Environmental Assessment and Alternative Route Analysis for the Dallam to Channing 230-kV Transmission Line Project Dallam and Hartley Counties, Texas

PBS&J Job No. 100001202

ENVIRONMENTAL ASSESSMENT AND ALTERNATIVE ROUTE ANALYSIS FOR THE DALLAM TO CHANNING 230-KV TRANSMISSION LINE PROJECT DALLAM AND HARTLEY COUNTIES, TEXAS

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Acronyms and Abbreviations

AOU	American Ornithologists Union
APLIC	Avian Power Line Interaction Committee
BEG	Bureau of Economic Geology
BLS	Bureau of Labor Statistics
BNSF	Burlington Northern Santa Fe
CCN	Certificate of Convenience and Necessity
CWA	Clean Water Act
CFR	Code of Federal Regulations
CR	County Road
EA	Environmental Assessment
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FM	Farm-to-Market Road
ft	foot/feet
FWS	U.S. Fish and Wildlife Service
HPA	high probability area
IH	Interstate Highway
kV	kilovolt
MM	Mobilemedia
MPO	Metropolitan Planning Organization
NAIP	National Agriculture Imagery Program
NASS	National Agricultural Statistics Service
NDD	Natural Diversity Database
NOI	Notice of Intent
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWP	Nationwide Permits
OTHM	Official Texas Historical Marker
PUC	Public Utility Commission of Texas
PURA	Public Utility Regulatory Act
RR	Ranch Road
ROW	right-of-way
SAL	State Archaeological Landmark
SCS	Soil Conservation Service
SDHPT	State Department of Highways and Public Transportation

SH	State Highway
SPS	Southwestern Public Service Company
SWPPP	Storm Water Pollution Prevention Plan
TARL	Texas Archaeological Research Laboratory
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
TORI	Texas Outdoor Recreation Inventory
TPWD	Texas Parks and Wildlife Department
TWC	Texas Workforce Commission
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
US	U.S. Highway
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey

1.0 DESCRIPTION OF THE PROPOSED PROJECT

1.1 SCOPE OF PROJECT

Southwestern Public Service Company (SPS), a subsidiary of Xcel Energy, is proposing to construct a single-circuit, 230-kilovolt (kV) electric transmission line. The line will initially be energized and operated at 115-kV and will extend from the existing Dallam County Substation, located approximately 0.5 miles east of U.S. Highway (US) 87 on Ponderosa Lane, on the northwest side of the City of Dalhart, to the existing Channing Substation, located on US 385 in the City of Channing, in Dallam and Hartley Counties, Texas (Figure 1-1). Depending on which route is ultimately selected, the proposed project would be approximately 33 to 35 miles long and located entirely within Dallam and Hartley Counties, Texas.

1.2 PURPOSE AND NEED FOR PROJECT

SPS has developed several projects to improve the transmission service to customers in the Texas Panhandle. These projects are needed to improve the reliability of existing transmission service, and to accommodate the growth of existing customer loads.

One of these projects is construction of a 230-kV line from the Dallam County Substation to the Channing Substation. This line is needed to support the Dalhart, Texas area during the contingency loss of any of the existing 115-kV transmission lines feeding Dalhart.

1.3 AGENCY ACTIONS

Construction documents and specifications will indicate any special construction measures needed to comply with the regulatory requirements listed below. In addition, depending upon the location of the transmission line structures, road crossing and railroad crossing permits may be required.

1.3.1 Public Utility Commission

SPS's proposed transmission line project will require an application for a Certificate of Convenience and Necessity (CCN) with the Public Utility Commission of Texas (PUC). This environmental assessment and route analysis report has been prepared by PBS&J in support of SPS's application for the CCN on this project. This document is intended to provide information on certain environmental and land use factors contained in Section 37.056(c)(4) of the Texas Utilities Code, PUC Substantive Rule 25.101(b)(3)(B), as well as to address relevant questions in the PUC's CCN application. This report may also be used in support of any other local, state, or federal permitting requirements, if necessary. SPS will acquire PUC approval prior to beginning construction of the transmission line.

1.3.2 U.S. Army Corps of Engineers

Under Section 404 of the Clean Water Act (CWA), activities in wetlands are regulated by the U.S. Army Corps of Engineers (USACE), in conjunction with the Environmental Protection Agency (EPA). The discharge of dredged or fill materials, draining, excavation, or mechanized land clearing in waters of the U.S., including wetlands, is subject to USACE regulatory policies. Thus, potential wetland impacts incurred by the proposed transmission line project are subject to USACE regulation.

Certain construction activities that potentially impact waters and wetlands may be authorized by one of the USACE's Nationwide Permits (NWP). Permits that may apply to placement of support structures and associated activities are NWP numbers 25 and 12. NWP 25 authorizes the discharge of concrete, sand, rock, etc., into tightly sealed forms or cells where the material is used as a structural member for standard pile-supported structures (linear projects, not buildings or other structures). NWP 12 authorizes discharges associated with the construction of utility lines and substations within waters of the U.S. and additional activities affecting waters of the U.S. such as those associated with the construction and maintenance of utility line substations; foundations for overhead utility line towers, poles, and anchors; and access roads for the construction and maintenance of utility lines.

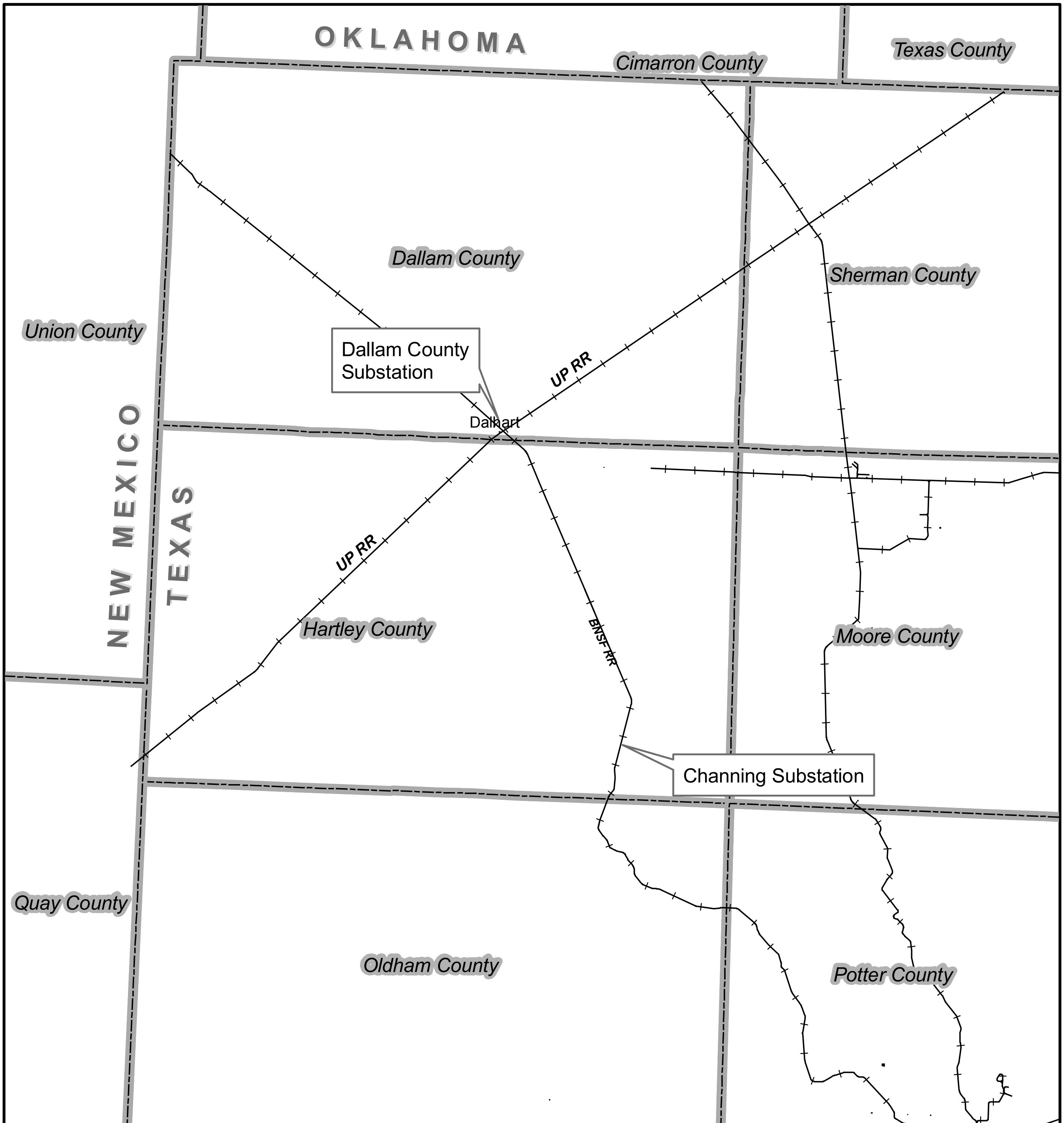
Under Section 10 of the Rivers and Harbors Act of 1899, the USACE is directed by Congress to regulate all work and structures in, or affecting the course, condition, or capacity of, navigable waters of the U.S. According to the Tulsa District, there are no features within the study area that would require permitting under Section 10 of the Rivers and Harbors Act.

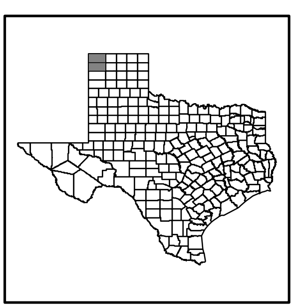
1.3.3 Texas Commission on Environmental Quality

If this project requires more than one acre of clearing the Texas Commission on Environmental Quality (TCEQ) would require implementation of a Storm Water Pollution Prevention Plan (SWPPP). SPS will submit a Notice of Intent (NOI) with the TCEQ prior to clearing and construction if it is determined that more than one acre will be cleared.

1.3.4 Federal Aviation Administration

SPS is evaluating alternative routes that are in the vicinity of one Federal Aviation Administration (FAA) registered airport and two private airstrips. The Dalhart Municipal Airport (FAA-registered) is located southwest of the City of Dallam, and the Miller Airfield is located east of US 54 and north of Ranch Road 297. SPS will file a "Notice of Proposed Construction or Alteration" (Form 7460-1) with the FAA if the alternative route certificated by the PUC is located in the vicinity of any of the FAA registered airports.





BASE MAP: ESRI STREETMAP USA DATA

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Figure 1-1
Project Area Location Map
Dallam - Channing
230-kV Transmission Line Project

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1.3.5 Texas Historical Commission

Prior to construction, SPS will obtain clearance from the Texas Historical Commission (THC) with regard to requirements concerning historic and prehistoric cultural resources.

1.3.6 Texas Department of Transportation

Permits will be obtained from the Texas Department of Transportation (TxDOT) for any crossing of a state-maintained roadway. Permits will also be obtained from Union Pacific Railroad and Burlington Northern Santa Fe (BNSF) Railroad for any crossing of a railroad.

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2.0 SELECTION AND EVALUATION OF ALTERNATIVE TRANSMISSION LINE ROUTES

2.1 OBJECTIVE OF STUDY

The objective of this study was to select and evaluate several alternative transmission line routes and ultimately recommend a preferred and several alternative routes for the proposed 230-kV transmission line that are feasible from economic, engineering, and environmental standpoints. SPS and PBS&J utilized a comprehensive transmission line routing and evaluation methodology to delineate and evaluate alternative transmission line routes. Methods used to locate and evaluate potential routes were governed by SPS's transmission line routing process and criteria, and the Texas Public Utilities Code. The following sections provide a description of the process used in the selection and evaluation of alternative transmission line routes.

2.2 DATA COLLECTION

Data used by PBS&J in the delineation and evaluation of alternative routes were drawn from a variety of sources, including published literature (documents, reports, maps, aerial photography, etc.) and information from local, state and federal agencies. Aerial photography acquired from the National Agriculture Imagery Program (NAIP) dated 2008, U.S. Geological Survey (USGS) topographic maps (1:24,000 and 1:100,000), TxDOT county highway maps, and ground reconnaissance surveys were used throughout the selection and evaluation of alternative routes. Ground reconnaissance of the study area and computer-based evaluation of digital aerial imagery were utilized for both refinement and evaluation of alternative routes. The data collection effort, although concentrated in the early stages of the project, was an ongoing process that continued up to the point of final route selections.

2.3 DELINEATION OF ALTERNATIVE ROUTES

2.3.1 Study Area Delineation

The first step in the selection of alternative routes was to select a study area. This area needed to encompass both project termination points (the existing Dallam County Substation and the existing Channing Substation) and include a large enough area within which an adequate number of alternative routes could be located. The study area, as shown on Figure 2-1, is a roughly pentagonal area located between Dallam County Substation on the northwest and Channing Substation on the south. The study area is approximately 39 miles long and 37 miles wide. Altogether, this study area covers approximately 1,443 square miles in Dallam and Hartley Counties.

2.3.2 Constraints Mapping

Since a large number of potential routes could be drawn to connect the Dallam County Substation and the Channing Substation, a constraints mapping process was used in selecting/refining possible alternative routes. The geographic locations of environmentally sensitive and other restrictive areas within the study area were located and considered during transmission line route delineation. These constraints were mapped on a topographic base map, which was created using USGS 1:100,000 topographic maps (Figure 2-2). The overall impact of the alternative routes presented in this report has been greatly reduced by avoiding, to the greatest extent possible, such constraints as individual residences, community facilities, airstrips, traveling irrigation systems, cemeteries, historic sites, archaeological sites, wetlands, parks, churches, schools, and endangered or threatened species habitat, and by utilizing or paralleling existing compatible right-of-way (ROW) and property lines where possible.

2.3.3 Preliminary Alternative Routes

Utilizing the information described above, PBS&J identified numerous preliminary routes, which were presented to SPS for review and comment. These initial preliminary routes were examined in the field in spring 2008 by PBS&J staff. The project team made modifications to the preliminary routes, based on the results of the field evaluation and review of high-resolution aerial photography. These preliminary routes, which are shown on Figure 2-3, were presented to the public at an open-house meeting held in the study area on June 23, 2008.

Subsequent to the public meetings, PBS&J staff and/or SPS staff performed additional reviews to look at areas of concern discussed at the public meetings, met with individual landowners, evaluated the public comments, and considered revisions to the preliminary routes. In response to public and landowner concerns, some new links were added and others were eliminated. Using this input, the project team made final revisions to the preliminary routes and identified the primary alternative routes to be evaluated by PBS&J in this document.

Generally, the changes that were made to the preliminary routes after the June public meeting were made for the following reasons:

- To improve the paralleling of apparent property lines,
- To improve the paralleling of compatible ROW,
- To reduce other land use impacts to ranching and farming operations.

2.3.4 Primary Alternative Routes

Ultimately, three primary alternative routes were selected that were then specifically studied and evaluated by the PBS&J staff. The results of PBS&J's effort are presented in this Environmental Assessment (EA) in Sections 4.0 and 6.0. The primary alternative routes are shown on Figure 6-1. The primary routes constitute, for the purposes of this analysis, the only alternative routes addressed in this report. Table 2-1 presents the composition of these routes by link as well as their approximate length in miles.

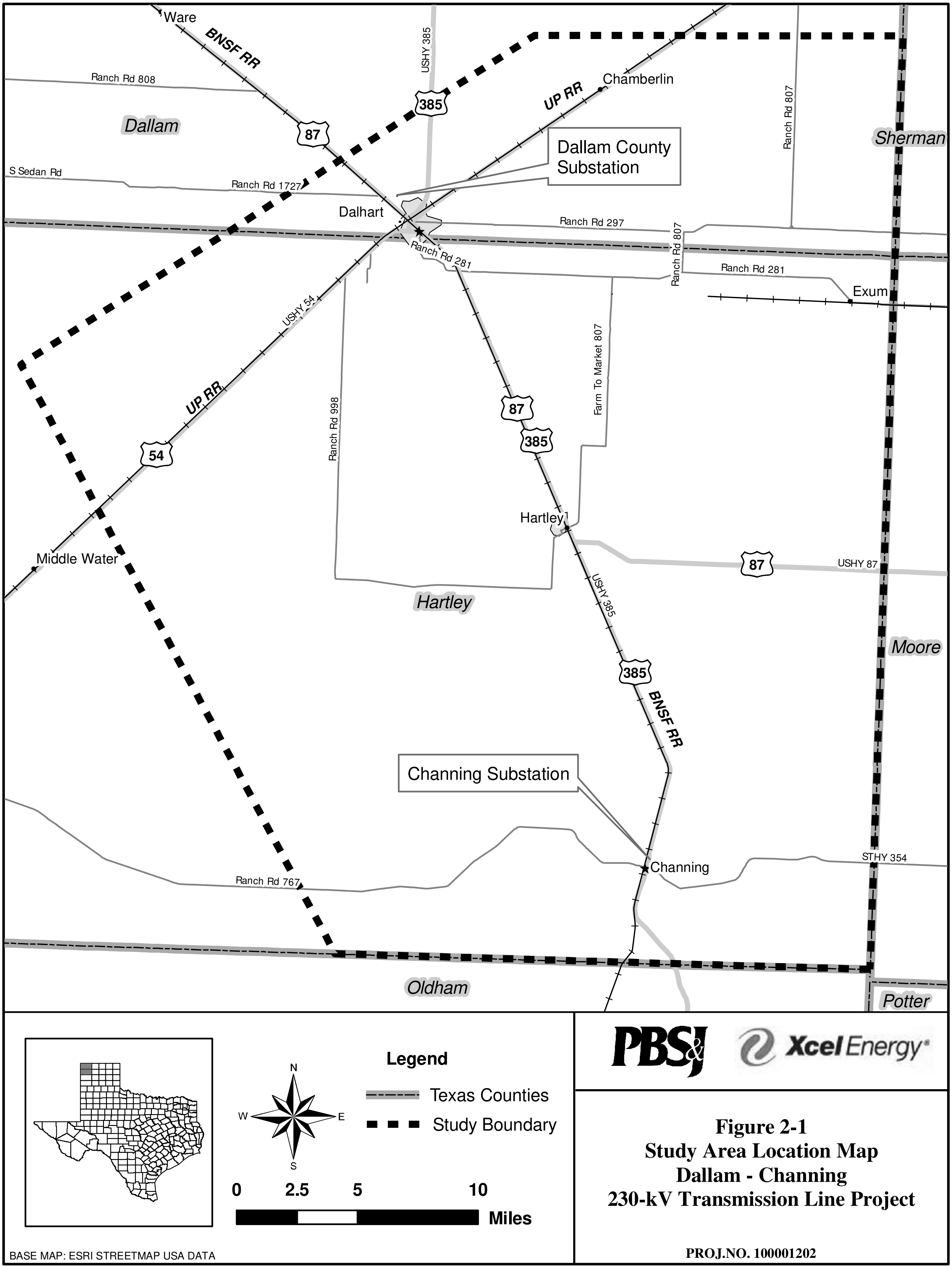

Figure 2-1
Study Area Location Map
Dallam - Channing
230-kV Transmission Line Project

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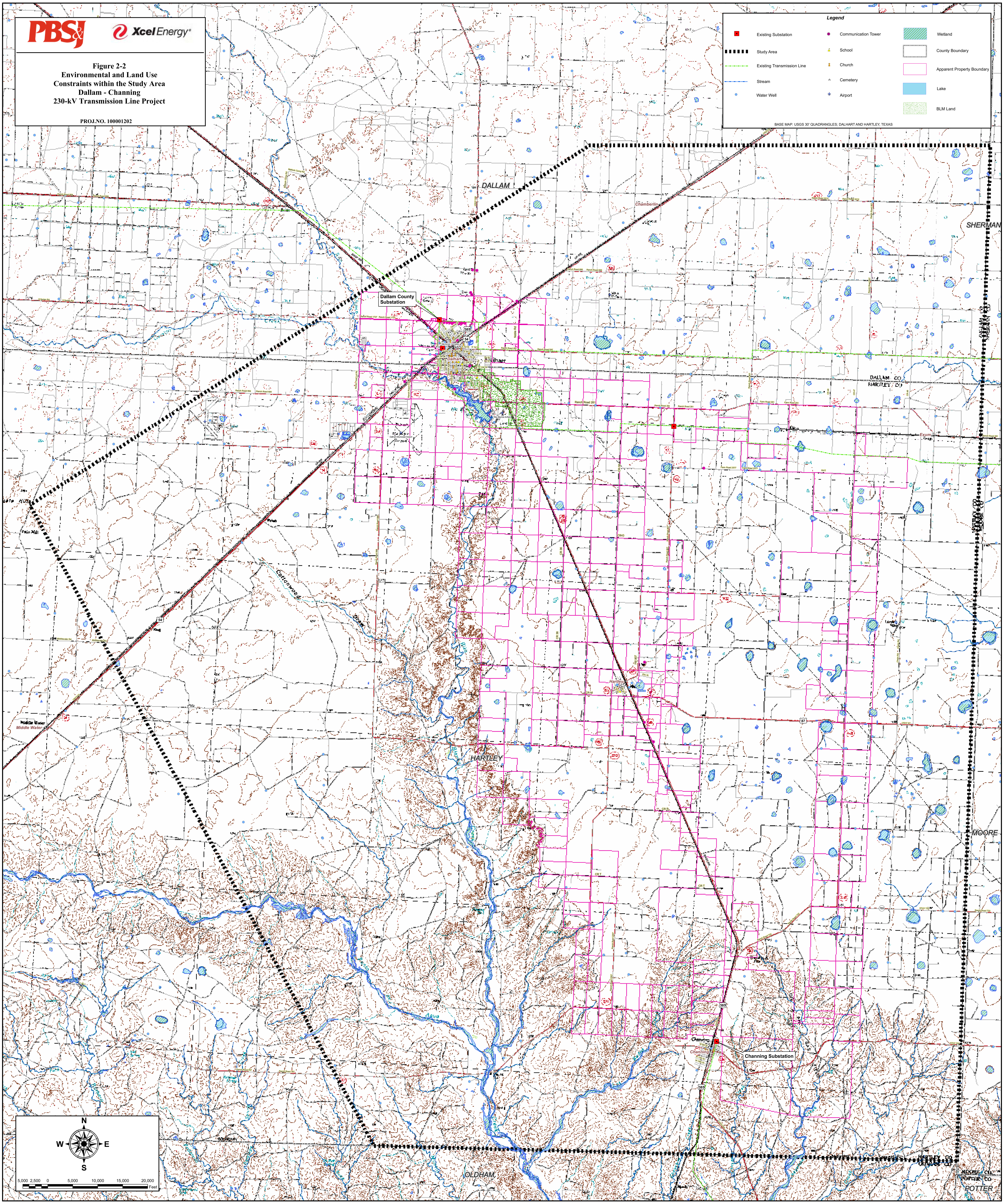

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Figure 2-2
Environmental and Land Use Constraints within the Study Area
Dallam - Channing
230-kV Transmission Line Project
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Legend
Existing Substation
Study Area
Existing Transmission Line
Stream
Water Well
Communication Tower
School
Church
Cemetery
Airport
Wetland
County Boundary
Apparent Property Boundary
Lake
BLM Land
BASE MAP: USGS 30' QUADRANGLES; DALHART AND HARTLEY, TEXAS
DALLAM
SHERMAN
Dallam County Substation
Chamberlin
Dalhart
DALLAM CO
HARTLEY CO
Hartley
Middle Water
HARTLEY
MOORE
Channing
Channing Substation
OLDHAM
POTTER
N
W
E
S
5,000 2,500 0 5,000 10,000 15,000 20,000
Feet

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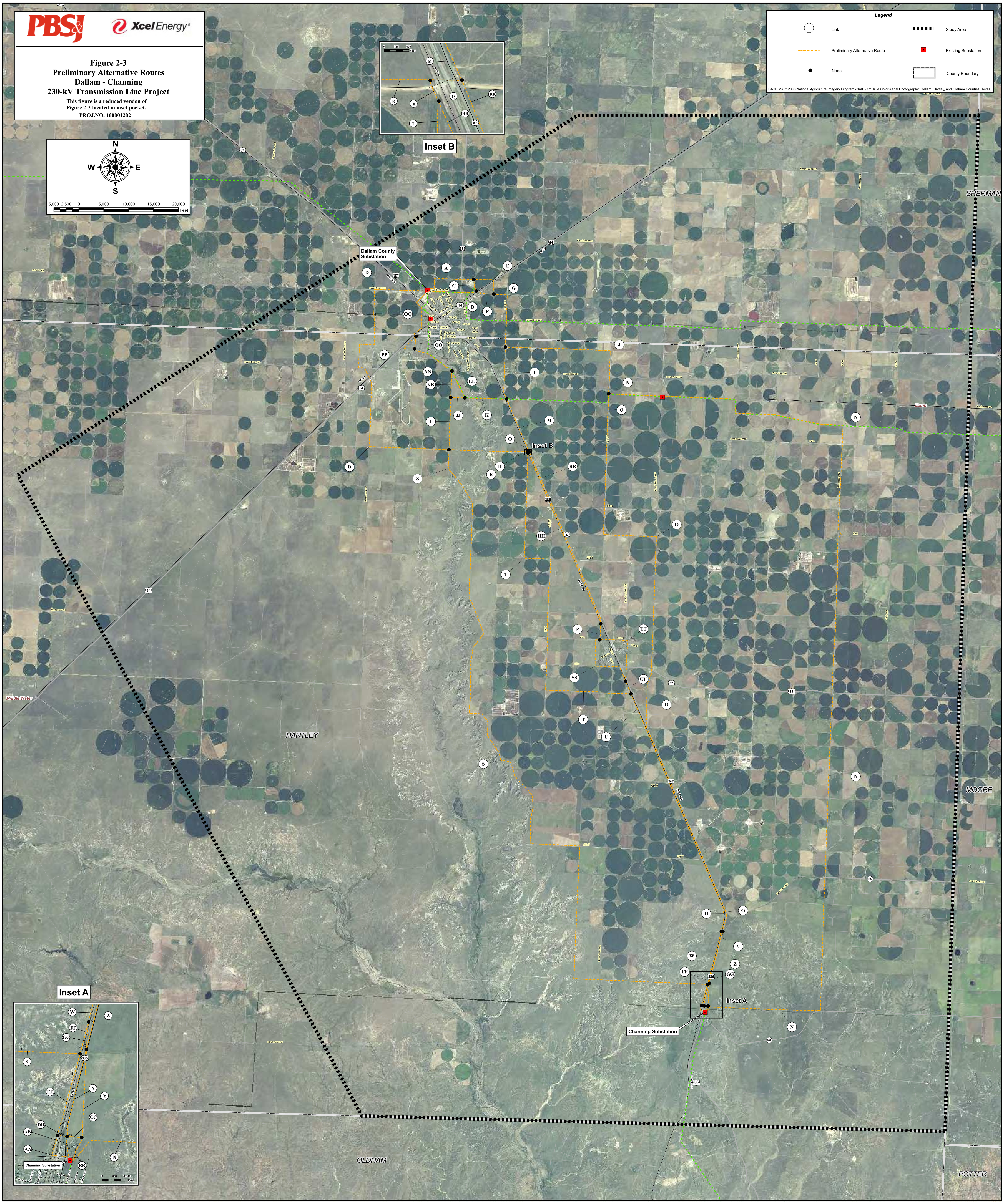

Figure 2-3
Preliminary Alternative Routes
Dallam - Channing
230-kV Transmission Line Project
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Figure 2-3 located in inset pocket.
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Table 2-1

Primary Alternative Route Composition and Length
Dallam To Channing Project

Route Number	Links	Length (miles)
1	QQ-KK-L-R-II-HH-P-SS-UU-U-W-GG-NN-Y-BB	34.5
2	B-F-G-I-M-II-HH-P-TT-UU-U-W-FF-EE-AA	33.1
3	QQ-LL-K-M-II-HH-P-SS-UU-U-W-FF-H-OO-Y-BB	33.4
Note: For primary route locations, see Figure 6-1.		

Each of the alternative routes were examined in detail in the field during spring 2008 and 2009. In evaluating the alternative routes, 34 environmental criteria were considered (see Table 6-1). The goal of this evaluation was to select a preferred and several alternate transmission line routes between the Dallam County Substation and the Channing Substation. PBS&J's recommendations of a preferred and several alternative routes are discussed in Section 6.1. The analysis of each route involved inventorying and tabulating the number or quantity of each environmental criterion located along the centerline of each route (e.g., number of habitable structures, the length across pastureland/cropland, etc.). The number or amount of each factor was determined by reviewing various maps and recent color aerial photography, and by field verification where possible. The environmental advantages and disadvantages of each alternative were then evaluated. Potential environmental impacts of the primary alternative routes are addressed in Section 4.0 of this document.

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3.0 EXISTING ENVIRONMENT

3.1 PHYSIOGRAPHY AND GEOLOGY

As shown on Figure 3-1, the study area is in the High Plains physiographic regions of Texas (Bureau of Economic Geology [BEG], 1996). The High Plains form a nearly flat plateau with average elevations of approximately 3,000 feet (ft). Gravel deposits and stream-laid sands, which contain the Ogallala Aquifer, underlie the plains. Windblown sands and silts form thick, rich soils and caliches locally. Numerous playa lakes are scattered randomly over the treeless plains. The eastern boundary is a westward-retreating escarpment capped by a hard caliche.

Widespread small, intermittent streams dominate the drainage. The Canadian River cuts across the region, creating the Canadian Breaks and separating the Central High Plains from the Southern High Plains. The Pecos River drainage erodes the west-facing escarpment of the Southern High Plains, which terminates against the Edwards Plateau on the south.

Quaternary rock formations include alluvial and fluviatile deposits associated with the Canadian River and its larger tributaries. Alluvium includes recent floodplain deposits consisting of clay, silt, sand, and gravel (BEG, 1969, 1983, 1984). Mapped deposits of alluvium occur along Rosita, East Amarillo, West Amarillo, Horse, Big Blue, Coldwater, Rita Blanca, Punta de Agua, Indian, Corral, and Sand Creeks. Fluviatile terrace deposits include terraces along streams (low terrace deposits) and high gravel deposits. These terrace deposits generally occur above the floodplain and consist of varying amounts of gravel, sand, silt, clay, and organic material, with gravel more prominent on the older, higher terraces (BEG, 1969). Low terrace deposits occur along the major streams within the study area, while high gravel deposits occur at slightly higher elevations. Other Quaternary formations include wind deposited sand and loess.

There is one Tertiary formation in the study area: the Ogallala Formation, which overlies Permian, Triassic, Jurassic, and Cretaceous strata and consists primarily of a heterogeneous space of coarse-grained sand and gravel in the lower part grading upward into fine clay, silt, and sand (BEG, 1969).

Triassic formations include both the Trujillo and Tecovas formations. The Trujillo Formation is a conglomerate with sand and shale. This is sandy and composed of granules and pebbles of quartz, limestone, sandstone, siltstone, chert, and fragments of petrified wood (BEG, 1983). The Tecovas Formation is composed of shale, clay, siltstone, and sand (BEG, 1983).

3.1.1 Minerals and Energy Resources

Major mineral resources located within the study area include sand and gravel (BEG, 1969). Energy resources occurring within the study area include petroleum and natural gas (BEG, 1976). Small pockets of petroleum and natural gas producing horizons are scattered throughout the study area. According to USGS topographic maps, there are also numerous oil and/or gas wells throughout the study area.

3.2 SOILS

3.2.1 Soil Associations

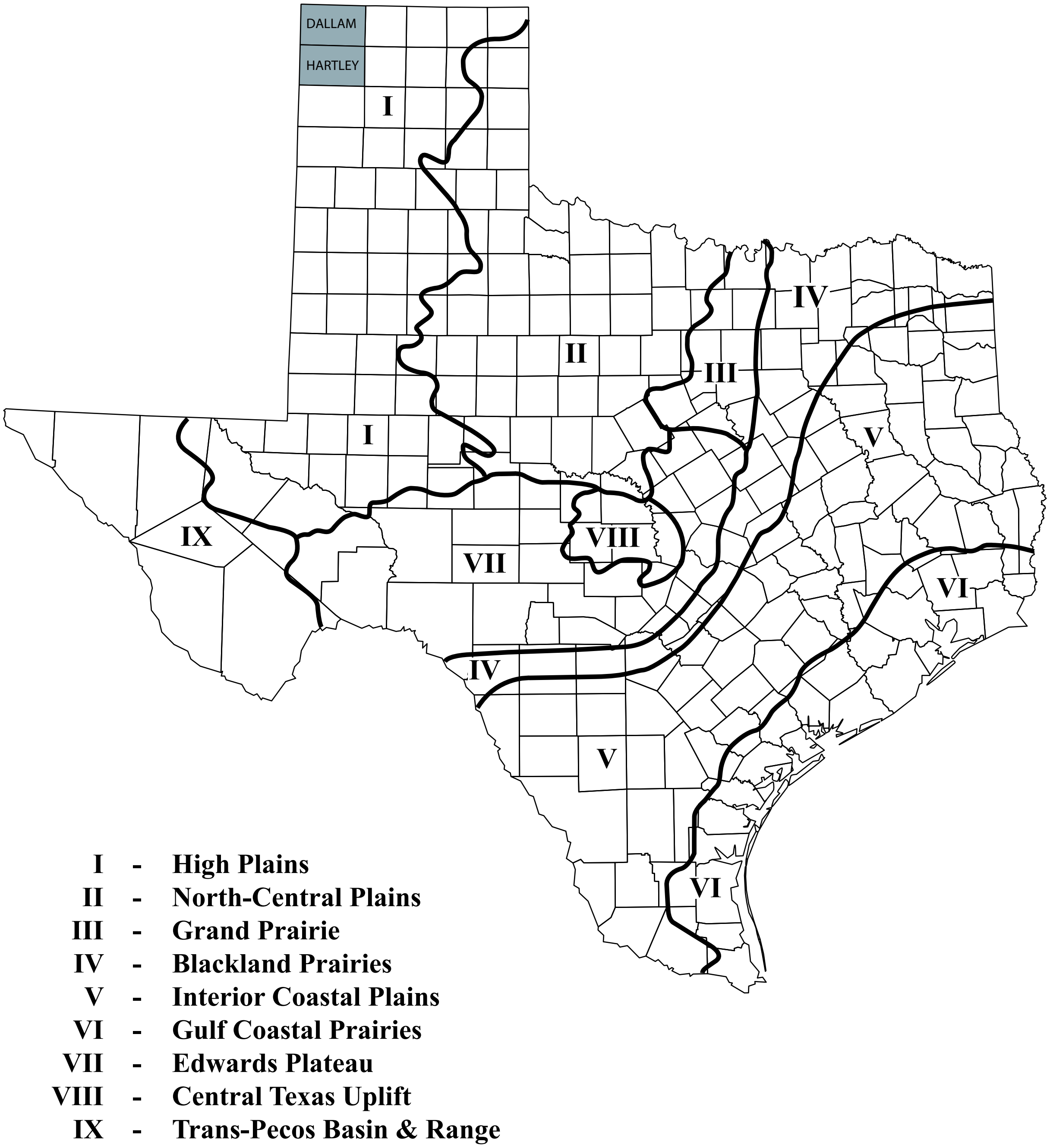
The U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS, formerly Soil Conservation Service [SCS]) published soil surveys for Dallam (1975) and Hartley Counties (1977), that were used to describe the eight soil associations found within the study area.

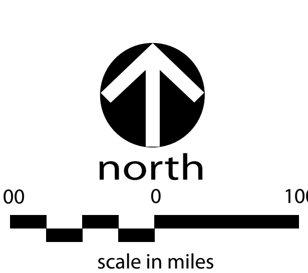
The soil associations found within the study area include the following: Dallam-Perico, Dallam-Vingo-Spurlock, Sunray-Conlen, Gruver-Sherm-Dumas, Plack-Berthoud, Berda-Veal-Potter, Conlen-Sunray-Dumas, and Berda-Tascosa. The Dallam-Perico, Gruver-Sherm-Dumas, Plack-Berthoud, and Sunray-Conlen associations consist of nearly level and gently sloping, sandy and loamy soils. The Dallam-Vingo-Spurlock association consists of nearly level and gently sloping, sandy and loamy soils (NRCS, 1975). The Berda-Veal-Potter association consists of deep to very shallow, gently sloping to very steep, calcareous, moderately permeable clay loams to fine sandy loams. The Conlen-Sunray-Dumas association consists of deep, nearly level to gently sloping, calcareous to noncalcareous, moderately permeable loamy fine sands to fine sandy loams. The Berda-Tascosa association consists of deep to shallow, gently sloping to steep, calcareous, moderately permeable loams to gravelly loams (NRCS, 1977).

3.2.2 Prime Farmland

Prime farmland is defined by the Secretary of Agriculture in 7 Code of Federal Regulations (CFR) 657 (Federal Register, Vol. 43, No. 21) as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber or oilseed and is also available for these uses (i.e., the land could be used as cropland, pastureland, rangeland, forest land, but not land which is developed or under water). It has the soil quality, growing season, and moisture supply needed to economically sustain high yields of crops when treated and managed properly (NRCS, 1978). Some soils are considered prime farmland in their native state and others are considered prime farmland only if they are irrigated well enough to grow the main crops in the area.

In Dallam County, prime farmland soils make up approximately 14 percent of the total county land area and in Hartley County, prime farmland soils make up approximately 13 percent of the total county land area (NRCS, 2009).





Source: BEG, 1996

PBSJ Xcel Energy

FIGURE 3-1

LOCATION OF DALLAM AND HARTLEY COUNTIES IN RELATION TO THE PHYSIOGRAPHIC PROVINCES OF TEXAS

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Soils that occur within the study area and that are listed by the NRCS as prime farmland soils are: Bippus clay loam, 0 to 1 percent; Bippus clay loam, 1 to 3 percent slopes, Gruver soils, 0 to 1 percent slopes; Gruver soils, 1 to 3 percent slopes; Sherm clay loam, 0 to 1 percent slopes, and Spur loam (NRCS, 2009). These soils are primarily in the eastern and northeastern portion of the study area.

3.3 WATER RESOURCES

3.3.1 Surface Water

The majority of the study area falls within the Canadian River Basin. The Canadian River Basin extends from its headwaters in northeastern New Mexico through the Texas Panhandle into Oklahoma and merges with the Arkansas River in eastern Oklahoma. Total drainage area of the basin is 12,700 square miles. Limited surface water supplies, often depleted by drought, remain an issue in the basin. Historically, groundwater supplies have provided the majority of water used in the basin, yet these groundwater supplies are experiencing long-term decline.

There are several surface water impoundments in the study area, the largest being Rita Blanca Lake. The most noteworthy creeks and streams within the study area include Rita Blanca Creek and Punta de Agua Creek, with the remaining creeks and streams being smaller tributaries of the Canadian River (Texas Water Development Board [TWDB], 2007).

3.3.2 Groundwater

The study area encompasses parts of the Ogallala and the Dockum Aquifers in Dallam and Hartley Counties, Texas.

The Ogallala Aquifer is the largest aquifer in the United States and is a major aquifer of Texas underlying much of the High Plains region. It consists of sand, gravel, clay, and silt and has a maximum thickness of 800 ft. The Ogallala Aquifer covers more than 36,497 square miles of the High Plains in the Texas Panhandle, providing water to all or parts of 47 counties. This aquifer extends through eight states northward to South Dakota; the Texas High Plains is the southernmost extension of the Great Plains physiographic province (USGS, 2003). More water is pumped from the Ogallala in Texas than from any other aquifer. Total groundwater pumping from the Ogallala in Texas was 6.0 million acre-feet during 2003 (TWDB, 2007).

The Dockum Aquifer is a minor aquifer found in the northwest portion of the state. The Dockum Aquifer consists of sand and conglomerate interbedded with layers of silt and shale. Uranium within the aquifer produces naturally occurring radioactivity and has resulted in radiation in excess of the state's primary drinking water standard. Radium also occurs in amounts above acceptable standards. Water quality in the aquifer is considered poor. Fresh water is contained in the outcrop areas in the east, while brine water occurs in the western subsurface portions of the aquifer. Water from the aquifer is used mainly for irrigation, municipal water supply, and oil field operations. Recharge is typically from rainfall in the outcrop, while discharge is primarily to wells, adjacent aquifers, and the saline zone (TWDB, 2007).

3.3.3 Floodplains

The Federal Emergency Management Agency (FEMA) does not have detailed floodplain analyses for Dallam and Hartley Counties. Therefore, no Flood Insurance Rate Maps are available to indicate the limits of the 100-year floodplain within the study area.

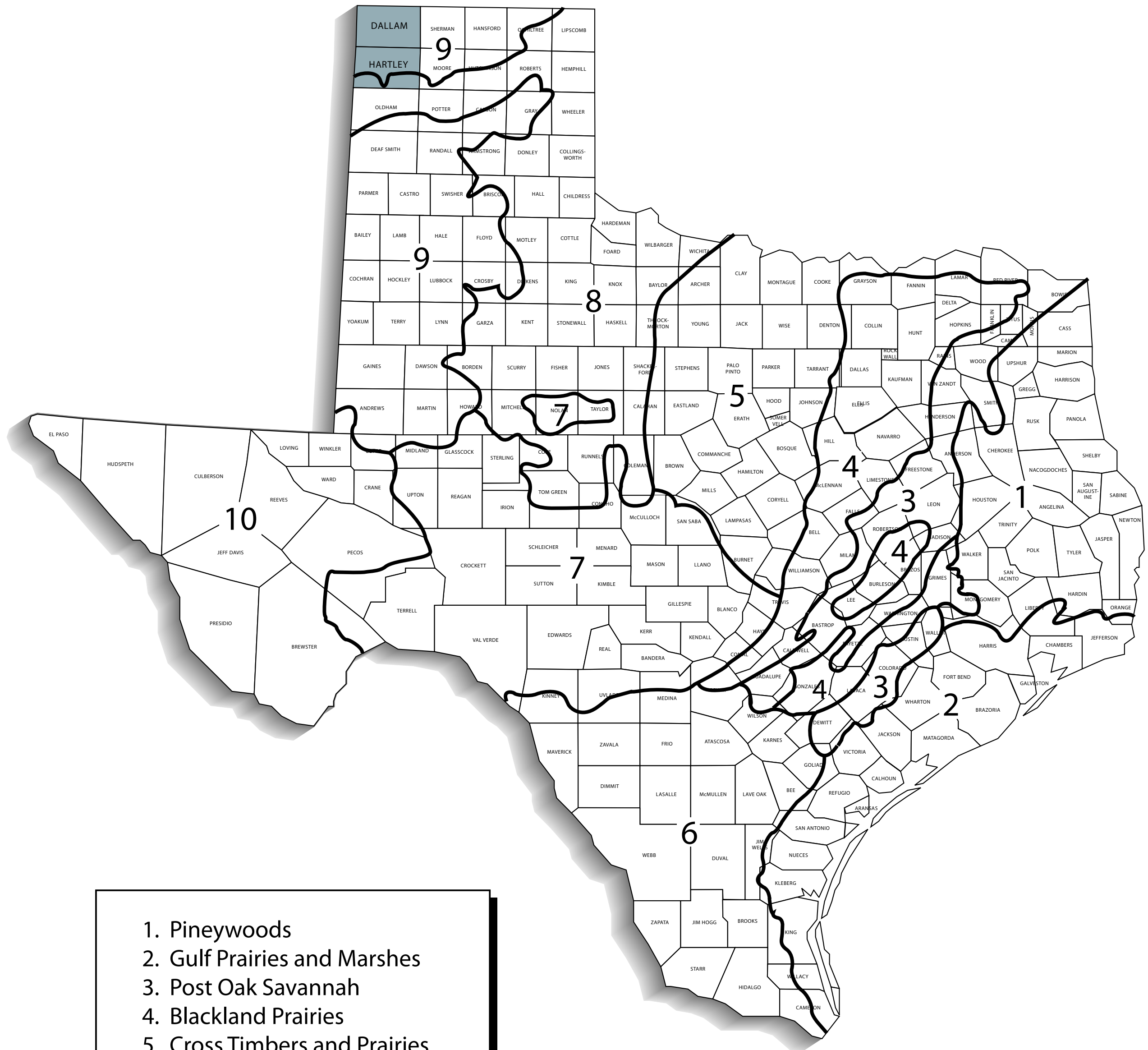
3.4 VEGETATION

3.4.1 Regional Vegetation

As shown in Figure 3-2, the study area falls within the High Plains Vegetational Areas of Texas as delineated by Hatch et al. (1990). The High Plains Vegetational Area is higher and drier than the Central Great Plains to the east, and in contrast to the irregular, mostly grassland or grazing land of the Northwestern Great Plains to the north. Much of the High Plains is characterized by smooth to slightly irregular plains with a high percentage of cropland. Grama-buffalograss is the natural vegetation in this region compared to mostly wheatgrass-needlegrass to the north, Trans-Pecos shrub savanna to the south, and taller grasses to the east. The northern boundary of this ecological region is also the approximate northern limit of winter wheat and sorghum and the southern limit of spring wheat (USGS, 2003).

Within the High Plains, the study area is located within the Rolling Sand Plains and the Canadian/Cimarron High Plains. The Rolling Sand Plains expand northward from the lip of the Canadian River trough, and they are topographically expressed as flat sandy plains or rolling dunes. In northern Texas, the vegetative cover of the Rolling Sand Plains is transitional between the Shinnery Sands to the south and the sandsage prairies of Oklahoma and Kansas to the north. Havard shin oak (*Quercus havardii*) and sand sagebrush (*Artemisia filifolia*) perform an important function of stabilizing sandy areas subject to wind erosion. The goal of both agricultural and grazing management is to keep enough vegetative cover on the land surface to minimize wind erosion. The sandsage association includes grasses such as big sandreed (*Calamovilfa gigantea*), little bluestem (*Schizachyrium scoparium*), sand dropseed (*Sporobolus cryptandrus*), and sand bluestem (*Andropogon hallii*).

The Canadian/Cimarron High Plains ecoregion includes that portion of the Llano Estacado that lies north of the Canadian River in the Texas Panhandle. Winters are more severe than on the Llano Estacado; the increased snow accumulation delays summer drought conditions because the snowmelt saturates the ground in the spring season. Although the topography is just as flat as the rest of the Llano Estacado, the northern portion has fewer playas, and it is more deeply dissected by stream channels. There is also more grazing land; the rougher terrain near the stream incisions tends to be grazed rather than tilled. In cultivated areas, corn, winter wheat, and grain sorghum are the principal crops.



1. Pineywoods
2. Gulf Prairies and Marshes
3. Post Oak Savannah
4. Blackland Prairies
5. Cross Timbers and Prairies
6. South Texas Plains
7. Edwards Plateau
8. Rolling Plains
9. High Plains
10. Trans-Pecos

north

100 0 100 200

scale in miles

Source: Hatch et al., 1990

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FIGURE 3-2

LOCATION OF DALLAM AND HARTLEY COUNTIES IN RELATION TO THE VEGETATIONAL AREAS OF TEXAS

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3.4.2 Vegetation Community Types in the Study Area

Vegetation community types occurring in the study area include upland brushland, riparian woodland, open savannah, grassland (including pasture and cropland), and hydric and aquatic habitats. The grassland community type comprises the large majority of the study area. Upland woodland and riparian woodland communities are a relatively small component within the study area due to the fact that much of the region has been converted to cropland, pastureland, and rangeland with the majority of the remaining woodlands restricted to linear, riparian zones along streams.

3.4.2.1 Terrestrial

The community types that occur within the study area, as described by McMahan et al. (1984), are Blue Grama-Buffalograss Grassland, Mesquite Shrub/Grassland, Sandsage-Havard Shin Oak Brush, and Crops. The Blue Grama-Buffalograss Grassland community type makes up the majority of the grassland areas found within the study area. These communities consist of sideoats grama (*Bouteloua curtipendula*), hairy grama (*Bouteloua hirsuta*), sand dropseed, grassland pricklypear (*Opuntia* spp.), narrowleaf yucca (*Yucca angustissima*), western ragweed (*Ambrosia psilostachya*), broom snakeweed (*Gutierrezia sarothrae*), zinnia (*Zinnia* spp.), rushpea (*Hoffmannseggia glauca*), scurfpea (*Psoralidium tenuiflora*), catclaw sensitive briar (*Schrankia nuttalli*), wild buckwheat (*Polygonum convolvulus*), and woollywhite (*Hymenopappus artemisiifolius*). The Mesquite Shrub/Grassland is located primarily in the High Plains, Rolling Plains and northwestern Edwards Plateau Vegetational Areas. These communities consist of narrow-leaf yucca, tasajillo (*Cylindropuntia leptocaulis*), juniper (*Juniperus* spp.), grassland pricklypear, blue grama (*Bouteloua gracilis*), hairy grama, purple three-awn (*Aristida purpurea*), buffalograss (*Bouteloua dactyloides*), little bluestem, western wheatgrass (*Pascopyrum smithii*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), James rushpea (*Hoffmanseggia jamesii*), scurfpea, plains beebalm (*Monarda* spp.), scarlet gaura (*Gaura coccinea*), yellow evening primrose (*Oenothera flava*), sandsage, and wild buckwheat. The Sandsage-Havard Shin Oak Brush contains most of the brushland located within the project area. This community consists of skunkbush sumac (*Rhus trilobata*), Chickasaw plum (*Prunus angustifolia*), Indiangrass, switchgrass, sand lovegrass (*Eragrostis trichodes*), big sandreed, sideoats grama, hairy grama, sand dropseed, sand paspalum (*Paspalum* spp.), scurfpea, slickseed bean (*Strophostyles leiosperma*), wild blue indigo (*Baptisia australis*), wild buckwheat, and bush morning glory (*Ipomoea leptophylla*). The crops in this area consist of cultivated cover crops or row crops providing food and/or fiber for either man or domestic animals. This type may also portray grassland associated with crop rotations. Managed pastureland is typically dominated by improved varieties of Bermudagrass (*Cynodon dactylon*) and bahiagrass (*Paspalum notatum*). Unimproved pastureland, old fields, and ROWs consist of a variety of grasses, forbs, and woody species.

3.4.2.2 Aquatic/Hydric

Aquatic habitat within the study area includes Lake Rita Blanca, Punta de Aqua Creek, Los Redos Creek, Cheyenne Creek, Rico Creek, Cottonwood Draw and Rita Blanca Creek. Vegetation in aquatic habitat is typically limited to the shallow edges of the water. Plant species common to this habitat type include black willow (*Salix nigra*), spikerushes (*Eleocharis* spp.), sedges (*Carex* spp.), cattails (*Typha* sp.), and flatsedges (*Cyperus* spp.). Additional species covering portions of the water's surface include yellow nelumbo (*Nelumbo lutea*), American waterlily (*Nymphaea odorata*), pondweed (*Potamogeton* sp.), and duckweed (*Lemna* sp.).

Hydric habitats in the study area are primarily located within the floodplains and are generally associated with streams, creeks, impoundments, and low topographic areas. Wetter portions of the study area that could be classified as hydric habitat undergo seasonal inundation and/or maintain saturated soils. Typical plant species in these portions include American elm (*Ulmus americana*), cedar elm (*Ulmus crassifolia*), and pecan (*Carya illinoinensis*). Marshes are typically found as narrow bands along the edges of ponds and streams and support such species as cattails, rushes (*Juncus* spp.), sedges, flatsedges, smartweeds (*Polygonum* spp.), bushy bluestem (*Andropogon glomeratus*), cocklebur (*Xanthium* sp.) and, occasionally, woody species such as common buttonbush (*Cephalanthus occidentalis*) and black willow.

National Wetlands Inventory (NWI) mapping on 1:24,000 topographic maps, prepared by the U.S. Fish and Wildlife Service (FWS), indicate potential wetlands scattered throughout the study area. These areas may be defined as jurisdictional wetlands by the USACE. If these areas meet the criteria necessary to define them as jurisdictional wetlands pursuant to Section 404 of the CWA, certain activities (e.g., placement of fill) within these habitats are subject to regulation.

3.4.2.3 Commercially or Recreationally Important Plant Species

Commercially important species are defined as those that are (a) commercially or recreationally valuable; are (b) endangered or threatened; (c) affect the well-being of some important species within criterion (a) or (b); and are (d) critical to the structure and function of the ecological system or are biological indicators.

Commercially important species within the study area include hay crops, row crops, and pastureland. Pastureland and cropland are extensive throughout much of the study area. Row crops cultivated within the study area include wheat, corn, oats, cotton, and sorghum.

3.4.3 Endangered and Threatened Plant Species

An endangered species is one that is in danger of extinction throughout all or a significant portion of its range, while a threatened species is one likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Proposed species are those that have been formally submitted for official listing as endangered or threatened, but have yet to be designated. In addition, the FWS has identified species that are candidates for listing as a result of identified threats to their continued existence. Candidates are those species for which the FWS has on file sufficient information on biological vulnerability and threat(s) to support them being listed as either endangered or threatened, and are likely to be proposed for listing in the foreseeable future.

The Endangered Species Act (ESA) also provides for the conservation of "critical habitat," or the areas of land, water, and air space that an endangered species needs for survival. These areas include sites with food and water, breeding areas, cover or shelter sites, and sufficient habitat to provide for normal population growth and behavior. One of the primary threats to endangered and threatened species is the destruction or modification of essential habitat areas by uncontrolled land and water development. No designated critical habitat for any endangered/threatened plant species occurs within the study area.

Information was received from the Texas Parks and Wildlife Department (TPWD) Natural Diversity Database (NDD) concerning the occurrence and location of state and federally listed plant species in the study area (TPWD, 2008). The official state list of endangered and threatened plant species promulgated by the TPWD includes the same species listed by the FWS as endangered or threatened. Currently, 29 plant species are listed by the FWS as endangered or threatened in Texas (FWS, 2009).

There are no known locations of threatened or endangered plant species occurring within the study area (TPWD, 2008).

3.4.4 Waters of the U.S., Including Wetlands

The USACE regulates waters of the U.S., including wetlands, under Section 404 of the CWA. 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 uses the regulatory term "ordinary high water mark" in describing the jurisdictional portion of a stream. This term refers to the established line on the bank or shore indicated by the fluctuation of water (an average width is determined). The USACE defines wetlands in a broad sense as transitional areas (ecotones) between terrestrial and aquatic systems where the water table is usually at or near the ground surface, or where shallow water covers the land (Cowardin et al., 1979). Wetlands generally include bogs, seeps, marshes, swamps, forested bottomland wetlands, and other similar areas (USACE, 1987). Construction activities resulting in the placement of fill materials within waters of the U.S. are subject to the regulations and restrictions outlined in Section 404 of the CWA and may require coordination with the USACE to ensure compliance.

The study area is known for its isolated wetlands that have no connection to streams or ponds. Most isolated wetlands within the study area are playa lakes and are not jurisdictional under the CWA unless hydrologic connectivity is proven. NWI maps indicate that potential wetland communities within the study area are generally palustrine (i.e., marsh) and lagustrine (i.e., lake) communities, and there are no emergent wetlands. None of the corridors for the proposed alternative routes cross any known wetlands, according to NWI mapping, but the NRCS has identified 10 individual hydric soils within the study area (Appendix A). Four of the hydric soils are present along the proposed alternative routes.

Streams containing an ordinary high water mark and/or wetlands in the study area may meet the criteria necessary to classify them as jurisdictional streams or wetlands, pursuant to Section 404. Certain activities (e.g., placement of fill) within these habitats are subject to regulation and may require some level of permitting.

3.5 WILDLIFE

3.5.1 Wildlife Habitat and Species

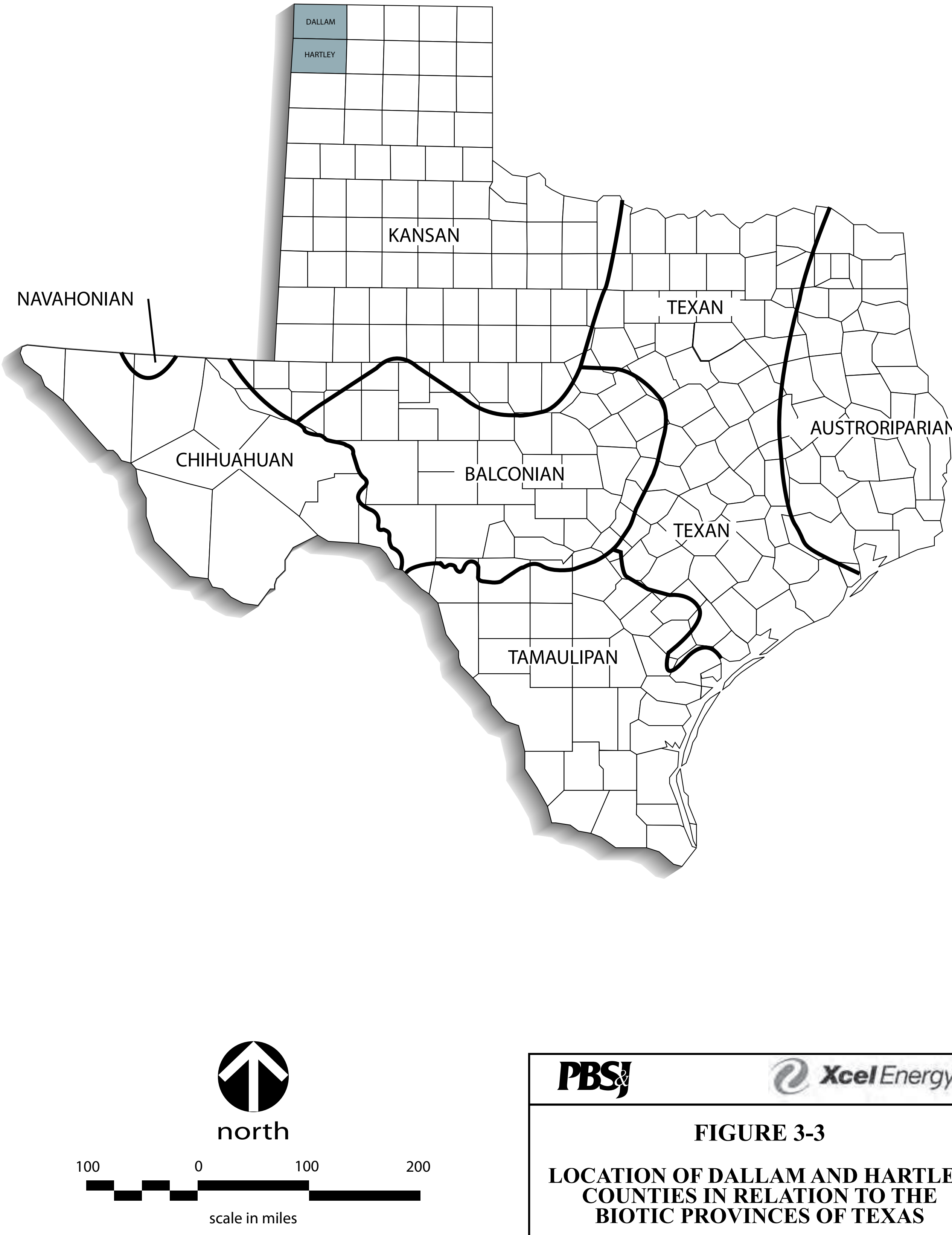
The study area lies within the Kansan Biotic Province (Figure 3-3), as described by Blair (1950). The Kansan Biotic Province is divided into three well marked biotic districts: Mixed-grass Plains district, Mesquite Plains district, and Short-grass Plains district. At least 59 species of mammals are known to have occurred in the Kansan province in recent times, in addition to 31 snake species, 14 lizards, one land turtle, 14 anurans (frogs and toads), and one urodele (salamanders and newts) (Blair, 1950). Only one snake, Brazos water snake (*Natrix harteri)*, with a restricted range in the Mesquite Plains district, is limited to the Kansan province. There are five species of mammals which are restricted to the Kansan province. These species include: swift fox (*Vulpes velox*), pocket gopher (*Geomys lutescens*), plains pocket mouse (*Perognathus flavescens*), Texas kangaroo rat (*Dipodomys elator*), and Palo Duro mouse (*Peromyscus comanche*).

Urodele fauna likely to occur in the study area include the barred tiger salamander (*Ambystoma tigrinum mavortium*), which is restricted to moist bottomland or hydric habitats (Garrett and Barker, 1987; Dixon, 2000).

3.5.2 Amphibians and Reptiles

Anuran species (frogs and toads) found in the region include the plains spadefoot (*Spea bombifrons*), New Mexico spadefoot (*Spea multiplicata*), great plains toad (*Bufo cognatus*), Woodhouse's toad (*Bufo woodhousii*), western green toad (*Bufo debilis*), red-spotted toad (*Bufo punctatus*), plains leopard frog (*Rana blairi*), bullfrog (*Rana catesbeiana*), and couch's spadefoot toad (*Scaphiopus couchii*).

Common reptiles expected to occur in the study area include the ornate box turtle (*Terrapeneornata ornata*), red-eared slider (*Trachemys scripta elegans*), yellow mud turtle (*Kinosternon flavescens flavescens*), common snapping turtle (*Chelydra serpentina serpentina*), and lizards such as the eastern collared lizard (*Crotaphytus collaris collaris*), northern earless lizard (*Holbrookia maculate maculate*), Texas horned lizard (*Phrynosoma cornutum*), southern prairie lizard (*Sceloporus undulates consobrinus*), great plains skink (*Eumeces obsoletus*), and prairie-lined racerunner (*Cnemidophorus sexlineatus viridis*). Snakes in the area include the New Mexico blind snake (*Leptotyphlops dulcis dissectus*), Kansas glossy snake (*Arizona elegans elegans*), ground snake (*Sonora semiannulata*), eastern yellow-bellied racer (*Coluber constrictor flaviventris*), prairie ring-necked snake (*Diadophis punctatus arnyi*), plains hog-nosed snake (*Heterodon nasicus nasicus*), Brazos water snake, central plains milk snake (*Lampropeltis triangulum gentilis*), western coachwhip (*Masticophis flagellum testaceus*), bull snake (*Pituophis catenifer sayi*), mountain patch-nosed snake (*Salvadora grahamiae grahamiae*), plains black-headed snake (*Tantilla nigriceps nigriceps*), blotched water snake (*Nerodia erythrogaster transversa*), Texas night snake (*Hypsiglena torquata jani*), Texas longnose snake (*Rhinocheilus lecontei tessellates*), western garter snake (*Thamnophis radix haydenii*), checkered garter snake (*Thamnophis marcianus marcianus*),



Source: Blair, 1950

PBSJ Xcel Energy

FIGURE 3-3

LOCATION OF DALLAM AND HARTLEY COUNTIES IN RELATION TO THE BIOTIC PROVINCES OF TEXAS

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New Mexico garter snake (*Thamnophis sirtalis dorsalis*), prairie kingsnake (*Lampropeltis calligaster calligaster*), great plains rat snake (*Elaphe guttata emoryi*), desert kingsnake (*Lampropeltis getula splendida*), and speckled kingsnake (*Lampropeltis getula holbrooki*). A couple venomous species also occur in the region, including the western diamondback rattlesnake (*Crotalus atrox*), and prairie rattlesnake (*Crotalus viridis viridis*) (Garrett and Barker, 1987; Tennant, 1998; Dixon, 2000).

3.5.3 Birds

Numerous avian species are found within the study area. Year-round residents include the eared grebe (*Podilymbus podiceps*), black-crowned night-heron (*Nycticorax nycticorax*), white-faced ibis (*Plegadis chihi*), great blue heron (*Ardea herodias*), turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperii*), ferruginous hawk (*Buteo regalis*), peregrine falcon (*Falco peregrinus*), American kestrel (*Falco sparverius*), ring-necked pheasant (*Phasianus colchicus*), scaled quail (*Callipepla squamata*), northern bobwhite (*Colinus virginianus*), American coot (*Fulica americana*), killdeer (*Charadrius vociferus*), mourning dove (*Zenaida macroura*), white-winged dove (*Zenaida asiatica*), greater roadrunner (*Geococcyx californianus*), barn owl (*Tyto alba*), burrowing owl (*Athene cunicularia*), great horned owl (*Bubo virginianus*), belted kingfisher (*Ceryle alcyon*), northern flicker (*Colaptes auratus*), red-headed woodpecker (*Melanerpes erythrocephalus*), downy woodpecker (*Picoides pubescens*), ladder-backed woodpecker (*Picoides scalaris*), eastern phoebe (*Sayornis phoebe*), loggerhead shrike (*Lanius ludovicianus*), brown thrasher (*Toxostoma rufum*), curve-billed thrasher (*Toxostoma curvirostre*), blue jay (*Cyanocitta cristata*), American crow (*Corvus brachyrhynchos*), Chihuahuan raven (*Corvus cryptoleucus*), horned lark (*Eremophila alpestris*), blue-gray gnatcatcher (*Polioptila caerulae*), American robin (*Turdus migratorius*), cedar waxwing (*Bombycilla cedrorum*), common yellowthroat (*Geothlypis trichas*), spotted towhee (*Pipilo maculatus*), red-breasted nuthatch (*Sitta canadensis*), rock wren (*Salpinctes obsoletus*), Bewick's wren (*Thryomanes bewickii*), house wren (*Troglodytes aedon*), chipping sparrow (*Spizella passerine*), vesper sparrow (*Pooecetes gramineus*), Lark sparrow (*Chondestes grammacus*), savannah sparrow (*Passerculus sandwichensis*), song sparrow (*Melospiza melodia*), Bullock's oriole (*Icterus bullockii*), lark bunting (*Calamospiza melanocorys*), house finch (*Carpodacus mexicanus*), red crossbill (*Loxia curvirostra*), pine siskin (*Carduelis pinus*), American goldfinch (*Carduelis tristis*), eastern bluebird (*Sialia sialis*), northern mockingbird (*Mimus polyglottos*), European starling (*Sturnus vulgaris*), northern cardinal (*Cardinalis cardinalis*), red-winged blackbird (*Agelaius phoeniceus*), eastern meadowlark (*Sturnella magna*), western meadowlark (*Sturnella neglecta*), yellow-headed blackbird (*Xanthocephalus xanthocephalus*), common grackle (*Quiscalus quiscala*), great-tailed grackle (*Quiscalus mexicanus*), brown-headed cowbird (*Molothrus ater*), field sparrow (*Spizella pusilla*), and house sparrow (*Passer domesticus*) (Texas Ornithological Society [TOS], 1995; Seyffert, 2002).

Many species of birds migrate through the study area in the spring and fall, including such winter residents as the mallard (*Anas platyrhychos*), blue-winged teal (*Anas discors*), green-winged teal (*Anas crecca*), canvasback (*Aythya valisineria*), redhead (*Aythya americana*), ruddy duck (*Oxyura jamaicensis*), cinnamon teal (*Anas cyanoptera*), northern shoveler (*Anas clypeata*), northern pintail (*Anas acuta*), American wigeon (*Anas americana*), snow goose (*Chen caerulescens*), Ross's goose (*Chen rosii*), Canada goose (*Branta canadensis*), American white pelican (*Pelecanus erythrorhynchos*), Mississippi kite (*Ictinia mississippiensis*), bald eagle (*Haliaeetus leucocephalus*), merlin (*Falco columbarius*), prairie falcon (*Falco mexicanus*), sandhill crane (*Grus canadensis*), common snipe (*Gallinago gallinago*), common nighthawk (*Chordeiles minor*), common poorwill (*Phalaenoptilus nuttallii*), scissor-tailed flycatcher (*Tyrannus forficatus*), northern shrike (*Lanius excubitor*), common raven (*Corvus corax*), ruby-crowned kinglet (*Regulus calendula*), Townsend's solitaire (*Myadestes townsendi*), Swainson's thrush (*Catharus ustulatus*), hermit thrush (*Catharus guttatus*), yellow-rumped warbler (*Dendroica coronata*), American tree sparrow (*Spizella arborea*), clay-colored sparrow (*Spizella pallida*), white-crowned sparrow (*Zonotrichia leucophrys*), grasshopper sparrow (*Ammodramus savannarum*), white-throated sparrow (*Zonotrichia albicollis*), Lincoln's sparrow (*Melospiza lincolnii*), McCown's longspur (*Calcarius mccownii*), Lapland longspur (*Calcarius lapponicus*), and dark-eyed Junco (*Junco hyemalis*). Summer migrant species expected to reside in the study area during the summer months include cattle egret (*Bubulcus ibis*), American bittern (*Botaurus lentiginosus*), green heron (*Butorides virescens*), chimney swift (*Chaetura pelagica*), Swainson's hawk (*Buteo swainsoni*), eastern kingbird (*Tyrannus tyrannus*), cliff swallow (*Petrochelidon pyrrhonota*), barn swallow (Hirundo rustica), Cassin's sparrow (*Aimophila cassinii*), blue grosbeak (*Guiraca caerulea*), western kingbird (*Tyrannus verticalis*), painted bunting (*Passerina ciris*), dickcissel (*Spiza americana*), western tanager (*Piranga ludoviciana*), yellow warbler (*Dendroica petechia*), orchard oriole (*Icterus spurius*), and black-and-white warbler (*Mniotilta varia*). Numerous other migrating species, such as arctic shorebirds wintering on the Gulf coast, northern passerines wintering in Central and South America, raptors, and waterfowl, pass through or over the study area during spring and fall migrations (TOS, 1995; Seyffert, 2002).

3.5.4 Mammals

Common mammals of this region include the Virginia opossum (*Didelphis virginiana*), desert shrew (*Notiosorex crawfordi*), least shrew (*Cryptotis parva*), eastern mole (*Scalopus aquaticus*), hoary bat (*Lasiurus cinereus*), big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), western pipistrelle (*Pipistrellus Hesperus*), Townsend's big-eared bat (*Corynorhinus townsendii*), Pallid bat (*Antrozous pallidus*), Brazilian free-tailed bat (*Tadarida brasiliensis*), eastern red bat (*Lasiurus borealis*), nine-banded armadillo (*Dasypus novemcinctus*), eastern cottontail (*Sylvilagus floridanus*), desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), eastern fox squirrel (*Sciurus niger*), spotted ground squirrel (*Spermophilus spilosoma*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), black-tailed prairie dog (*Cynomys ludovicianus*), plains pocket gopher (*Geomys bursarius*), yellow-faced pocket gopher (*Cratogeomys castanops*), plains pocket mouse (*Perognathus flavescens*), silky pocket mouse (*Perognathus flavus*), hispid pocket mouse (*Chaetodipus hispidus*), Ord's kangaroo rat (*Dipodomys ordii*), beaver (*Castor canadensis*), western harvest mouse (*Reithrodontomys megalotis*), plains harvest mouse (*Reithrodontomys montanus*), white-footed mouse (*Peromyscus leucopus*), deer mouse (*Peromyscus maniculatus*), northern pygmy mouse (*Baiomys taylori*), northern grasshopper mouse (*Onychomys leucogaster*), hispid cotton rat (*Sigmodon hispidus*), eastern white-throated woodrat (*Neotoma leucodon*), southern plains woodrat (*Neotoma micropus*), porcupine (*Erethizon dorsatum*), coyote (*Canis latrans*), Kit fox (*Vulpes velox*), gray fox (*Urocyon cinereoargenteus*), ringtail (*Bassariscus astutus*), common raccoon (*Procyon lotor*), American badger (*Taxidea taxus*), striped skunk (*Mephitis mephitis*), eastern spotted skunk (*Spilogale putorius*), mountain lion (*Puma concolor*), bobcat (*Lynx rufus*), pronghorn (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), and white-tailed deer (*Odocoileus virginianus*) (Davis and Schmidly, 1994; Manning and Jones, 1998; Schmidly, 2004).

3.5.5 Commercially or Recreationally Important Animal Species

As stated in Section 3.4.2.3, a species is considered commercially important if one or more of the following criteria applies: (a) the species is recreationally or commercially valuable; (b) the species is endangered or threatened; (c) the species affects the well-being of some important species within criterion (a) or criterion (b); and (d) the species is critical to the structure and function of the ecological system or is a biological indicator.

Wildlife resources within the study area provide human benefits as a result of both consumptive and nonconsumptive uses. Nonconsumptive uses include activities such as observing and photographing wildlife, birdwatching, etc. These uses, although difficult to quantify, deserve consideration in the evaluation of the wildlife resources of the study area. Consumptive uses of wildlife species, such as hunting and trapping, are more easily quantifiable. Consumptive and nonconsumptive uses of wildlife are often enjoyed simultaneously and are generally compatible. Many species occurring in the study area provide consumptive uses, and all provide the potential for nonconsumptive benefits.

The white-tailed deer is the most important big game mammal in Texas. Deer require woodlands containing good shrub layers that provide food and cover. Edge situations are often favored for browsing. Although food habits vary regionally and seasonally, twigs of shrubs and trees, acorns, and various forbs and grasses make up most of a deer's diet (Martin et al., 1951). The TPWD divides the counties of Texas into wildlife districts for white-tailed deer management with Dallam and Hartley counties falling within the High Plains wildlife district. Distribution of white-tailed deer is limited to the northern border of Dallam County. In Hartley County their populations are limited to the southwestern portion of the county.

Other game species regularly hunted within the High Plains region are the pheasant, northern bobwhite, scaled quail, dove, rabbits, and numerous species of migratory waterfowl (NRCS, 1975; Sullivan, 1997; Peterson, 1998; Perez, 1998).

3.5.6 Endangered and Threatened Animal Species

Table 3-1 lists those fish and wildlife species with a geographic range that includes Dallam and Hartley counties and that are considered by FWS and/or TPWD to be endangered, threatened, or rare. Sources reviewed to develop the list include FWS (2009), TPWD NDD (TPWD, 2008), and TPWD County Lists

Table 3-1

Endangered, Threatened and Rare Wildlife And Plants of Potential Occurrence in Dallam And Hartley Counties[1]

Common Name[2]	Scientific Name[2]	Status[3] FWS	Status[3] TPWD	Known Occurrence in the Study Area
BIRDS				
Whooping crane	*Grus americana*	E	E	
Bald eagle	*Haliaeetus leucocephalus*	DL	T	
Mountain plover	*Charadrius montanus*	NL	R	Y
American peregrine falcon	*Falco peregrinus anatum*	DL	T	
Arctic peregrine falcon	*Falco peregrinus tundrius*	DL	R	
Baird's sparrow	*Ammodramus bairdii*	NL	R	
Western burrowing owl	*Athene cunicularia hypugaea*	NL	R	
Ferruginous hawk	*Buteo regalis*	NL	R	
Lesser prairie chicken	*Tympanuchus pallidicinctus*	C	R	
Prairie falcon	*Falco mexicanus*	NL	R	
Peregrine falcon	*Falco peregrinus*	DL	T	
INSECTS				
Wiest's sphinx moth	*Euproserpinus wiesti*	NL	R	
MAMMALS				
Big free-tailed bat	*Nyctinomops macrotis*	NL	R	
Black bear	*Ursus americanus*	T/SA;NL	T	
Black-footed ferret	*Mustela nigripes*	E	R	
Black-tailed prairie dog	*Cynomys ludovicianus*	NL	R	Y
Gray wolf	*Canis lupus*	E	E	
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	NL	R	
Plains spotted skunk	*Spilogale putorius interrupta*	NL	R	
Swift fox	*Vulpes velox*	NL	R	
Western small-footed bat	*Myotis ciliolabrum*	NL	R	
REPTILES				
Texas horned lizard	*Phrynosoma cornutum*	NL	T	

[1]According to FWS (2009), NDD (2008), TPWD County list (2009).
[2]Nomenclature follows Crother (2000), Crother et. al (2001), Hatch et al. (1990), Hubbs et al. (1991), AOU (1998, 2000, 2002, 2003, 2004, 2005, 2006, 2007), and Manning and Jones (1998).
[3]FWS – U.S. Fish and Wildlife Service.
TPWD – Texas Parks and Wildlife Department.
E – Endangered; in danger of extinction.
T – Threatened; severely depleted or impacted by man.
DL – Formerly listed as threatened or endangered, but due to significant population increases has officially been removed from threatened or endangered status.
R – State listed as rare, but with no regulatory listing status.
NL – Not listed.
C – Candidate Species.
T/SA - Threatened/Similarity of Appearance

(2009). It should be noted that inclusion on the list does not imply that a species is known to occur in the study area, but only acknowledges the potential for occurrence. Only those species listed as endangered or threatened by FWS are afforded federal protection.

Two species listed in Table 3-1 are considered by both the FWS and TPWD as endangered. These are the whooping crane (*Grus americana*) and the gray wolf (*Canis lupus)*. The black-footed ferret (*Mustela nigripes*) is listed as endangered by the FWS. The FWS lists the lesser prairie chicken (*Tympanuchus pallidicinctus)* as a candidate species.

While not listed by the FWS, 18 of the remaining species in Table 3-1 are state-listed as threatened, endangered, or rare by TPWD. The species that are state-listed as threatened are the bald eagle, American peregrine falcon, peregrine falcon, black bear, and Texas horned lizard. The remaining 12 species are not listed by the FWS and are state-listed as rare. They are the mountain plover, Arctic peregrine falcon, Baird's sparrow, western burrowing owl, ferruginous hawk, prairie falcon, Wiest's sphinx moth, big free-tailed bat, black-tailed prairie dog, pale Townsend's big-eared bat, plains spotted skunk, swift fox, and the western small-footed bat.

Information was received from the TPWD NDD concerning the occurrence and location of state and federally listed species in the study area (NDD, 2008). The official state list of endangered and threatened animal species promulgated by the TPWD includes the same species listed by the FWS as endangered or threatened. Species considered rare by TPWD that have known occurrences within the study area are the mountain plover and the black-tailed prairie dog.

The mountain plover nests in high plains or shortgrass prairies, always on the ground in shallow depressions. During nonbreeding season the mountain plover will occupy short grass plains, bare dirt, and plowed fields. They are primarily insectivorous. One known occurrence can be found in the southern part of the study area, just north of the community of Channing, Texas.

The black-tailed prairie dog is scattered throughout the study area. It occupies dry, flat, short grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle. The areas of occupancy are large underground networks of tunnels sometimes consisting of hundreds of individuals known as "Prairie Dog Towns."

3.6 AQUATIC ECOLOGY

3.6.1 Aquatic Habitats and Species

As mentioned previously, the study area lies in the Kansan Biotic Province. Although the various biotic provinces were originally separated on the basis of terrestrial animal distributions, Hubbs (1957) has shown that the distribution of freshwater fishes within the state generally corresponds with the terrestrial-vertebrate province boundaries, although northeast Texas and the coastal zone show a number of departures from this general rule.

The aquatic habitats in the study area are dominated by Punta de Aqua Creek, Los Redos Creek, Cheyenne Creeks, Rico Creek, Cottonwood Draw, Rita Blanca Creek, intermittent streams, ephemeral streams, and man-made impoundments.

The manmade ponds located in the study area exhibit variability in terms of their age, drainage, use by cattle, and past stocking and fertilization history. Unlike the creeks and streams of the area, these aquatic habitats are almost always exposed to full sunlight and do not experience the large fluctuations in water level and flow associated with streams during heavy precipitation. Bottom materials in these ponds are universally silt-sized to clay-sized particles, either naturally occurring where the pond was built or added as a liner to prevent its leaking.

In stream reaches dominated by scoured, sandy-clay bottoms, accumulations of woody debris or leaf pack provide the most important feeding and refuge areas for invertebrates and forage fish. While this material is also an important habitat component in reaches with soft, muddy substrate, the softer bottoms also generally harbor substantial populations of burrowing invertebrates (e.g., larval diptera and oligochaetes), which may be an important food resource at higher trophic levels.

The streams of the study area support aquatic species primarily adapted to ephemeral pool habitats. Because they consist of small headwater drainages in a predominantly sandy clay substrate, flow is unlikely to be sufficiently persistent to support any substantial lotic assemblage. Stream inhabitants will, instead, be species adapted to rapid dispersal and completion of life cycles in pool habitats having fine-grained substrates.

Fish are prominent in the trophic structure of most streams, being the largest and most conspicuous of the ecosystem's resident consumers. Extensive environmental changes in an area can lead directly or indirectly to changes in the feeding habits of fish. However, changes in available feeding levels are not necessarily detrimental, unless the organism's feeding habits are very specialized. Food habits of fish vary with season, food availability and life cycle stages. For example, the diet of most young fish consists of microscopic plants and animals including algae, protozoans and crustaceans found on plants, in bottom material or suspended in the water column. As fish develop and attain sexual maturity, feeding adaptations develop and the diets of some species become very restricted. Some fish are herbivorous, while others (e.g., bass) are strictly carnivorous. Most of the sunfish (*Lepomis* spp.) and catfish (*Ictalurus punctatus*) are omnivorous.

According to Lee et al. (1980) and Hubbs et al. (1991), up to 100 species of freshwater fish are known to occur in this region of Texas. However, not all of these species would occur in the particular habitats available in the study area based on the size and characteristics of the various water bodies. Most of the creek segments in the area are either too small or ephemeral to offer habitat to larger species, especially gamefish. The headwater segments of the feeder tributaries probably host minnows (*Notropis* spp.), mosquitofish (*Gambusia affinis*), red shiner (*Cyprinella lutrensis*), and darters (*Etheostoma* spp.), with some younger members of larger species. With distance downstream, especially in pooled areas, the fish community tends to be heavily dominated by sunfish that are probably widely distributed in area streams when sufficient water is present. Impoundments within the study area support various gamefish such as the largemouth bass (*Micropterus salmoides*), channel catfish, and various species of sunfish.

3.6.2 Important Species

Streams in the study area are generally too small to provide or support any substantial recreational or commercial fishery. The majority of sport fish in the creeks would either be too small, or found in such low numbers, that few people would fish them. Instead, the major impoundments and large creeks in the study area, like Palo Duro Creek, provide the bulk of the recreational fishery. Pond habitats in the area typically provide a private recreational fishery for landowners and their guests. No commercial fishery is known to occur in the study area.

Important gamefish and recreational species expected to occur in the lakes and aquatic habitats of the study area include the largemouth bass, white crappie, black crappie (*Pomoxis nigromaculatus*), striped bass, white bass, channel catfish, green sunfish (*Lepomis cyanellus)*, and bluegill (*Lepomis macrochirus*). Threadfin shad (*Dorosoma petenense*), brook silverside (*Labidesthes sicculus*), sunfishes, and gizzard shad (*Dorosoma cepedianum*) are important forage species. Important rough species include gar (*Lepisosteus* spp.) and several species of catfish.

3.7 SOCIOECONOMICS

This section presents a summary of economic and demographic characteristics of Dallam and Hartley counties and the State of Texas and briefly describes the socioeconomic environment of the study area. The study area is located entirely within Dallam and Hartley counties. Literature sources reviewed include publications of the Texas Water Development Board (TWDB), Texas Workforce Commission (TWC), the U.S. Census Bureau, and the Bureau of Labor Statistics (BLS).

3.7.1 Population Trends

As shown in Table 3-2 and Figure 3-4, the populations of both Dallam County and Hartley County have experienced overall increases since 1990. The population of Dallam County increased by approximately 14% between 1990 and 2000, while the population of Hartley County increased by approximately 52% during the same period. The populations of both counties decreased slightly between 2000 and 2007, by 1.6% (Dallam County) and 6.5% (Hartley County). Meanwhile, the State of Texas's population increased consistently from 1990 to 2007, from 16,986,510 persons in 1990 to an estimated 23,904,380 persons in 2007 (an increase of 41%) (U.S. Census Bureau, 1990, 2000, and 2009).

According to population projections published by the TWDB, the populations of Dallam and Hartley counties, and the state, are expected to increase between 2000 and 2030. The state's population is expected to increase by 38% between 2000 and 2030, while Dallam County's population is expected to increase by 26%, and Hartley County's population is expected to increase by 16% (TWDB, 2006).

Table 3-2

Population Trends and Projections

Place	Population					
	1990	**2000**	**2007 (est.)**	**2010**	**2020**	**2030**
Dallam County	5,461	6,222	6,125	6,851	7,387	7,724
Hartley County	3,634	5,537	5,179	5,697	5,889	5,989
Texas	16,986,510	20,851,820	23,904,380	24,915,388	29,117,537	33,052,506
	% change 90-00	**% change 2000-2007**	**AAI* 90-2007**	**Projected Increase 2000-30**	**AAI* 2000-30**	
Dallam County	13.94%	-1.56%	0.72%	26.11%	0.87%	
Hartley County	52.37%	-6.47%	2.50%	15.64%	0.52%	
Texas	22.76%	14.64%	2.40%	38.27%	1.28%	

AAI = Annual Average Increase

3.7.2 Employment

As shown in Figure 3-5, the labor force of Dallam County has fluctuated since 2000, while Hartley County's and the state's labor forces have steadily increased. The labor force in Dallam County decreased between 2000 and 2005, and then increased between 2005 and December of 2008, for an overall increase of 6.9%. Hartley County's labor force increased from 2000 through December of 2008, for an overall increase of 3.3%. The state's labor force increased consistently between 2000 and December 2008, for an overall increase of 14.1% (BLS, 2009).

The unemployment rates of both counties and the state experienced similar trends between 2000 and December 2008. All experienced an increase between 2000 and 2005, and then decreased between 2005 and December 2008 (BLS, 2009).

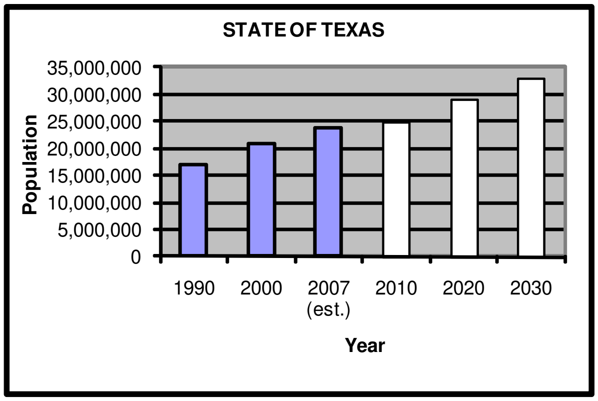
Table 3-3

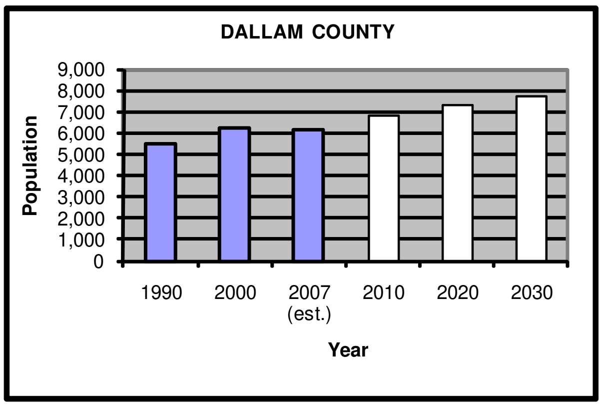
Civilian Labor Force and Unemployment

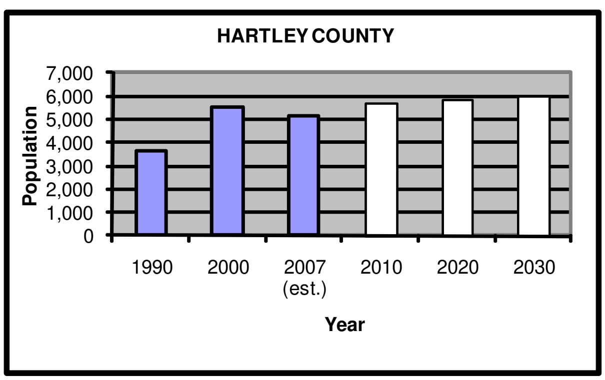
	Labor Force			Unemployment Rate		
	2000	**2005**	**2008**	**2000**	**2005**	**2008**
Dallam County	3,277	3,099	3,502	4.4%	5.4%	3.2%
Hartley County	2,425	2,286	2,494	3.2%	3.9%	3.3%
State of Texas	10,347,847	11,196,284	11,809,216	4.4%	5.4%	5.0%

	Civilian Labor Force		
		% annual Increase 2000-2005	**% increase 2005-present**
Dallam County		-1.09%	13.00%
Hartley County		-1.10%	10.91%
State of Texas		1.64%	5.47%

FIGURE 3-4
POPULATION TRENDS AND PROJECTIONS







Source: U.S. Census Bureau, 1990, 2000, 2009; TWDB, 2006

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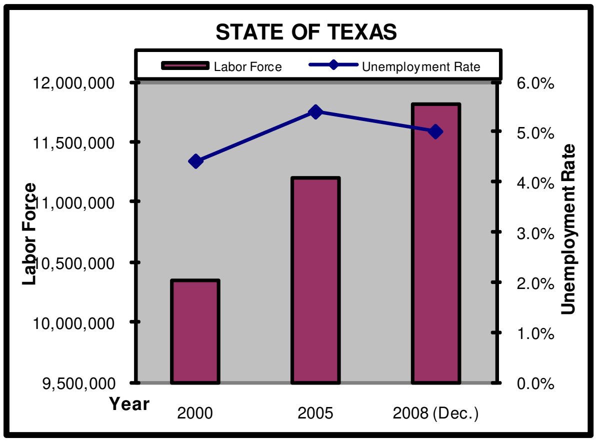
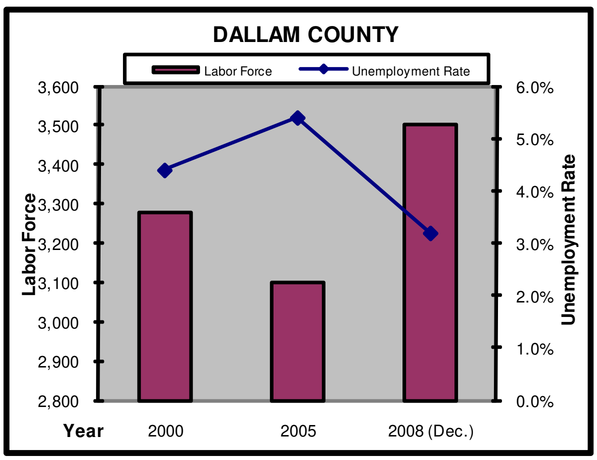
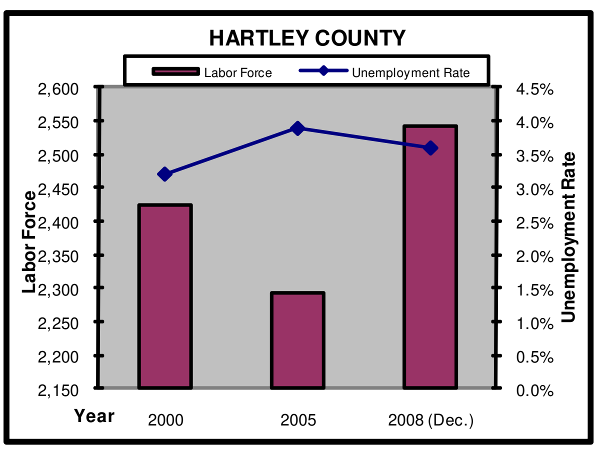
FIGURE 3-5
CIVILIAN LABOR FORCE AND UNEMPLOYMENT







Source: TWC, 2009

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3.7.3 Leading Economic Sectors

Covered employment data incorporates jobs that are located within the county and state. It includes workers who are covered by state unemployment insurance and most agricultural employees. The employment count includes all corporation officials, executives, supervisory personnel, clerical workers, wage earners, pieceworkers, and part-time workers. The data excludes employment covered by the Railroad Retirement Act, self-employed persons, and unpaid family workers. A comparison of third quarter covered employment data between 2003 and 2008 show the total number of jobs in Dallam County increased from 3,291 to 3,857 (an increase of 17.2%), while the total number of jobs within Hartley County increased from 1,058 to 1,423 (an increase of 34.5%). During the same five-year period, covered employment at the state level increased from 9,178,177 to 10,427,514 (an increase of 13.6%) (TWC, 2009).

As shown in Figure 3-6, the leading economic sectors in the third quarter of 2008 for Dallam County were natural resources and mining (25%), trade, transportation, and utilities (21%), and federal, state, and local government (15%). The leading sectors for Hartley County were federal, state, and local government (39%), and natural resources and mining (26%). For the State of Texas, the leading economic sectors were trade, transportation, and utilities (21%), federal, state, and local government (16%), and professional and business services (13%) (TWC, 2009).

3.7.4 Agriculture

Agriculture is an important segment of the economy throughout the Panhandle and is represented mostly by pastureland and cropland. Aerial figures of the study area (Figures 2-3 and 2-4) illustrate the extent of circle pivot irrigation and dry land agricultural areas. Dallam and Hartley counties are located within the Texas Agricultural Statistics Service District 1, the Northern High Plains Region (National Agricultural Statistics Service [NASS], 2008a). Dallam County livestock includes beef and milk cattle, angora goats and sheep and crops include corn for grain, oats, sorghum for grain, sunflower and wheat (NASS, 2008b). Hartley County produces the same livestock and crops, with the exception of oats (NASS, 2008b).

Primarily, the only areas not under some type of agricultural production in the study area are developed towns and cities and the steeper topographical features (“breaks”) of Rita Blanca Creek and Punta de Agua Creek, tributaries to the Canadian River.

Table 3-4

Covered Employment and Major Economic Sectors
3rd Quarter 2003 and 2008

Dallam County

Employment Sector	3rd Quarter Emp.		% Total Employment		% Change
	2003	2008	2003	2008	2003-2008
Natural Resources & Mining	674	958	20.48%	24.84%	42.14%
Construction	134	227	4.07%	5.89%	69.40%
Manufacturing	55	347	1.67%	9.00%	530.91%
Trade, Transportation & Utilities	837	792	25.43%	20.53%	-5.38%
Information	20	69	0.61%	1.79%	245.00%
Financial Activities	187	148	5.68%	3.84%	-20.86%
Professional & Business Services	136	111	4.13%	2.88%	-18.38%
Education & Health Services	52	52	1.58%	1.35%	0.00%
Leisure & Hospitality	274	471	8.33%	12.21%	71.90%
Other Services	86	98	2.61%	2.54%	13.95%
Unclassified	7	5	0.21%	0.13%	-28.57%
Federal/State/Local Government	829	579	25.19%	15.01%	-30.16%
Total Employment	**3,291**	**3,857**			**17.20%**

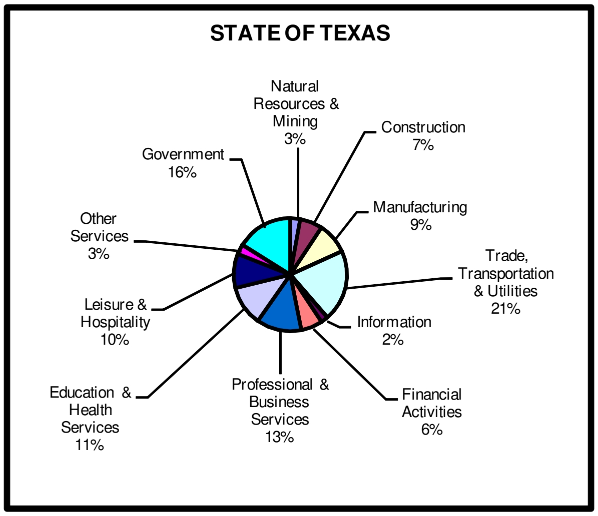
Hartley County

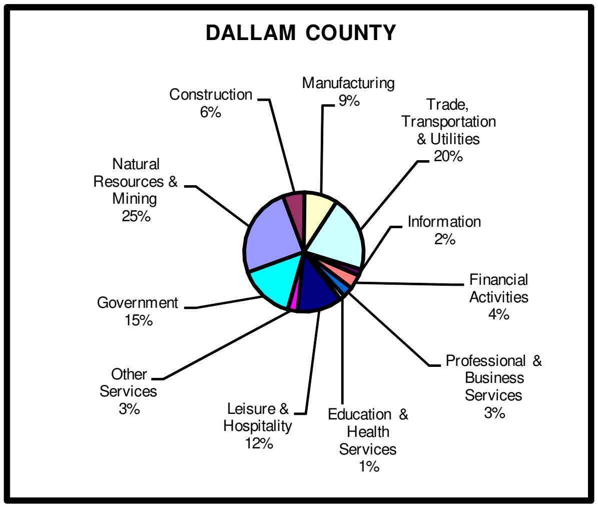
Employment Sector	3rd Quarter Emp.		% Total Employment		% Change
	2003	2008	2003	2008	2003-2008
Natural Resources & Mining	284	366	26.84%	25.72%	28.87%
Construction	61	96	5.77%	6.75%	57.38%
Trade, Transportation & Utilities	297	262	28.07%	18.41%	-11.78%
Financial Activities	18	35	1.70%	2.46%	94.44%
Professional & Business Services	24	43	2.27%	3.02%	79.17%
Education & Health Services	33	38	3.12%	2.67%	15.15%
Leisure & Hospitality	39	11	3.69%	0.77%	-71.79%
Other Services	31	20	2.93%	1.41%	-35.48%
Federal/State/Local Government	271	552	25.61%	38.79%	103.69%
Total Employment	**1,058**	**1,423**			

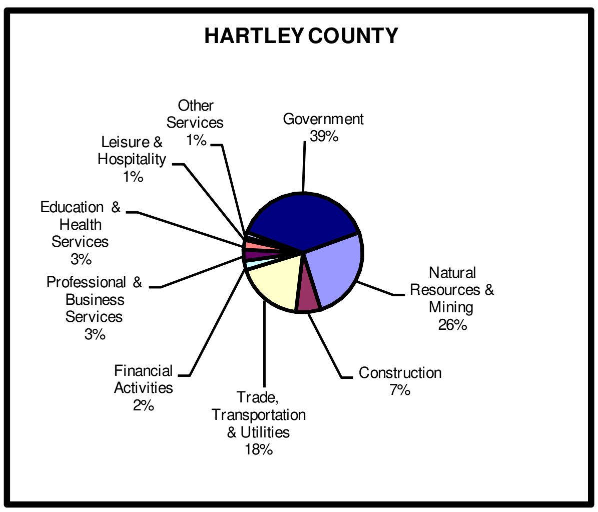
State of Texas

Employment Sector	3rd Quarter Emp.		% Total Employment		% Change
	2003	2008	2003	2008	2003-2008
Natural Resources & Mining	210,034	291,705	2.29%	2.80%	38.88%
Construction	556,431	677,104	6.06%	6.49%	21.69%
Manufacturing	898,003	927,828	9.78%	8.90%	3.32%
Trade, Transportation & Utilities	1,901,894	2,132,463	20.72%	20.45%	12.12%
Information	234,857	216,948	2.56%	2.08%	-7.63%
Financial Activities	578,894	642,972	6.31%	6.17%	11.07%
Professional & Business Services	1,044,815	1,340,320	11.38%	12.85%	28.28%
Education & Health Services	1,025,801	1,196,690	11.18%	11.48%	16.66%
Leisure & Hospitality	875,280	1,022,257	9.54%	9.80%	16.79%
Other Services	274,608	296,039	2.99%	2.84%	7.80%
Unclassified	10,772	7,490	0.12%	0.07%	-30.47%
Federal/State/Local Government	1,566,788	1,675,698	17.07%	16.07%	6.95%
Total Employment	**9,178,177**	**10,427,514**			**13.61%**

FIGURE 3-6
COVERED EMPLOYMENT AND MAJOR ECONOMIC SECTORS
3RD QUARTER 2008







Source: TWC, 2009

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3.7.5 Community Values

The term "community values" is included as a factor for the consideration of transmission line certification under Section 37.056(c)(4) of the Public Utility Regulatory Act (PURA), although the term has not been specifically defined for regulatory purposes by the PUC.

For the purposes of evaluating the effects of the proposed transmission line, PBS&J has defined the term community values as a "shared appreciation of an area or other natural or human resource by a national, regional, or local community."

3.8 LAND USE, AESTHETICS, AND RECREATION

3.8.1 Land Use

The study area includes portions of Dallam and Hartley Counties, Texas, and encompasses the communities of Chamberlin, Dalhart, Hartley, Rehm, Exum and Channing. Development is generally concentrated in the cities and towns located along major roadways; however, rural single-family residences and farm operations are scattered throughout the study area along the various farm-to-market (FM) and county roads (CR). Major roadway corridors include US 385, US 87, US 54, and SH 354 (TxDOT, 2006).

PBS&J solicited information from Dallam and Hartley counties, economic development boards, chambers of commerce, independent school districts, and various state and federal agencies regarding environmental and/or land use constraints within the study area (See Appendix A: Agency Correspondence).

3.8.2 Aesthetic Values

Aesthetics is considered in the transmission facility evaluation in Section 37.056(c) (4) (A)–(D) of the Texas Utilities Code. For the purposes of this study, the term aesthetics is defined by PBS&J as the subjective perception of natural beauty in a landscape and scenic qualities which may be perceived from the proposed facilities.

Consideration of the visual environment includes a determination of aesthetic values (where the major potential effect of a project on the resource is considered visual) and recreational values (where the location of a transmission line could potentially affect the scenic enjoyment of the area). PBS&J considered the following aesthetic values in this study that combine to give an area its aesthetic identity:

- topographical variation (hills, valleys, etc.);
- prominence of water in the landscape (rivers, lakes, etc.);
- vegetation variety (woodlands, meadows);
- diversity of scenic elements;

- degree of human development or alteration; and
- overall uniqueness of the scenic environment compared with the larger region.

The immense flat sandy plain of the study area is north of the Llano Estacado (U.S. Geological Survey [USGS], 2000) that spans into New Mexico and a large part of the Texas Panhandle. It is one of the largest expanses of near featureless terrain in the U.S. North of the Canadian River, the study area exhibits similar topographical features to the Llano Estacado (flat expansive terrain) dissected by the eroded breaks along tributaries to the Canadian River (Rita Blanca Creek and Punta de Agua Creek). While these vast views are occasionally interrupted by localized wind farm and oil and gas development structures, the intensely rural character of the area supports the Texas Economic Development and Tourism Office's claim that the region has the "clearest and brightest star-filled evening skies you'll find anywhere in the Lone Star State" (2008). Distinguished from many areas rapidly developing across Texas, this landscape exhibits a unique contrasting aesthetic.

Likewise, in the dry and irrigated open landscapes of the study area, Rita Blanca Lake is an oasis for water recreation, wildlife and wintering waterfowl viewing, and other outdoor day uses which could be considered an aesthetic element of local and regional public importance.

TxDOT has mapped 10 separate "Travel Trails" throughout Texas to provide travel routes through different areas of the state, highlighting natural, cultural, and scenic attractions. These routes are described in pamphlets distributed by TxDOT offices and tourist information centers and marked by special signs along designated highways (TxDOT, 2006). One of the Travel Trails through Texas follows US 385 through the City of Channing and continues east along SH 354. The original headquarters of the famous XIT Ranch resides on Main Street in the City of Channing. In 1879, the Sixteenth Texas Legislature appropriated three million acres of land to finance a new state Capitol building and appointed a Capitol Board composed of the governor, comptroller, treasurer, attorney general, and land commissioner to sell the land and contract for the building. In 1882, Mathias Schnell accepted the contract to build the Capitol building in return for land in the unsettled Panhandle area, which is known as the XIT Ranch (THC, 2008).

A review of a TxDOT publication entitled "Scenic Overlooks and Rest Areas" in Texas, found that none of the locations listed as having particularly strong aesthetic views or settings were located within the study area (TxDOT, 1998). The National Park Service website does not identify any Wild and Scenic Rivers, Historic Trails, National Parks, National Monuments, or National Battlefields within the study area (National Park Service, 2005). No other outstanding aesthetic resources, designated scenic views, scenic roadways, or unique visual elements were identified from the literature review of the study area.

3.8.3 Recreational and Park Areas

A review of the Texas Outdoor Recreation Inventory (TORI) (TPWD, 1990), Texas Land and Water Conservation and Recreation Plan (TPWD, 2005), Dalhart Area Chamber of Commerce (2008), U.S.

Forest Service National Grasslands Plan Revision (2007), Office of the Governor Economic Development and Tourism (2008), and federal, state, and local maps identified several park/recreational facilities within the study area.

The largest recreation area in the study area is Lake Rita Blanca and its associated public land, formerly managed by TPWD as the state's northernmost state park and now owned and managed by the City of Dalhart. This site provides more than 2,000 acres of public land for hiking, riding, fishing, and birding with trails, picnic areas and playgrounds, rock-climbing walls, and barn facilities. This is a site on the Panhandle Plains Rita Blanca Loop of the Great Texas Wildlife Trails (TPWD, 2006).

The Dalhart Country Club also lies within the study area and just southwest of the city. This facility is a private golf course. Additional parks in the study area are concentrated within the City of Dalhart. These include a swimming pool; sand volleyball, basketball and tennis courts; playgrounds and picnic areas; walking trail; skate park; and veterans' memorial.

3.8.4 Transportation/Aviation

Due to the large geographic coverage of the study area, the existing transportation system includes US highways, state highways, county and FM roads. The study area's existing transportation system is a limited system of public roads, particularly US 385, US 87, US 54, SH 354, and few county and FM roads. The major highway (US 385) runs north-south through the central portion of the study area, connecting Channing to Dalhart. US 87 is located in the northern portion of the study area, entering from an easterly direction to Dalhart and then continuing northwest, outside the study area. Most of the smaller evident roadways in the study area (see aerial extents on Figures 2-3 and 2-4) are private ranch and oil/gas exploration roads.

No Metropolitan Planning Organizations (MPO) operate in the study area. The closest MPO is Amarillo, bounded by the area around the city of Amarillo likely to urbanize in the next 20 years within Potter and Randall counties (Amarillo MPO, 2008). The Panhandle Regional Transportation Advisory Group was formed to address the rural transit needs of the Panhandle area. This group recently received the final Panhandle Region Transportation Coordination Study (Goodman Corporation, 2006) which identified areas of high need in Dallam County and moderate need in Hartley County; however, no known projects are planned within the study area to address those needs.

A review of TxDOT's Statewide Transportation Improvement Program (2008-2011) identified improvements to be made to US 87. These improvements include reconstruction and the addition of two travel lanes from the Moore County line to US 385, south of Hartley and from FM 1879 to the west city limits of Dalhart (TxDOT, 2007).

A review of the Dallas, Albuquerque and Wichita Sectional Aeronautical Charts (FAA, 2008a), the FAA Airport/Facility Directory (FAA, 2008b), the TxDOT Texas Airport Directory (TxDOT, 2008), recent aerial photography, USGS maps, field reconnaissance, and Internet resources revealed one FAA-registered airport and one private airport/landing strip located within the study area. The Dalhart Municipal Airport (FAA-registered) is located southwest of the City of Dalhart, and the Miller Airfield is located east of US 54 and north of Ranch Road 297.

3.8.5 Communication Towers

A search of the Federal Communications Commission (FCC) website identified one AM radio tower (KXIT) in Dalhart, a total of four FM radio towers, and no television towers within the study area (FCC, 2008). Additionally, a total of 17 cellular telephone towers were identified within the study area (FCC, 2008; Mobilemedia [MM], 2008) (see Figure 6-1).

3.9 CULTURAL RESOURCES

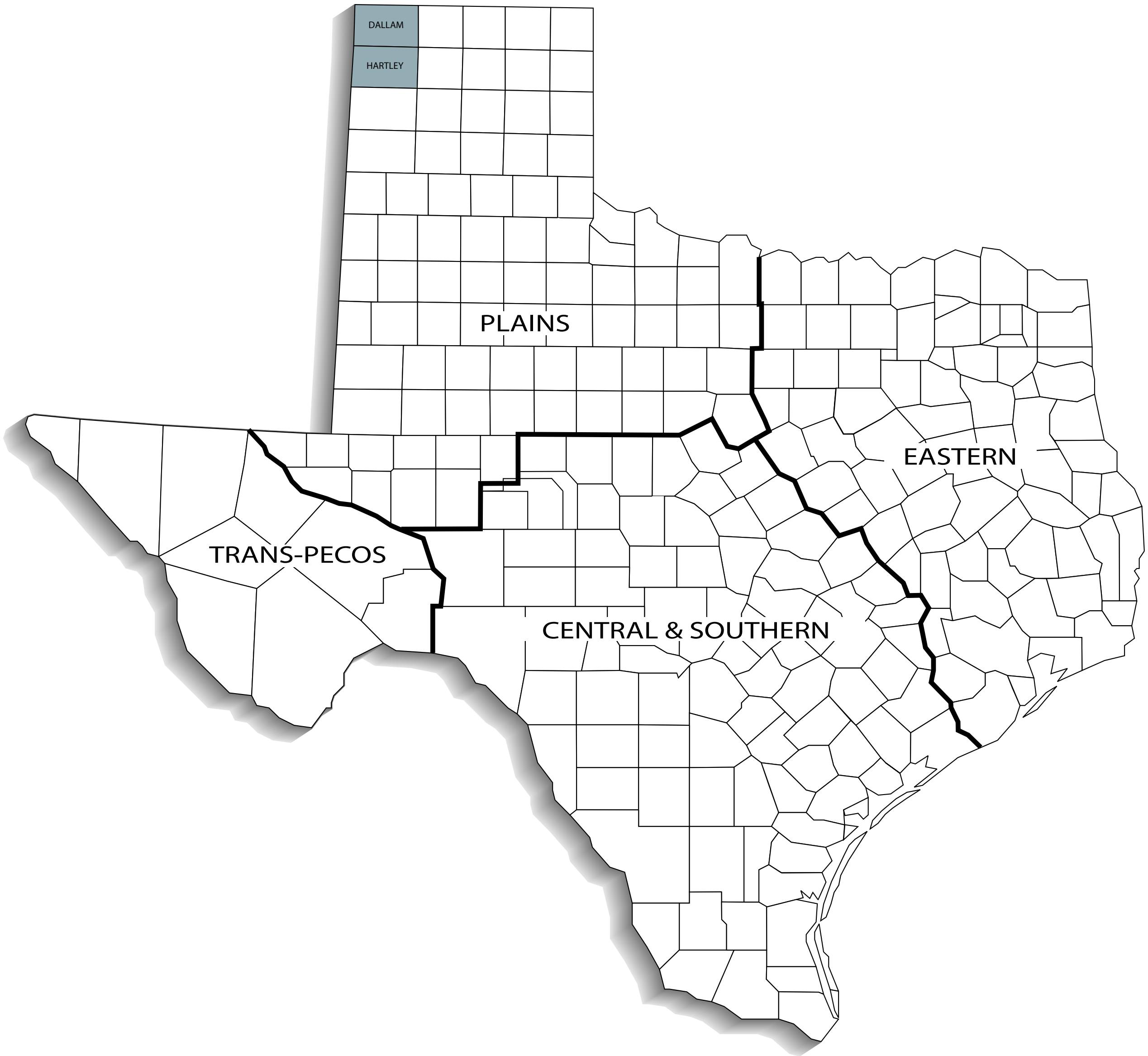
3.9.1 Cultural Setting

As shown on Figure 3-7, both counties in the project area are in the Plains Planning Region as delineated by the THC (Mercado-Allinger et al., 1996). The geographic region is described as the High Plains and the vegetation as Plains Grassland (Biesaart et al., 1985). The topography is generally flat, showing little vertical relief. Playa lakes, shallow depressions which collect runoff water into ponds, are scattered throughout the region. No cultural chronology has been specifically constructed for this region; however, the broad periods used throughout the Texas area are applicable to this region. A brief description of the cultural chronology and major cultural developments of the region are presented below.

The generalized cultural chronology that is recognized for the Texas Panhandle Plains region is divided into four cultural stages or periods that go by various names. The cultural history of the study area, known from recovered archaeological material, can be assigned to one of four developmental periods: Paleoindian, Archaic, Late Prehistoric, and Protohistoric (Boyd, 1997). These divisions primarily reflect changes in subsistence as indicated by material remains and settlement patterns. The following sections present an overview of major prehistoric and historic resources that may be found within the study area.

3.9.1.1 Paleoindian Period

The Paleoindian period refers to prehistoric populations that inhabited North America from the end of the Pleistocene epoch until the early Holocene epoch. The earliest well-defined period of human habitation in the New World began about 11,000 B.C. These populations are believed to have been composed of small nomadic bands of hunters and gatherers who exploited herds of megafauna, such as mammoth, and now extinct bison, as well as smaller mammals. Plants were almost certainly consumed, but data regarding this aspect of subsistence is rare.



PBSJ

Xcel Energy

FIGURE 3-7

LOCATION OF DALLAM AND HARTLEY COUNTIES IN RELATION TO THE CULTURAL RESOURCES PLANNING REGIONS OF TEXAS

Source: Mercado-Allinger et. al., 1996

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The Paleoindian period on the Llano Estacado is subdivided into a sequence of four main cultures (Holliday, 1987), from earliest to latest these are *Clovis*, *Folsom*, *Plainview*, and *Firstview* (Turner and Hester, 1985). Distinctive projectile points and economic activities differentiate one from the next.

The primary marker of the Clovis culture is the Clovis fluted point. Clovis hunters commonly attacked now-extinct megafauna such as mammoths. A number of Clovis sites occur in the region. These include the Clovis type site at Blackwater Draw Locality #1 near Clovis, New Mexico (Hester, 1972) and the Roberts County Miami site on the northern edge of the Llano Estacado (Sellards, 1938). Johnson and Holliday (1985) report Clovis material at the Lubbock Lake site near Lubbock, Texas.

Folsom culture is characterized by the *Bison antiquus* hunting, using a more refined fluted point than *Clovis*. Regional Folsom sites include the type site near Folsom, New Mexico (Figgins, 1927), the Lipscomb site in Lipscomb County (Wormington, 1957) the Lubbock Lake site, the Adair-Steadman site in Fisher County (Tunnell, 1977), and the Briscoe County Lake Theo site (Harrison and Smith, 1975).

The Plainview culture was similar to the Folsom culture in its use of *Bison antiquus*. The *Plainview* point, however, was unfluted and parallel-flaked. Plainview sites in the region include the Hale County type sites (Sellards et al., 1947), and the San Jon (Wormington, 1957), and the Milnesand sites in eastern New Mexico (Sellards, 1955).

The terminal Paleoindian *Firstview* culture hunted both extinct and modern bison with unfluted, parallel-flaked points similar to Plainview. Sites in the region with *Firstview* components include Blackwater Draw Locality #1 and Lubbock Lake.

Environmental changes and the resultant adaptation by later cultural groups define the end of the Paleoindian period. By about 6500 B.C. the wet and cool conditions of the Anathermal gave way to much warmer and drier conditions. Most megafauna species, including mammoth, mastodon, and *Bison antiquus* as well as Anathermal plants were then extinct.

3.9.1.2 Archaic Period

The Archaic period spans the period between 6500 B.C. to approximately A.D. 500 and is divided into Early Archaic (5500 B.C. to 2000 B.C.) and Late Archaic (2000 B.C. to A.D. 500). The Early Archaic sub-stage in the high plains is characterized by a pattern of localized foraging for wild plant food and small game. There is a notable absence of bison kill sites and Dillehay (1974) surmises this as the first period of bison absence on the Southern Plains. Lithic artifacts which are common during the Early Archaic include stemmed dart points, gouges, grinding implements, hearth stones and boiling pebbles (Hughes, 1991).

3.9.1.3 Late Archaic Period

By about 2000 B.C., the Late Archaic sub-stage is identified primarily by climatic changes to a more modern climate (Medithermal). The Late Archaic is represented by thousands of archaeological sites in sharp contrast to the few sites which have been identified to date to the Early Archaic sub-stage. During the Late Archaic the primary mode of subsistence was bison hunting even though assemblages dating to this sub-stage indicate exploitation of both large and small game animals as well as exploitation of wild plants. Nomadic groups of people followed the ever increasing bison herds redeveloping bison-hunting skills reminiscent of their Paleoindian predecessors (Hughes, 1991; Boyd, 1997). Late Archaic site types include bison kill/butchering sites, campsites, and rockshelters. The predominant types of projectile points during this time are various kinds of barbed dart points (Hughes, 1991). Other types of lithic tools in a Late Archaic assemblage include knives, key-shaped drills, bifacial and unifacial choppers, various types of scrapers, gravers and denticulates. The most commonly investigated site from this time period is the bison kill site.

3.9.1.4 Late Prehistoric

The Late Prehistoric period begins with a wetter climate than the preceding Late Archaic period and is subdivided into Late Prehistoric I and Late Prehistoric II. The introduction of several new ideas to the cultural inventory began the change from nomadic hunter-gatherers toward a more sedentary villager-gardener lifestyle (Hughes, 1991). These new innovations included the bow and arrow, pottery, pit houses and more than likely some gardening or horticulture (Hughes, 1991; Boyd, 1997). Settlements typically are located near active or abandoned river and stream channels. Late Prehistoric occupations typically occur in the same location as those of the preceding Archaic period. Hunting and gathering was still the primary mode of subsistence for people in the area. Diagnostic artifacts from this period include contracting-stemmed *Perdiz* arrow points, triangular *Harrell* and *Toyah* points, and crudely-made *Livermore* points (Suhm and Jelks, 1962; Runkles, 1964; Collins, 1969; Turner and Hester, 1985).

3.9.1.5 Late Prehistoric I

Hughes (1991) defines this period as "…starting about A.D. 200…with the appearance of barbed arrowpoints and Woodland cordmarked and/or Mogollon brownware pottery. The terminal date of about A.D. 1100 splits the difference between about A.D. 1000, when a Woodland/Village transition was taking place in the northern part of the Panhandle Plains, and about A.D. 1200, when a pit-to-surface-house transition was taking place on the southwestern part of the South Plains." The transition includes changes in house type as well as a shift from barbed points to side-notched triangular points.

Three Late Prehistoric cultures occur on the Llano Estacado: Lake Creek on the northern edge, Palo Duro on the eastern edge, and Eastern Jornada on the southwest. The latter consists of Querecho and Maljamar phases.

Based on test excavations at sites on the southwestern Llano Estacado in New Mexico, Corley (1965) proposed an eastern extension of the Jornada branch of the Mogollon culture with a sequence of Querecho and Maljamar phases. Since 1965 Collins reported components of the eastern Jornada phases at several other sites in southeastern New Mexico and Texas (Collins, 1966, and 1968).

According to Corley (1965) and Collins (1966, 1968, 1971), the Querecho phase evolved out of the local Late Archaic Jornada-wide Hueco phase. It dates from A.D. 950 to A.D. 1100. It is characterized by a lack of houses. Locally made plain brownware, corner-notched arrowpoints, and small dart points are common artifacts at such sites. The Maljamar phase (A.D. 1100 – A.D. 1300) is characterized by pithouses locally made plain and corrugated brown wares, several kinds of intrusive wares, and corner-notched and side-notched arrowpoints.

3.9.1.6 Late Prehistoric II

On the northern Llano the Late Prehistoric II marks the transition from Woodland to Village cultural lifestyle. Its beginnings are around A.D. 1100 or 1200 and coincide with the appearance of side-notched triangular arrowpoints. On the southern Llano Estacado this period marks the transition from pit houses to surface houses and subsistence regimes with a heavy reliance on horticulture (Hughes, 1991).

Two main Late Prehistoric II cultures occur on the Llano Estacado. On the northern Llano is Antelope Creek while Eastern Jornada Ochoa occupations occur in the south. The Ochoa phase dates between A.D. 1300 and A.D. 1450. It is characterized by jacal-like surface houses with rock and adobe foundations, side-notched triangular points, and locally made Ochoa Indented Brownware.

3.9.1.7 Protohistoric

The Late Prehistoric II pattern of seasonal hunting and gathering and limited horticulture probably would have remained unchanged until well into the historic stage had it not been for Athapaska- and Shoshonean-speakers, bison, and the horse. By at least A.D. 1200, Athapaskan-speakers began to move south along the eastern slope of the Rockies from the Great Slave Area of Canada (Cruse et al., 1993).

The Athapaskan split into two prongs. The Western Athapaskan gradually evolved in the Navajo, and San Carlos, Chiricahua, and Mescalero Apache. The Eastern Athapaskan included Jicarilla, Paloma, Carlana, and Lipan Apache. The latter assumed control of the Llano Estacado and its bison herds by about A.D. 1500. The Lipan Apache also engaged in limited agriculture with techniques learned from the Pueblos.

3.9.1.8 Historic

Coronado crossed the northern Llano and Panhandle Plains between 1540 and 1542. The Eastern Apache by then had a well-defined seasonal round including communal hunts and raids and limited agriculture. Apache camps of this time are identified by the presence of Garza and Loot projectile points, Tierra Blanca plain ceramics and Rio Grande glaze wares (Cruse, et al., 1993). At the time of European contact, the area was inhabited by the Jumano Indians. The Jumano initiated extensive trading activities with the Caddo in east Texas and the Trans-Pecos groups to the west (Suhm, 1958). The Lipan Apache entered the area from the Plains in pursuit of food in the seventeenth century. Their weapons included the lance and the bow. Trade items such as glass beads, European-made ceramics, gun parts, and metal arrow points indicate contact-period occupations. Two inter-related events eventually led to the removal of the

Eastern Apache from the Llano proper. The events were the wide-spread acceptance after 1598 of the Spanish mustang by the Plains cultures and the absolute mastery of the horse by the Shoshone-speaking Comanche.

Historically, the project area lies in the eighteenth and nineteenth century *Comancheria*, the regions of Comanche dominance (Thurmond et al., 1981). From approximately A.D. 1700, the region's population grew to include Lipan Apache, various bands of Comanche and, it is supposed remnants of the original bands of the indigenous hunters and gatherers. The introduction of the horse and European firearms allowed the Comanche to function as the dominant cultural groups until the late 1870s.

Unlike previous occupants of the area, the Comanche lived in seasonal encampments and did not construct permanent dwellings. Their mobile society followed the plains herd animals on seasonal migrations. This is not to imply that the Comanche did not come together in large groups. By necessity, multiple bands would gather in the summer and fall for large-scale bison hunts (Cruse, et al., 1993). Other important inhabitants of this region during this time where undoubtedly the Comancheros, ciboleros, and pastores who came from New Mexico into *Comancheria* (Abbe and Anderson, 2008)

Almost all of the counties which are now part of the Texas Panhandle were the Indians' domain until the Red River War of 1874-75 (Abbe and Anderson, 2008). During this military campaign the United States Calvary was commanded to drive all of the Indians still in Texas to the Indian Territory. Comanche, Kiowa, and Cheyenne Indians joined forces to fight against this ouster but in the end they were forcibly removed from Texas. The result of the Indians' removal was that the buffalo hunters moved in and exterminated the great herds on which the Indians had depended and the Anglo ranchers moved into the area (Cruse, 2008).

Dallam County was named for James W. Dallam, a Republic of Texas lawyer and newspaper editor. The county was originally a part of the Bexar District and it was separated in 1876 however, no settlement occurred in the county until 1882. The county was officially organized in 1891 with Texline as the county seat. In 1903 a new county seat, Dalhart, was selected.

On January 10, 1882, about two-thirds of the county was deeded to the Capitol Freehold Land and Investment Company (Abbe and Anderson, 2008). The first headquarters for the XIT Ranch were in the northern part of Dallam County at Buffalo Springs. The XIT was among one of the largest ranches in the Texas Panhandle at the time (Anderson, 2008). For several years the only settlers in the county were XIT cowboys.

By the early 1900s farming and industry were added to ranching as the mainstays of the economy of the Texas Panhandle. The foundation of the farming industry was wheat but corn, milo, and millet are also grown in the county. The advent of modern irrigation, railroads, and its strategic location on two major US highways have all contributed to the economy of the county.

Hartley County was created in 1876 by the Texas legislature from land originally a part of Bexar and Young counties. Hartley County land was included in many of the largest and most well-known panhandle ranches, such as the XIT, LE, LIT, and the Matador Ranch (Abbe and Anderson, 2008). Cattle and sheep ranching took up about 180,000 acres by 1890. Farming was a very minor economic activity in the area at this time only about 160 acres of corn and 100 acres of cotton were reported in the 1890 census. While the cattle industry grew during the early part of the twentieth century, the number of ranches declined to about 30.

The community of Hartley was made the county seat of Hartley County in 1890. Six years later in 1896 the county seat was moved to Channing. This move was contentious and it was not until 1903 that Channing was finally confirmed as the county seat by an election. By this time the railroad was extended westward from Amarillo into Hartley and Dallam counties. The railroad along with the United States Department of Agriculture's cereal-crop experiments rapidly increased the number of farmers moving into the county. The number of farms increased and corn, wheat, and chickens became an important part of the regional economy. However, ranching and cattle remained the primary economic pursuit (Abbe and Anderson, 2008).

During the 1930s the Dust Bowl and Great Depression had a great impact on the farmers of the region. Many people moved away and the number of farms and crop production dropped sharply. The economy however was revived during the period of World War II primarily as a result of the establishment of the Dalhart Army Air Field in northern Hartley County.

3.9.2 Previous Investigations

In Hartley County very little professional archeological investigations have been conducted. Survey and excavations for an El Paso Pipeline project were conducted in the mid 1990s (Phippen et al., 1996; Wase, 1995) and TxDOT conducted archeological work for transportation projects along FM 3489 and US87/385 (State Department of Highways and Public Transportation [SDHPT], 1988; TxDOT, 1993a, 1993b).

Dallam County archeological investigations have primarily been conducted for oil and gas projects (Baker, et al., 1981; Brett and Beck, 1981; Johnson, 1980) or for activities conducted by the Rita Blanca Ranger District, Cibola National Forest (Hamilton, 1985; Hamilton and Childress, 1985 and 1981; Hamilton and Reagan, 1982, 1983, 1984 and 1985). Other surveys have also been conducted for fiber optic or seismic lines (Holan, 1981; Landis, 1985 and 1988; Brett and Beck, 1981 and 1982; Cojeen, 1982).

3.9.3 Results of the Literature/Records Review

The Texas Archaeological Research Laboratory (TARL) file review identified 61 archeological sites in Hartley County. The THC's on-line Atlas identified four National Register of Historic Places (NRHP) listed properties, four cemeteries designated as Texas Historic Cemeteries, seven Official Texas Historical Markers (OTHM)s and one State Archaeological Landmark (SAL) in the county.

Two of the NRHP listed properties are archeological sites identified during the Pastore Sites Survey (Taylor, 1980). This survey covered portions of New Mexico as well as portions of Potter, Oldham, Lubbock, Hartley, Hall, Floyd, and Deaf Smith Counties and resulted in the identification of more than 55 sites, all of which have been listed on the NRHP.

Dallam County files identified 43 previously recorded archaeological sites in the county, one NRHP listed property, the Dallam County Courthouse, six historic markers (two of which are NRHP eligible because they are 1936 Centennial Markers), and four Texas Historic Cemeteries. No SAL sites are designated in the county.

4.0 ENVIRONMENTAL IMPACTS OF THE ALTERNATIVE ROUTES

4.1 IMPACTS ON PHYSIOGRAPHY/GEOLOGY/SOILS

Construction of the proposed transmission line will have no significant effect on geologic features or resources within the study area. The erection of the support structures will require the removal and/or disturbance of small amounts of near-surface materials, but will have no measurable impact on geologic resources or features along any of the alternative routes. Some economically valuable geologic resources, including limestone, sand, and gravel, occur in the study area. If the selected route traverses sites producing those resources, there could be minor short-term impacts to those resources; however, alternative routes were delineated to avoid any such areas.

4.1.1 Soils

The construction and operation of transmission lines normally create few long-term adverse impacts on soils. Soil erosion and compaction are the primary potential impacts resulting from any transmission line construction. The hazard of soil erosion is generally greatest during the initial clearing (where necessary) of the ROW. To provide adequate space for construction activities and to minimize corridor maintenance and operational problems, the removal of most woody vegetation is necessary within the ROW. In these areas, the necessary movement of heavy equipment will disturb only the remaining leaf litter and a small amount of herbaceous vegetation. The most important factor in controlling soil erosion associated with construction activities is revegetating areas that have potential erosion problems immediately following construction. Revegetation of a majority of the ROW would occur through natural succession. Critical areas, such as steep slopes and areas with shallow topsoil may require additional seeding. To maximize the protection of land and water resources, SPS will exercise special care when clearing near waterways. Vegetation on the stream banks will remain intact to the greatest extent possible. Revegetation of these areas (if necessary) will take priority over less-critical areas. SPS will inspect the ROW during and after construction to identify problem erosion areas, and will take special precautions to minimize vehicular traffic over areas with very shallow soils.

4.1.2 Prime Farmlands

The Secretary of Agriculture, in 7 U.S.C. 4201(c)(1)(A), defines prime farmland soils as those soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. The USDA recognizes the importance and vulnerability of prime farmlands throughout the nation, and therefore encourages the wise use and conservation of these soils where possible.

Prime farmland soils are predominantly west and northwest of Hartley, along portions of all three alternative routes, and are of limited extent.

Whenever feasible, the alignment of alternative routes follow existing roadways, property lines, fence lines, or other existing ROWs, so as to minimize potential impacts (including those to prime farmland). Other than construction-related erosion, the primary impact on prime farmland soils will be the physical occupation of small areas by the base of the support structures, which may slightly reduce the potential of those areas for agricultural production. The NRCS has stated that they do not normally consider the construction of electric transmission lines to constitute a major impact, or conversion, of prime farmland, since the soils can still be used for farming following construction (Appendix A).

4.2 IMPACTS ON WATER RESOURCES

4.2.1 Surface Water

Alternative Routes 1 and 3 each cross Rita Blanca Creek twice. Alternative Route 2 does not cross any streams or surface water. Table 6-1 (in Section 6 of this document) presents the potential impacts to surface waters for each route, including the number of stream crossings and length of ROW across open water.

None of the proposed routes intersect any known floodplains. Impacts on floodplains in the form of sedimentation or impedance of water flow will not occur from the construction of any of the proposed routes.

The construction of the proposed 230-kV transmission line should have little adverse impact on the surface water resources. The main potential impact on surface waters from any major construction project is siltation resulting from erosion and potential pollution from the accidental spillage of petroleum products (e.g., fuel, lubricants, solvents, etc.) or other chemicals. Vegetation removal could result in increased erosion potential of the affected areas, leading to the delivery of slightly higher-than-normal sediment yields to area streams during heavy rainfall events. However, these short-term effects should be minor because of the relatively small area to be disturbed at any particular time, the short duration of construction activities, the preservation of streamside vegetation where practicable, and SPS's efforts to control runoff from construction areas. In addition, the proposed project will require a SWPPP, including the filing of a NOI with the TCEQ.

SPS will avoid or minimize the placement of supporting structures in the streambed of drainage features. If appreciable stream flow is present in any of the spanned streams, construction crews will transport machinery and equipment around these areas via existing roads to avoid direct crossings. This will eliminate the necessity of constructing temporary low-water crossings that may result in erosion, siltation, and disturbance of the stream and its biota. If a spanned stream is dry at the time of construction, some earth removal may be necessary to facilitate crossing; however, the area will undergo restoration to preconstruction contours. If clearing of vegetation is necessary at stream crossings, SPS will employ selective clearing (i.e., use of chainsaws instead of heavy machinery), to minimize erosion problems. Highly erodible areas adjacent to streams (stream banks) will not be cleared unless necessary.

Construction of the proposed transmission line could result in some temporary erosion or short-term disturbance resulting in siltation, but impacts will be minimal and localized because of the intermittent nature of Rita Blanca Creek. No long-term adverse effects are likely. SPS will make efforts during construction for proper control and handling of any petroleum or other chemical products. The most effective method for avoiding surface water impacts is the implementation of proper spill-prevention and spill-response plans.

4.2.2 Groundwater

The construction, operation, and maintenance of the proposed transmission line should not adversely affect groundwater resources in the study area or vicinity. The effect of the proposed transmission line on groundwater resources will be negligible because the line will be above ground rather than buried. The amount of recharge area disturbed by construction is insignificant compared to the total amount of recharge area available for the aquifer systems in the region. No measurable alterations of aquifer recharge capacity or groundwater contamination are likely to occur.

Potential groundwater impacts from construction activities associated with the proposed project possible contamination from the accidental spillage of chemicals (e.g., fuels, lubricants, solvents, petroleum products, etc.). The most effective method to avoid groundwater impacts is the implementation of proper spill response plans. It is unlikely that polluted surface water run-off will contaminate any groundwater supplies; however, such control measures will be in place as additional precautionary measures during the construction phase of the project.

4.3 IMPACTS ON TERRESTRIAL ECOSYSTEMS

4.3.1 Vegetation

Impacts on vegetation within the study area will be limited to the removal of herbaceous vegetation along the proposed transmission line ROW. The amount of vegetation cleared from the transmission line ROW is dependent upon the type of vegetation present. For example, the greatest amount of vegetation clearing would occur in brushland areas, whereas pasturelands would require little to no removal of vegetation. Areas currently used as pastureland or cropland may be temporarily unavailable for grazing or commercial crop production for the duration of the transmission line construction, but can usually be returned to previous land uses upon completion of construction.

During the vegetation clearing process, SPS will make efforts to retain native ground cover where possible, and to minimize impacts to local vegetation. Much of the undeveloped land along the alternative routes is pastureland and cropland and little to no clearing will be necessary. Clearing of woody vegetation will only occur where necessary to provide access and working space and to protect conductors. Soil conservation practices will benefit native vegetation and assist in successful restoration of disturbed areas. As soon as possible after the construction of the transmission line, SPS will reseed the ROW in herbaceous species or a cover of forage crop, if necessary to facilitate erosion control.

The interpretation of 1 inch = 1,000 ft color aerial photography provided the basis for quantifying the approximate impacts to vegetation associated with the proposed alternative routes. Table 6-1 (in Section 6 of this document) presents the potential impacts on vegetation communities for each route, including the length of ROW crossing pastureland, length of ROW crossing cropland, length of ROW crossing upland woodland/brushland, length of ROW crossing riparian woodland, and length of ROW crossing potential wetlands. Field reconnaissance of the study area revealed pastureland and cropland along all of the proposed routes. None of the routes will require the removal of upland brushland or upland woodland. In addition, none of the routes will affect riparian woodland.

4.3.2 Aquatic/Hydric

Alternative Routes 1 and 3 cross Rita Blanca Creek at two locations. Alternative Route 2 does not cross any streams. None of the alternative routes cross any open water.

Aquatic/hydric habitat potentially affected by the proposed transmission line would generally be minor in extent because of the ephemeral and intermittent nature of most surface water features in the region. The study area is known for its isolated wetlands that have no connection to streams or ponds. Most isolated wetlands within the study area are playa lakes and are not jurisdictional under the CWA unless hydrologic connectivity is proven. NWI maps indicate that potential wetland communities within the study area are generally palustrine (i.e., marsh) and lagustrine (i.e., lake) communities, and there are no emergent wetlands. None of the corridors for the proposed alternative routes cross any known wetlands, according to NWI maps, but the NRCS has identified hydric soils within the study area (Appendix A), and some of the soils are present along the proposed alternative routes. Based on field reconnaissance of the study area it does not appear that any wetlands would be impacted and if any jurisdictional wetlands do occur within the proposed ROW, it is likely that the aerial transmission line will easily span those features.

The removal or disturbance of streamside vegetation can result in an increased potential for erosion and sedimentation. Placement of erosion control devices down gradient of areas disturbed by construction activities would help to minimize runoff into local streams. In close proximity to streams, the positioning of erosion control measures between the disturbed area and the waterway will prevent or minimize siltation of streams. Placement of dredged or fill material within waters of the U.S. (including wetlands) is subject to USACE regulations.

4.3.3 Endangered and Threatened Plant Species

The FWS and TPWD were consulted to determine the potential occurrence of federal or state-listed endangered or threatened plant species within the study area. County-level endangered and threatened species lists prepared by FWS (2009) indicate that no federally listed endangered or threatened plant species occur in Dallam and Hartley counties.

Alternative Routes 1 and 3 cross one rare plant community according to species lists prepared by TPWD's NDD (2008). The blue grama-buffalograss series (*Bouteloua gracilis-Buchloe dactyloides*) historically occupied much of the High Plains region of Texas but has since become scarce due to the native vegetation being converted to cropland and grazing land. This rare plant community will incur temporary impacts during construction in the form of vehicular traffic and clearing of groundcover near structures, but once construction is complete revegetation in disturbed areas should occur.

4.3.4 Wildlife

The impacts of transmission lines on wildlife include short-term effects resulting from physical disturbance during construction, as well as long-term effects resulting from habitat modification. The net effect from transmission line construction on local wildlife is typically minor.

Any required clearing or other construction-related activities will directly and/or indirectly affect most animals that reside within or traverse the transmission line ROW. Heavy machinery may adversely affect smaller, low mobility species, particularly amphibians, reptiles, and small mammals.

If construction occurs during the breeding season (generally spring to fall), construction activities may adversely affect some species of birds. Heavy machinery may cause soil compaction, which may adversely affect fossorial animals (i.e., those that live underground). Mobile species, such as birds and larger mammals, may avoid initial clearing and construction activities and move into adjacent areas outside the ROW. Construction activities may temporarily deprive some animals of cover, and therefore potentially subject them to increased natural predation. Wildlife in the immediate area may experience a slight loss of browse or forage material during construction; however, the prevalence of similar habitats in adjacent areas and vegetation succession in the ROW following construction will minimize the effects of these losses.

The increased noise and activity levels during construction could potentially disturb the daily activities (e.g., breeding, foraging, etc.) of species inhabiting the areas adjacent to the ROW. Dust and gaseous emissions should minimally affect wildlife. Although construction activities may disrupt the normal behavior of many wildlife species, little permanent damage to these populations should result. Periodic clearing along the ROW, while producing temporary negative impacts to wildlife, can improve the habitat for ecotonal or edge species through the increased production of small shrubs, perennial forbs, and grasses.

Transmission line structures could benefit some bird species, particularly raptors, by providing resting and hunting perches, particularly in open, treeless arid habitats (Avian Power Line Interaction Committee [APLIC], 2006). Raptor species, particularly the red-tailed hawk, often use the support structures as nesting sites. Vultures and ravens commonly use the structures as roosting sites and the wires and structures often serve as hunting or resting perches for species such as American kestrel, mourning dove, loggerhead shrike, and meadowlarks (*Sturnella* spp.). As a result, transmission lines have significantly increased raptor populations in several areas of the U.S. (APLIC, 2006). The danger of electrocution to birds will be insignificant because the distance between conductors or conductor and structure or ground wire on 230-kV transmission lines is usually greater than the wingspan of any bird in the area.

The transmission line (both structures and wires) could present a hazard to flying birds, particularly migrants. Collisions tend to increase in frequency during the fall and spring, when migrating flocks are denser and flight altitudes are lower in association with cold air masses, fog, and/or inclement weather. The greatest danger of mortality exists during periods of low ceiling, poor visibility, and drizzle when birds are flying low, perhaps commencing or terminating a flight, and may have difficulty seeing obstructions (Electric Power Research Institute [EPRI], 1993). Most migrant species, including passerines, should experience minimal adverse effects during migration since their normal flying altitudes are greater than the heights of the proposed transmission structures (Willard, 1978; Gauthreaux, 1978). For year-round or seasonal resident birds, those most prone to collision are often the largest and most common in a given area (Rusz et al., 1986; APLIC, 2006). Resident birds, or those in an area for an extended period, learn the location of power lines and become less susceptible to wire strikes (Avery, 1978). Raptors, typically, are uncommon victims of transmission line collisions because of their great visual acuity (Thompson, 1978). In addition, many raptors only become active after sufficient thermal currents develop, which is usually late in the morning when poor light is not a factor (Avery, 1978).

Power lines within daily use areas are responsible for most bird collisions. Waterfowl species are vulnerable because of their low altitude flight and high speed. Species that travel in large flocks, such as blackbirds and many shorebirds, are also vulnerable, because dense flocking makes movement around obstacles more difficult for individuals in the flock (APLIC, 2006).

Utility companies can employ several means to minimize transmission line impacts on birds in flight. The initial placement of a transmission line is the most important consideration (Avery, 1978; APLIC, 2006). The proximity of a transmission line to areas of frequent bird use is crucial. This is especially true for daily use areas, such as feeding areas or other areas where birds may be taking off or landing regularly (APLIC, 2006). The position of the individual structures can also help reduce collisions. Faanes (1987), in an in-depth study in North Dakota, found that birds in flight tend to avoid the transmission line structures, presumably because such structures are visible from a distance. Instead, most appear to fly over the lines in the mid-span region. In areas where the transmission line passes between roosting and foraging areas, the structures can be placed in the center of the flyway (i.e., where the birds are more likely to fly) to increase their visibility, in addition to heavily marking the wires.

Other considerations during the initial transmission line routing include the height of the surrounding vegetation and the topography of the area (APLIC, 2006). The height of transmission lines relative to the surrounding vegetation can help reduce the probability of collisions. Lines built at the height of the surrounding trees seldom are a problem for forest-dwelling birds, and large birds will avoid the tree line, thus avoiding the transmission line (Thompson, 1978; APLIC, 2006). Consideration of topographical features such as valleys, ridges, and mountain passes, can help avoid important flight paths.

Faanes (1987) reported that 97% of birds observed colliding with a power line did so with the ground (static) wire, largely because of attempts to avoid the conductors. Beaulaurier (1981) found that removal of the ground wire at two study sites in Oregon resulted in a reduction in collisions of 35% and 69%.

Increasing the visibility of the wires by using markers such as orange aviation balls, black-and-white ribbons, or spiral vibration dampers, particularly at mid-span, can reduce the number of collisions. Beaulaurier (1981) reviewed 17 studies involving marking ground wires or conductors and found an average reduction in collisions of 45% when compared to unmarked lines.

Waterfowl are among the birds most susceptible to wire strikes (Faanes, 1987) and yet, despite these hazards, it has been estimated that wire strikes (including distribution lines) account for less than 0.1% of waterfowl non-hunting mortality, compared to 88% from diseases and poisoning and 7.4% because of weather (Stout and Cornwell, 1976). In some areas, hunting affects 20 to 30% of waterfowl populations (Thompson, 1978). Suitable habitat for waterfowl within the study area is limited to small isolated ponds and playa lakes, therefore impacts are unlikely.

When considering impacts on wildlife, the ranking of the three alternative routes relates primarily to the degree of disturbance or loss of habitat. Other considerations include the length of ROW parallel to streams, impacts to wetlands, the number of stream crossings, and the length of line using existing transmission line ROW, or parallel to other compatible ROW.

None of the alternative routes would require clearing through upland brushland/woodland and riparian woodland. Pastureland and cropland is the predominant habitat type within the study area. All clearing of vegetation would be in the form of herbaceous removal for the construction of the poles. Proposed Alternative Route 2 would cross the least distance of pastureland (87,334 ft), while proposed Alternative Route 1 would cross the greatest distance of pastureland (118,116 ft). Proposed Alternative Route 3 would cross the least distance of cropland (51,173 ft), while Alternative Route 2 would cross the greatest distance of cropland (73,280 ft). Alternative Route 1 and Alternative Route 3 cross the same number of streams (2). Alternative Route 2 does not cross any streams. None of the proposed routes parallel any streams. None of the alternative routes cross known emergent wetlands.

From a wildlife standpoint, the route with the least amount of vegetation clearing, the least amount of streams and wetlands to be crossed, and the least amount of threatened/endangered species habitat to be crossed would be best. Alternative Route 2 would be the preferred route from a wildlife standpoint, as it would impact the least amount of the aforementioned criteria. Alternative Route 1 would follow. Alternative Route 3 would be the least preferred from a wildlife standpoint, as it would likely result in the greatest total impact to threatened/endangered species habitat.

4.3.5 Endangered and Threatened Wildlife

The FWS and TPWD were consulted to determine the potential for occurrence (within the study area) of federal or state-listed endangered or threatened species. According to TXNDD (2008) and FWS (2009), eight federal and/or state-listed endangered and threatened species potentially occur in Dallam and Hartley counties.

Two of the eight species listed in Table 3-1, the gray wolf and the black-footed ferret, no longer occur in Texas. Five of the species listed in Table 3-1 are unlikely to reside in the study area. These include the whooping crane, bald eagle, American peregrine falcon, peregrine falcon, and black bear, which would likely occur only as migrants or transients. The proposed transmission line project is unlikely to result in adverse impacts to these species.

Species known to occur in the general area and that are likely present in suitable habitat include the state-listed (threatened) Texas horned lizard. The Texas horned lizard occurs in Dallam and Hartley Counties (Dixon, 2000) and is likely present throughout the study area in suitable habitat. Temporary disturbances to the Texas horned lizard and its habitat will be in the form of vehicular and equipment traffic during construction. Texas horned lizards do have the ability to move to a safe area when disturbed, but it is possible that incidental take of this species could occur by a vehicle or equipment during construction. However, the proposed transmission line project would not adversely affect the species.

According to NDD (2008) and field reconnaissance, known locations of black-tailed prairie dogs in the form of prairie dog towns, occur within and near the ROW of the proposed alternative routes. Impacts on the prairie dog towns would occur during the drilling and setting of a pole within their known location. The proposed transmission line project is unlikely to result in any long term adverse impacts to the species.

According to TPWD's NDD, critical habitat exists within the study area for the Mountain Plover. All three alternative routes will cross critical habitat for the Mountain Plover. The proposed transmission line project is unlikely to result in adverse impacts to the species.

4.4 IMPACTS ON AQUATIC ECOSYSTEMS

Potential impacts on aquatic systems include the number of streams crossed and the amount of open water habitat crossed. Other considerations relevant to aquatic systems are associated with the amount of ROW that will require clearing, particularly through wetlands.

Impacts on aquatic ecosystems as a result of transmission line construction are generally minor. Aquatic features within the study area, such as streams and ponds, are of limited extent. Those present are largely ephemeral and intermittent, and the proposed transmission line would likely span them. The implementation of sedimentation controls during construction will help minimize erosion and sedimentation into area streams.

When considering impacts to aquatic ecosystems, the ranking of the three alternative routes relates primarily to the number of streams crossed and the amount of open water and wetlands crossed. Alternative Route 1 and Alternative Route 3 will both cross two streams (see Table 6-1). Alternative Route 2 does not cross any streams. The alternative routes do not cross any known emergent wetlands or open water. From an aquatic habitat standpoint, Alternative Route 2 would create the least amount of impact, while Alternative Route 1 and Alternative Route 3 would have a greater magnitude of impact because of the potential to affect Rita Blanca Creek.

4.5 SOCIOECONOMIC IMPACTS

4.5.1 Social and Economic Factors

Economic growth and development rely heavily on adequate public utilities, including a reliable electrical power supply. Construction and operation of the proposed transmission line would benefit the residents of the area by enabling SPS to provide adequate and reliable electric service to expanding communities. The proposed transmission line project would enhance the utility's ability to meet increasing demands for power, provide operational reliability to deliver power as needed throughout the area, and allow the utility to more efficiently transport power to loads.

For this project, minimal short-term local employment would be generated. SPS normally uses labor supervised by SPS employees during the clearing and construction phase of transmission line projects. A portion of the project wages would find their way into the local economy through purchases, such as fuel, food, lodging, and possibly construction materials. SPS is also required to pay sales tax on purchases and is subject to paying local property tax on land or improvements.

Economic growth and development rely heavily on adequate public utilities, including a reliable electrical power supply. Without this basic infrastructure the area's potential for economic growth would be limited.

4.5.2 Community Values

For the purposes of evaluating the effects of the proposed transmission line, PBS&J has defined the term community values as a "shared appreciation of an area or other natural or human resource by a national, regional or local community." Adverse effects upon community values are defined as aspects of the proposed project which would significantly and negatively alter the use, enjoyment or intrinsic value attached to an important area or resource by a community. This definition assumes that community concerns are identified with the location and specific characteristics of the proposed transmission line and do not include possible objections to electric transmission lines.

Impacts on community values can be classified into two areas: (1) direct effects, or those effects which would occur if the location and construction of a transmission line results in the removal or loss of public access to a valued resource; and (2) indirect effects, or those effects which would result from a loss in the enjoyment or use of a resource due to the characteristics (primarily aesthetic) of the proposed line, structures, or ROW. Impacts on community values, whether direct or indirect, can be more accurately gauged as they affect recreational areas or resources and the visual environment of an area (aesthetics). Impacts in these areas are discussed in detail in Sections 4.6.2 and 4.6.3 of this report.

4.6 LAND USE, AESTHETICS, RECREATION, AND TRANSPORTATION/AVIATION

4.6.1 Land Use

Land use impacts from transmission line construction are determined by the amount of land (of varying use) displaced by the actual ROW and by the compatibility of electric transmission line ROW with adjacent land uses. During construction, temporary impacts to land uses within the ROW could occur due to the movement of workers and materials through the area. Construction noise and dust, as well as temporary disruption of traffic flow, may also temporarily affect residents and businesses in the area immediately adjacent to the ROW. Coordination between SPS, contractors, and landowners regarding access to the ROW and construction scheduling should minimize these disruptions.

The primary criteria considered to measure potential land use impacts for this project included proximity to habitable structures (e.g., residences, businesses, schools, churches, hospitals, nursing homes, etc.), length of existing transmission line ROW paralleled or utilized, length parallel to other compatible ROW, length parallel to property lines, and the overall length of each route.

Generally, one of the most important measures of potential land-use impact is the number of habitable structures located within a specified distance of an alternative route centerline. Habitable structures are defined by the PUC as … "single-family and multifamily dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis." PBS&J staff determined the number and distance of habitable structures within 300 ft of each route by the interpretation of aerial photographs, backed up by field reconnaissance, where possible. Of the three primary alternative routes being evaluated, Alternative Route 1 has the fewest number of habitable structures within 300 ft of the ROW (14), followed by Alternative Route 3 (15), and Alternative Route 2 (32).

The least impact on land use generally results from locating new lines either within or parallel to existing transmission line ROW. Existing transmission line ROW located in the City of Dalhart, adjacent to Lake Rita Blanca, and along US 385/87 provided an opportunity to parallel existing transmission line ROW along links QQ, LL, K, and M. As such, Alternative Route 3 utilizes the greatest amount of paralleling transmission line ROW (approximately 25,990 ft, or 12.5% of its total length), followed by Alternative Route 2 (20,060 ft, or 11.5%), and Alternative Route 1 (5,527 ft, or 3.0%).

Paralleling other existing compatible ROW (roads, highways, pipelines, etc) is also generally considered to be a positive routing criterion, one that usually results in fewer impacts than establishing new ROW, and is included in the PUC's transmission line certification criteria. As such, Alternative Route 2 parallels the greatest amount of roadway/highway ROW (149,939 ft, or 85.8% of its total length), followed by Alternative Route 3 (124,090 ft, or 70.3%) and Alternative Route 1 (115,958 ft, or 63.6%).

Paralleling property lines, where existing compatible ROW is not available, is another positive routing criterion, and was also recognized in the PUC's recent amendment to its substantive rules regarding transmission certification. From this perspective, Alternative Route 2 parallels the greatest amount of existing corridors including apparent property lines (169,916 ft, or 97.2%). Alternative Route 1 parallels fewer existing corridors including apparent property lines (164,117 ft, or 90.0%). Alternative Route 3 parallels the least amount of existing corridors including property lines (154,578 ft, or 87.5%).

Finally, the overall length of a particular alternative route can be an indicator of the relative level of land use impacts. Generally, the shorter the route, the less land is crossed, which would usually result in fewer potential impacts. In this regard, Alternative Route 2 is the shortest alternative (approximately 174,795 ft), while Alternative Route 1 (approximately 182,308 ft) is the longest route.

Agriculture, especially farming, constitutes a significant percentage of land use throughout the study area, especially the northern and eastern portions. Potential impacts on agricultural land uses include the disruption or preemption of farming activities. Disruption may include the time lost going around, or backing up to, structures in order to cultivate as much area as possible, and the general loss of efficiency compared to plowing or planting unimpeded in straight rows. Preemption of agricultural activities refers to the actual amount of land lost to production directly under the structures. The type and location of transmission line structures used in agricultural areas determine the nature and degree of potential impacts to farming operations. Generally, single-pole structures impact agricultural land less than H-frame or lattice towers because they present a smaller obstacle and take up less actual acreage at the foundation. Structures (and routes) located along field edges (property lines, roads, drainage ditches, etc.) generally present fewer problems for farming operations than a route running across an open field.

Construction-related activities could slightly impact agricultural production, depending upon the timing of construction related to the local planting and harvesting schedule. However, due to the relatively small area affected (beneath the structures), and the short duration of construction activities at any one location, such impacts should be both temporary and minor. Since the ROW for this project will not be fenced or otherwise separated from adjacent lands, there will be no significant long-term displacement of grazing or farming activities. Most existing agricultural land uses may be resumed following construction.

Impacts on agricultural lands can generally be ranked by degree of potential impact, with the least potential impact occurring in areas where grazing is the primary use (pasture or rangeland), followed by cultivated cropland, with forested/wooded land (orchards, commercial timber, etc.) having the highest degree of potential impact. There is no wooded land, so the highest degree of impact would be associated with cropland uses. Alternative Route 1 and Alternative Route 3 would cross the shortest distance of cropland (51,327 ft and 51,173 ft, respectively), while Alternative Route 2 would cross the longest distance of cropland (73,280 ft).

A portion of each primary alternative route crosses cropland irrigated by circle-pivot or other above-ground mechanical means (Figure 6-1). Alternative Route 3 has the greatest length of ROW that crosses cropland irrigated by mechanical systems with approximately 8,889 ft (5.0% of its total length), followed by Alternative Route 2 with 8,427 ft (4.8%), while Alternative Route 1 has the least possible impact with approximately 8,190 ft (4.5%). Each alternative route would be developed to have a minimal impact on mobile irrigation systems. The transmission line poles will be positioned as not to span the mobile systems with wires, and thereby minimize any potential impact.

The proposed transmission line project should have a minimal effect on communication operations in the study area. One AM tower (KXIT), located in Dalhart, is located within 10,000 ft of all three primary alternative routes. This tower is located approximately 3,231.74 ft north of Link A. Additionally, Alternative Route 3 and Alternative Route 1 each have a total of three electronic communication towers located within 2,000 ft of the primary routes, while Alternative Route 2 has two.

4.6.2 Aesthetics

Aesthetic impacts, or impacts upon visual resources, exist when the ROW, lines, and/or structures of a transmission line system create an intrusion into, or substantially alter the character of, an existing scenic view. The significance of the impact is directly related to the quality of the view, in the case of natural scenic areas, or to the importance of the existing setting in the use and/or enjoyment of an area, in the case of valued community resources and recreational areas.

In order to evaluate aesthetic impacts, field surveys were conducted to determine the general aesthetic character of the area and the degree to which the proposed transmission line would be visible from selected areas. These areas generally include those of potential community value, parks and recreational areas, particular scenic vistas that were encountered during the field survey, and US and state highways that traverse the study area. Measurements were made to estimate the length of each alternative route that would fall within recreational, major highway, or church, school, or cemetery foreground visual zones (½ mile, unobstructed). The determination of the visibility of the transmission line from various points was calculated from USGS maps and aerial photographs.

Construction of the proposed transmission line could have both temporary and permanent aesthetic effects. Temporary impacts would include views of the actual construction (assembly and erection of the structures) and any clearing of the ROW. Permanent impacts from the project would include the views of the structures and lines themselves as well as views of cleared ROW.

The foreground visual zone is defined as that part of the transmission line within one-half mile of an observer, which is also visible (i.e., not obstructed by terrain or vegetation). Portions of each alternative route would be located within the foreground visual zone of the study area's US and state highways. Alternative Route 2 would have the greatest amount within the foreground visual zone of the US and state highways (153,590 ft, or 87.9%), followed by Alternative Route 3 (150,518 ft, or 85.2%). Alternative Route 1 would have the least amount of impact (140,999 ft, or 77.3%).

Additionally, Alternative Route 3 would have approximately 29,485 ft of ROW located within the foreground visual zone of Lake Rita Blanca State Park. Alternative Route 1 would have 25,234 ft, while Alternative Route 2 would have the least amount with zero.

4.6.3 Recreation

Potential impacts on recreational land use include the disruption or preemption of recreational activities. Although there are numerous recreational sites within the study area, attempts were made to avoid these lands when defining the alternative routes. Rita Blanca Lake State Park is crossed by Alternative Route 2 (9.096 ft).This alternative could potentially have aesthetic impacts, as discussed in Section 4.6.2.

4.6.4 Transportation/Aviation

Potential impacts on transportation could include temporary disruption of traffic and conflicts with proposed roadway and/or utility improvements, and may include increased traffic during construction of the proposed project. However, such impacts are usually temporary and short-term. In this regard, the number of US and state highway crossings range from seven (Alternative Route 2) to three (Alternative Route 3 and Alternative Route 1). Additionally, Alternative Route 2 would have the least number of FM/RR road crossings (3), while Alternative Route 1 and Alternative Route 3 would each have the greatest number of FM/RR crossings (4). SPS will acquire road-crossing permits from TxDOT for all state-maintained roads/highways crossed by the proposed transmission line. These include all US, state, and FM/RR roads and highways.

According to Federal Aviation Regulations, Part 77, notification of the construction of the proposed transmission line will be required if structure heights exceed the height of an imaginary surface extending outward and upward at a slope of 100 to 1 for a horizontal distance of 20,000 ft from the nearest point of the nearest runway of a public or military airport having at least one runway longer than 3,200 ft (FAA, 1975). If a runway is less than 3,200 ft, notification would be required if structure heights exceed the height of an imaginary surface extending at a slope of 50 to 1 for a distance of 10,000 ft. Notification is also required for structure heights exceeding the height of an imaginary surface extending outward and upward at a slope of 25 to 1 for a horizontal distance of 5,000 ft from the nearest point of the nearest landing and takeoff area for heliports.

According to PBS&J's preliminary calculations, construction of the proposed transmission line along any of the alternative routes would fall under any of the above criteria, and thus notification of the FAA would not be required. There is one FAA-registered airport (Dalhart Municipal Airport) located within 20,000 ft of all three primary alternative routes. Dalhart Municipal Airport is located approximately 4,744 feet from Link QQ. One private landing strip, Miller Airfield, is located approximately 11,972 feet from Link J.

4.7 CULTURAL RESOURCES IMPACTS

Any construction activity has the potential for adversely impacting cultural resource sites. The impacts may occur through changes in the quality of the historical, architectural, archaeological, or cultural characteristics of that cultural entity. These impacts may occur when an undertaking alters the integrity of location, design, setting, materials, construction, or association of the property that contributes to its significance according to the National Register criteria. Impacts may be direct or indirect.

As discussed in 36 CFR 800, adverse impacts to National Register or eligible properties may occur under conditions that include, but are not limited to:

1) destruction or alteration of all or part of a property;

2) isolation from or alteration of the property's surrounding environment (setting); or

3) 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 known or unknown cultural resource sites may occur during the construction phase of the proposed transmission line and cause physical destruction or alteration of all or part of a resource. Typically, direct impacts are caused by the actual construction of the line or through increased vehicular and pedestrian traffic during the construction phase. The increase in vehicular traffic may damage surficial or shallowly buried sites, while the increase in pedestrian traffic may result in vandalism of some sites. Additionally, construction of a transmission line may directly alter, damage, or destroy historic buildings, engineering structures, landscapes or districts. Direct impacts may also include isolation of a historic resource from or alteration of its surrounding environment (setting).

4.7.2 Indirect Impacts

Indirect impacts include those effects caused by the project that are further removed in distance, or which occur later in time but are reasonably foreseeable. These indirect impacts may include introduction of visual or audible elements that are out of character with the resource or its setting. Indirect impacts may also occur as a result of alterations in the pattern of land use, changes in population density, accelerated growth rates, or increased pedestrian or vehicular traffic. Historic buildings, structures, landscapes and districts are among the types of resources that might be adversely impacted by the indirect impact of the proposed transmission towers and lines.

4.7.3 Mitigation

The preferred form of mitigation for impacts to cultural resources is avoidance. An alternative form of mitigation of direct impacts can be developed for archaeological and historical sites with the implementation of a program of detailed data retrieval. Indirect impacts on historical properties and landscapes can be lessened through careful design and landscaping considerations. Additionally, relocation may be possible for some historic structures.

4.7.4 Summary of Cultural Resources Impacts

Three proposed transmission line routes were evaluated for this project. Each of the proposed routes is a unique combination of links. Each of the 25 links was individually assessed for its likelihood for containing previously unrecorded archeological or historical sites. Each of the routes was then assessed as a whole and the rankings below are a result of this comparison. The variables usually used to evaluate the potential for the presence of unrecorded cultural resources included the number and type of previously recorded archeological sites within 1,000 ft of the proposed alignments, the amount of high probability area identified along each of the routes, and the number, if any, of previously recorded sites that are crossed by the line. During the file review no recorded archeological sites crossed by any of the links were identified. It did, however, identify five links that are located within 1,000 ft of at least one previously recorded site. Link QQ is located within 1,000 ft of two recorded archeological sites, and links S, TT, VV, XX, and YY are each located within 1,000 ft of one previously recorded site.

Two NRHP listed properties are located on the southern end of the proposed project. They are both within the Channing city limits. The first property is the XIT General Office that is located at 517 Railroad Avenue at 5th Street. The structure on the property is also designated a Recorded Texas Historic Landmark. The second property is the Hartley County Courthouse and Jail located on Railroad Avenue. The XIT property appears to be about 1,200 ft south of links AA and BB. The Hartley County Courthouse and Jail are about 2, 800 ft south of those two links.

The high probability areas (HPA) identified for the study area are those that are deemed as possessing the greatest potential for containing significant cultural resource sites. HPA's were identified using criteria such as topography and landforms, distance to water, available natural resources, and previously recorded sites in the area. For this particular area an HPA consists of all areas within 300 meters of a mapped creek or drainage, all upland areas within 300 meters of a valley edge, and all upland areas within 300 meters from playas mapped on USGS topographic quadrangle sheets. Once in the field archeologists may adjust these HPA's and additional HPAs may be identified or dismissed based on conditions observed during the survey.

Previous archeological investigations in this region of Texas indicate that a variety of site types may be expected within the project area such as prehistoric lithic scatters, habitation sites including remnants of pit houses or rock shelters, and camp/bison processing sites. Historic type sites may include ranching and farming features and associated trash dumps and campsites.

The only HPA delineations that have been field verified are those for the Alternative Route 3. The HPA delineations for Alternative Route 1 and Alternative Route 2 are based solely on a review of soil and geology maps, landforms and water sources depicted on USGS topographic maps.

The total of HPAs identified along Alternative Route 1 is approximately 24,740 ft (4.70 miles) and there are no recorded archeological sites within 1,000 ft of this route.

Alternative Route 2 has about 19,000 ft (3.60 miles) of HPA and there is one previously recorded archeological site that based on the map appears to be within 1,000 ft of the alignment, along Link tt. This site however, is not considered a constraint. The site was recorded and tested in 1992 and 1993 prior to the rehabilitation of the US 87/385 highway interchange by the TxDOT. The investigations at the site identified a historic cemetery dating from 1891 to the early 1920s. The shafts of four historic graves were found but the remains were not exhumed at that time. These locations were marked and in 1994 all four graves at the site, Laura Seybold, J.C. Seybold, Isaac Hardy, and Sarah Estelle Williams were removed and re-interred in the Hartley County Cemetery under an approved court order (Price, 1998). Therefore, no burials are currently located at this site.

Alternative Route 3 has about 33,170 ft (6.30 miles) of HPA all of which has been field verified. This route has two newly recorded sites located within 1,000 ft. These two sites, 41DA45 and 41HT62 along Link QQ were recorded during the archeological survey conducted for this project. It is the opinion of PBS&J archeologists that these sites do not meet the criteria for NRHP listing or SAL designation. The THC has not had the opportunity to review the survey report so the eligibility status of sites 41DA45 and 41HT62 have not been determined.

From a cultural resources perspective the preferred route is Alternative Route 2. Alternative Route 2 has the least amount of HPA, approximately 19,000 ft (3.60 miles). Alternative Route 2 has a recorded historic cemetery within 1,000 ft of the centerline but the burials have been relocated and are no longer a constraint. Alternative Route 1 is the second ranked route with no recorded archeological sites within 1,000 ft and the second lowest amount of HPA with about 24,740 ft (4.70 miles). Alternative Route 3 is the least preferred with the most HPA, approximately 33,170 ft (6.30 miles), and two recorded sites within 1,000 ft of the centerline.

5.0 PUBLIC INVOLVEMENT ACTIVITIES

5.1 CORRESPONDENCE WITH AGENCIES/OFFICIALS

PBS&J and SPS contacted the following local, state, and federal agencies and officials by letter in March 2008 to solicit comments, concerns, and information regarding potential environmental impacts, permits, or approvals for the construction of the proposed 230-kV transmission line in Dallam and Hartley Counties, Texas. A map of the study area was included with each letter. A sample copy of the letter and responses received as of the publication of this report are included in Appendix A.

- Bureau of Land Management, Amarillo Field Office
- Channing Independent School District
- City of Channing City Commissioners
- City of Channing Director of Utilities
- City of Channing Mayor
- City of Dalhart City Manager and Assistant City Manager
- City of Dalhart Mayor
- City of Dalhart Parks and Recreation Director
- County Farm Bureau
- County Historical Commission
- Dalhart Area Chamber of Commerce
- Dalhart Assistant City Manager
- Dalhart City Manager
- Dalhart Independent School District
- Dallam County Commissioner Precinct 1
- Dallam County Commissioner Precinct 2
- Dallam County Commissioner Precinct 3

- Dallam County Commissioner Precinct 4
- Dallam County Judge
- Director of Parks and Recreation of Dalhart
- FEMA
- Hartley County Commissions Precinct 1
- Hartley County Commissions Precinct 2
- Hartley County Commissions Precinct 3
- Hartley County Judge
- Hartley Independent School District
- Ingram Flying Service, Dalhart Municipal Airport
- Miller Airfield
- NRCS
- Texas Airport Development Office (FAA)
- Texas General Land Office
- THC
- TPWD
- TWDB
- TxDOT, Amarillo District
- TxDOT, Aviation Division
- TxDOT, Environmental Affairs Division
- U.S. Fish and Wildlife Service - Amarillo
- USACE, Tulsa District

5.2 PUBLIC MEETINGS

SPS and PBS&J held a public open-house meeting in the study area on June 23, 2008. The intent of the meeting was to solicit comments from citizens, landowners, and public officials concerning the proposed project. The meetings had the following objectives:

- Promote a better understanding of the proposed project including the purpose, need, and potential benefits and impacts,
- Inform and educate the public with regard to SPS's routing procedures, schedule, and decision process, and
- Ensure that the decision-making process accurately identifies and considers the values and concerns of the public and community leaders.

Public involvement contributed both to the evaluation of issues and concerns by SPS and PBS&J, and to the selection of a preferred route for the project. Letters were sent inviting potentially affected landowners to the meeting. The letters stated the location, time, and purpose of the meetings. Sample copies of the letters are included in Appendix B.

At the meeting, rather than a typical presentation in the speaker-audience format, SPS and PBS&J staff set up several information stations within the venue space. Each station was devoted to a particular aspect of the routing study and was manned by SPS and/or PBS&J staff. Each station provided maps, illustrations, photographs, and/or text explaining each particular topic. Interested citizens and property owners were encouraged to visit each station in order, so that the entire process could be explained in the general sequence of project development. The information station format is advantageous because it allows attendees to process information in a more relaxed manner and allows them to focus on their particular area of interest and ask specific questions. More importantly, the one-on-one discussions with SPS/PBS&J staff encouraged more interaction from those citizens who might be hesitant to participate in a speaker-audience format.

PBS&J staff at the first station signed visitors in and handed out a questionnaire. The questionnaire solicited comments on citizen concerns as well as an evaluation of the information presented at the open house. Copies of the questionnaire are included in Appendix B. Completed questionnaires were received either at the meeting or later. Below is a description of the meeting and a summary of questionnaires received:

A total of 55 people signed in as attending the public open-house meeting in Hartley, Texas, on June 23, 2008. Twenty-five individuals submitted questionnaires at the meeting and one individual submitted a questionnaire at a later date.

Of those completing questionnaires, 88 percent of the respondents agreed the meeting and information provided was helpful to their understanding of the project.

The most important considerations for respondents who completed questionnaires were maintaining reliable electric service and minimizing the number of residences near the line. Approximately 73 percent preferred the transmission line along roads and railroads. Approximately 42 percent of the respondents considered it acceptable for the proposed transmission line to be along fence lines away from roads and/or section lines, but placement of transmission lines along half-section lines was considered unacceptable to approximately 62 percent of the respondents.

The questionnaires also provided space for respondents to include any general comments or remarks. A brief summary of comments, remarks, and concerns documented by the meeting attendees in either questionnaire or letter format include:

- the route along Highway 385 is most direct and accessible;
- please do the least amount of damage to property
- could adversely affect existing irrigation systems, irrigation sprinklers would have to be shortened, which would take irrigated land out of production, would not be able to move equipment to some locations
- could damage creek bed
- support, in favor of the project

6.0 PREFERRED ROUTE SELECTION

6.1 PBS&J'S ENVIRONMENTAL EVALUATION

The purpose of this study was to identify and evaluate the most viable alternative routes for SPS's proposed 230-kV transmission line between the existing Dallam County Substation and the Channing Substation, and to recommend the routes having the least adverse impacts.

PBS&J completed the environmental analysis of the three primary alternative routes (Section 4.0), the results of which are shown in Table 6-1. The environmental evaluation was a comparison of alternatives from a strictly environmental viewpoint, based upon the measurement of 34 separate environmental criteria and the consensus opinion of PBS&J's group of evaluators. SPS used this information along with engineering, construction, maintenance, and operational factors to select a preferred route and several alternative routes. PBS&J's evaluation is discussed below.

PBS&J professionals with expertise in different environmental disciplines (wildlife biology, plant ecology, land use/planning, and archaeology) evaluated the three alternative routes based upon environmental conditions present along each route (augmented by aerial photo interpretation and field surveys, where possible) and the general routing methodology used by PBS&J and SPS. Each PBS&J staff person independently analyzed the routes and the environmental data presented in Table 6-1. The evaluators then discussed their independent results. The relationship and relative sensitivity among the major environmental factors were determined by the group as a whole. The group then selected a recommended preferred and alternative routes based strictly upon the environmental data.

During the initial discussion of the three primary alternative routes, it was the opinion of the group of evaluators that each of the alternative routes would be environmentally acceptable alternatives for this project. The final decision in the selection of a preferred route was reached by comparing the advantages and disadvantages of these routes and recommending one least-impacting route, and several alternative routes.

PBS&J's land use evaluator selected Alternative Route 1 as the preferred route as it has the least amount of habitable structures with 14. It also parallel's the greatest percentage (90.0%) of existing corridors (including apparent property boundaries) and crosses the least amount of land irrigated by mobile irrigation systems (1.6 miles). Alternative Route 3 was selected as the second route from a land use perspective because it has the second least amount of habitable structures with 15, parallels the lowest percentage of existing corridors (87.5%), and crosses the most land irrigated by mobile irrigation systems (1.7 miles). Alternative Route 2 was selected third, as it has the greatest number of habitable structures located within 300 ft (33), crosses the greatest amount of cropland (14 miles), and is the only route crossing park/recreational areas.

The ecological evaluation (vegetation, wildlife, and aquatic) focused on three primary factors: the number of streams crossed, the amount of known habitat of threatened and endangered species crossed, and the amount of existing ROW either used or paralleled (which reduces habitat clearing and fragmentation). Based on the data, the ecology evaluator selected Alternative Route 2 as the preferred route, followed by routes 1 and 3.

Based on the amount of HPA delineated along each of the alignments, Alternative Route 2 is ranked first from a cultural resources perspective. Alternative Route 2 has about 3.6 miles of HPA, which is the least amount of all the alignments. Alternative Route 1 is next with about 4.7 miles of HPA, followed by Alternative Route 3 with approximately 6.3 miles of HPA.

Following the evaluation by discipline, the group of PBS&J evaluators discussed the relative importance and sensitivity of the various criteria as they applied to the three primary alternative routes and the study area. It was the decision of the group that Alternative Route 3 be selected as the preferred route based on the land use data in Table 6-1. The group ranking of the alternatives is shown in Table 6-2. The decision to recommend the preferred route was based primarily on the following advantages for Alternative Route 3.

- Second shortest alternative route
- Second lowest number of habitable structures located within 300 ft with 15, however, only one more than the route with the lowest number
- The most amount of route parallel, adjacent to, or utilizing existing transmission lines
- The least amount of route across cropland

PBS&J's project manager for the Dallam to Channing 230-kV project reviewed all of the data and evaluations and concurred with the rankings and recommendations for the alternative routes. Therefore, based upon its evaluation of this particular project and its experience and expertise in the field of transmission line routing, PBS&J recommends Alternative Route 3 as the preferred route and the remaining routes as alternates. Considering all pertinent factors, it is PBS&J's opinion that these routes best satisfy the criteria specified in Section 37.056(c)(4) of the Texas Utilities Code for consideration in the granting of CCNs.

Table 6-1

Environmental Data For Alternative Route Evaluation
Dallam-Channing 230-kV Transmission Line Project

	Alternative Route		
	Alt. 1	Alt. 2	Alt. 3
1. Length of alternative route	182308	174795	176631
2. Length of route parallel, adjacent to, or utilizing existing transmission lines	5527	20060	25990
3. Length of route parallel and adjacent to existing public roads/highways	115958	149939	124094
4. Length of route parallel and adjacent to existing pipelines	0	0	0
5. Length of route parallel to apparent property boundaries	69018	68407	47066
6. Total length of route parallel to existing corridors (including apparent property boundaries)	164117	169916	154578
7. Total number of habitable structures[1] within 300 ft of the route centerline	14	33	15
8. Number of newly affected habitable structures[1] within 300 ft of route centerline	13	20	14
9. Length of route across parks/recreational areas[2]	0	9096	0
10. Number of additional parks or recreational areas within 1,000 ft of the route centerline	0	0	1
11. Length of route across pastureland	118116	87334	113080
12. Length of route across cropland	51327	73280	51173
13. Length of route across land with mobile irrigation systems	8190	8427	8889
14. Length of route across upland forest	0	0	0
15. Length of route across bottomland forest, including forested wetlands	0	0	0
16. Length of route across emergent wetlands	0	0	0
17. Number of streams crossed by the route	2	0	2
18. Length of route parallel to streams (within 100 ft)	0	0	0
19. Number of known rare/unique plant locations within the ROW	1	0	1
20. Length of route through known habitat of endangered or threatened species	14513	14574	14840
21. Number of recorded cultural resource sites crossed by the route	0	0	0
22. Number of additional recorded cultural resource sites within 1,000 ft of the route centerline	0	1	2
23. Length of route across areas of high archaeological/historical site potential	24740	19000	33170
24. Number of FAA-registered airstrips within 20,000 ft of the route centerline	1	1	1
25. Number of private airstrips within 10,000 ft of the route centerline	1	1	1
26. Number of heliports within 5,000 ft of the route centerline	0	0	0
27. Length of route across open water (lakes, ponds)	0	0	0
28. Number of commercial AM radio transmitters within 10,000 ft of route centerline	1	1	1
29. Number of FM radio transmitters, microwave relay stations, and other electronic installations w/in 2,000 ft	3	2	3
30. Number of U.S. or State Highways crossed by the route	3	7	3
31. Number of farm-to-market (FM) and ranch roads (RR) crossed by the route	4	3	4
32. Number of railroads crossed by the route	3	5	3
33. Length of route within visual foreground zone of park/recreational areas (½ mile unobstructed)	25234	0	37448
34. Length of route within visual foreground zone of State and U.S. Highways (½ mile unobstructed)	140999	153590	150518

[1] Structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis. Habitable structures include but are not limited to single-family and multi-family dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, and schools.
[2] Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church.
Note: All length measurements in feet. All linear measurements were obtained from aerial photography flown in 2008, with the exception of areas of high archaeological/historical site potential which were measured from the USGS Topographic Quadrangles.
The aerial photography was ortho-rectified to National Map Accuracy Standards of +/- 15 ft.

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Table 6-2

Environmental Ranking Of Primary Alternative Routes

Category/Ranking	Alternative Route		
	1	2	3
Land Use	1st	3rd	2nd
Ecology	2nd	1st	3rd
Cultural Resources	2nd	1st	3rd
Project Manager	2nd	3rd	1st
Group Consensus	2nd	3rd	1st

6.2 SPS'S PREFERRED ROUTE SELECTION

To select a preferred route for the Dallam to Channing Project, SPS based their review on potential environmental impacts, land use, engineering constraints, maintenance and construction considerations, public input/community values, estimated costs, system operations, and landowner concerns and preferences. Based on this review and evaluation, SPS determined that each of the primary routes was a feasible and acceptable alternative from an engineering and cost perspective. Following consideration of each of the above factors, SPS selected Alternative Route 3 as their preferred route.

Figure 6-1 and Tables 6-3 through 6-5 present detailed information for habitable structures and other land use features in the vicinity of the preferred and alternative routes.

Table 6-3

Habitable Structures in the Vicinity of SPS's Preferred Route 3
Dallam to Channing 230-kV Transmission Line Project

Map Number	Structure	Approximate Distance(in feet) from Centerline	Direction
4	House	110	W
5	House/Shop	117	W
8	House	161	N
9	Barn	104	N
10	Barn	109	N
11	House	188	N
12	Shop	285	N
13	Mobile Home	116	N
14	Barn	135	N
15	House	205	N
26	Mobile Home	83	W
60	Business	207	N
61	Mobile Home	130	SE
62	Mobile Home	189	E
64	Mobile Home/2 Shops	205	E

Table 6-4

Habitable Structures in the Vicinity of Alternative Route 1
Dallam to Channing 230-kV Transmission Line Project

Map Number	Structure	Approximate Distance (in feet) from Centerline	Direction
4	House	110	W
5	House/Shop	117	W
8	House	161	N
9	Barn	104	N
10	Barn	109	N
11	House	188	N
12	Shop	285	N
13	Mobile Home	116	N
14	Barn	135	N
15	House	205	N
60	Business	207	N
61	Mobile Home	130	SE
62	Mobile Home	189	E
64	Mobile Home/2 Shops	205	E

Figure 6-1, Environmental and Land Use Constraints including Habitable Structures Within 300 Feet of Preferred and Alternate Routes

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Table 6-5

Habitable Structures in the Vicinity of Alternative Route 2
Dallam to Channing 230-kV Transmission Line Project

Map Number	Structure	Approximate Distance (in feet) from Centerline	Direction
2	Office/Shop	290	S
3	Office/Shop	178	N
16	House	97	W
18	Mobile Home	219	W
19	Mobile Home	88	S
20	House	78	NE
21	Shop/Barn	60	S
22	Barn	53	N
23	House	49	N
26	Mobile Home	83	W
28	House	116	W
29	Mobile Home	257	W
32	Barn	146	W
34	House	159	W
36	House	124	E
38	House	137	E
39	House	248	E
40	Mobile Home	54	E
41	Shop	76	E
42	Barn	25	E
47	Shop	85	N
48	House	253	S
49	Mobile Home	300	S
50	Mobile Home	281	S
51	Mobile Home	265	S
52	Mobile Home	245	S
53	House	135	N
55	Mobile Home	114	N
56	Mobile Home	69	N
58	Mobile Home	216	S
59	Mobile Home	121	S
60	Business	69	N
103	Mobile Home	180	N

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7.0 LIST OF PREPARERS

This EA was prepared for SPS by PBS&J. SPS provided most of the information in Section 1.0, Description of the Proposed Project and portions of Section 6.2, SPS's Preferred Route Selection. PBS&J employees with primary responsibilities for preparation of this document include the following:

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Appendix A

Agency Correspondence

Appendix B

Public Involvement