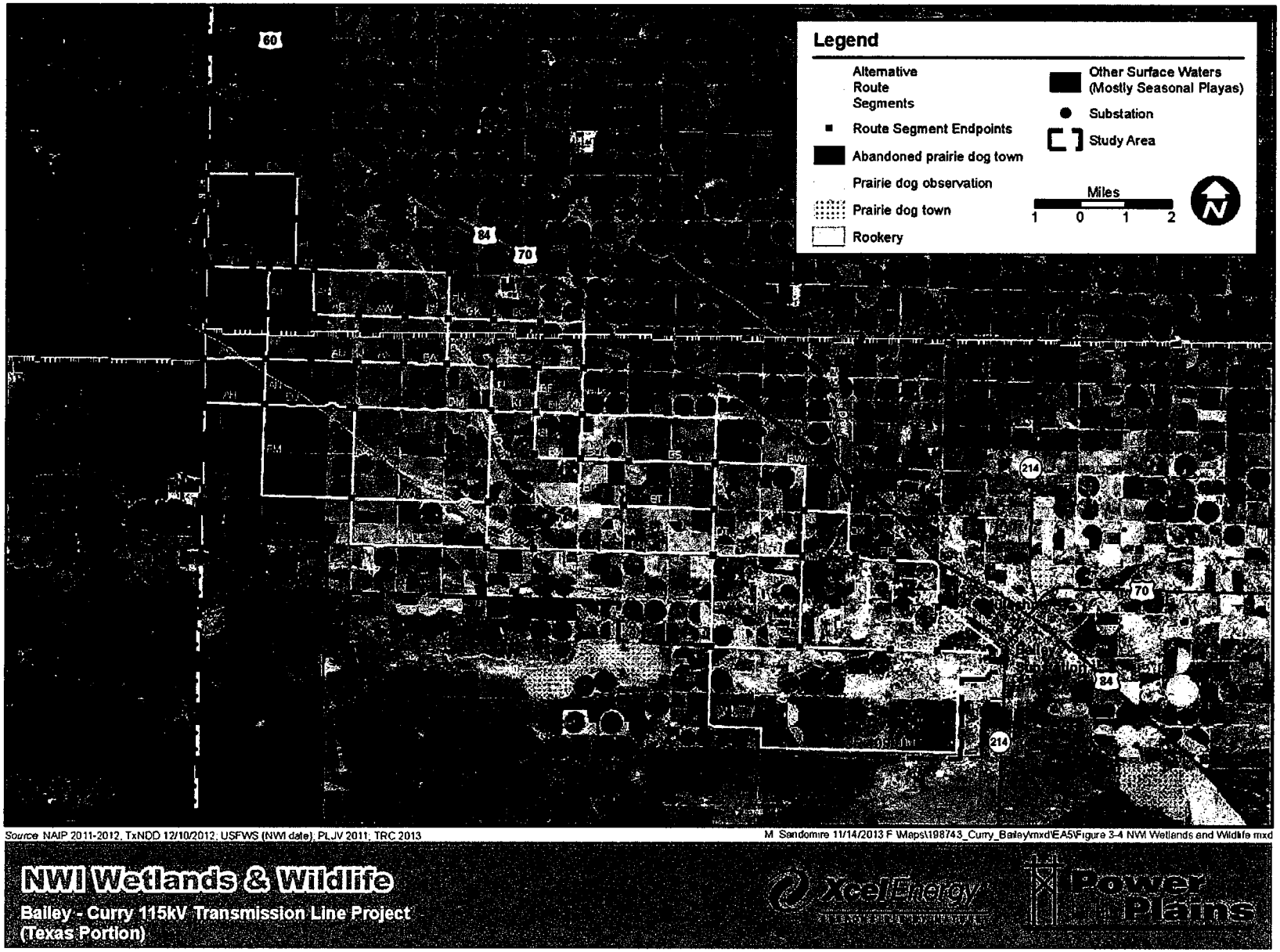

Figure 3.4 NWI Wetlands and Wildlife

During the April 2013 and June 2013 surveys, numerous avian species were observed including the Swainson's hawk (*Buteo swainsoni*), red-tailed hawk (*Buteo jamaicensis*), rough-legged hawk (*Buteo lagopus*), northern harrier (*Circus cyaneus*), American kestrel (*Falco sparverius*), turkey vulture (*Cathartes aura*), eastern meadowlark (*Sturnella magna*), western meadowlark (*Sturnella neglecta*), European starling (*Sturnus vulgaris*), great-tailed grackle (*Quiscalus mexicanus*), northern mockingbird (*Mimus polyglottos*), loggerhead shrike (*Lanius ludovicianus*), red-winged blackbird (*Agelaius phoeniceus*), barn swallow (*Hirundo rustica*), western burrowing owl (*Athene cunicularia hypugaea*), blue jay (*Cyanocitta cristata*), Eurasian collared dove (*Streptopelia decaocto*), white-winged dove (*Zenaida asiatica*), mourning dove (*Zenaida macroura*), rock pigeon (*Columba livia*), long-billed curlew (*Numenius americanus*), killdeer (*Charadrius vociferus*), horned lark (*Eremophila alpestris*), western kingbird (*Tyrannus verticalis*), Chihuahuan raven (*Corvus cryptoleucus*), Carolina chickadee (*Poecile carolinensis*), and lark bunting (*Calamospiza melanocorys*). A representative list of bird species of potential occurrence in the Study Area is included in Table 3.3.

3.5.4 Mammals

At least 59 mammalian species occur or have occurred in the Kansan Biotic Province (Blair, 1950). Mammal species in the Study Area are those associated with short-grass and mixed-grass ecosystems of the Great Plains. During the April 2013 and June 2013 surveys, several mammals were observed including the white-tailed deer (*Odocoileus virginianus*), black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), and black-tailed prairie dog (*Cynomys ludovicianus*). A representative list of common mammals known to occur in the Kansan Biotic Province and potentially occur in the Study Area is presented in Table 3.4.

3.5.5 Recreationally/Commercially Important Species

No recreational public hunting grounds have been identified within the Study Area. However, private hunting areas are located within Bailey and Parmer counties that allow hunting of dove, quail, pheasant, waterfowl, wild turkey, prairie dog, white-tailed deer, and mule deer. All of these species that are hunted for recreation may occur in the Study Area. Non-consumptive recreation such as wildlife viewing and bird watching occur within the region, but is probably rare within the Study Area. Because most land in the Study Area is private and is used for agriculture, it is not considered a high quality recreation, viewing, or birding area.

One Community Fishing Lake (CFL), a one acre city park lake (Muleshoe City Park Lake), is located adjacent to the Study Area in Muleshoe, Bailey County, Texas (TPWD, 2013c). One CFL, a six-acre playa lake (Reeves Lake), is located in Friona, Parmer County, Texas (TPWD, 2013c). A CFL is defined by the TPWD as a public impoundment 75 acres or smaller located totally within an incorporated city limits or a public park, or any impoundment lying totally within the boundaries of a state park. Many CFLs are stocked annually with channel catfish and/or rainbow trout. No major fishing lakes over 75 acres are located in Bailey or Parmer counties.

3.5.6 Threatened, Endangered, and Important Wildlife Species

The ESA gives the USFWS federal legislative authority for the protection of threatened and endangered (T&E) species. This protection includes a prohibition of direct take (e.g., killing, harassing) and indirect take (e.g., destruction of critical habitat). The ESA also requires the evaluation of effects to proposed and candidate species. The Texas Parks and Wildlife Code also establishes a state regulatory mandate for the protection of state-listed T&E species by prohibiting the take of such species. The TPWD maintains the authority to protect state-listed species.

Table 3.2 Potential Reptile Species in Study Area

Common Name	Scientific Name	Common Name	Scientific Name
Lizards			
Great Plains skink	*Eumeces obsoletus*	Lesser common earless lizard	*Holbrookia maculata approximans*
Great Plains earless lizard	*Holbrookia maculata*	Eastern fence lizard	*Sceloporus undulatus*
Texas horned lizard	*Phrynosoma cornutum*	Common side-blotched lizard	*Uta stansburiana stejnegeri*
Snakes			
Plains black-headed snake	*Tantilla nigriceps*	Texas long-nosed snake	*Rhinocheilus lecontei tessellatus*
New Mexico threadsnake	*Leptotyphlops dissectus*	Desert massasauga	*Sistrurus catenatus*
Marcy's checkered gartersnake	*Thamnophis marcianus*	Prairie rattlesnake	*Crotalus viridis*
Glossy snake	*Arizona elegans*	Western diamondback rattlesnake	*Crotalus atrox*
Gopher snake	*Pituophis catenifer*	Desert kingsnake	*Lampropeltis getula*
Ground snake	*Sonora semiannulata*	Milk snake	*Lampropeltis triangulum celaenops*
Plains hog-nosed snake	*Heterodon nasicus*	Ringneck snake	*Diadophis punctatus arnyi*
Prairie racerunner	*Aspidoscelis sexlineata viridis*	Checkered gartersnake	*Thamnophis marcianus*

Source: NatureServe (2012); Cannatella (2000)

Table 3.3 Potential Avian Species in Study Area

Common Name	Scientific Name	Common Name	Scientific Name
Mississippi kite	*Ictinia mississippiensis*	Western wood pewee	*Contopus sordidulus*
American avocet	*Recurvirostra americana*	Ring-necked pheasant	*Phasianus colchicus*
Red-winged blackbird	*Agelaius phoeniceus nevadensis*	Say's phoebe	*Sayornis saya*
European starling	*Sturnus vulgaris*	Common poorwill	*Phalaenoptilus nuttallii*
Mountain bluebird	*Sialia currucoides*	Lesser prairie-chicken	*Tympanuchus pallidicinctus*
Indigo bunting	*Passerina cyanea*	Pyrrhuloxia	*Cardinalis sinuatus*
Lark bunting	*Calamospiza melanocorys*	Chihuahuan raven	*Corvus cryptoleucus*
Painted bunting	*Passerina ciris*	American redstart	*Setophaga ruticilla*
Gray catbird	*Dumetella carolinensis ruficrissa*	American robin	*Turdus migratorius*
Yellow-breasted chat	*Icteria virens*	Northern flicker	*Colaptes auratus*
Mountain chickadee	*Poecile gambeli*	Scissor-tailed flycatcher	*Tyrannus forficatus*
Brown-headed cowbird	*Molothrus ater*	Loggerhead shrike	*Lanius ludovicianus*

Common Name	Scientific Name	Common Name	Scientific Name
Sandhill crane	*Grus canadensis*	Pine siskin	*Spinus pinus*
Yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Cassin's sparrow	*Peucaea cassinii*
Long-billed curlew	*Numenius americanus*	Chipping sparrow	*Spizella passerina arizonae*
Mourning dove	*Zenaida macroura*	Clay-colored sparrow	*Spizella pallida*
Rock pigeon	*Columba livia*	House sparrow	*Passer domesticus*
Eurasian collared dove	*Streptopelia decaocto*	Lark sparrow	*Chondestes grammacus*
Red-tailed hawk	*Buteo jamaicensis*	Cassin's sparrow	*Peucaea cassinii*
Swainson's hawk	*Buteo swainsoni*	Yellow warbler	*Setophaga petechia*
Turkey vulture	*Cathartes aura*	House finch	*Carpodacus mexicanus*
Western burrowing owl	*Athene cunicularia hypugaea*	Western meadowlark	*Sturnella neglecta*
Greater roadrunner	*Geococcyx californianus*	White-breasted nuthatch	*Sitta carolinensis nelsoni*
Northern bobwhite quail	*Colinus virginianus*	Bullock's oriole	*Icterus bullockii*

Source: NatureServe (2012); Lockwood and Freeman (2004)

Table 3.4 Potential Mammal Species in Study Area

Common Name	Scientific Name	Common Name	Scientific Name
Western red bat	*Lasiurus blossevillii*	North American least Shrew	*Cryptotis parva*
American badger	*Taxidea taxus berlandieri*	Western harvest mouse	*Reithrodontomys megalotis*
Brazilian free-tailed bat	*Tadarida brasiliensis mexicana*	Hispid pocket mouse	*Chaetodipus hispidus*
Hoary bat	*Lasiurus cinereus*	Plains pocket mouse	*Perognathus flavescens copei*
Eastern red bat	*Lasiurus borealis*	Silky pocket mouse	*Perognathus flavus*
Bobcat	*Lynx rufus baileyi*	White-footed mouse	*Peromyscus leucopus arizonae*
Coyote	*Canis latrans texensis*	Virginia opossum	*Didelphis virginiana*
Mule deer	*Odocoileus hemionus*	Common porcupine	*Erethizon dorsatum couesi*
White-tailed deer	*Odocoileus virginianus*	Pronghorn	*Antilocapra americana*
Black-tailed prairie dog	*Cynomys ludovicianus*	Desert cottontail	*Sylvilagus audubonii*
Common gray fox	*Urocyon cinereoargenteus scottii*	Black-tailed jack rabbit	*Lepus californicus*

Common Name	Scientific Name	Common Name	Scientific Name
Red fox	*Vulpes vulpes*	Common raccoon	*Procyon lotor hirtus*
Swift fox	*Vulpes velox*	Hispid cotton rat	*Sigmodon hispidus*
Plains pocket gopher	*Geomys bursarius major*	Ord's kangaroo rat	*Dipodomys ordii*
Jones' pocket gopher	*Geomys knoxjonesi*	Brown rat	*Rattus norvegicus*
Yellow-faced pocket gopher	*Cratogeomys castanops*	Southern plains wood rat	*Neotoma micropus*
Deer mouse	*Peromyscus maniculatus*	White-throated wood rat	*Neotoma albigula*
Northern grasshopper mouse	*Onychomys leucogaster*	Ringtail	*Bassariscus astutus*
Plains harvest mouse	*Reithrodontomys montanus*	Least shrew	*Cryptotis parva*
Spotted ground squirrel	*Xerospermophilus spilosoma canescens*	Striped skunk	*Mephitis mephitis*
Wild pig	*Sus scrofa*	Long-tailed weasel	*Mustela frenata arizonensis*

Source: (NatureServe, 2012); Davis and Schmidly (1994)

According to the USFWS (2013a) and TPWD (2013a) lists of T&E species, one federally listed endangered species potentially occurs in Bailey and Parmer counties (Table 3.5). One candidate species for federal protection is also listed for Bailey and Parmer counties. Seven state-listed endangered or threatened species are listed for Bailey County and six state-listed endangered or threatened species are listed for Parmer County. There are also 14 and 15 state-listed species of concern for Bailey and Parmer counties, respectively.

Suitable habitat for the federally and state-listed endangered whooping crane (*Grus americana*) is present within the Study Area and is primarily associated with the playa lakes, which are stopover habitat for the bird during migration. The whooping crane may be encountered in the area as a migrant during the spring and fall. Likewise, the state-listed peregrine falcon (*Falco peregrinus*), including the American peregrine falcon subspecies (*Falco peregrinus anatum*), and bald eagle (*Haliaetus leucocephalus*) may be encountered as migrants within the Study Area despite the lack of preferred quality habitat. Marginal habitat for the candidate species for federal protection, the lesser prairie chicken (*Tympanuchus pallidicinctus*; LEPC), is present along the southeastern portion of the Study Area. Potential habitat for the Texas horned lizard (*Phrynosoma cornutum*), a state-listed threatened species in Bailey County, is also present within the Study Area. None of the federally or state-listed threatened or endangered species were observed during the April 2013 and June 2013 surveys.

Potential habitat is present within the Study Area for several other state-listed rare species of concern including the Baird's sparrow (*Ammodramus bairdii*), ferruginous hawk (*Buteo regalis*), mountain plover (*Charadrius montanus*), prairie falcon (*Falco mexicanus*), western burrowing owl (*Athene cunicularia hypugaea*), black-tailed prairie dog (*Cynomys ludovicianus*), plains spotted skunk (*Spilogale putorius interrupta*), and swift fox (*Vulpes velox*). Marginal habitat is present within the Study Area for other state-listed rare species of concern including the snowy plover (*Charadrius alexandrinus*), its subspecies, the western snowy plover (*Charadrius alexandrinus nivosus*), and the big free-tailed bat (*Nyctinomops macrotis*), all of which could occur as migrants. Active black-tailed prairie dog towns, some of which were also occupied by the western burrowing owl, were observed during the April 2013 and June 2013 surveys; additional details for the two burrowing species are provided below. None of the remaining state-listed rare species of concern were observed during the surveys.

Two state-listed species for Bailey and Parmer counties, the black bear (*Ursus americanus*) and pale Townsend's big-eared bat (*Corynorhinus townsendii pallescens*), are not expected to occur within or adjacent to the Study Area because of the absence of suitable habitat. Two state-listed species for Bailey and Parmer counties, the black-footed ferret (*Mustela nigripes*) and gray wolf (*Canis lupus*), are not expected to occur because they are considered extirpated in the counties. Therefore, no further evaluations are included for these four state-listed species. In addition although listed by the state of Texas and tracked by the TPWD, rare species of concern are not afforded formal protection. It should be noted that only species that have potentially suitable habitat within the Study Area and are currently federally or state-listed as endangered or threatened or species federally listed as candidate for protection are discussed further below. Detailed species and habitat descriptions are provided in Table 3.5.

The TXNDD was reviewed in order to assess the potential for federal and state-listed T&E species to occur within the vicinity of the Project Areas. Data from the TXNDD do not provide a definitive statement as to the presence, absence, or condition of special status species, natural communities, or other significant features within a project area. The TXNDD data were received on January 24, 2013, and included the occurrence records for listed species and rare habitat within the Study Area and adjacent areas (TPWD, 2013b). The TXNDD data report (TPWD, 2013b) included five occurrence records of black-tailed prairie dog towns located within the Study Area. The black-tailed prairie dog currently has no state or federal listing status, but it is a state-listed rare species of concern that is tracked by the TPWD. It should be noted that the large black-tailed prairie dog town identified by the TXNDD and

located near the Bailey County Substation (Figure 3.4) was abandoned during the April 2013 survey. Additional occupied and unoccupied/abandoned black-tailed prairie dog towns were observed in other locations within the Study Area during the April 2013 and June 2013 surveys. Western burrowing owls were also observed inhabiting three of the prairie dog towns.

The Migratory Bird Treaty Act (MBTA), first enacted in 1918, prohibits taking, attempting to take, capturing, killing, selling, purchasing, processing, transporting, and importing migratory birds and their eggs, parts and nests, except when specifically authorized. Activities that result in removal or destruction of an active nest (a nest with eggs or young being attended by one or more adults) would violate the MBTA. The Migratory Bird Treaty Reform Act of 2004 further defined species protected under the act and excluded all non-native species. The list of migratory birds includes nearly all bird species native to the United States. As authorized by the MBTA, the USFWS issues permits to qualified applicants for the following types of activities: falconry, raptor propagation, scientific collecting, special purposes (rehabilitation, education, migratory game bird propagation, and salvage), take of depredating birds, taxidermy, and waterfowl sale and disposal. As mentioned in Section 3.5.3, many migratory avian species may occur within the Study Area, as the region is located within the Central Flyway migration route (Shackelford et al., 2005).

The Bald and Golden Eagle Protection Act (BGEPA; 16 USC 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The BGEPA provides criminal and civil penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The BGEPA defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." The BGEPA defines "disturb'' as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagles return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment. As described in detail below, it is possible that transient bald eagles may occur within the Study Area as uncommon to rare migrants, particularly near the playa lakes.

Table 3.5 Endangered, Threatened and Rare Species with the Potential to Occur in Parmer and Bailey Counties, Texas

Common Name	Scientific Name	USFWS[1]	TPWD[2]	Preferred Habitat	County Listed	Suitable Habitat in Project Area?
Birds						
American peregrine falcon	*Falco peregrinus anatum*	--	T	Year-round resident and local breeder in West Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	Migrant
Arctic peregrine falcon	*Falco peregrinus tundrius*	--	S	Migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	Migrant
Baird's sparrow	*Ammodramus bairdii*	--	S	Shortgrass prairie with scattered low bushes and matted vegetation; mostly migratory in western half of State, though winters in Mexico and just across Rio Grande into Texas from Brewster through Hudspeth counties. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	Yes
Bald eagle	*Haliaeetus leucocephalus*	DL	T	Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	Migrant
Ferruginous hawk	*Buteo regalis*	--	S	Open country, primarily prairies, plains, and badlands; nests in tall trees along streams or on steep slopes, cliff ledges, river-cut banks, hillsides, power line towers; year-round resident in northwestern high plains, wintering elsewhere throughout western 2/3 of Texas. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	Yes
Lesser prairie chicken	*Tympanuchus pallidicinctus*	C	S	Arid grasslands, generally interspersed with shrubs such as sand sagebrush, sand plum, skunkbush sumac, and shinnery oak shrubs, but dominated by sand dropseed, sideoats grama, sand bluestem, and little bluestem grasses; nests in a scrape lined with grasses. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	Yes
Mountain plover	*Charadrius montanus*	--	S	Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	Yes
Prairie falcon	*Falco mexicanus*	--	S	Open, mountainous areas, plains and prairie; nests on cliffs. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	Yes
Snowy plover	*Charadrius alexandrinus*	--	S	Formerly an uncommon breeder in the Panhandle; potential migrant; winters along coast. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	Migrant
Western burrowing owl	*Athene cunicularia hypugaea*	--	S	Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	Yes

Common Name	Scientific Name	USFWS[1]	TPWD[2]	Preferred Habitat	County Listed	Suitable Habitat in Project Area?
Western snowy plover	*Charadrius alexandrinus nivosus*	--	S	Uncommon breeder in the Panhandle; potential migrant; winter along coast. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	Migrant
Whooping crane	*Grus americana*	E	E	Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	Migrant
				Mammals		
Big free-tailed bat	*Nyctinomops macrotis*	--	S	Habitat data sparse, but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore. No Critical Habitat is designated in Bailey or Parmer counties.	Parmer	Migrant
Black bear	*Ursus americanus*	--	T	Bottomland hardwoods and large tracts of inaccessible forested areas. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	No
Black-footed ferret	*Mustela nigripes*	E	S	Extirpated; inhabited prairie dog towns in the general area. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	Extirpated
Black-tailed prairie dog	*Cynomys ludovicianus*	--	S	Dry, flat, short grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle; live in large family groups. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	Yes
Gray wolf	*Canis lupus*	E	E	Extirpated; formerly known throughout the western two-thirds of the state in forests, brushlands, or grasslands. No Critical Habitat is designated in Bailey or Parmer counties.	Parmer	Extirpated
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	--	S	Roosts in caves, abandoned mine tunnels, and occasionally old buildings; hibernates in groups during winter; in summer months, males and females separate into solitary roosts and maternity colonies, respectively; single offspring born May-June; opportunistic insectivore. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	No
Plains spotted skunk	*Spilogale putorius interrupta*	--	S	Catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	Yes
Swift fox	*Vulpes velox*	--	S	Restricted to current and historic shortgrass prairie; western and northern portions of Panhandle. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey, Parmer	Yes
				Reptiles		
Texas horned lizard	*Phrynosoma cornutum*	--	T	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September. No Critical Habitat is designated in Bailey or Parmer counties.	Bailey	Yes

[1] E = Endangered; T = Threatened; C = Candidate; DL = Delisted, Monitored; Source USFWS (2013a)

[2] E = Endangered; T = Threatened; S = Species of Concern; Source TPWD (2013a)

3.5.6.1 Peregrine Falcon (*Falco peregrinus*)

The peregrine falcon (including the American peregrine falcon subspecies) is state-listed as a threatened species for Bailey and Parmer counties, whereas the arctic peregrine falcon (*Falco peregrinus tundrius*) is state-listed as a rare species of concern for both counties (TPWD, 2013a). American peregrine falcons are resident breeders in the mountains of the Trans-Pecos and both subspecies migrate through Texas on their way to wintering grounds along the coast and farther south. Because the subspecies are not easily distinguishable at a distance, reference is generally made to the species level. Peregrine falcons prefer a variety of open habitats, and usually inhabit areas near water. Historically, peregrine falcons in the Great Plains nested on cliffs near rivers and lakes, on low dikes in marshes and mud banks, and in large trees (Nemec, 1984). It is possible that peregrine falcons may be present within the Study Area as rare migrants. Due to the limited number of playa lakes and large trees and lack of riparian zones and cliffs in the Study Area, only marginal stopover habitat is present within the Study Area. No peregrine falcons were observed during the April 2013 or June 2013 surveys.

3.5.6.2 Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle is state-listed as a threatened species for Bailey and Parmer counties (TPWD, 2013a). Originally listed as endangered at the federal level on March 11, 1967, the status of the bald eagle was down-listed to threatened on July 12, 1995, and then proposed for delisting on July 6, 1999. After an increase from approximately 487 breeding pairs in 1963 to an estimated 9,789 breeding pairs in 2007, the bird was officially de-listed in August of 2007. Bald eagles are present year-round throughout Texas as spring and fall migrants, breeders, or winter residents, and typically nest from October to July. Breeding populations occur primarily in the eastern half of the state and along coastal counties from Rockport to Houston, and nonbreeding or wintering populations are located primarily in the Panhandle, Central, and East Texas, as well as other areas of suitable habitat throughout the state. The typical nest is constructed of large sticks, with softer materials such as leaves, grass, and Spanish moss used as nest lining. Nests are typically used for a number of years, with the birds adding nest material every year. Bald eagle nests are often very large, measuring up to 6 feet in width and weighing hundreds of pounds. Eagles often have one or more alternative nests within their territories, and after the young are left on their own, they typically migrate northward out of Texas, returning by September or October. Various fish constitute the bald eagle's diet, but the birds also eat a wide variety of food depending on availability, including birds, reptiles, amphibians, invertebrates, and small mammals. Bald eagles often scavenge for carrion and also harass smaller raptors, stealing any dropped prey. Transient bald eagles may potentially occur within the Study Area as uncommon to rare migrants, particularly near the playa lakes. Due to the limited number of mature tree stands near open waterbodies, only marginal habitat for this species is present within the Study Area. No bald eagles were observed during the April 2013 or June 2013 surveys.

3.5.6.3 Lesser Prairie Chicken (*Tympanuchus pallidicinctus*)

The LEPC is a candidate species for federal listing as threatened and also a state-listed rare species of concern for Bailey and Parmer counties (USFWS, 2013a; TPWD, 2013a). In 1995, the LEPC was petitioned to be federally listed as a threatened species and its status is currently under review by the USFWS (77 Federal Register [FR] 73828 – 73888). The LEPC is a resident to rangelands in southwestern Kansas, the Oklahoma and Texas panhandles, southeastern Colorado, and northeastern New Mexico. Required habitat for the LEPC consists of intact, semi-arid grasslands interspersed with shrubs such as sand sagebrush, sand plum, skunkbush sumac, and shinnery oak and dominated by sand dropseed, sideoats grama, sand bluestem, and little bluestem grasses. Nests generally are located in a scraped out area lined with grasses.

Populations and distributions of the LEPC have declined since the 1800s (Giesen, 1998). Many factors have contributed to the LEPC's reduction in population and distribution including drought, predation, agricultural and energy development, chemical control of vegetation, and hunting (Crawford, 1980).

Several studies have also indicated that LEPCs tend to avoid tall, anthropogenic structures such as residential buildings, power plants, compressor stations, and transmission lines (Pitman et al., 2005; Crawford and Bolen, 1976; Woodward et al, 2002; Sullivan et al, 2001; and others cited in 77 FR 73828 – 73888).

According to the USFWS, landscapes supporting less than 63 percent native rangeland appear incapable of supporting self-sustaining LEPC populations (USFWS, 2012a). A habitat assessment tool, the Southern Great Plains Crucial Habitat Assessment Tool (SGP CHAT), has been developed in coordination with a three-year Western Governors' Association (WGA) Wildlife Council project, led by the Oklahoma Department of Wildlife Conservation and the Kansas Department of Wildlife, Parks and Tourism with the cooperation of the TPWD (among other agencies). A review of the SGP CHAT indicates that the southeastern portion of the Study Area is located within the range of the LEPC. The SGP CHAT further classifies land by its relative value as LEPC habitat, according to WGA-defined categories. The SGP CHAT identifies crucial habitats for the LEPC (including connecting corridors) that can be used in the early stages of development or conservation planning. The SGP CHAT crucial habitat database classifies land by its relative value as LEPC habitat, according to the categories described below (SGP CHAT, 2011).

- Category 1 (Irreplaceable): Habitat that is rare or fragile and is essential to achieving and/or maintaining LEPC population viability.

- Category 2 (Limiting): Habitat that is limiting to LEPC populations or metapopulations. Loss of any of this habitat could result in a significant local or population-level decline in species distribution, abundance, or productivity.

- Category 3 (Significant): Habitat, including wildlife corridors, that contributes significantly to the maintenance of LEPC populations or metapopulations. Loss of a significant portion of the habitat or corridor could result in local or population-level declines in species distribution, abundance, or productivity.

- Category 4 (Unknown): Lands likely to have significant value to the LEPC, but for which there is insufficient data or a lack of information about the importance of the habitat in meeting conservation objectives.

- Category 5 (Common): Habitat which is relatively common, generally less limiting to LEPC populations or metapopulations, and generally better suited for land use conversion.

According to the SGP CHAT, the majority of the Study Area is mapped as Category 5 land, which generally corresponds to the agricultural, urban, and residential land present in those areas. Land mapped as either Category 3 (Significant) or Category 2 (Limiting) is located in the southeastern portion of the Study Area. Land mapped as Category 1 (Irreplaceable) is present just outside of the southern boundary of the Study Area that is adjacent to and parallels County Road (CR) 1090. All eight Alternative Routes traverse land mapped as Category 3 (Significant) and Category 2 (Limiting), although Alternative Route 7 crosses considerably more land mapped as Category 2 (Limiting).

Concurrently with the April 2013 reconnaissance survey, a survey for the LEPC was conducted in accordance with the USFWS LEPC Road Survey Protocol provided in a letter from the USFWS dated December 19, 2012 (Appendix H). The survey was performed to provide an assessment of the presence and preferred habitat of the LEPC along the southeastern portion of the Study Area and to satisfy the survey recommendations by the USFWS in a letter dated December 19, 2012, and by the TPWD in a letter dated January 17, 2013. No LEPCs were heard or observed during the survey. During the LEPC survey, it was

determined that most of the areas along Alternative Routes 1 through 6 that are mapped as Category 3 (Significant) or Category 2 (Limiting) were of relatively low quality and unsuitable habitat for the LEPC and consisted mainly of recently plowed (i.e., barren) and active agriculture fields with numerous agricultural structures (e.g., grain silos, barns, irrigation systems, and other facilities), cattle feed lots, existing transmission line infrastructure, highways and local roads, and residential and commercial structures located throughout the area. Although not included in the April 2013 survey, the portion of Alternative Route 7 that is adjacent to CR 113, CR 1086, and CR 1090 and between CR 1090 and the Bailey County Substation likely provides higher quality habitat for the LEPC based on aerial photographs of the area. These areas of habitat along Alternative Route 7 that are likely higher in quality generally correspond with the areas that are mapped as Category 2 (Limiting) along the route in those locations.

3.5.6.4 Whooping Crane (*Grus americana*)

The whooping crane is a federally and state-listed endangered species for Bailey and Parmer counties (USFWS, 2013a; TPWD, 2013a). Whooping cranes breed in the wetlands of Wood Buffalo National Park in northern Canada and winter on the salt flats and marshes of the Texas coast at Aransas National Wildlife Refuge near Rockport, Texas. An estimated 10,000 whooping cranes were present in North America during pre-colonial times, and as of August 31, 2011, there were a total of 599 whooping cranes in North America (Stehn, 2011). Population declines have historically been associated with habitat loss, and in addition, collisions with power lines currently are a source of concern regarding mortality for fledged whooping cranes (Stehn and Wassenich, 2008).

The whooping crane migration route includes the Great Plains region between northern Canada and the Texas coast, with the fall migration south to Texas beginning in mid-September and the spring migration north to Canada beginning in late March or early April. The whooping crane migration corridor is essentially a straight line of 2,400 miles from central Canada to Texas. Migration along this route takes approximately 1.5 months to complete. Whooping cranes primarily migrate in groups of one to five birds (Johns et al., 1997) during daylight hours at an altitude of 1,000 to 6,200 feet when thermal currents are optimal and glide downward in the evening at up to 62 miles per hour to roost in shallow wetlands (USFWS, 2009). During migration, they are most vulnerable to impacting structures in the early morning and late evenings when light is diminished. Research suggests that approximately 80 percent of the fledged whooping cranes fatalities occur during migration (Lewis et al., 1992). Although the Study Area is located outside of the whooping crane migration corridor (95 percent probability of occurrence; USFWS, 2012b; SGP CHAT, 2011), the cranes could potentially occur within the Study Area as rare migrants based on confirmed sightings that have been recorded in the Texas Panhandle outside of the 95 percent corridor (USFWS, 2012b). In the Study Area, wetlands, including playas, may provide suitable migratory habitat for this species (USFWS, 2012c). No whooping cranes were observed during the April 2013 or June 2013 surveys.

3.5.6.5 Texas Horned Lizard (*Phrynosoma hernandesi*)

The Texas horned lizard is state-listed as a threatened species (TPWD, 2013a). The preferred habitat for the relatively slow moving lizard includes flat, open terrain with sparse vegetation (e.g., grass, cacti, and scattered brush or shrubby trees) and areas of sandy, rocky, or loamy soil (TPWD, 2013a). Texas horned lizards generally are active in the High Plains region from mid-April through September and when surface temperatures are above 75 degrees Fahrenheit (°F). When inactive, the lizards burrow into the soil, enter rodent burrows, or hide under rocks, usually hibernating only a few inches from the surface. Diet primarily consists of harvester ants (*Pogonomyrmex barbatus)*, but other small arthropods may be eaten. Numerous harvester ant colonies were observed across all portions of the Study Area. The Texas horned lizard could potentially occur in the Study Area. No Texas horned lizards were observed during the April 2013 or June 2013 surveys.

3.5.7 Critical Habitat

The USFWS Critical Habitat Portal was reviewed in order to assess the presence of federally designated Critical Habitat within or near the Study Area. No federally designated Critical Habitat was identified in Bailey or Parmer counties (USFWS, 2013c).

3.6 Aquatic Ecology

No surface waters that would support aquatic species occur in the Study Area. Therefore, it is anticipated that aquatic species are not located within the Study Area.

3.7 Socioeconomics

The Study Area encompasses portions of Bailey and Parmer Counties in the Panhandle region of Texas. No incorporated city is included in the Project Study Area, though both county seats, Muleshoe and Farwell, respectively, are immediately adjacent. These communities will incontrovertibly be affected by the Project and are thus included in this socioeconomic analysis. Data which characterizes the entire state of Texas provides regional comparison.

3.7.1 Population

The most recent population estimates from the U.S. Census Bureau are for June 2012: Bailey County, 7130; City of Muleshoe; 5128; Parmer County, 10,183; City of Farwell, 1352 (United States Census Bureau 2013). While Texas grew by 3.63% during the two years between these estimates and the last official census (2010), each of the jurisdictions shrank: Bailey County lost 35 persons (down 0.49%), the City of Muleshoe lost 86 persons (down 0.84%), Parmer County lost 30 persons (down 0.58%), and the City of Farwell lost 11 persons (down 0.81%).

As of 2010, the populations of the four reporting areas are less racially diverse vis-à-vis Texas as a whole (Table 3.6). Notable is the higher percentage of people who reported as "White," "American Indian and Alaska Native," or "Other," and the lower percentage of people who reported as "Black" or "Asian."

Table 3.6 Population by Race in Cities of Muleshoe and Farwell and Bailey and Parmer Counties

Race	Texas	Bailey County	City of Muleshoe	Parmer County	City of Farwell
White	70.4%	75.3%	75.2%	77.6%	84.7%
Black or African American	11.9%	1.2%	1.3%	1.2%	2.0%
American Indian and Alaska Native	0.7%	1.4%	1.5%	1.0%	1.1%
Asian	3.7%	0.4%	0.4%	0.2%	0.6%
Native Hawaiian and Pacific Islander	0.1%	0.1%	0.0%	0.2%	0.0%
Some Other Race	10.5%	19.6%	19.6%	17.7%	10.1%
Two or More Races	2.7%	2.0%	2.0%	2.1%	1.5%
Total	100.0	100.0	100.0	100.0	100.0

Also of note is that the local communities reported higher percentages of Hispanic or Latino citizens—Bailey County, 59.8%; City of Muleshoe, 64.3%; Parmer County, 60.0%; City of Farwell, 40.9%—than did Texas at 37.6% (United States Census Bureau 2013).

3.7.2 Economy and Employment

Given the Study Area's location in the Panhandle region, it should come as no surprise that agriculture is a prominent employment sector for the local economies (Table 3.7). This industry is far more important to the local communities than to Texas as a whole. As a counterpoint, it should be noted that manufacturing is more important in Parmer County, and the City of Farwell has a higher percentage of citizens employed in construction and the education, health care, and social services (United States Census Bureau 2013).

Table 3.7 Employment by Industry

Industry	Texas	Bailey County	City of Muleshoe	Parmer County	City of Farwell
Agriculture, forestry, fishing and hunting, and mining	2.9%	22.6%	16.3%	20.7%	12.2%
Construction	8.3%	0.9%	1.4%	7.8%	15.1%
Manufacturing	9.6%	4.0%	3.5%	22.6%	5.1%
Wholesale trade	3.2%	3.9%	5.1%	3.1%	3.3%
Retail trade	11.5%	7.7%	5.9%	8.4%	8.1%
Transportation and warehousing, and utilities	5.6%	8.5%	8.7%	3.6%	1.9%
Finance and insurance, and real estate and rental and leasing	6.8%	7.9%	10.7%	3.1%	4.5%
Professional, scientific, and management, and administrative and waste management services	10.6%	4.2%	5.9%	3.8%	7.8%
Educational services, and health care and social assistance	21.2%	22.4%	22.7%	14.3%	20.9%
Arts, entertainment, and recreation, and accommodation and food services	8.3%	5.9%	6.6%	3.7%	6.1%
Other service, except public administration	5.3%	5.5%	7.6%	5.3%	9.6%
Public administration	4.4%	4.1%	2.3%	2.5%	3.9%

The median household income for the communities included in this analysis were all significantly below that of Texas ($50,920 in 2011 dollars). Bailey County's median household income is $41,106 (80.7%), City of Muleshoe is $40,926 (80.4%), Parmer County, is $41,113 (80.7%), and City of Farwell is $38,274 (75.2%). Except for Parmer County, these communities have a lower percentage of families living below the federal poverty line ($23,550 for a family of 4) than Texas (13.2%): Bailey County, 11.7%; City of Muleshoe, 11.3%; Parmer County, 17.9%; and City of Farwell, 11.1% (United States Census Bureau 2013).

Unemployment rates in the Study Area vary clearly based on the county boundary. Texas reported 7.3% unemployment for the analysis period. Bailey County experienced 6.2% unemployment, while the City of Muleshoe was higher at 7.8%. Parmer County had a notably lower rate of 3.3%, while the City of Farwell

reported 0.0%. This last number includes a margin of error of 5.3 percentage points, so it probably is underreported to some degree (United States Census Bureau 2013).

3.7.3 Community Services

The Bailey County Sheriff's Department is staffed by seven deputies, one reserve deputy, and one constable. Each officer has a vehicle, for a total of nine cars. The City of Muleshoe also has nine vehicles, used by eight officers and one reservist (DeLaPaz personal communication 2013). Parmer County law enforcement is provided by that Sheriff's Office, which employs five officers (the sheriff and four deputies) in five cars (Saraba personal communication 2013).

Bailey County emergency services are provided by Muleshoe's six paramedics/Emergency Medical Technicians with three ambulances, along with 25 fire personnel. The Muleshoe Fire Department uses two pumper trucks, two tankers with 3500 gallon capacity, and five brush trucks which are specialized for wildland fires (DeLaPaz personal communication 2013). Parmer County emergency services include eleven personnel in two ambulances, and 19 firefighters with six trucks (Wauson personal communication 2013).

Hospitals near, but not within, the Study Area include the Muleshoe Area Medical Center, but the nearest general hospital with 24-hour medical services is the Plains Regional Medical Center in Clovis, NM (Presbyterian Healthcare Services 2013). Additional public services near, but not within, the Study Area include one country club each in Farwell and Muleshoe; and a library, a city pool, and three parks in Muleshoe.

The Study Area overlaps with parts of the Farwell and Muleshoe Independent School Districts. Farwell has one school at each level—elementary, middle, and high—in addition to a private school (Farwell Independent School District 2013). Muleshoe has two elementary schools, one middle school, and one high school (Muleshoe Independent School District 2013).

3.7.4 Community Values

The communities adjacent to the Project Study Area have not adopted comprehensive plans, master plans, or general plans. Both Bailey and Parmer Counties defer to the Panhandle Regional Planning Commission for planning guidance (Agee personal communication 2013; Harrison personal communication 2013).

While there are no population centers within the Study Area, the City of Muleshoe may serve as a voice for the local community values: "Muleshoe is a progressive, industry-driven city with many technological resources…[and] citizens of Muleshoe are positive minded, forward thinking and very hospitable" (City of Muleshoe 2013).

3.8 Land Use

3.8.1 Land Use Character

3.8.1.1 Existing Land Use

The majority of the Project Study Area is agricultural and rural, with small nodes of rural residential and agricultural support operations. Figures 2.1 and 2.2 depict the land use pattern across the Project Study Area and the high concentration of irrigated and non-irrigated cropland. Cultivated field crops include wheat, corn, alfalfa, cotton, and sorghum. Large dairies and beef cattle feed lot operations are present in the landscape and reflect the type and scale of livestock production in the region. Smaller animal husbandry operations consist of cattle, horses, goats, and poultry and are affiliated with rural residential development. Data collection during field reconnaissance in December 2012 and April 2013 confirmed the initial observations of the aerial photography.

Livestock production in the Project Study Area is primarily beef cattle feed lots and commercial dairies with open lots. Beef cattle are also pasture-raised on scattered farms. Winter wheat and alfalfa are the most harvested crop in the Project Study Area. Other crops include corn, upland cotton, sorghum (for grain), and soybeans (USDA 2012).

Muleshoe and Farwell, Texas are incorporated communities outside of the Project Study Area. They have denser concentrations of residential and commercial development with parks and recreation facilities, hospitals/clinics, and are the location of independent school districts that serve the Project Study Area. There is no oil or gas production in the Project Study Area.

3.8.1.2 Planned Land Use

The Project Study Area is located in the western portion of the Texas Panhandle that encompasses part of Bailey and Parmer counties. Parmer County is a member of the Panhandle Regional Planning Commission (PRPC), a planning organization with 26 member counties. The PRPC provides planning services, economic development, and transportation planning to support local governments, The PRPC does not provide guide and direction to the planning or permitting of high voltage transmission lines.

Bailey County is a member of the South Plains Association of Governments (SPAG), a 15 county member organization that assists local governments with economic development, community development, aging and elder issues, and emergency preparedness and planning. The SPAG does not provide guidance and direction to the planning or permitting of high voltage transmission lines.

TRC consulted with the office of each county judge for Bailey and Parmer County regarding planned land use and development regulations. Parmer and Bailey Counties do not have a county general plan (personal communication, The Honorable Sherri Harrison and Ms. Michelle Agee, July 2013). TRC consulted with the Muleshoe Economic Development Director regarding planned development activities in the Project Study Area. According to the director, there are no planned commercial or industrial activities planned for the Project Study Area (personal communication, Kasey Coker, January 2013)

3.8.2 Habitable Structures

Single-family residences are scattered throughout the Project Study Area on large tracts along the various Farm-to-Market roads and County Roads and agricultural land. There are small clusters of rural residential development consisting of three to six houses. Some dairies have clusters of mobile homes to accommodate their workers.

Through a combination of aerial photograph interpretation and field reconnaissance, the Project Team identified habitable structures located within 300 feet of the centerline of each Alternative Route. Appendix G contains a table listing all habitable structures and parcels located within 300 feet of the Alternative Route Segments. This table presents the type of structure, distance, and direction from the route centerline, and a description of the habitable structure and any related or associated structures.

3.8.3 Commercial and Industrial Structures

The Project Study area is rural and agrarian in nature. The commercial and industrial structures are typically associated with agriculture and agricultural support uses. Milking parlors and offices associated with dairies, cotton gins, grain silos, seed cleaning facilities, and irrigation support services are commercial structures. Reliant Processing has a carbon dioxide processing and loading facility adjacent to Alternative Route Segment BN. The Bravo carbon dioxide pipeline crosses Alternative Route BN at the Reliant Processing facility. Figure 2.2b depicst the location of commercial and industrial structures in context to alternative route segments.

3.8.4 Irrigation Systems

Throughout the Panhandle region and Project Study Area, agriculture is an important element of the economy and is represented mostly by cropland, rangeland/pasture, and large-scale livestock operations. Due to the arid climate, crops are irrigated for optimal production. Alfalfa, winter wheat, and cotton are irrigated crops in the Project Study Area. Some areas of perennial grass are irrigated for livestock grazing. Dryland cotton and sorghum are typically not irrigated.

The most common form of irrigation in the Project Study Area is the central pivot irrigation system. An irrigation well near the edge of a field provides a source of water for one or more systems. The location of central pivot irrigation systems and crop type is depicted on Figure 2.2b. Many of the alternative routes skirt the perimeter of existing center-pivot irrigation systems.

3.8.5 Aesthetic Values

Aesthetic values of the Study Area must be considered as a factor for transmission-line corridors per PURA. The scenic qualities that make up the aesthetic value of an area include: topographic variation, vegetative variety, presence of water, variety and/or intensity of color, uniqueness of the landscape relative to other surrounding locations, and degree of human development. Landscapes with flat terrain, low vegetation species diversity, absence of water, monochromatic color palette, and structures or features that detract from the landscape have low scenic and aesthetic value.

Due to the flat terrain, lack of substantial stands of trees, abundant cropland, and absence of massed vertical structures, the visual study area extends outside of the Project Study Area. Views across the study area extend over ten miles. The Project Study Area is largely agricultural land and exhibits several general types of landscapes that contribute to the area's scenic qualities. These landscape categories include large tracts of flat open lands; areas of gently rolling terrain associated with drainages, scattered playas and isolated wetlands, and small rural settlements associated with agriculture. There are small clusters of trees associated with windbreaks around rural residential development and dairies, and linear masses of trees paralleling drainages. Structures in the landscape consist of single family residences, agricultural outbuildings, dairy milking parlors, grain silos, and storage buildings associated with agriculture (hay, food crops, and farm equipment). Colors in the natural landscape range from browns and tans in the winter to medium and dark greens with browns and tans in the spring and early summer. Figure 3.5 shows typical views of the landscape setting in the Project Study Area.

The natural vegetation of the Project Study Area has been modified through crop production, large-scale livestock operations, and rural residential development. There are pockets of native vegetation typical of the High Plains Province at field corners, around undeveloped playas and wetlands, and along drainages. Modification of the landscape has occurred in the vicinity of Muleshoe and Farwell and along US 70 and 84 where commercial development and grain silos are visible on the northern edge of the Project Study Area.

Due to the rural and undeveloped nature of the Project Study Area, the primary views are from roadways and rural residences. The US and state highways have high volumes of traffic and provide views from the east and west edges of the Project Study Area and across the agrarian landscape. Traffic on county and local roads is lower in volume and primarily consists of residents or employees of agricultural operations.

Absent are scenic driving trails, heritage trails, scenic highways, scenic overlooks, and designated viewing areas in the Project Study Area. In addition, there are no areas or features managed for scenic quality located within the Project Study Area (Texas Highways 2013).

OVERSIZED SHEET Figure 3.5

3.8.6 Recreation and Park Areas

There are no recreation or park areas within the project study area. Babe Ruth Park, a small park in the city of Muleshoe, is approximately 1,900 feet northeast of the existing Bailey County Substation. Babe Ruth Park has two ball fields.

3.8.7 Transportation/Aviation Facilities

3.8.7.1 Transportation Facilities

The Project Study area is approximately 78 miles to the northwest of Lubbock and approximately 85 miles to the southwest of Amarillo. Both Lubbock and Amarillo are economic centers in the Texas Panhandle. The major transportation corridor between Lubbock to Muleshoe is US 84. State Highway 214 extends south through Muleshoe to define the eastern edge of the Project Study Area. New Mexico State Highway 348 defines the western edge of the Project Study Area. The Project Study Area has a gridded network of county and local roads. Figure 2.2b depicts the transportation network in the Project Study Area.

In 2012, the Lubbock District of TxDOT scheduled an $11 million roadway repair project for US 70 in Parmer County. The project extends from the Bailey County line to the New Mexico state line and is scheduled for FY 2016. US 70 is immediately north of the project area in Bailey and Parmer Counties. TxDOT has not planned or scheduled any roadway improvement projects within the Project Study Area in Bailey County.

There are no rail lines in the Project Study Area. The Project Study area is south of a rail line that parallels US 70 on the north side and is operated by BNSF.

3.8.7.2 Aviation Facilities

The Albuquerque sectional navigation chart was checked for the location of public and private airfields in the project area. There are no public, FAA registered airports within 10,000 feet of the center line of any route. There are no heliports within 5,000 feet of the centerline of any route.

The Locker Brothers Airstrip (1TEO) is the only FAA-registered airport with a runway more than 3,200 feet that is located within 20,000 feet of the center line of any route. The Locker Brothers Airstrip is a private airport north of Muleshoe and the Project Area. Runway 9/18 is listed having a gravel surface and is 4,000 feet in length. The end of the runway is 14,710 feet from the Project Area and 14,930 feet from the nearest segment (Segment CA, Route 5).

A private airstrip associated with an agricultural spraying service is located near Farwell, Texas. Segment Z is located at the south end of the airstrip. Segment DN of Route 1 is located 5,300 feet from the south end of the airstrip. However, at present the airstrip is not being used for aircraft operations and agricultural equipment is stored on the airstrip and taxiway.

The Muleshoe Municipal Airport (2T1) is an uncontrolled public airport and the end of the runway is 26,815 feet from the Project Area and 27,520 feet from the nearest segment (Segment HH). The Fairview (private, no International Civil Aviation Organization desgnation) airstrip is located south of Muleshoe and the Project Area. The end of the airstrip is 44,850 feet from the Project Area and the nearest segment (Segment HH).

3.8.8 Communication Facilities

There are several Federal Communications Commission (FCC) registered communication facilities in the Project Study Area. Table 3.6 lists the communication towers and their location in context to each

alternative route. Figures 2.2 and 3.6 depict all AM towers within 10,000 feet of an alternative route centerline and all FM, microwave, cell, and other communication towers within 2,000 feet of an alternative route centerline.

Table 3.8 Transmitters/Communication Facilities in Proximity to Alternative Routes

Route	Closest Transmitter to Route Alternative	Distance from Centerline (feet) of Closest Segment	Closest Segment	Structure Number for Figure 2.2
1	AM/FM	8,815	GC	1
	AM	6,023	AP	2
	AM	8,679	AP	3
	TV	297	BJ	5
	TV	204	BS	9
	FM	1,265	JM	19
	FM	968	JM	20
	Microwave Relay	545	JM	21
	AM	1,200	JM	22
2	TV	1,758	BK	5
	TV	260	BO	6
	TV	259	BO	7
	Farm Radio	660	BO	8
	TV	417	BW	10
	FM	1,265	JM	19
	FM	968	JM	20
	Microwave Relay	545	JM	21
	AM	1,200	JM	22
3	Home TV	484	BP	11
	FM	1,265	JM	19
	FM	968	JM	20
	Microwave Relay	545	JM	21
	AM	1,200	JM	22
4	TV	292	BN	12
	Meteorological Station	42	BN	13
	TV	273	BN	14
	FM	1,265	JM	19
	FM	968	JM	20
	Microwave Relay	545	JM	21
	AM	1,200	JM	22
5	AM	7,853	BC	3
	Unknown	1,700	BG	4
	TV	297	BJ	5
	TV	260	BO	6
	TV	259	BO	7
	Farm Radio	660	BO	8
	TV	417	BW	10
	Unknown	1,042	CA	15
	Unknown	1,268	CA	16

Route	Closest Transmitter to Route Alternative	Distance from Centerline (feet) to Closest Segment	Closest Segment	Structure Number for Figure 2.3
	AM	4,577	CA	17
	FM	1,748	CD	18
	FM	973	CD	19
	FM	968	JM	20
	Microwave Relay	298	CD	21
	AM	1,200	JM	22
6	TV	292	BN	12
	Meteorological Station	42	BN	13
	TV	273	BN	14
	FM	1,265	JM	19
	FM	968	JM	20
	Microwave Relay	545	JM	21
	AM	1,200	JM	22
7	TV	292	BN	12
	Meteorological Station	42	BN	13
	TV	273	BN	14
	FM	1,265	JM	19
	FM	968	JM	20
	Microwave Relay	545	JM	21
	AM	1,200	JM	22
8	TV	292	BN	12
	Meteorological Station	42	BN	13
	TV	273	BN	14
	FM	1,265	JM	19
	FM	968	JM	20
	Microwave Relay	545	JM	21
	AM	1,200	JM	22

OVERSIZED MAP
Figure 3.6

Table 3.9 Previously Recorded Archaeological and Historic Locations Within Proposed Routes

Quad	County	Segment Traversed	Alternative Routes	Distance from Route Centerline	Cultural Affiliation	Site Description	Additional Comments
Bailey NE	Bailey	BN	4 and 6	50 feet	Historic	Historic Marker	First Irrigation Well in Bailey County, Marker Number 1732, erected 1972
Pleasure Lake	Parmer	GD	3	1,300 feet	Historic	Mt. Olivet Cemetery	PM-C006 122 interments; oldest grave dated 1891

The cemetery within the Route 3 is the Mt. Olivet Cemetery (PM-C006). There are several old grave markers, including members of the Hassell family who died on December 8, 1926.

A historical marker established by the THC is within the 70-foot ROW of Routes 4 and 6. The marker was established in 1972 and commemorates the first irrigation well in Bailey County. In 1909, the well was dug by hand on Willard Burns' farm, however the exact well location is unknown.

There are no resources in Bailey or Parmer County listed on the National Register of Historic Places (NRHP). For a cultural resource to be eligible for the NRHP, it must possess integrity of location, design, setting, materials, workmanship, feeling, and association. Not all seven aspects of integrity must be present for a resource to be eligible for the NRHP, but overall, a resource must retain the defining features and characteristics that were present during its period of significance. In addition, the cultural resource must meet one or more of the following criteria:

1. Be associated with events that have made a significant contribution to the broad patterns of our history;

2. Be associated with the lives of persons significant in our past;

3. Embody the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that possess high artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction; and/or

4. Have yielded or may be likely to yield information important in prehistory or history (NPS 1994, 36 CFR §§ 800.3-800.13).

4.0 Environmental Impacts of the Potential Alternative Routes

4.1 Impacts on Physiography/Geology/Soils/Prime Farmland

4.1.1 Impacts on Physiography and Geology

Construction of the proposed Project is temporary and does not require excavation to great depths or extensive disturbance of the physiography or underlying geology. With the exception of infrequent maintenance activities, or the rare natural disaster, operation of an electric transmission line is unlikely to have any long-term permanent impact upon the area in which it is constructed. Construction and operation of the proposed Project is not expected to have a significant long-term impact on the physiographic or geologic resources located within the Study Area.

4.1.2 Impacts on Geology and Soils

Construction of transmission lines is a temporary activity which will generally entail the disturbance of soils, in limited areas, mostly associated with the auguring of structures foundations, lay down areas, and access to their locations. Alternative Routes 1 through 8 would affect soil units, in linear feet, as listed in Table 4.1.

Table 4.1 Soil Map Units Crossed by Project Alternatives

	Alternative Routes (linear feet crossed)							
Soil Map Unit[a]	1	2	3	4	5	6	7	8
AcA[b]	4,243							
AcB[b]	1,576							
Ad	445	445	445	445	833	445	2,615	445
AfA	3,389	30,533	15,704	29,363	15,740	19,455	25,051	19,556
AfB	3,892	5,163	4,708	3,892		5,163		5,575
AlA[b]					4,408			
AmA	32,257			10,578	25,055			
AmB	961			688	2,380		8,232	
An	9,283	6,229	9,283	6,505	3,282	6,229	4,587	6,229
Ao	6,612	4,015	6,612	4,015		4,015	2,171	4,015
ArA	3,592			2,245	8,960			
AvA	9,046	17,050	15,680	7,265	6,128	13,491	6,652	13,565
AvB		543				543		
AyA	1,377		2,687					
BeC				139				
BfA	156			334	723			
Br							18,229	
Bs3							4,398	
Ch		2,591		2,591		2,591		2,591
DrB	284	635	284	1,141	1,985	635		635
DrC	2,116	1,017	2,116	1,017	848	1,017	2,212	1,017
DrE	2,943	4,670	2,943	4,670	2,503	4,670	1,105	4,670
EsA					4,333			
FrA[c]					578			
Ga	2,926	2,926	2,926	2,926	1,535	3,802	1,594	2,926

	Alternative Routes (linear feet crossed)							
Soil Map Unit[a]	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Ga3							3,201	
Km				174			174	
La	2,427		2,427		1,722		550	
Ld		430	528	1,308	492	1,244	784	1,949
Lu				1,010			1,010	
MfA	8	344	373		8	847	847	
MfB	769		458	161		883	505	458
MfC		301		666		301		
PfA	22,433	25,589	16,891	6,137	32,217	12,280	11,796	11,004
PfB	4,062	1,321	2,000	1,812	5,076	1,321	1,056	2,520
PmA	19,718	8,692	24,530	22,530	8,658	21,699	17,184	23,293
Ps			230					230
Ra	971				1,658			
Sf	2,638		2,638				1,709	
Tv	5,353	5,353	5,353	5,353		5,353	9,708	5,353
TwC	1,092				2,142			
ZcA[b]								
ZfA		2,952	2,655	3,223	1,859	1,924	1,924	2,433
ZfB				506			506	
ZmA[b]	4,500	1,276	5,248	17,404		14,017	14,352	18,373

[a] Refer to Figure 3.1 for soil types associated with these unit references.
[b] Considered Prime Farmland
[c] Prime Farmland if irrigated

Permanent soil and geology impacts will be caused in the discrete areas in which the structures foundations are placed. Some, minor, long-term impacts to soils could occur from the presence of concrete foundations for line towers. Effects will likely be moderately greater at foundations for structures at corners and angles because the foundations can be larger in area and deeper in depth. Table 4.2 shows estimated permanent impacts to soils, for each Alternative Route.

Table 4.2 Permanent Soil Impact in Acres by Alternative Route

	Foundations (angle/corner/dip)		Direct Embed (tangent)		Total Permanent Impact Area (acres)
Alternative Route	No. of Structures	Area (acres)[a]	No. of Structures	Area (acres)[b]	
1	45	0.052	190	0.031	0.083
2	26	0.030	159	0.026	0.056
3	39	0.045	158	0.025	0.070
4	28	0.032	193	0.031	0.063
5	36	0.041	172	0.028	0.069
6	17	0.020	176	0.028	0.048
7	22	0.025	200	0.032	0.057

[a] Estimates based on largest possible size foundation of 10 feet x 20 feet.
[b] Estimates based on footprint of four feet diameter for augured tangent structures.

According to the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) "soil erosion involves the breakdown, detachment, transport, and redistribution of soil particles by forces of water, wind, or gravity" (USDA NRCS 2007) Soil erosion is a natural process that can be accelerated by human disturbance associated with the construction process and product. Factors that influence the degree of erosion include soil texture, structure, length, percent of slope, vegetative cover, rainfall, and wind intensity. Soils with low wind erosion potential are those soils with favorable surface particle size, armoring coarse fragments or higher organic matter content. Sand size surface layers, no coarse fragment protection, or low organic content, are soil qualities that cause high wind erosion probability (USDA NRCS 2007).

Wind erosion is a concern in the Texas Panhandle due to high wind speeds (NREL 2013). At present natural erosion is exacerbated by a "severe" to "exceptional" drought the region has suffered through past several years. (U.S. Drought Monitor 2013a & b)

Water erosion potential is also affected by soil characteristics. In addition to the same factors that contribute to wind erosion, sand size surface layers, no coarse fragment protection, or low organic content, soil permeability and slope play a significant role. Water erosion is of particular concern near water bodies where soil and sediment can settle after rain events.

Compaction of soils and rutting, usually a result of vehicular traffic, can also contribute to water induced erosion. By creating a decrease in the space between particles, compacted soil has a higher bulk density that is more easily carried by water. Additionally compaction can damage plant roots and prevent further spread of vegetation that would prevent erosion. Access to location of tower structures will utilize existing roads, driveways, and agricultural roads for transportation of materials and workers, wherever possible. However, overland travel may be required in areas with limited established access roads. Soft soils in these areas could be compacted by vehicle passage, especially in moist conditions. The majority of soils in the Study Area are highly sand based in composition and compaction is unlikely to have long term effects.

To minimize impacts to soils and protect waterways during the construction process, SPS will develop a Storm Water Pollution Prevention Plan (SWPPP) to protect waterways from sedimentation. The SWPPP will specify revegetation practices, work area inspection frequency both during and after construction, erosion prevention controls, and identify priority areas for revegetation. Discharges of storm water runoff from construction projects of this type are eligible for coverage under TCEQ's Texas Pollutant Discharge Elimination System (TPDES) General Permit No. TXR150000, General Permit to Discharge Wastes, pursuant to Section 402 of the Clean Water Act. SPS will comply with the requirements of this General Permit to minimize potential erosion associated with storm water runoff. Construction and operation of the proposed Project are not expected to result in significant impacts to the Study Area associated with erosion or storm water runoff.

Vegetation clearing, access road construction, equipment movement, and excavation for transmission structure foundations could accelerate the erosion process by wind and water. Best Management Practices, as identified in the SWPPP, will be employed in construction to negate or reduce erosion potential. These include stabilizing methods and vegetative cover restoration. Additionally, the level to gently sloping terrain of the Project Study Area minimizes erosion potential. The Project construction and operations therefore will likely result in few long-term effects or short term effects on soils.

Corrosion potential of materials varies with components of structural materials. Moisture, pH, soil conductivity, sodium content, and soil textures all influence the rate of corrosion. Concrete and steel, the typical materials used in the creation of an electric transmission line, have corrosion potential based on their materials and the use of various treatments to prevent corrosion. Structures and foundations would be monitored, evaluated, and addressed on a case-by-case basis.

4.1.3 Impacts on Prime Farmland

The Study Area contains approximately 8,154 acres of Prime Farmland soils, which is approximately 10 percent of the Study Area (Texas General Land Office, 2009 and USDA NRCS 2009). Potential impacts to Prime Farmland include erosion, compaction, and rutting. The primary impact of Project construction and operation, however, on Prime Farmland soils would be the small amount of land taken out of production by the transmission structure foundations. The NRCS, though, does not consider the construction and operation of electric transmission lines to be a conversion of Prime Farmland to another use because the affected land can still be used for agricultural purposes after construction (Berhernds 2013). The amount of Prime Farmland actually disturbed/occupied by structure installation, given the size of foundations, would be quite small. Additionally, structure locations are intentionally planned along property boundaries, at the edge of roads and agricultural fields, and are widely spanned to avoid interference with agricultural operations, and minimizing taking Prime Farmland soils out of production. Therefore, construction and operation of the proposed Project would not result in significant impacts to Prime Farmland soils in the Study Area.

4.1.4 Substation

The existing Bailey County Substation would be expanded and upgraded in association with the route construction. Improvements would be made to the existing site and to the adjacent five acre substation expansion parcel. Impacts to the existing substation would be minimal because of previous disturbance and new equipment would be placed on existing pads or new pads would be constructed. The upgrade to the Bailey County Substation would require clearing of vegetation and grading for equipment foundations, extension of the perimeter fence, and a 5-foot wide clear area outside the perimeter fence. The proposed expansion of the Bailey County Substation would permanently affect the adjacent rangeland because the top layer of soil would be cleared, graded, and a ground grid permanently maintained.

4.1.5 Recommended Construction Measures

Short-term and long-term construction impacts to soils, farming and agricultural operations could largely be avoided by employing the following recommended measures:

To reduce soil compaction and soil mixing and to reduce the potential for a reduction in soil productivity on prime farmland soils:

Measure A

Operate equipment only when soils are dry (below the plastic/malleability limit to a depth of six to eight inches or more). If rutting should occur to over three inches deep, construction should be suspended until soil conditions are again suitable.

To ensure that nutrient and biologically rich topsoil would be maintained at the surface, and, if calcareous subsoils are present, they remain below the rooting zone, and to maintain soil productivity in prime farmland soil:

Measure B

Soil should be conserved and returned to any excavated area in the order it was removed. Excavated excess subsoil for foundations beyond 10 inches in depth, is to be considered construction debris, and should be disposed of, not spread on the soil surface.

To prevent the penetration of clay lining in playa lakes:

Measure C

Permanent structures should not be placed in map units Ch (Lipan clay loam) or Ra (Randall Clay) soil. These are somewhat poorly and poorly drained soils typically associated with playa lakes in the Project Area.

To reduce erosion:

Measure D

Apply erosion control Best Management Practices (BMPs) in areas that are heavily disturbed by construction. Erosion controls may include mud mat-type blankets, waddles, silt fences, wetting, mulching, and re-vegetation.

4.2 Impacts on Water Resources

4.2.1 Surface Water

No running water was observed in any of the intermittent streams, or draws, located in the Study Area. The majority of stream beds in the Study Area have been historically altered by road building and agricultural practices such that the streambeds are largely absent. Some depressional areas along the Blackwater Draw and Lariat Draw showed signs of channelization, moisture, and flow, and impounded areas along draws had standing water during the June field survey (after significant rain events). No channelization of Progress Draw, or the unnamed tributary to Blackwater Draw in the southern portion of the study area, was observed in the field.

Several potential segments (AG, AN, DJ, DK, AO, DV, GI, BV, HI, FS, CB, CC, and CD in Routes 1, 2, 3, 4, 5, 6, 7, and 8) cross Blackwater Draw. Lariat Draw also crosses a number of potential segments (AP, AZ, DQ, GB, DM, and BN in Routes 1, 2, 3, 4, 5, 6, and 8). Progress Draw, though not visibly evident in the field, is crossed by just three potential segments (DX, BY, and BZ in Route 5). All stream beds observed, most quite narrow, could easily be spanned by the transmission line to avoid any impacts.

Construction-related impacts may include short-term effects on water quality associated with localized increases in turbidity and sedimentation, resulting from storm water runoff from adjacent upland construction areas. Turbidity has the potential to result in localized temporary impacts to aquatic habitat and organisms. Conservation measures to control erosion and sedimentation will be included in the project SWPPP, which will be designed and implemented to minimize impacts to surface water quality during construction. SPS intends to utilize erosion and sediment runoff controls, which will be properly installed, as needed, to minimize the potential for sediment and debris to enter waterways along the project route.

Because construction will proceed quickly at water body crossings, with little or no in-stream activity, disturbances will be limited. Construction access across streams and rivers will be minimized to the extent practicable. Long-term impacts on water quality or aquatic organisms are not anticipated given the intermittent nature of the water bodies and the spanning of water bodies. To the extent possible, routes have been developed to cross stream beds perpendicularly, minimize multiple crossings of water bodies, and minimize paralleling water bodies. It is anticipated that streams, and playa lakes, will be spanned by the aboveground conductors, without the need to place any support structures, fill, or other obstructions within a water body. Water quality and other stream attributes are expected to return to pre-construction conditions within a short period after the completion of construction.

Construction and operation of the proposed Project are not expected to result in significant impacts to surface water resources.

4.2.2 Floodplains

There are no FEMA 100-year floodplain maps available for either Parmer County or Bailey County; therefore potential impacts to floodplains in the Texas portion of the Study Area cannot be evaluated. (FEMA 2013)

4.2.3 Playa Lakes

Playa lakes have been identified by the USFWS and the TPWD as important habitats for migratory birds. As previously detailed, playa lakes are not specifically regulated and protected at the federal or state level but are considered ecological areas of importance. A potential impact that could result from the Project is an increase in avian mortality or injury due to collision with the new transmission line.

Indirect avian mortality could also occur as birds directly killed as a result of contact with new infrastructure fall into standing water, decay, and possibly increase the spread of diseases, including avian cholera and botulism (Wicker 2010). Avian cholera and botulism are a major source of non-hunting mortality of playa lake wintering birds, affecting thousands each year (Haukos and Smith 1992); however, it is likely that predators and scavengers would most likely dispose of any deceased birds quickly, reducing the likelihood of decay and spread of disease.

SPS has conducted GIS data collection, aerial photo interpretation and field reconnaissance to identify potential playa lakes (PLJV 2013). Any playa lake that cannot be avoided will be spanned wherever practicable. Following CCN issuance, if necessary, SPS will determine appropriate locations for placement of line markers. During Project operations, SPS will assess and adjust the placement of transmission line markers as prudent. Construction and operation of the proposed Project are not expected to result in significant impacts to playa lakes.

Most playa lakes in the Study Area are small and would be easily spanned by the transmission line. Large playa lakes are present under three of the potential segments, FM, DU and BY, which are part of a conglomerate of playa lakes). Of these, only segment DU is part of a potential Alternative Route, Routes 2, 4, 6, and 8. If these segments were constructed, extra measures would be taken, such as suspended construction during wet conditions, to ensure the least possible impact to the playa lakes.

4.2.4 Groundwater

The construction, operation, and maintenance of the Project are not expected to adversely affect groundwater resources within the Study Area. The depth to the Ogallala Aquifer precludes any direct impacts from surface construction.

Field surveys were conducted to ascertain the location of wells accessing groundwater under potential segments. To provide long term access to presently used and historic wells, design teams will route around wells where possible. In the event a transmission line may be installed over an area where a historic or present well is located, discussions with landowners will be carried out to avoid potential access difficulties in the future.

Where groundwater is present under unconfined, water table conditions, there is a possibility that very shallow groundwater may be encountered during excavation. Since this would only be likely in deep depressions, that are associated with draws that will be spanned, impacts are unlikely.

No groundwater withdrawals are proposed as the minimal amount of water needed for concrete production will be purchased through municipalities. Additionally, new impervious surface area associated with the pole structure foundations are too small to have any impact on groundwater recharge. It is unlikely that construction or operation of the transmission line will impact groundwater.

4.3 Impacts on Terrestrial Ecosystems

4.3.1 Vegetation

Most of the eight proposed Alternative Routes are located in previously disturbed or open lands (i.e., agricultural croplands, agricultural rangeland/pasture, and areas of cleared vegetation), with some areas of the Alternative Routes crossing grassland and sagebrush habitat. Playas and drainages potentially supporting wetland vegetation are associated with all eight Alternative Routes.

Impacts to vegetation resulting from the construction and operation of transmission lines are primarily associated with minimal removal of vegetation within the proposed transmission line right-of-ways (ROWs). With the exception of permanent removal of vegetative cover at transmission structure locations, temporary impacts to vegetation would result from the removal of vegetation (where present) during any necessary clearing of the ROW and additional temporary workspaces. Construction of transmission line structures within the ROW would be performed in a manner that would minimize adverse impacts to vegetation and retain existing ground cover to the extent practicable. Clearing would only occur where necessary to provide access and working space and to protect conductors. Only minimal clearing of vegetation would be necessary within agricultural lands. During operation of the transmission line, woody vegetation that could interfere with the conductors would be trimmed or removed in accordance with North American Electric Reliability Corporation standards to ensure the safe and reliable operation and maintenance of the transmission line. Construction and operation of the Project are not expected to result in significant or long-term impacts to vegetation or agricultural crops.

Depending on placement, the construction of transmission line structures could result in small areas of localized long-term removal of wetland vegetation where playa lakes could not be spanned by the route. However, with proper placement of transmission line structures, it is anticipated that most playa lakes could be spanned by the Project. Alternative Routes 2, 4 6, and 8 traverse a relatively large playa lake system that likely could not be entirely spanned (along Segment DU, a shared segment among Alternative Routes 2, 4, 6, and 8). Alternative Routes 1, 3, 5, and 7 cross playa lakes and drainages as well, but it is assumed that the features present within these routes are likely narrow enough to be spanned. With appropriate design and pole placement, it is anticipated that Project construction activities would not occur in wetland vegetation associated with any of the routes except possibly Alternative Routes 2, 4, 6, and 8.

Construction of Alternative Routes 2, 4, 6, and 8 likely would require work within the boundaries of a large playa lake system and may result in removal of wetland vegetation for construction of temporary access and placement of concrete pole foundations. Vegetation removal would be permanent in areas with constructed pole foundations and potentially temporary in other areas used for access to construct the foundations. Access to Segment DU would be from the County Road 133 which parallels the segment, minimizing impacts from new disturbance to the playa lake area. Vegetation removal for construction access areas would be temporary and wetland vegetation would re-establish following construction and restoration of native cover. The concrete foundations would vary in size and range from 6 feet x 12 feet to 10 feet x 20 feet, depending on the specific structure type, soil conditions, load specifications, and results from geotechnical studies of the playa soils and groundwater table. Assuming no more than four foundations would be required within the playa lake area along Segment DU, as well as a maximum size of 10 feet x 20 feet per foundation, the total acreage of wetland vegetation permanently removed would be approximately 800 square feet (0.01-acre) as a result of construction of Alternative Route 2, 4, 6, or 8.

Impacts to wetland vegetation would be considered minor due to the small acreage of vegetation affected and lack of special-status plant species in the Study Area. It is likely that the isolated playa lakes and drainages within the Study Area would be considered non-jurisdictional by the USACE due to the lack of a significant nexus to a TNW. However, a formal jurisdictional determination should be made if either

Alternative Route 2, 4, 6, or 8 is selected as the recommended route and if construction activities would result in discharge of temporary or permanent fill materials within the boundaries of wetlands or drainages. The term "fill material" includes, but is not limited to, placement of any materials such as rock, sand, concrete or dirt or other activities such as construction of temporary or permanent access roads, placement of concrete foundations or any other facilities. It should be noted that coordination with the USACE may be required for any impacts to jurisdictional waters.

4.3.1.1 Recommended Mitigation

Following construction activities, unless otherwise requested by landowners (i.e., avoiding cultivated agricultural lands), the disturbed areas would be revegetated with a native plant species seed mixture appropriate for the land type as soon as possible after Project completion. Prompt application of native vegetation would allow for efficient establishment and would provide additional erosion control. Vegetation management of the project area would be in accordance with the 1994 Presidential Memorandum on Environmentally Beneficial Landscaping and 1999 Executive Order 13112 on Invasive Species, which would include the use of regionally native vegetation for landscaping and approved seed mixes. As recommended by the TPWD in a letter dated January 17, 2013, a list of native plant species suitable for use in the Study Area can be developed using the Texas Plant Information Database (TPWD, 2013c).

If discharge of fill material is required within the boundaries of playas identified on the constraints map, a jurisdictional determination may be required. If no jurisdictional waters are present, no further mitigation would be required. If discharge into jurisdictional waters is required, an application to the USACE for a Clean Water Act Section 404 permit may be required depending on the acreage of Project-related impacts. No work should occur within jurisdictional waters of the U.S. until the appropriate Clean Water Act Sections 401 and 404 permits are obtained. Avoidance, mitigation and/or compensation for loss of jurisdictional waters may be required under Section 404.

Disturbance of adjacent upland areas could result in erosion and sedimentation within the wetland. Conservation measures to control erosion and sedimentation would be included in the Project Storm Water Pollution Prevention Plan (SWPPP), which would be designed and implemented to minimize impacts to water quality in wetlands and surface waters during construction.

4.3.2 Endangered and Threatened Plant Species

No plants are currently federally or state-listed listed as endangered, threatened, candidate species for listing, or rare species of concern in Bailey or Parmer counties. Therefore, no impacts to any federally or state-listed plant species are expected to result from the Project.

4.3.3 Wildlife

Impacts to wildlife species (Section 3.5) as a result of Project-related construction activities are expected to occur. These impacts include short-term adverse impacts related to construction activities including ground-clearing, movement of vehicles and construction equipment, and the presence of construction workers. Long-term effects to wildlife could result from the presence of new transmission lines, poles and maintenance of the new facilities.

Construction activities would temporarily increase human presence, increase noise and movement of vehicles and equipment, and would also require ground-disturbance for placement of temporary access areas and permanent transmission lines and associated structures. As a result, many mammalian and avian species may be temporarily disturbed and displaced during Project-related construction activities. However, disturbances are expected to be minimal since area wildlife are generally accustomed to low-level disturbances of the area including general residential activity, noise and traffic from nearby roads, and agricultural operations (e.g., mowing, tractor, and irrigation activities on agricultural lands, and dairy

and feedlot activities). It is possible that some individuals of smaller, lower mobility species (e.g., small reptiles or small mammals) or ground dwelling wildlife (e.g., black-tailed prairie dog and western burrowing owl) may be injured or killed by construction equipment; however, most animals are adequately mobile and would avoid the construction area during active work periods. This type of impact is anticipated to be relatively uncommon and minor. Wildlife in the immediate area may experience a minor loss of browsing or foraging material during construction; however, the prevalence of similar habitats in adjacent areas and regrowth of vegetation in the ROW following Project-related construction would minimize the effects of this loss.

Following construction, most vegetation within the ROW would re-establish relatively quickly (i.e., within one to three growing seasons), and habitat for wildlife is anticipated to return to preconstruction conditions. Agricultural practices are expected to continue within the Project ROW where the ROW crosses the edge of active agriculture fields. Once construction is completed and the vegetation has recovered, wildlife would move back into the ROW and general wildlife use of the Study Area would be similar to that of pre-construction.

Impacts to avian (including migratory) species from electric transmission lines can have both adverse and beneficial effects. Much of the published information is available from the Avian Power Line Interaction Committee (APLIC), a collaboration of the USFWS and power companies to address issues of avian protection and electric power reliability. Positive impacts of transmission lines and structures on avian species, particularly raptors, include additional nesting and roosting sites and resting and hunting perches, particularly in open, treeless habitats (APLIC, 2006). Perching on power lines and utility structures can give raptors a wide view of the surrounding area while they hunt for prey. Several species of raptors have been documented nesting and roosting on transmission structures and poles including the American kestrel, red-tailed hawk, and Swainson's hawk. Transmission lines have also been documented to provide nesting and roosting habitat for other common avian species. It is believed that transmission lines have significantly contributed to increased raptor populations in several areas of the United States (APLIC, 2006). Minor, adverse impacts to prey species would be anticipated with any increase in avian predator species in the area. The Study Area currently has a number of existing transmission and distribution lines that presently provide these perching opportunities. The Project would incrementally add to the number of available perch sites.

Adverse impacts to avian species from electric transmission lines range from conductor, ground wire, and structure interactions (electrocution and/or collision), to habitat loss and fragmentation from ROW construction and maintenance. Typically, electrocution is not a threat from electric transmission lines greater than 69 kV, as the distance between conductors or conductor and structure or ground wire is greater than the wingspan of most birds (i.e., greater than six feet; APLIC, 2006).

Collision hazards are greatest near higher quality habitats such as wetlands. Collision hazards are also greatest for migratory or juvenile birds, because over time, resident species typically learn the location of transmission lines and become less susceptible to wire strikes (APLIC 2006). However, direct loss to wildlife from collisions with transmission lines or facilities may be less of an impact than the impacts associated with potential disease created from decomposition of the carcasses. Indirect adverse impacts associated with collisions within waterbodies and wetlands can contribute to the concentration of botulism bacteria that can be highly toxic and often fatal to other wildlife.

Habitats attractive to birds are associated with the playa lakes and drainages identified along or adjacent to all of the Alternative Routes. It is anticipated that the potential for collision hazards is similar for all Alternative Routes based on the distribution of playa lakes and drainages in the Study Area.

4.3.3.1 Recommended Mitigation

The TPWD identified additional measures to protect migratory birds in general in a letter dated January 17, 2013. In the letter, the TPWD noted that if migratory bird species are found nesting on or adjacent to the project area, they must be dealt with in a manner consistent with the MBTA. Specifically, it is recommended to avoid the removal of vegetation during the primary migratory bird nesting season (March through August) to avoid adverse impacts to nesting migratory birds. If clearing vegetation during the nesting season could not be avoided, the TPWD recommends surveying the construction area to ensure that no nests with eggs or young would be disturbed during construction.

TPWD also recommended routing the transmission lines to avoid crossing or disturbing water resources in the Study Area to the extent feasible. Lines that cross or are located near creeks, drainages, and playa lakes should have line markers installed at the crossings or closest points to the water features to reduce potential collisions by birds flying along or near the features.

Implementation of the Project would be in accordance with the procedures described in the guidelines published by the USFWS and APLIC in *Reducing Avian Collisions with Power Lines: State of the Art in 2012* (APLIC, 2012). To the extent practicable, the Project also would be implemented in accordance with the *Guidance Recommendations for Avoiding and/or Minimizing Environmental Impacts from Utility Construction* guidance document provided by the USFWS in a letter dated December 19, 2012 (Appendix H). Project-related activities would be conducted in accordance with the MBTA and BGEPA. Under the mitigation measures described above, Project-related construction and operation of the proposed Project are not expected to result in significant impacts to migratory birds.

In order to avoid impacts to the black-tailed prairie dog towns that may be located within the selected Alternative Route, the TPWD in the letter dated January 17, 2013, recommended avoiding prairie dog towns during ROW clearing and placement of the transmission line structures. If prairie dog burrows would be disturbed by Project-related activities, the TPWD also recommended using non-harmful exclusion methods, such as the construction and placement of artificial prairie dog barrier fences (i.e., silt fence), to encourage the animals to vacate the area prior to disturbance and discourage them from returning to the area during construction. Appropriate non-harmful exclusion methods for the selected Alternative Route would be developed under a prairie dog management plan, which would also identify active prairie dog burrows that may be disturbed by Project-related activities. The appropriate non-harmful exclusion methods developed under the prairie dog management plan would be implemented prior to Project-related disturbance to active prairie dog burrows.

4.3.4 Endangered and Threatened Wildlife

Based on available data from the USFWS and TPWD and data collected during the April 2013 and June 2013 reconnaissance surveys, potential habitat was identified within the Study Area for the federally listed endangered whooping crane and the state-listed Texas horned lizard (in Bailey County). The state-listed threatened peregrine falcon (and its subspecies) and the bald eagle could potentially occur within the Study Area as migrants, using the playa lakes for stopover habitat. Potential habitat was also identified within the Study Area for the LEPC, a candidate for federal protection.

Two state-listed species for Bailey and Parmer counties are not expected to occur within or adjacent to the Study Area because of the absence of suitable habitat and two state-listed species are not expected to occur because they are considered extirpated in the counties; therefore, no further evaluations are included for these species. Potential habitat was identified within the Study Area for several state-listed rare species of concern including the ferruginous hawk, Baird's sparrow, mountain plover, prairie falcon, western burrowing owl, black-tailed prairie dog, plains spotted skunk, and swift fox. The snowy plover, western snowy plover, and big free-tailed bat are state-listed rare species of concern that could occur

within the Study Area as migrants. Although listed by the state of Texas and tracked by the TPWD, these rare species of concern are not afforded formal protection. It should be noted that only species that have potentially suitable habitat within the Study Area and are currently federally or state-listed as endangered or threatened or species federally listed as candidate for protection are discussed further below.

4.3.4.1 Peregrine Falcon

Project-related impacts to peregrine falcons would be similar to the impacts to avian/raptor/migratory species described in Section 4.3.3. Due to the lack of preferred habitat, it is likely that peregrine falcons would occur temporarily within the Study Area as rare migrants rather than seasonal occupants, using stopover habitat such as the playa lakes to rest and hunt for prey. Therefore, it is anticipated that Project-related activities would have negligible impacts to the peregrine falcon.

4.3.4.2 Bald Eagle

Project-related impacts to bald eagles would be similar to the impacts to avian/raptor/migratory bird species described in Section 4.3.3. Due to the lack of preferred habitat, it is likely that bald eagles would occur temporarily within the Study Area as uncommon to rare migrants rather than seasonal occupants, using stopover habitat such as the playa lakes to rest and possibly hunt or scavenge for food. Therefore, it is anticipated that Project-related activities would have negligible impacts to the bald eagle.

4.3.4.3 Lesser Prairie Chicken

In the "Candidate Notice of Review," in the December 10, 2008, *Federal Register* (73 FR 75176), the "magnitude of threats" categorization for LEPC was changed from moderate to high. Development of wind energy and placement of associated transmission lines throughout the occupied range of LEPC was given as the primary factor for the change in level of threat (73 FR 75176). The proposed transmission lines and associated structures can create zones that LEPC avoid, resulting in habitat fragmentation. Power lines and unmarked wire fences are known to cause LEPC injury and mortality, although the specific range-wide impacts are largely unquantified. LEPC exhibit strong avoidance of tall vertical features such as electrical transmission and overhead utility lines. In typical LEPC habitat where vegetation is low and the terrain is relatively flat, power lines and power poles provide attractive hunting and roosting perches for many species of raptors. However, in order to minimize impacts to the LEPC, all of the proposed routes were developed to the extent practicable with existing roads, utility ROWs, and/or property lines.

According to available data (SGP CHAT, 2011), the southeastern portion of the Study Area is located within areas mapped as range of the LEPC. As discussed in Section 3.5.6, most of the habitat within the Study Area is mapped as Category 5 (Common) by the SGP CHAT. However, the southeastern portion of the Study Area along Alternative Routes 1 through 7 is classified as either Category 4 (Significant) or Category 3 (Limiting) habitat by the SGP CHAT. During the LEPC survey, it was determined that most of the areas along Alternative Routes 1 through 6 that are mapped as Category 3 (Significant) or Category 2 (Limiting) were of relatively low quality and unsuitable habitat for the LEPC and consisted mainly of recently plowed (i.e., barren) and active agriculture fields with numerous agricultural structures (e.g., grain silos, barns, irrigation systems, and other facilities), cattle feed lots and dairies, existing transmission line infrastructure, highways and local roads, and residential and commercial structures located throughout the area. Although not included in the April 2013 survey, the portion of Alternative Route 7 that is adjacent to County Road 113, County Road 1086, and County Road 1090 and between County Road 1090 and the Bailey County Substation likely provides higher quality habitat for the LEPC based on aerial photographs of the area. This portion along Alternative Route 7 generally corresponds with the areas that are mapped as Category 2 (Limiting) along the route in those locations. Although no LEPCs were recorded during the April 2013 survey, it is possible that the birds

could be present in the area, particularly along the southernmost portion of Alternative Route 7 where higher quality habitat for the species likely is present.

4.3.4.4 Texas Horned Lizard

Excluding the disturbed, paved roads within the Study Area, potential habitat for the Texas horned lizard occurs throughout all eight Alternative Routes, though the species is only state-listed as a threatened species in Bailey County. The Texas horned lizard is not listed for Parmer County. Being a relatively slow moving lizard, the species could be potentially disturbed, displaced, or killed during construction activities by earth-moving equipment and construction vehicles. Long-term operations and management of the transmission lines would involve periodic vehicle travel along access roads to monitor and maintain and repair lines and associated structures. If Texas horned lizard populations are present along the transmission line ROWs, individual lizards could be disturbed, displaced, or killed by vehicles. Impacts to this species could be avoided with implementation of mitigation measures such as those detailed in the following section. With implementation of mitigation measures, short- and long-term impacts on the Texas horned lizard would be considered minor.

4.3.4.5 Whooping Crane

The whooping crane was originally listed as an endangered species on March 11, 1967, following establishment of the Endangered Species Preservation Act on October 15, 1966, and is currently listed as endangered under the Endangered Species Act of 1973, as amended. Reasons for decline of the whooping crane include: hunting and specimen collection; human disturbance; and conversion of the primary nesting habitat to hay, pastureland, and grain production. The whooping crane is still vulnerable to extinction in the wild with current threats including limited genetics of the population, loss and degradation of migration stopover habitat, construction of additional power lines, degradation of coastal ecosystems, and the threat of chemical spills (USFWS, 2006).

Collisions with power lines are a substantial cause of whooping crane mortality in migration. The APLIC, composed of nine investor-owned electric utilities and the USFWS, was established in 1989 to address the issue of whooping crane collisions. In 1994, the APLIC provided voluntary guidelines to the industry on avoiding power line strikes. The guidelines were subsequently updated in 2006 and again in 2012 with the currently available guidelines, *Reducing Avian Collisions with Power Lines: State of the Art in 2012* (APLIC, 2012). Tests of line marking devices, using sandhill cranes as surrogate research species, have identified techniques effective in reducing power line collisions by cranes. Techniques include marking lines in areas frequently used by cranes and avoiding placement of new line corridors around wetlands or other crane use areas (USFWS, 2006).

Wetland habitats are associated with playa lakes located throughout the Study Area. All seven Alternative Routes cross directly through or are adjacent to playa lakes varying in size from relatively small to large. Whooping cranes may use these playa lakes as stopover habitat to feed and rest during migration. The construction and maintenance of the transmission line is not anticipated to alter current land uses since the proposed Alternative Routes primarily follow existing roads, utility ROWs, and/or property lines. Therefore, the primary concern to the whooping crane is the potential for collisions with transmission lines and poles. In addition, Alternative Routes 2, 4, and 6 may result in removal of small areas of wetland habitat (Segment DU) for placement of the transmission line foundations.

4.3.5 Critical Habitat

No federally designated Critical Habitat is located in Bailey or Parmer counties. Therefore, no Project-related impacts to federally designated Critical Habitat are expected.

4.3.6 Suggested Mitigation

4.3.6.1 Whooping Crane

In a letter dated December 19, 2012 (Appendix H), the USFWS acknowledged that although the Study Area is located outside of the 95 percent migration corridor for the whooping crane, the birds may occur in Bailey and Parmer counties while searching for stopover habitat. In order to reduce Project-related impacts to the whooping crane, the USFWS recommended marking transmission lines with red aviation markers or bird diverters near known or potential stopover habitats (e.g., playa lakes). The USFWS indicated that implementing these devices has been shown to reduce the incidence of collision by 60 to 70 percent. These mitigation guidelines are provided in the APLIC guidance document, *Reducing Avian Collisions with Power Lines: State of the Art in 2012* (APLIC, 2012).

4.3.6.2 Lesser Prairie Chicken

The USFWS and TPWD were consulted to ensure that impacts to LEPC are avoided. In a letter dated December 19, 2012 (Appendix H), the USFWS acknowledged that the Study Area is located immediately north of the estimated occupied range of the LEPC and recent documented occurrences of the LEPC were recorded along the Study Area's southern border. In addition to recommending LEPC surveys in the southern portion of the Study Area, the USFWS recommended routing the Project as far from the southern border of the Study Area as possible. Specifically, the USFWS recommended routing the line along U.S. Highway 70, where placement of the proposed route along existing ROWs and agricultural land would minimize ecological impacts.

The TPWD in a letter dated January 17, 2013 (Appendix H), also acknowledged the proximity of the Study Area to the LEPC habitat mapped by the SGP CHAT and recommended LEPC surveys in the southern portion of the Study Area. The TPWD recommended avoiding any modifications to the Bailey County Substation that would encourage future transmission lines to be located in LEPC habitat, particularly lines that would extend south of the substation into areas mapped as crucial habitat by the SGP CHAT. The TWPD also indicated that efforts should be made to avoid impacts to the LEPC by avoiding occupied or potential habitat for the LEPC.

4.3.6.3 Texas Horned Lizard

In the letter dated January 17, 2013 (Appendix H), the TPWD recommended avoiding the Texas horned lizard and its primary food source, harvester ant colonies, during Project-related clearing and construction activities. The following measures previously recommended by the TPWD could be implemented for the protection of the Texas horned lizard to avoid "take" under state law:

Ground excavation or disturbance should be conducted when surface temperatures are above 75 degrees °F when feasible. If ground excavation or disturbance is proposed in areas of potential Texas horned lizard habitat when surface temperatures drop below 75°F, it is recommended to perform a Texas horned-lizard transect survey, when Texas horned lizards are active (i.e., above 75°F) and prior to construction, to identify areas of Texas horned lizard use. This information would be provided to construction crews to assist in avoiding harm to Texas horned lizards potentially present at the Site.

Construction crews should be informed, during pre-construction and bi-weekly meetings, that Texas horned lizards may be present and that they are not to be harmed, touched, or moved.

If Texas horned lizards are in the path of potentially harmful work, then work should stop until they leave on their own (or a TPWD-permitted biologist removes them from the area).

A TPWD-permitted biologist should be on-call in the event Texas horned lizards are spotted within the area in which construction is taking place.

Disturbed areas within suitable habitat for the Texas horned lizard should be revegetated using site-specific native, patchy vegetation rather than sod-forming grasses.

4.4 Impacts on Aquatic Ecosystems

No perennial surface waters occur in the Study Area. Therefore, no Project-related impacts are anticipated to aquatic ecosystems.

4.4.1 Endangered and Threatened Aquatic Species

No federally or state-listed species are listed in Bailey and Parmer counties and no perennial surface waters occur within the Study Area. Therefore, no Project-related impacts are anticipated T&E aquatic species.

4.5 Socioeconomic Impacts

The Project represents a major long-term investment by SPS in the Panhandle region. Construction of the Project facilities will have a positive impact on improved energy reliability and delivery, income, and tax revenues across the U.S. (for manufacturing of the materials) and in the Texas counties directly affected by Project activities. During the operational phase of the Project, additional tax revenues will accrue to Bailey and Parmer Counties for the new transmission and substation infrastructure.

The socioeconomic impact is functionally the same for all of the eight alternative routes. Improved energy reliability and delivery in Bailey and Parmer Counties may have a long-term indirect effect by creating a favorable environment for economic development resulting from increased energy availability and reliability.

4.5.1 Population

The short-term impact of non-local construction workforce on the local population will be minimal due to the temporary nature of the construction phase. SPS may use a combination of its own staff and contractors to construct the Project, approximately 35 workers. Construction staffing will likely originate from Clovis, New Mexico or Amarillo, Texas and could commute from either location to the Project Area, therefore no impact demand for temporary or permanent housing is anticipated. No long-term population impacts will result from construction of the Project.

4.5.2 Economy and Employment

The construction of the Bailey to Curry 115kV transmission line and the expansion of the Bailey County Substation will require a small, specialized labor pool. The construction, operation, and maintenance of the transmission line and substation are expected to have a minimal influence on the economy as SPS would draw upon an existing pool of staff and contractors.

The local economic benefit from payroll earnings and construction expenditures will be minimal and short-term during the construction period. It is likely that the specialized construction staff will be from outside the region. However, they will purchase fuel, food, and miscellaneous sundry items from the local community during the duration of the construction period.

The materials used for the transmission line structures and expansion of the substation is highly specialized and manufactured by a limited number of providers and fabricators. The structures and equipment will be

manufactured outside the region and then shipped in for assembly and construction. Purchase of the materials will generate a positive direct effect on communities outside of the Project Study Area.

4.5.3 Community Services

Construction of Project facilities could add an additional minor, short-term service load on the availability of local community services such as police, fire, medical, and solid waste. However, the temporary increase in the non-local workforce population will be small relative to the current population and is not anticipated to stress local service providers. Solid waste will be primarily generated during the construction period. SPS will contract with a local provider to dispose of the construction waste, likely in a specialized landfill for hazardous materials and at the City of Muleshoe Landfill in Muleshoe, Texas or at the Clovis Regional Landfill in Clovis, New Mexico, as appropriate.

The counties in the Study Area are not expected to see an increase in the cost of public services as a result of the Project. However, in the event public services are impacted during the short-term construction period, any costs will be more than offset by increased employment, and increased employment income, as well as the long-term economic and fiscal benefits of the Project from increased tax revenue.

4.5.4 Community Values

As discussed in Section 3.7.4, community values are a factor for consideration under PURA § 37.056(c)(4). Impacts to community values and resources could occur if the location and construction of a transmission line results in changes to land use, the loss of public access to a valued resource, or loss of the use of a resource due to the proposed transmission line, structures, or ROW.

The Project Team sent consultation letters to local, state, and federal agencies, landowners, conducted meetings with elected and appointed officials, and hosted two open house public meetings to identify and collect information regarding local community values. In general, the Project Study Area is moderately to sparsely populated and the Alternative Route Segments avoid direct impacts to the churches, health clinics, hospitals, schools, day care centers, and nursing homes.

The Project will increase the reliability of power in the Project Study Area. This will increase this area's appeal for potential economic development through the expansion or development of commercial and industrial projects. The city of Muleshoe will benefit as well from enhanced reliability and energy delivery and may experience development in the downtown and adjacent residential areas.

There are existing high voltage transmission lines, both 115kV and 230kV, that cross the Project Area and in the vicinity of Muleshoe. A network of distribution lines exists nearly ubiquitously in the Project Study Area. The addition of the Project to the presence of both transmission and distribution lines will not create an adverse impact to community values as they are an existing element of the rural landscape.

4.6 Impacts on Land Use

4.6.1 Land Use

Land displaced by the transmission line construction represents the largest land use impact. In addition, land use impacts result from the compatibility of electric transmission line ROW with adjacent land uses. Impacts to land uses would be significant if they eliminate existing land uses or prevent planned land uses from being fully developed. The project does occur in an area where Conservation Reserve Program Lands exist. The proposed Project would generally stay on the perimeter of parcels and have a small permanent footprint.

Many of the Alternative Routes cross agricultural land including cultivated cropland, pasture, and rangeland. Impacts to agricultural land will vary depending on the amount and type of land uses crossed. Because existing agricultural land uses can be resumed following construction, there will be no long-term or significant displacement of farming or grazing activities.

Permanent land use conversion will not occur to most lands within the ROW. Allowable land uses generally permitted within the permanent ROW will include agriculture based on the use of farming equipment and the cultivation of row crops, and rangeland/pastureland. The only future land uses not allowed in the permanent ROW are aboveground construction and the growth, planting, or cultivation of trees.

Most existing land uses will continue during the construction period. Movement of workers and materials through the area during construction will result in temporary impacts to land uses within the ROW. Temporary effects on residents and businesses in the area immediately adjacent to construction work areas may also occur from construction noise and dust, as well as temporary disruption of traffic flow. Coordination among SPS, its contractors, and landowners regarding access to the ROW and construction scheduling will minimize these temporary disruptions.

Following construction, disturbed work areas will be graded or otherwise restored and allowed to revert to approximate preconstruction conditions, except where individual landowner agreements negotiated during the easement acquisition process dictate other acceptable restoration measures. Where applicable, natural revegetation will be encouraged, and any necessary seeding or plantings will be conducted using a seed mixture of native species developed in consultation with individual landowners. As a result, land use impacts to these areas will be temporary. Because vegetation is expected to return to preconstruction conditions within one to two growing seasons, impacts to lands currently classified as agricultural, pasture, commercial/industrial, or open land located within the ROW will be short term and minor.

The Project Team identified croplands and pastures in the Study Area that are irrigated by mechanical center-pivot irrigation systems. Table 4.3 provides the total length of each Alternative Route that crosses irrigated agricultural land. Impacts to these areas will be minimized by siting the transmission structures outside of the arc of irrigation system movement to the greatest extent possible (i.e., along roadways, property lines, or areas not irrigated).

Because there will be no long-term impact to grazing or farming, and mechanical irrigation systems will be avoided to the extent possible, no significant impacts to agricultural practices are anticipated from the construction of the transmission lines along any of the Alternative Routes.

There are four pipelines that cross the Project Study Area. All alternative routes cross two or more of the pipelines. Two of the pipelines are natural gas, one is carbon dioxide, and one is natural gas liquids. Minor adjustments may be required during final route design for the placement of transmission structures to span the pipelines.

Table 4.3 Land Uses Affected by Proposed Transmission Line by Route

	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6	Route 7	Route 8
Route length (miles)	28.2	23.1	24.0	26.1	25.3	23.1	26.9	24.0
Habitable structures within 300 feet of centerline	38	36	29	38	33	35	38	45

	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6	Route 7	Route 8
Length of ROW across dryland cropland (non-irrigated)	3.3	7.7	6.8	3.3	6.5	4.0	2.2	5.1
Length of ROW crossing dryland cropland (non-irrigated) at property line or field edge	3.3	6.6	6.8	2.3	6.0	2.9	2.2	4.0
Length (miles) along edge of mobile irrigation systems	6.3	2.9	2.9	5.4	4.9	4.0	4.8	3.8
Number of center pivots crossed by ROW	35	20	18	36	30	26	31	25

As depicted in Table 4.4, there are between 26 and 35 habitable structures located within 300 feet of alternative route centerlines. Habitable structures include residential, commercial, and industrial structures but do not include abandoned homes or other structures. Table 4.4 details the number and distance from the centerline for each alternative segment. Most of the habitable structures have the main entrance facing the alternative segment. Many of the rural residences have vegetated windbreaks around their property, which will limit the view of the transmission line. Occupants and users of habitable structures will likely temporarily experience the sights and sounds of construction activity including movement of construction equipment, deliveries of materials, and workers commuting to the site. The effects of construction activity will diminish with distance from the activity. Access to habitable structures may be temporary impacted during the placement of transmission line structures and stringing conductors. Direct impacts from construction activities to habitable structures will be short-term and temporary in duration and not considered adverse.

There are no community or public facilities, including schools, parks, hospitals, or nursing homes, located near the alternative routes.

Table 4.4 Habitable Structures within 300 Feet of Centerline

Structure ID Number (on Figure 2.3)	Segment	Distance to Centerline (feet)	Type of Structure[a]
Route 1 (38 Structures)[b]			
37	AP	135	House
44	AP	168	House
48	GB	160	House
48	GB	253	Workbarn
53	GB	158	House
53	GB	237	Workbarn
72	BH	110	Workbarn
72	BH	127	Mobile home
72	BH	265	House

Structure ID Number (on Figure 2-3)	Segment	Distance to Centerline (feet)	Type of Structure*
76	BH	86	Mobile home
84	BJ	246	House
85	BJ	99	Mobile home
90	BQ	163	House
90	BQ	166	House
90	BQ	244	Workbarn
96	BQ	118	House
99	BS	191	House
99	BS	280	Workbarn
105	BS	140	Mobile home
105	BS	156	House
108	BS	204	House
109	BS	184	House
109	BS	219	Workbarn
110	BS	244	House
112	BV	233	Workbarn
113	BV	113	Agricultural
113	BV	185	House
113	BV	204	Workbarn
114	DS	222	House
114	DS	241	Workbarn
142	JL	92	Commercial
142	JL	201	Commercial
142	JL	293	Commercial
144	GC	185	House
Route 2 (36 structures)			
4	AH	138	House
26	DJ	197	House
29	DJ	282	Agricultural
33	DM	172	House
33	KL	200	House
33	KL	294	Workbarn
40	DM	184	Workbarn
40	DM	255	House
46	DM	235	House
56	KI	167	House
71	BK	100	House
71	BK	238	Workbarn
71	BK	239	Workbarn
81	BK	129	House

Structure ID Number (on Figure 2.3)	Segment	Distance to Centerline (feet)	Type of Structure*
100	BO	162	House
100	BO	226	House
103	BO	158	House
103	BO	195	House
114	BW	171	House
114	BW	260	Workbarn
122	BW	156	House
122	BW	292	Workbarn
123	BW	178	House
123	BW	278	Workbarn
126	BW	216	House
126	BW	296	Workbarn
127	BX	162	House
128	BX	172	House
128	BX	251	House
135	BO	147	House
142	JL	92	Commercial
142	JL	201	Commercial
142	JL	293	Commercial
Route 3 (29 structures)			
3	AG	206	House
15	AG	128	House
15	AG	130	House
22	AS	91	Workbarn
22	AS	154	Workbarn
22	AS	178	Workbarn
22	AS	211	House
43	BA	234	House
48	GB	160	House
48	GB	253	Workbarn
53	GB	158	House
53	GB	237	Workbarn
71	BI	163	House
73	BM	199	House
79	BM	278	House
80	BM	272	Workbarn
80	BM	278	House
86	BP	89	House
111	BT	151	House
112	BV	233	Workbarn

Structure ID Number on Figure 2-3	Segment	Distance to Centerline (feet)	Type of Structure
113	BV	113	Agricultural
113	BV	185	House
113	BV	204	Workbarn
142	JL	92	Commercial
142	JL	201	Commercial
142	JL	293	Commercial
Route 4 (38 structures)			
20	KF	145	Workbarn
20	KF	210	House
24	FM	174	House
24	FM	178	House
24	FM	283	Workbarn
24	FM	294	Workbarn
42	AO	154	House
50	AO	167	Workbarn
50	AO	202	House
55	DV	137	House
55	DV	157	House
65	GI	143	Workbarn
83	BN	155	House
88	BN	202	House
91	BN	99	House
91	BN	151	House
91	BN	165	Workbarn
91	BN	189	House
91	BN	192	House
91	BN	282	Workbarn
92	BN	175	House
92	BN	239	Mobile home
95	BN	156	House
97	BN	193	Commercial
97	BN	249	Commercial
101	BN	186	House
102	BN	294	Workbarn
106	BN	218	House
106	BN	297	Workbarn
120	BU	209	House
142	JL	92	Commercial
142	JL	201	Commercial
142	JL	293	Commercial

Structure ID Number (or Figure 2-3)	Segment	Distance to Centerline (feet)	Type of Structure*
Route 5 (33 structures)			
27	AQ	145	House
27	AQ	288	Workbarn
61	BC	111	Workbarn
84	BJ	246	House
85	BJ	99	Mobile home
100	BO	162	House
100	BO	226	House
103	BO	158	House
103	BO	195	House
114	BW	171	House
114	BW	260	Workbarn
122	BW	156	House
122	BW	292	Workbarn
123	BW	178	House
123	BW	278	Workbarn
126	BW	216	House
126	BW	296	Workbarn
134	DX	156	House
134	DX	252	Workbarn
135	BO	147	House
136	FR	162	House
136	FR	186	House
137	FR	264	House
139	CA	220	House
140	CA	164	House
140	CA	231	House
141	CA	166	House
141	CA	168	House
141	CA	191	House
141	CA	265	Workbarn
Route 6 (35 structures)			
4	AH	138	House
26	DJ	197	House
29	DJ	282	Agricultural
33	DK	267	House
33	KL	200	House
33	KL	294	Workbarn
38	DL	204	House
41	DL	298	House

Structure ID Number (on Figure 2.3)	Segment	Distance to Centerline (feet)	Type of Structure
65	GI	143	Workbarn
83	BN	155	House
88	BN	202	House
91	BN	99	House
91	BN	151	House
91	BN	165	Workbarn
91	BN	189	House
91	BN	192	House
91	BN	282	Workbarn
92	BN	175	House
92	BN	239	Mobile home
95	BN	156	House
97	BN	193	Commercial
97	BN	249	Commercial
101	BN	186	House
102	BN	294	Workbarn
106	BN	218	House
106	BN	297	Workbarn
120	BU	209	House
142	JL	92	Commercial
142	JL	201	Commercial
142	JL	293	Commercial
Route 7 (38 structures)			
4	AH	138	House
24	FM	174	House
24	FM	178	House
24	FM	283	Workbarn
24	FM	294	Workbarn
38	DL	204	House
41	DL	298	House
65	GI	143	Workbarn
83	BN	155	House
88	BN	202	House
91	BN	99	House
91	BN	151	House
91	BN	165	Workbarn
91	BN	189	House
91	BN	192	House
91	BN	282	Workbarn
92	BN	175	House

Structure ID Number (on Figure 2-3)	Segment	Distance to Centerline (feet)	Type of Structure [1]
92	BN	239	Mobile home
95	BN	156	House
97	BN	193	Commercial
97	BN	249	Commercial
101	BN	186	House
102	BN	294	Workbarn
106	BN	218	House
106	BN	297	Workbarn
112	BV	233	Workbarn
113	BV	113	Agricultural
113	BV	185	House
113	BV	204	Workbarn
115	HH	180	House
117	HH	246	Workbarn
129	HH	97	House
Route 8 (45 structures)			
3	AG	206	House
15	AG	128	House
15	AG	130	House
22	AS	91	Workbarn
22	AS	154	Workbarn
22	AS	178	Workbarn
22	AS	211	House
43	BA	234	House
48	GB	160	House
48	GB	253	Workbarn
53	GB	158	House
53	GB	237	Workbarn
55	DV	137	House
55	DV	157	House
65	GI	143	Workbarn
83	BN	155	House
88	BN	202	House
91	BN	99	House
91	BN	151	House
91	BN	165	Workbarn
91	BN	189	House
91	BN	192	House
91	BN	282	Workbarn
92	BN	175	House

Structure ID Number for Figure 2.3	Segment	Distance to Centerline (feet)	Type of Structure [a]
92	BN	239	Mobile home
95	BN	156	House
97	BN	193	Commercial
97	BN	249	Commercial
101	BN	186	House
102	BN	294	Workbarn
106	BN	218	House
106	BN	297	Workbarn
120	BU	209	House
142	JL	92	Commercial
142	JL	201	Commercial
142	JL	293	Commercial
145	JO	106	Workbarn
145	JO	142	House
145	JO	145	Workbarn
145	JO	149	Workbarn
145	JO	176	House

[a] Commercial = commercial, industrial, retail (nonresidential and non-hotel or non-motel).
[b] Total number per route and excludes double counts if a structure is near two or more segments.

The proposed expansion of the Bailey County Substation will be located adjacent to the existing substation on land that has been previously disturbed. The proposed expansion is adjacent to the north side of the existing substation, with State Highway 214 to the east, and rangeland to the north and west. Approximately five acres of rangeland will be converted to a utility use as a result of the substation expansion. An impact to prime farmland is not expected because prime farmland soils are absent. The nearest residence to the substation expansion is approximately 820 feet to the south, but it is unlikely that the expansion will be visible due to the existing substation obscuring the view. Residential development on the outskirts of Muleshoe is north of the proposed substation expansion. The nearest resident in this direction is approximately 1,600 feet away but the view from the residence is buffered by trees and other vegetation. Motorists will see the substation expansion from State Highway 214. However, due to the high speed limit and road alignment from north to south, the view of the substation expansion will be short in duration. No adverse long term effects to existing land uses will be generated by the expansion of the Bailey County Substation with the exception of potential visual effects.

4.6.2 Aesthetic Values

Impacts to visual resources can occur when the ROW, transmission lines, and/or structures alter the character of existing views. The degree of scenic impact is highly subjective and depends on the value that viewers place on the landscape in its natural form versus the presence of the transmission line. Factors that affect the amount of overall visual impact include the numbers of viewers who will see the facilities, how long they will view the facilities, the expectations of those viewers in terms of what they are used to seeing and their aesthetic preferences, the natural scenic quality of the existing landscape, and the extent to which other artificial features such as utilities, buildings, and roadways are already present in the area.

Construction of the transmission line could have temporary and permanent aesthetic effects. Temporary impacts will include views of the actual assembly and erection of the Project. Permanent impacts will

involve the views of the structures and lines associated with the Project. SPS proposes to use monopole, steel structures which generally reduce visual impacts and contrast as their visibility fades into the background horizon as pole structures become more distant from and less visible to the viewer.

There are no officially designated federal, state, or local scenic areas in the Project Study Area that will be affected by the Project. Visual impacts are likely to be experienced mostly by local residents and motorists on the State Highways or local roadways near the Project. The local roadways are lightly traveled, limiting the number of viewers who will see the Project, and those travelers who do see the Project will likely experience its view for short to moderate periods of time due to the flat terrain and lack of significant vegetation.

Based on the presence of few residences and the lack of designated visual resources in the Study Area, no significant impacts to aesthetic resources are anticipated.

4.6.3 Recreation Values

No public parks or recreation areas will be directly affected by the proposed Project. Babe Ruth Park, a small park with two baseball fields, is located approximately 1,900 feet northeast of the Project Study area.

4.6.4 Transportation/Aviation Facilities

4.6.4.1 Transportation Facilities

Construction of the Project will result in minor, short-term impacts to the transportation network in the Project Study Area. There may be temporary road closures to allow the installation of transmission pole structures and stringing of conductors. The movement of construction equipment and materials and the daily commuting of SPS and construction staff to and from the construction work areas may slightly increase traffic volumes. Because construction will move sequentially along the transmission line route, traffic flow impacts that do arise will be temporary on any given section of roadway.

The expansion of the Bailey County Substation will generate minor, short-term impacts to the transportation network. The expansion site is located west of State Highway 214 and access will be from the existing substation. Additional daily trips will be incurred for workers commuting to the site and delivery of construction materials.

Overall, SPS does not anticipate significant traffic impacts along the route during construction. No traffic-related impacts are anticipated during operation of the Project. SPS will consult with the TxDOT and county public works departments to obtain road crossing permits where required. Table 4.5 provides the number of roads crossed by each Alternative Route.

Long term effects to traffic and transportation networks from the operation and maintenance of the Project will consist of periodic trips to the transmission line and substation expansion. There will be no short- or long-term impact to traffic or transportation networks resulting from the operation of the transmission line or substation expansion under any alternative route.

4.6.4.2 Aviation Facilities

There are no public, FAA registered airports within 10,000 feet of the center line of any route. There are no heliports within 5,000 feet of the centerline of any route. Only one FAA-registered airport with a runway longer than 3,200 feet is located within 20,000 feet of the centerline. The Locker Brothers Airstrip is a private airport north of Muleshoe and the Project Study Area. Runway 9/18 is 4,000 feet in length. The end of the runway is 14,710 feet from the Project Area and 14,930 feet from the nearest segment (Segment CA, Alternative Route 5). Using the calculation of 100:1 (length in horizontal

distance: height in vertical distance), the maximum height a structure on the CA segment could be is approximately 147.1 feet. The typical transmission structure height is a maximum of 140 feet, thus the project's structure will not exceed the 100:1 slope.

The Locker Brothers Airport is a private facility; therefore it will not require coordination with the FAA, including submittal of Form 7460-1, Notice of Proposed Construction of Alternation, and associated compliance with Federal Aviation Regulation (FAR) Part 77. The FAA mandates through FAR Part 77 that the airspace and clear zones of public use airports shall be protected from encroachment of buildings, towers, and other vertical structures that may impede airspace operations.

4.6.5 Communication Facilities

4.6.5.1 Communication Towers

Transmission lines operating in the vicinity to FM broadcast station transmitters, microwave relay towers, radio towers, and other communication facilities can interfere with the operation of broadcast transmissions. The Project Team identified several groups of electronic installations or towers in the Project Study Area (Figure 2.2b). As confirmed through the FCC database, four commercial AM radio transmitters are located within 10,000 feet of the center line of an Alternative Route and up to 11 FM radio transmitters are located within 2,000 feet of the center line of one of the Alternative Routes. Table 4.5 presents information on cellular, television, and microwave relay towers that are located within 2,000 feet of the center line of Alternative Route Segments.

Based on the Project Team's review, none of the existing communication towers or guy wires will be directly affected by any of the Alternative Routes or the expansion of the Bailey County Substation. Therefore, no significant impacts to communication towers are anticipated from the construction of the transmission line along any of the Alternative Route.

Table 4.5 Transportation, Aviation, and Communication Facilities Affected by Proposed Transmission Lines, by Route

Facility Type	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6	Route 7	Route 8
Transportation Facilities								
Number of county and local road crossings	61	41	60	41	42	40	56	39
Number of U.S. and state highway crossings	1	0	0	1	1	0	0	0
Communication and Utility Facilities								
Number of AM Towers (within 10,000 ft of centerline)	4	1	1	1	3	1	1	1

Facility Type	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6	Route 7	Route 8
Number of FM, microwave, cell, and other electronic installations (within 2,000 feet of centerline)	5	8	4	6	12	6	6	6
Length paralleling existing transmission lines	6.4	5.3	6.3	4.3	1.2	4.3	0.3	4.3
Number of electric transmission line crossings by ROW	7	1	5	1	5	1	4	1
Aviation Facilities								
Number of FAA-registered airports with runway >3,200 ft.(within 20,000 ft of centerline)	0*	0*	0*	0*	0	0*	0*	0

4.7 Cultural Resources Impacts

Because of the limited physical disturbance associated with construction of a transmission line project and the ability to span areas where significant resources could occur, potential impacts to archaeological and cultural resources that would result from development of the Project are expected to be limited.

As discussed in Section 3.9, the Project Team identified a total of two previously recorded sites within 1,000 feet of the centerline of each alternative segment. The sites consist of a historical marker and a historic cemetery. Construction activities associated with the proposed project have a potential to adversely impact cultural resources through changes in the quality of the archaeological, historical, or cultural characteristics that qualify a property to meet the criteria of eligibility to the NRHP. These impacts occur when the construction of a project alters the integrity of locations, design, setting, materials, construction, or association that contribute to a resource's significance in accordance with the NRHP criteria. As discussed in 36 CFR 800, adverse impacts on NRHP-listed or -eligible properties may occur under conditions that include, but are not limited to:

- Destruction or alteration of all or part of a property;
- Isolation from or alteration of the property's surrounding environment (setting); or

- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting.

4.7.1 Direct Impacts

Direct impacts to cultural resource sites could occur during the construction phase of the proposed transmission line that could result in alteration or destruction of archeological or historic resources. Direct impacts are typically a result of heavy equipment operations and pedestrian traffic along the ROW. Vehicular traffic could damage surficial or shallow buried sites, while pedestrian traffic could result in vandalism. Existing historic markers and structures could also be potentially altered, damaged, or destroyed during construction, or result in a separation of historic resources from their environmental setting or historic context. No direct effects are expected based on the Class I records and literature search. The potential for direct effects to unknown/undocumented resources is uncertain due to the lack of previous surveys completed in the Project Study Area.

4.7.2 Indirect Impacts

Indirect impacts could result from the introduction of visual or auditory elements that would be out of context for the setting. The historic context of a given area can be affected through changes in land use patterns, population density, urbanization, or increased vehicular and pedestrian traffic. Historic buildings, structures, landscapes, and districts typically are indirectly affected by new construction and new urban elements.

4.7.3 Summary of Cultural Resources Impacts

The Project Study Area was occupied in prehistory and more recently by various Native American tribes before the arrival of settlers during the early- to mid-1800s. Consequently, archeological and historical cultural resources may be present in unknown and currently undiscovered locations. Resources that may be in the area are most likely to be found in association with high probability areas (HPA), such as playas and streams. However, playas and drainages, such as Blackwater Draw, Lariat Draw, and Progress Draw crossed by Segments BY, BZ, CB, CC, CD, AP, AZ, BA, BL, BN, AE, AN, AG, AO, and BV will be spanned by the transmission line, minimizing potential direct and indirect effects. Impacts expected for the transmission line and substation construction within these HPAs should be evaluated via cultural resource survey to insure that impacts to cultural resources are avoided.

4.7.4 Mitigation

Field Surveys commissioned by SPS and reviewed by a registered professional archaeologist on the Project Team may not identify deeply buried archaeological resources and may be impacted as a direct or indirect result of project construction. However, the severity of such impacts can be reduced through appropriate measures. Such measures include implementing a construction monitoring plan and plan of action in the event resources are discovered during construction. If archaeological or historic resources are found during construction and cannot be avoided, a determination regarding their significance would be made by a registered professional archaeologist.

Following CCN issuance, SPS will conduct a cultural resources survey of the certified route in accordance with a preapproved research design developed in consultation with the THC for the new transmission line project. Field work will focus on identifying all cultural resources within the Project's Area of Potential Effect, and assessing their status in terms of the criteria established for the NRHP. The results of these surveys will be presented to the THC for review and comment.

5.0 Agency and Public Involvement Activities

5.1 Correspondence with Agencies/Officials

The following federal, state, and local agencies and officials were notified by letter, dated December 7, 2012, about the proposed project. The letter was sent to solicit comments, concerns, and information regarding potential environmental effects and impacts, permits, or approvals for the construction of the 115kV transmission line in Bailey and Parmer Counties. A map of the Project Study Area was included with each letter. A copy of the agency letter and map is included in Appendix B.

Federal

- Federal Aviation Administration
- National Park Service
- US Army Corps of Engineers
- US Department of Agriculture – Natural Resource Conservation Service
- US Department of Agriculture – Farm Service Agency
- US Environmental Protection Agency
- US Fish and Wildlife Service

State

- Texas Department of Agriculture
- Texas Historical Commission
- Texas Department of Transportation
- Texas Natural Diversity Database
- Texas Parks and Wildlife Department
- Texas State Soil and Water Conservation Board

Local

- Bailey County Judge, The Honorable Sherri Harrison
- Parmer County Judge, The Honorable Trey Ellis
- Muleshoe and Bailey County Chamber of Commerce and Agriculture
- Parmer County Industrial Development Corporation
- Muleshoe Economic Development Corporation
- City of Muleshoe
- City of Farwell
- Muleshoe Independent School District
- Farwell Independent School District

Regional/Non-Governmental

- South Plains Association of Governments
- Panhandle Regional Planning Commission
- Texas Water Development Board
- Brazos River Authority
- Audubon Texas
- Playa Lakes Joint Venture
- The Archaeological Conservancy
- The Nature Conservancy – Texas
- Texas Land Trust Council
- Texas Land Conservancy
- Texas Agricultural Land Trust

Federally Recognized Tribes

- Apache Tribe of Oklahoma
- Caddo Nation
- Comanche Nation of Oklahoma
- Jicarilla Apache Nation
- Kiowa Tribe of Oklahoma
- Mescalero Apache Tribe
- Tonkawa Tribe of Oklahoma
- Wichita and Affiliate Tribes

A second letter dated March 14, 2013 notified 31 federal, state, and local agencies about the public meetings held on March 27th and 28th, 2013. The Bailey County Electric Cooperative was notified about the project and the public meetings via letter and telephone.

5.2 Agency Actions

The Bailey to Curry Project is subject to several state and local rules, regulations, and recommendations as identified and discussed below.

5.2.1 Public Utility Commission of Texas

SPS's proposed transmission line will require approval of the Project's CCN application by the PUC. This environmental assessment and alternative route analysis is intended to provide environmental and land use constraint information, pursuant to PURA § 37.056(c)(4), P.U.C. SUBST. R. 25.101(b)(3)(B), as well as to address any potential concerns or questions raised regarding SPS's CCN application, In addition to supporting the CCN application, the information in this study can be used for purposes of other local, state, or federal permitting requirements. SPS will not commence construction until the PUC has approved the CCN application.

5.2.2 US Army Corps of Engineers

Neither individual nor nationwide permits pursuant to Section 404 of the Clean Water Act are expected for any of the alternative routes, except potentially for Alternative Routes 2, 4, 6, and 8 which would cross a fairly large playa complex. Consultation with the Fort Worth District of the USACE is recommended to determine whether there is potential impact to jurisdictional waters.

5.2.3 Texas Commission on Environmental Quality

The proposed transmission line is expected to result in more than one acre of aggregate disturbance which would consist of grading and clearing for direct embedded tangent structures and foundations for angle and corner structures along with proposed staging areas and construction access. A General Construction Permit would be required by TCEQ. Additionally, expansion of the Bailey County Substation would result in approximately five acres of clearing and grading, also requiring a separate General Construction Permit. SPS would be required to prepare a SWPPP and submit a Notice of Intent to the TCEQ prior to clearing and construction activities.

5.2.4 Texas Parks and Wildlife Department

SPS is required to provide a copy of the environmental assessment to the TPWD for its review. The Project Team coordinated with TPWD and acquired a specific project number for the project and environmental assessment. SPS will transmit a copy of the environmental assessment to TPWD within seven days after filing the project with the PUC.

5.2.5 Texas Historical Commission

As noted in Section 4.7, SPS will conduct a cultural resources survey of the certificated route in accordance with a preapproved research design developed in consultation with the THC for the new transmission line project.

5.2.6 Texas Department of Transportation

Permits from TxDOT are required for any crossing of state-maintained roadways, or for any use of a state-maintained ROW for purposes of access during construction or maintenance. All of the alternative routes cross one state highway and thereby require a permit from TxDOT.

5.2.7 Parmer and Bailey Counties

All of the alternative routes parallel and cross county and farm to market roads in Parmer and Bailey Counties. Coordination and permitting with the counties would be required prior to construction of the project.

5.2.8 City of Muleshoe

All of the alternative routes are located outside of the City of Muleshoe. Therefore the city does not have jurisdiction or require regulatory permitting for the Project.

5.3 Public Involvement Program

The Project Team designed and executed a proactive Public Involvement Program. The purpose of this program was to provide information about SPS, present the Preliminary Alternative Route Segments to the public, and to solicit comments and input from residents, landowners, public officials, elected officials, resource agencies, special interest groups, and other non-governmental organizations affected by or interested in the Project. The Public Involvement Program focused on compliance with the regulatory requirement for SPS's CCN application, and was executed to inform the public about the Project, obtain feedback on routing alternatives, and discuss opportunities and constraints in the Study Area and along the potential routes.

5.3.1 Agency Correspondence

Representatives of federal, state, and local agencies and non-governmental organizations were consulted with the purpose of gathering data, obtaining permitting requirements, disseminating information, and understanding and incorporating stakeholder issues in the routing process. Initial consultation letters were sent to agencies during December, 2012. Appendix B includes a table of contents listing agencies contacted, a table summarizing agency consultation, and copies of both outgoing and incoming correspondences, and communications.

5.3.2 Public Open House Meetings

The open house meetings were announced through the SPS website, newspaper notices, a direct mail-out to all potentially affected landowners within 300 feet of the Preliminary Alternative Route Segments, and local newspaper announcements to ensure relevant public participation. SPS noticed landowners within 300 feet of the centerline of all relevant route segments to ensure robust public participation, data collection, and analysis. Copies of the newspaper notices and the landowner mail-out packets, regarding the open house meeting in Texas, are located in Appendix E. A copy of the survey provided to the Texas open house attendees is provided in Appendix C. Discussions with various stakeholders continued throughout the development of alternative routes and will continue through the post-CCN permitting process.

The public information meetings for the Bailey to Curry 115-kV Transmission Line project were held on March 27, 2013 at the Clovis High School in Clovis, New Mexico and March 28, 2013 at the Bailey County Electric Cooperative in Muleshoe, Texas. The meetings were noticed in several local newspapers including the Amarillo Globe-News, the Lubbock Avalanche Journal, The Clovis News Journal, and The Muleshoe Journal. Copies of each meeting notice are included in Appendix E.

The questionnaire was designed to elicit background information on those who attended the open house meetings, including their reasons for attending the open house, and to ensure that the information presented adequately explained the purpose and need for the Project. Of the respondents, 58 percent indicated that Preliminary Alternative Route Segments were on or near their land, nine percent indicated that segments were near their business, 43 percent indicated that segments were near their home, nine percent indicated that segments were near employee housing.

At the public meetings, attendees were directed to review the aerial photograph-based maps of the Preliminary Alternative Route Segments provided at the Project Description and the Landowner/ROW information stations at the open house meeting. Many individual attendees worked with SPS representatives at the Project Description and the Landowner/ROW information stations and provided specific comments about the features presented on the maps.

In addition, attendees were asked if they had specific comments about the Preliminary Alternative Route Segments. Typical responses included:

- I prefer a specific segment over another;
- I prefer the lines not on my property; or
- I prefer the lines on my property.

There were 118 attendees at the March 27th meeting and 42 attendees at the March 28th meeting. Attendees included landowners, area residents, and local agency officials. A copy of the sign in sheets is included in Appendix E. Representatives from the following agencies attended the meeting:

- City of Clovis

- Curry County, New Mexico
- Texas Department of Transportation

Project questionnaires were sent to each landowner as a part of the project notification packet and were also available at the meeting. A total of 24 questionnaires were completed. Eleven were submitted at the public information meeting. Thirteen were returned by mail, email, or fax. None of the attendees were in general favor of the project and segments and seven were generally opposed to the project or location of the segments. One attendee had no objection to the project and thirteen did not comment in favor nor object to the project.

Permission to Survey forms were sent to each landowner as a part of the project notification packet and were distributed at the public meetings. Thirty six completed forms were received as of May 14, 2013. The Permission to Survey form is included in Appendix C.

Eleven project questionnaires were submitted at the public information meetings, thirteen were emailed or faxed after the meeting, and two comment letters were received after the meeting (Attachment 3). Twenty one of the total respondents were aware of the meeting through the mailing to landowners. One respondent learned about the meeting through a neighbor or friend, one learned about the meeting through the public notice in a newspaper, and one learned about the meeting through an Xcel Energy representative.

Respondents indicated existing land uses near a proposed segment included:

- Agriculture: 15
- Residential: 11
- Industrial: 1
- Commercial: 1
- Investment Real Estate: 1
- Conservation Easement: 0

Two respondents indicated that the proposed segments were in vicinity of their dairy operation. One response provided on the comment form indicated that their land is a part of the Conservation Reserve Program (CRP).

Comment forms were included in the information packet mailed to landowners and provided to meeting attendees (Appendix F). Fourteen comment forms were collected at the public information meeting or transmitted via fax or mail, and additional comments from the project questionnaire are compiled in Table 5.1. Comments or notes from the maps at the Public Open House Meeting are referenced as "map comment."

Table 5.1 Comments on Each Segment

Segment	Comment
AO	Does not want the new power line to run on County Road 1038 across or in front of their house. Commenteor states that their property value would be negatively impacted. (CR 1038 & RR 1731)
AO	Proposed segment goes right over house and prefers it across the road; line goes over livestock. (581 CR 1038, Muleshoe, Texas)
BK/BJ	Map comment: REA – The REA would prefer if the transmission line is within one mile of the Lariat Substation because they could off load the 69kV line contingent on using the Progress Substation 100%. Can only put 8 MW on the Progress Station now (full capacity is 14MW).
BQ/BR	Map comment: Parcel located southwest of the intersection is in the CRP.
BR	Open to having BR placed on his property. Land is in the CRP.
BW	Prefer that you do not use segment because of TriGlobal wind lease.
BW	Map comment: crop circle east of segment is under the CRP program (Max Bush)
CA	Against the segment going along FM 1760 due to existing homes along the segment. Many of the homes have elderly residents and there is concern that electrical contamination from the high voltage lines will cause illness. It makes more sense to use the ample wide open spaces in Bailey County rather than segment CA.
IA	Concerned about pacemaker.
IA	Does not want transmission line to affect farming operations and pivot irrigation.
	Other Comments/No Segment Indicated
	Landowner stated that he would construct a new private runway for a crop dusting business. Landowner: 349 CR G in Clovis, NM
	Landowner wanted to know what other sources have been identified as alternative ways to get the needed power? Landowner: Cooper Legacy Dairy
	Landowner interested in selling the property and they are interested in where the power line route is and how that will affect the property value. Landowner: Dale Johnson, 93882 Runestone Lane, Sturgeon Lake, MN
	Landowner does not want transmission lines through their front yard or in a field interfering with pivots or something to plough around. Landowner believes that single metal poles will be better than double wooden poles.84 SR 348, Texico, NM

General Comments taken from TRC staff at the public meeting:

According to meeting attendees, there will be wind turbine interests in the Project Study Area (TriGlobal).

5.3.3 Landowner Consultation

As part of its overall Public Involvement Program, SPS solicited landowner input via a public meeting, and invited input via multi-media venues (e.g., open house questionnaires, internet website, email, and telephone). The Project Team consulted with landowners who contacted SPS via multi-media venues requesting Project information or expressing interest or concern regarding potential Project impacts on landowners and/or their property and facilities. Furthermore, the Project Team initiated contacts with landowners where necessary to address potential Project impacts to landowners and/or their property and facilities.

5.3.4 Other Public Involvement Process Tools

SPS maintains a company website (http://www.powerfortheplains.com) with up-to-date information about all of its projects in Texas, Oklahoma, and New Mexico, including the Curry to Bailey 115kV Transmission Line Project. Posters, handouts, and aerial photograph-based maps displayed at the public open house are available for viewing and downloading under the Projects link. The website also provides

general information about SPS, the SPP, and frequently asked questions concerning transmission lines. SPS also will post a copy of the Project CCN application to the website.

The Project website also includes a direct email link to a Project representative. Individuals are able to send questions and comments via email to the Project Team. Efforts are made by members of the Project Team to respond to each request in a timely manner.

SPS published a direct SPS staff phone number on its website and all of its public handouts to facilitate and encourage ongoing public comment. Efforts are made by members of the Project Team to respond to each call in a timely manner.

Table 5.2 includes the libraries that have copies of the information presented at the March 27th and 28th, 2013 public meetings. SPS will provide these libraries with copies of the CCN application.

Table 5.2 Public Library Location

Library	Address and County
Muleshoe Area Public Library	322 W 2nd Street Muleshoe, Texas Bailey County, Texas
Clovis-Carver Public Library	701 North Main Street Clovis, New Mexico Curry County, New Mexico

6.0 Route Selection

6.1 Overview

The routing process began with the evaluation and selection of route segments that connected the Bailey County Substation to the Curry County Substation. The routes presented in this EA are made up of those segments and begin at the Bailey County Substation and end at the Texas/New Mexico state line. TRC conducted field surveys and research within the Project Study Area, focusing on the area of the proposed route segments. The preliminary route segments depicted on Figure 2.1 were assessed by addressing opportunities and constraints, conducting a public involvement process to collect input from landowners, agencies, and other organizations and stakeholders, and by evaluating the route segments against PUC and other planning and routing criteria. The routing process generated eight end-to-end routes comprised of 79 segments. The final segments and routes are depicted on Figure 2.2b.

The eight alternative routes and their associated segments were evaluated on a GIS-generated comparative model which depicted quantitative data for each segment and alternative route. The quantitative range for each opportunity and constraint was identified in Table 2.2 with a high, low, and average value for each criterion.

The Project Team reviewed the eight alternative routes, taking into consideration input from the public involvement process as well as reviewing and assessing engineering and cost factors. SPS believes that the 79 segments and the eight routes evaluated in this routing analysis provide a broad range of alternatives to construct the 115-kV transmission line between the Bailey County Substation and the Curry County Substation. The Project Team made an effort to locate alternative routes along existing linear corridors such as roads, property lines, and other utility ROW to minimize conflicts with environmental and land use constraints.

6.2 Summary of Environmental Evaluation and Conclusions

The purpose of the EA and Routing Study was to delineate and evaluate alternative routes for SPS's proposed transmission line between the Bailey County Substation and the Curry County Substation. The environmental analysis of the eight alternative routes is illustrated in map (Figures 3.1 through 3.7) and table form (Table 3.1 through 3.6). Figure 6.1 depicts the constraints and opportunities for the preliminary segments within the Project Area.

The Environmental Setting (Chapter 3) and Environmental Impacts (Chapter 4) provide an analysis of the existing setting and potential environmental effects resulting from the construction and operation of the proposed 115-kV transmission line and the expansion of the Bailey County Substation. A summary of the environmental effects considered during the final route selection is provided below.

6.2.1 Physiography/Geology/Soils

Impacts to geology and soils are similar for all eight alternative routes as the routes fan out from the Bailey County Substation and cross similar terrain and soil types. Standard BMPs identified in Section 4.1.2 are recommended during construction to minimize wind and water erosion with construction and operations and would also apply to the expansion of the Bailey County Substation.

OVERSIZED MAP
Figure 6.1

6.2.2 Prime Farmland and Agriculture

All eight alternative routes would result in a minimal reduction of prime farmland soils due to the small footprint of each structure installation. The total reduction is estimated to be between 0.048 and 0.083 acres for all structures. Approximately five acres of rangeland/pasture would be lost due to the expansion of the Bailey County Substation. Approximately ten percent of the study area is categorized as prime farmland and is close to the amount that is in crop production or used for livestock grazing. Therefore, the loss of 0.083 acres of 8,153 acres of prime farmland is 0.001 percent of the total area and is a minimal impact. All of the routes skirt and/or cross existing pivot irrigation systems. All eight routes would require strategic placement of transmission line structures near the perimeter of the irrigation crop circles in order to avoid wide spans across system pivots. Proposed segment alternatives avoid existing irrigation wells in order to prevent disruption of energy delivery and permit well maintenance.

6.2.3 Water Resources

Three draws cross through the project study area and can be easily spanned by the proposed transmission line structures, which have an average span length of 660 feet. Playas are dappled across the landscape in the Texas Panhandle region. Playas are typically characterized as closed, shallow inundations with clayey and silt soils that permit seasonal rainfall to accumulate. However, playas can flood when precipitation is sufficient in duration and intensity. Several playas exist in the project study area and vary in size from very small round areas of less than an acre to complexes that are tens of acres in size. Many of the playas are small in size and can be easily spanned by a transmission line. One of the largest playas in the study area is located along Segment DU. Alternative Routes 2, 4, 6, and 8 utilize Segment DU. The length of segment that crosses the playa is approximately 2,530 feet and therefore some structures may have to be located within the limits of the playa.

Segment-specific geotechnical evaluation of soils, hydrology, and the projected high water line would likely be needed to determine the placement and design of structure foundations. The playa is connected to Progress Draw, a drainage that is connected to the Blackwater Draw, which is part of the headwaters to the North Fork Double Mountain Fork Brazos River and may be regulated under Section 404 of the Clean Water Act. A formal jurisdictional determination of the playa complex would be required if construction and placement of structures generates discharge associated with the temporary or permanent fill of material in the playa. Construction costs associated with Segment DU would likely be higher for Alternative Routes 2, 4, 6, and 8 in order to cross the playa. There are no draws or playas located within the expansion of the Bailey County Substation. All other potential impacts to surface water resources would be similar for each of the eight routes. All routes and expansion of the Bailey County Substation, would require standard BMPs and a SWPPP to minimize potential impacts to water resources.

6.2.4 Biological Resources

The Project Study Area generally consists of farmland in agricultural production, rangeland, and a mix of rural residential and agricultural support facilities. Most of the land in the Project Study Area has been disturbed and small areas of native vegetation remain. However, playas and wetland vegetation exist throughout the Project Study Area and along all eight alternative routes. There are no playas in the immediate vicinity of the Bailey County Substation.

Most of the project area is highly disturbed as a result of agricultural activities; therefore, there are minimal adverse effects to sensitive plants or wetland habitat for any of the eight alternative routes. The existing vegetation where the Bailey County Substation expansion is planned consists of annual and perennial grasses associated with rangeland and deciduous trees adjacent to State Highway 214. Some of the trees may have to be trimmed or removed for safety and reliability purposes.

There are potential impacts to wildlife that include: 1) avian collisions with power lines; and 2) potential impacts to the federally listed whooping crane, the federally proposed (threatened) lesser prairie chicken and the state-listed Texas horned lizard. Potential impacts for each of the species would be similar for all eight alternative routes. Wildlife impacts from the expansion of the Bailey County Substation would be similar to transmission lines because of the structures that emerge from the substation and reduction of potential habitat for the Texas horned lizard.

Whooping cranes may use the playa lakes as stopover habitat to feed and rest during migration. The construction and maintenance of the transmission line is not anticipated to alter current land uses since the proposed Alternative Routes primarily follow existing roads, utility ROWs, and/or property lines. Therefore, the primary concern to the whooping crane is the potential for collisions with transmission lines and poles. In addition, Alternative Routes 2, 4, 6, and 8 may result in removal of small areas of wetland habitat in a playa for placement of the transmission line foundations for Segment DU.

Collisions with power lines are a substantial cause of avian and whooping crane mortality in migration. Collision hazards are greatest near higher quality habitats such as wetlands or riparian areas. The USFWS and TPWD would be consulted on how to reduce and avoid impacts to avian species and whooping cranes in habitat areas. In their letters about the project, the USFWS and TPWD provided guidance and direction regarding planning and design for transmission lines, including BMPs. (Appendix H) The APLIC provides voluntary guidelines to the utility industry on avoiding avian power line strikes.

The southeastern portion of the Project Study Area is located within areas mapped as range of the LEPC. Transmission lines and associated vertical structures can create zones that the species avoids, resulting in reduced preferred habitat and habitat fragmentation. LEPC exhibit strong avoidance of tall vertical features such as electrical transmission and overhead utility lines, as they provide attractive roosting perches for many species of raptors. Power lines and unmarked wire fences are known to cause LEPC injury and mortality, but habitat-wide impacts to the species have not been calculated. However, in order to minimize impacts to the LEPC, all of the proposed routes were developed to the extent practicable adjacent to agricultural fields, existing roads, utility ROWs, and/or property lines. It is unlikely that LEPC utilize the area adjacent to the Bailey County Substation due to the presence of tall structures such as fences, antennae, and transmission poles.

Habitat for the Texas horned lizard is present throughout the Panhandle region and may occur in the project study area. Construction activities, including the movement of earth-moving equipment and vehicles, could potentially disturb, displace, or kill the Texas horned lizard, as the species is slow-moving and may not be able to avoid areas of construction activity. Impacts to the Texas horned lizard could be reduced or avoided by conducting a pre-construction survey to identify harvester ant colonies and potential habitat. Construction crews would be informed, during pre-construction and bi-weekly meetings, that Texas horned lizards may be present and that they are not to be harmed, touched, or moved.

6.2.5 Socioeconomic Impact

There is no significant effect anticipated from the construction and operation of any of the eight alternative routes or the expansion of the Bailey County Substation. All routes would have similar effects on population, employment, local economy, community services, and community values.

6.2.6 Land Use

No adverse direct, long-term impacts to existing land use are expected outside of the potential temporary effects to agricultural operations addressed previously under Prime Farmlands. Between 29 and 45 habitable structures are located within 300 feet of the eight alternative route centerlines. There are no milking parlors within 300 feet of the ROW centerline. Alternative Route 3 has 29 habitable structures

within 300 feet of the centerline. Alternative Routes 5 and 6 each have 33 and 35 habitable structures within 300 feet of the centerline, respectively. Alternative Route 8 has the highest number of habitable structures within 300 feet of the ROW centerline with 45 structures.

Table 6.1 Detail of Structures by Type for Each Alternative Route

Structure Type	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6	Route 7	Route 8
Abandoned House	4	3	3	5	3	5	6	4
Agricultural	1	1	1	0	0	1	1	0
Commercial	3	3	3	5	0	5	2	5
House	17	21	14	18	21	17	18	22
Mobile home	4	0	0	1	1	1	1	1
Workbarn	9	8	8	9	8	6	10	13
Total	**38**	**36**	**29**	**38**	**33**	**35**	**38**	**45**

These routes would have more exposure to construction impacts related to noise, fugitive dust, and access as well as long-term changes to the visual setting in the foreground. Alternative Routes 7 and 5 have the greatest length of segments that parallel existing ROW such as highways and railroads at 22.31 and 22 miles, respectively. The eight alternative routes follow existing county and rural roads with minor jogs to avoid impacts with road intersections, habitable structures, irrigation wells, or other infrastructure.

6.2.7 Aesthetics/Visual Resources

Visual impacts associated with project construction would be short in duration and temporary in nature. The effect on the landscape would be the same for each of the eight alternative routes. However, the long-term visual effects would be associated for the alternative routes that have the greatest number of habitable structures fronting or immediately adjacent to the transmission line. As noted previously, Alternative Routes 8, 7, and 1 have the greatest number of habitable structures within 300 feet of the ROW centerline with 45, 38, and 38 structures, respectively. Alternative Routes 3 and 5 have the fewest number of habitable structures within 300 feet of the ROW centerline with 29 and 33 structures each. The centerline of each Alternative Route has been routed to the opposite side of the road from residential structures. However, there is a network of existing distribution lines that parallel many of the roads in the Project Study Area and a network of transmission lines in Bailey County that fan out from the Bailey County Substation.

No significant visual impacts are expected as a result of the expansion of the Bailey County Substation as the nearest habitable structure is approximately 1,700 feet to the north. A habitable structure is located approximately 580 feet to the south, but the visual impact of the substation expansion would be minimal because it is on the north side of the site. However, the substation is immediately adjacent to State Highway 214 and would be visible to motorists utilizing the roadway. The expansion of the substation would add to the existing industrial character of the immediate landscape.

6.2.8 Recreation

There are no park or recreation facilities in the Project Study Area or within 2,000 feet of an alternative route segment or the Bailey County Substation. Therefore, there are no impacts to park or recreation areas from the proposed project.

6.2.9 Transportation

TxDOT does not propose improvements within the next five years to US State Highway 84, located north of the Project Study Area. However, coordination with the New Mexico Department of Transportation will be required where each of the Alternative Routes cross from Texas into New Mexico. All eight alternative routes cross state and county roads and would require permits and coordination with the Texas Department of Transportation and Bailey or Parmer County. Traffic management plans during the construction phase would reduce potential conflicts between existing traffic and construction operations. Expansion of the Bailey County Substation would not generate impacts to traffic operations.

6.2.10 Aviation Impacts

There are no FAA-registered airports with runways longer than 3,200 feet within 20,000 feet of any alternative route segment or the Bailey County Substation. Therefore, there are no impacts to public aviation facilities from the proposed project.

6.2.11 Electronic Installations

Fifteen communication towers are located within the PUC-stipulated distance criteria to each of the eight alternative routes: twelve FM towers and four AM towers. The FM towers are approximately between 968 and 1,265 feet from an alternative route segment. Segment JM, which is a segment in all of the routes is 968 feet away from an FM tower. The nearest AM tower to and alternative route is the AM tower located approximately 1,381 feet from Segment BE, which is a segment in Routes 2, 3, 4, 5, 6, and 7. There are three towers close to the Bailey County Substation: a communications tower 200 feet to the north, an FM tower 565 feet to the northeast, and an FM tower 840 feet to the northeast.

If necessary, power line detuning can reduce the impact of a transmission line in the vicinity if a broadcast antennae in order to meet FCC tolerances. Several other types of communication towers exist in the Project Study Area and include microwave relay, farm radio, and a meteorological station.

6.2.12 Cultural Resources

A Class I study was performed to identify cultural and archaeological resources within 1,000 feet of proposed alternate route segments. Two historic resources were identified: a historic marker identifying the first irrigation well in Bailey County and the Mount Olivet Cemetery in Parmer County. The historic marker is located immediately adjacent to Segment AO on Alternative Routes 4 and 6. The Mount Olivet Cemetery is located approximately one mile south of Segment GC in Alternative Route 3 and approximately one mile north of Segment AD in Alternative Routes 4 and 5. Only the historic marker is within the 70-foot-wide ROW of Alternative Routes 4 and 6. The historic marker is not eligible for listing on the NRHP. The THC was notified about the project on December 4, 2012 and recommended that a high probability study be conducted by a registered professional archaeologist and that SPS consult with THC after the route has been selected.

6.3 Summary of Route Selection

The Project Team performed a quantitative analysis of each alternative route using the routing opportunities and constraints listed in Section 2.4, depicted in Tables 2.3 and 2.4, and illustrated in Figures 2.2b, 2.3 and 6.1. Specifically, this analysis included calculation of the cumulative length (miles) each route parallels and abuts routing opportunities, the cumulative length (miles) each route is affected by routing constraints, or the presence/absence and cumulative number of physical or land use constraints located within a specific distance from the center line of each alternative route. This information was reviewed along with the following over-arching considerations:

- Avoiding and/or minimizing impacts to the natural and human environment;
- Engineering constraints, including crossing other transmission lines;
- Preliminary construction cost estimates;
- Proximity and length of pivot irrigation system crossings;
- Comments received through the public open houses, agency consultation, and correspondence;
- Comments received from landowners and other stakeholders;
- Considerations related to ROW and property issues; and
- Overall permitting considerations.

The eight alternative routes were compared for a variety of routing criteria before the evaluation of environmental resources and effects in Chapters 3 and 4. Alternative Routes 6, 2, and 8 were shortest in length, Alternative Routes 2, 3, and 8 crossed the fewest pivot irrigation systems and had the shortest total length across pivot irrigation systems, and Alternative Routes 3, 5, and 6 had the fewest habitable structures within 300 feet of the ROW. All of the alternative routes followed existing road ROW and property lines.

After reviewing the potential environmental effects of each route, Alternative Routes 3, 5, 6 and 8 were determined to have fewer environmental effects and conflicts with existing land uses. Alternative Routes 4, 5, 6, and 8 were determined to have fewer environmental effects and land use conflicts than Alternative Routes 1, 2, 3, and 7 because they:

- require fewer angle and corner structures due to turns in the route alignment;
- have fewer crossings of existing 230kV transmission lines.
- have fewer center pivot irrigation systems crossed;
- have a shorter length (miles) along edge of mobile irrigation systems;
- cross fewer wetlands or playa lakes;
- have fewer non-AM electronic installations are within 2,000 feet of the ROW centerline;
- have shorter estimated length (miles) of ROW across potential mapped or otherwise indicated wetlands;
- have fewer county or local road crossings; and
- have a shorter estimated length (miles) of ROW within foreground visual zone of U.S. and state highways.

After combining the results of the initial routing phase and quantification of PUC criteria with the results of the environmental assessment, Alternative Routes 6 and 8 were determined to be the better routes of the eight alternative routes evaluated. Factors supporting the selection of Alternative Routes 6 and 8 include that they:

- are the shortest and third shortest routes (23.08 and 24.01 miles, respectively);
- have the short lengths across cultivated crops (4.05 and 3.84 miles, respectively);
- have a low number of road crossings (40 and 39, respectively)

- have a short length of ROW within NWI wetlands (0.49 miles);
- have short spans across open water (0.02 and 0.05 miles, respectively);
- have a low number of center-pivot irrigation systems crossings in the ROW (26 and 25, respectively); and
- have the second-lowest and lowest estimated construction costs.

6.4 SPS Recommended Route

Based on the evaluation of the information provided in the environmental assessment and routing analysis along with the project purpose and need, transmission engineering and planning considerations, operations, maintenance and construction considerations, agency and public comment, and estimated construction costs, SPS recommends Alternate Route 6 and Alternative Route 8 as the two routes that best addresses the requirements of PURA and P.U.C. Substantive Rules. The justification for SPS's recommendation for these two routes is discussed below.

Alternative Route 6, extends from the Bailey County Substation approximately 23.08 miles in a general westerly direction to the Texas/New Mexico state line and includes Segments JM, JK, JL, CE, CB, FS, DU, KM, BU, FQ, BN, GI, DL, DK, KL, DJ, and AH. Factors supporting the SPS recommendation of Alternative Route 6 include those factors listed in Section 6.1 and Section 6.3 and estimated construction costs. In addition, Alternative Route 6 has the third fewest number of habitable structures within 300 feet of its centerline (35). Approximately 85% of Route 6 parallels other linear ROW, including roads, transmission lines, and distribution lines. It has one of the least impacts to farming and agricultural operations, impacting 26 center-pivot irrigation systems. The route has a low number of road crossings (40), has short spans across open water (0.02 miles), would avoid crossing the center of playas, and would span drainages. This route has one crossing of an existing 69kV transmission line (1). It has the lowest estimated construction costs

Although SPS recommends Alternative Route 6, it can construct and operate the transmission line on any of the Alternative Routes in the Project Study Area. No airports, schools, cemeteries, hospitals, parks or known threatened and endangered species habitat will be affected by the route.

Alternative Route 8 is short in length (24.01 miles), few transmission line crossings (1), low number of road crossings (39), and low number of pivot-irrigation systems crossed (25). Approximately 81% of Route 8 parallels other linear ROW, including roads, transmission lines, and distribution lines. Alternative Route 8 extends from the Bailey County Substation in a general westerly direction to the Texas/New Mexico state line and includes Segments JM, JK, JL, CE, CB, FS, DU, KM, BU, BN, GI, DV, JO, JP, GB, BA, AX, KJ, AU, AS, and AG. Alternative Route 8 also minimizes impacts to mechanically irrigated pasture and cropland, non-irrigated cropland, and does not cross 100-year floodplains. No airports, schools, cemeteries, hospitals, parks or known threatened and endangered species habitat will be affected by the route. Although Alternative Route 8 does have the largest number of habitable structures (45), of those structures, only 23 are residences and 13 are workbarns. The remaining nine are commercial or abandoned structures.

On a cost per mile basis, Alternative Route 8 is the least expensive to construct due to the fact that it requires the fewest number of structures supported by concrete foundations.

7.0 List of Preparers

This Environmental Assessment was prepared for SPS by TRC. SPS provided information in Section 1.0. Personnel with primary responsibilities for the preparation of this document include the following.

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