Environmental Assessment and Alternative Route Analysis for the Proposed Newhart Substation to Kress Substation 115-kV Transmission Line Project Castro and Swisher Counties, Texas

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ENVIRONMENTAL ASSESSMENT AND ALTERNATIVE ROUTE ANALYSIS FOR THE PROPOSED NEWHART SUBSTATION TO KRESS SUBSTATION 115-KV TRANSMISSION LINE PROJECT CASTRO AND SWISHER COUNTIES, TEXAS

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Acronyms and Abbreviations

ac-ft	acre-feet
AOU	American Ornithologist's Union
APLIC	Avian Power Line Interaction Committee
BEG	Bureau of Economic Geology
BGEPA	Bald and Golden Eagle Protection Act
BLS	Bureau of Labor Statistics
CCN	Certificate of Convenience and Necessity
CFR	Code of Federal Regulations
CWA	Clean Water Act
EA	Environmental Assessment
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FM	Farm-to-Market Road
ft	feet/foot
FWS	U.S. Fish and Wildlife Service
HPA	high probability area
IH	Interstate
ISD	independent school district
kV	kilovolt
LPCIWG	Lesser Prairie-Chicken Interstate Working Group
MBTA	Migratory Bird Treaty Act
MPO	Metropolitan Planning Organization
msl	mean sea level
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 General Permit
NWR	National Wildlife Refuge

OTHM	Official Texas Historical Marker
PRPC	Panhandle Regional Planning Commission
PUC	Public Utility Commission of Texas
PURA	Public Utility Regulatory Act
ROW	right-of-way
RRC	Railroad Commission of Texas
RTHL	Recorded Texas Historic Landmarks
RTO	Regional Transmission Operator
SAL	State Archeological Landmark
SCS	Soil Conservation Service
SDHPT	State Department of Highways and Public Transportation
SH	State Highway
SHPO	State Historic Preservation Officer
SL	State Loop
SPP	Southwest Power Pool
SPS	Southwestern Public Service Company
STEP	SPP Transmission Expansion Plan
SWPPP	Storm Water Pollution Prevention Plan
TARL	Texas Archeological Research Laboratory
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
TORI	Texas Outdoor Recreation Inventory
TORP	Texas Outdoor Recreation Plan
TOS	Texas Ornithological Society
TPWD	Texas Parks and Wildlife Department
TSDC	Texas State Data Center
TSHA	Texas State Historical Association
TWC	Texas Workforce Commission
TWDB	Texas Water Development Board
TXDOT	Texas Department of Transportation
US	US 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, 115-kilovolt (kv) electric transmission line between the existing Kress Substation, located approximately 4 miles west of Interstate Highway (IH) 27, on the west side of County Road (CR) 10 in Swisher County, and the proposed Newhart Substation, located approximately 5 miles northeast of Hart, Texas, at the intersection of CR 620 and CR 527 in Castro County (Figure 1-1). Depending on which route is ultimately selected, the alternative routes would be approximately 18 to 25 miles long and located within a 70-foot (ft) right-of-way (ROW) Castro and Swisher counties, Texas.

1.2 PURPOSE AND NEED

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

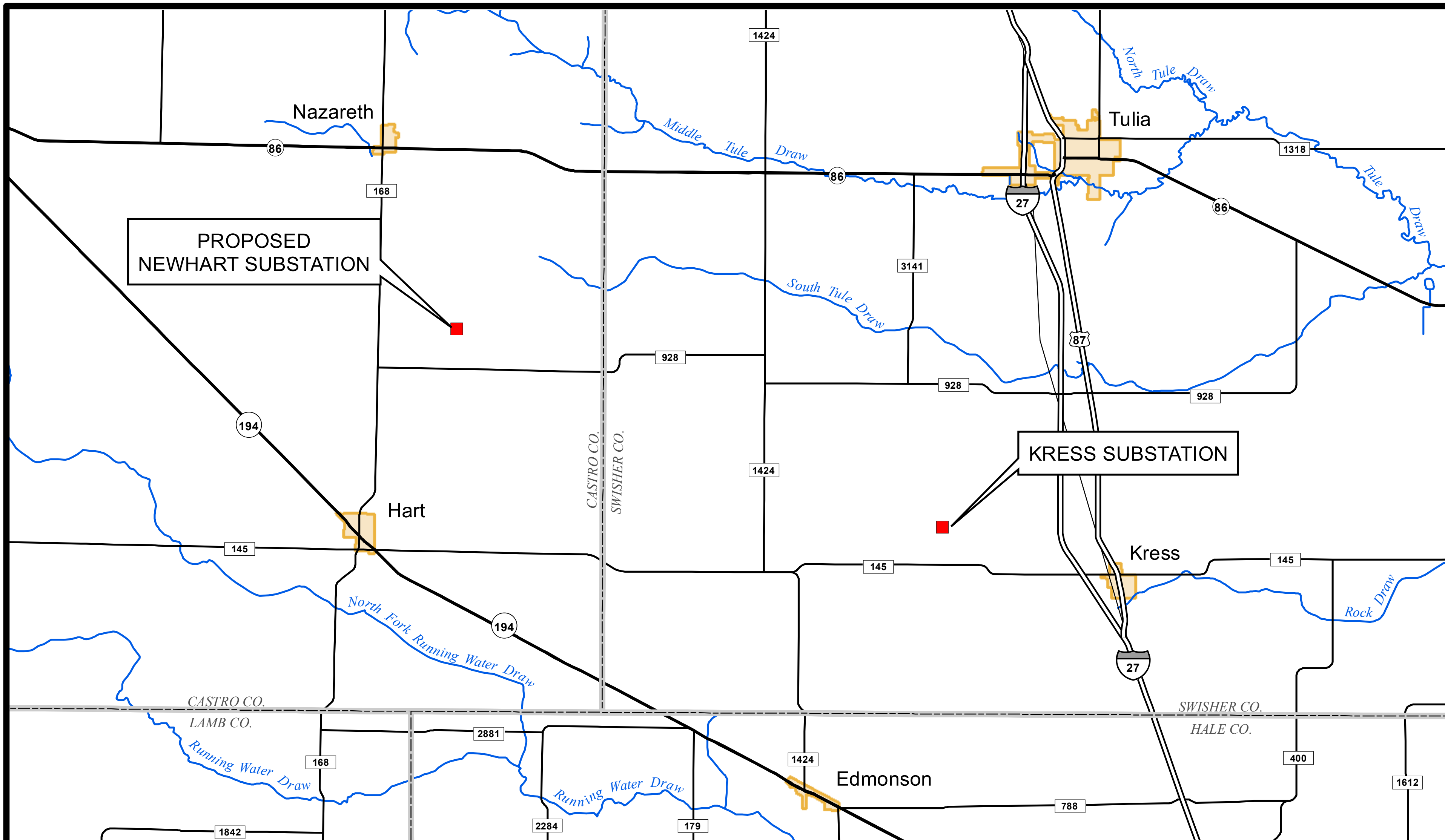
The proposed transmission line will connect the proposed Newhart Substation in Castro County, Texas, to the existing Kress Substation in Swisher County, Texas. The proposed transmission line was identified by SPP as needed for reliability to address overloads and low-voltage violations during contingency outages in the ___________________. The proposed transmission line is the result of the ______________ SPP Transmission Expansion Plan (STEP) study of the SPP Open Access Transmission Tariff, which is part of the Ten-Year Regional Transmission Organizational Regional Reliability Assessment (2011–2021).

1.3 AGENCY ACTIONS

Construction documents and specification 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, floodplain development permits and road crossing permits may be required by counties within the study area.

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 (EA) and route analysis report has been prepared by Atkins (formerly PBS&J) in



0 2 4 6 8 Miles

Base Map: TXDOT General Highway Maps

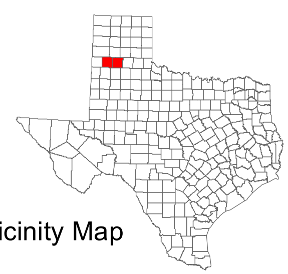


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Figure 1-1

PROJECT AREA LOCATION MAP
NEWHART TO KRESS
230-kV TRANSMISSION LINE PROJECT
CASTRO AND SWISHER COUNTIES

Revised: 7/8/2011

N:\Clients\U_Z\XCel_Energy\Newhart_projects\geo\figs\Newhart_to_Kress\Kress_Project_Area_Figure.mxd 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 U.S. 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 may be subject to USACE regulation.

Certain construction activities that potentially impact waters and wetlands may be authorized by one of the USACE's Nationwide General 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 (i.e., 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 Fort Worth District, there are no navigable waters 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 1 acre (ac) 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 1 ac will be cleared.

1.3.4 Federal Aviation Administration

If necessary, SPS will file a “Notice of Proposed Construction or Alteration” (Form 7460-1) with the Federal Aviation Administration (FAA), if the route certificated by the PUC is located in the vicinity of an airport, and within the relevant FAA criteria.

1.3.5 Texas Historical Commission

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

1.3.6 Texas Department of Transportation

Permits will be obtained from the Texas Department of Transportation (TxDOT) for any crossing of, or access from, a state-maintained roadway.

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 one route, along with several alternate routes, for the proposed 115-kV transmission line that are feasible from economic, engineering, and environmental standpoints. SPS and Atkins 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.

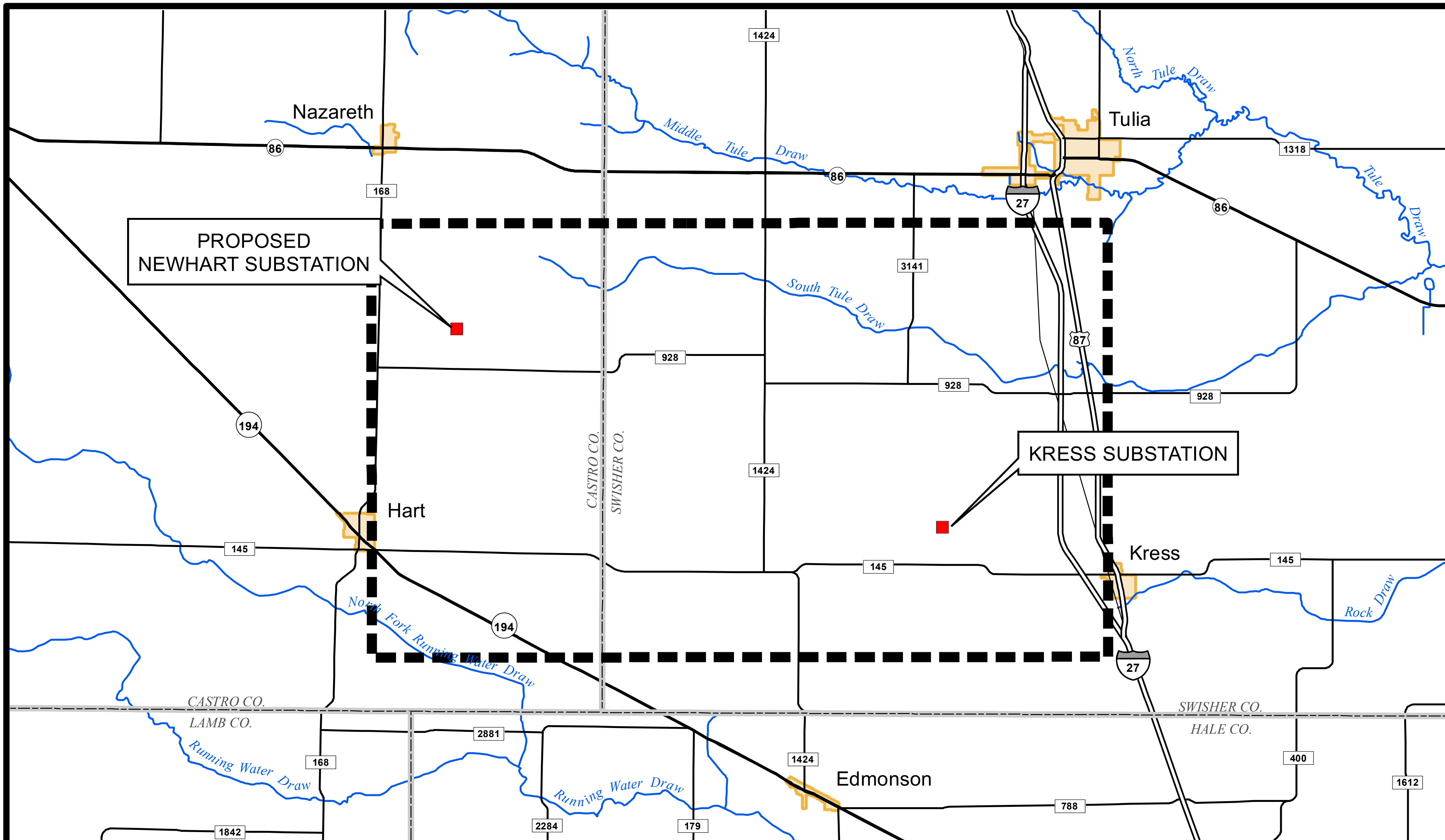
2.2 DATA COLLECTION

Data used by Atkins in the delineation and evaluation of alternative routes were drawn from a variety of sources, including published literature (e.g., 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 2010, U.S. Geological Survey (USGS) topographic quadrangles (1:24,000 and 1:100,000), TXDOT County Road 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 selection.

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 Kress Substation and the proposed Newhart 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 roughly a rectangular area encompassing the existing Kress Substation and the proposed Newhart Substation. The study area is approximately 20.4 miles west to east and 12 miles north to south. Altogether, this study area covers approximately 245 square miles in Castro and Swisher counties, Texas.



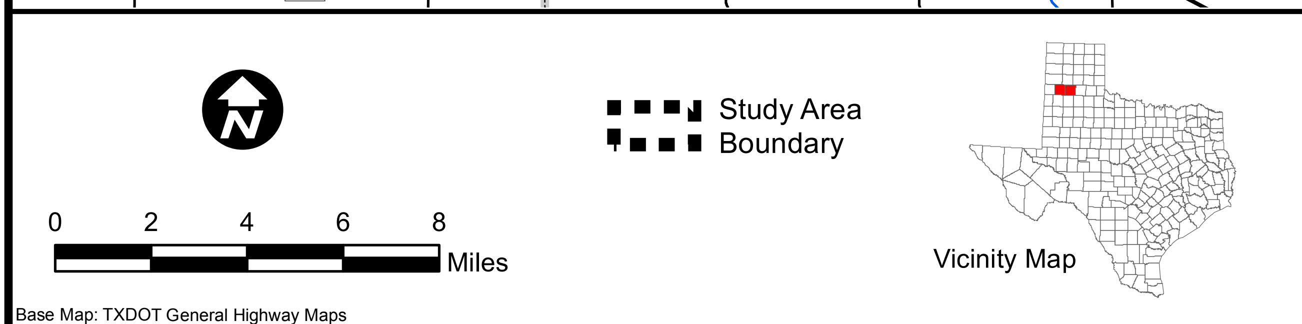


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Figure 2-1

STUDY AREA LOCATION MAP
NEWHART TO KRESS
230-kV TRANSMISSION LINE PROJECT
CASTRO AND SWISHER COUNTIES

Revised: 7/8/2011

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2.3.2 Constraints Mapping

Since numerous potential routes could be drawn to connect the existing Kress Substation and the proposed Newhart Substation, a constraints mapping process was used in selecting/refining possible alternative routes. The geographic locations of environmentally sensitive or otherwise 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 quadrangles (Figure 2-2). The overall impact of each alternative route presented in this report has been significantly reduced by avoiding, to the greatest extent possible, such constraints as individual residences, rural subdivisions, community facilities, airstrips, irrigation systems, cemeteries, historic sites, archeological sites, wetlands, parks, churches, schools, and endangered or threatened species habitat, and by utilizing or paralleling existing compatible right-of-way (ROW), property lines, and roadways, where possible.

2.3.3 Preliminary Alternative Routes

Utilizing the information described above, Atkins identified numerous preliminary routes, which were presented to SPS for review and comment. The project team made modifications to the preliminary routes based upon the results of the field evaluation and a review of high-resolution aerial photography. These preliminary routes, which are shown on Figure 2-3, were presented to the public at two open-house meetings held in Hart, Texas on June 7 and 9, 2011.

Atkins and SPS 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 for consideration. The project team, utilizing this input, made final revisions to the preliminary routes and identified the primary alternative routes to be evaluated by Atkins in this document.

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

- To improve the paralleling of apparent property lines,
- To improve the paralleling of compatible ROW, and
- To increase the number of possible alternative routes.

2.3.4 Primary Alternative Routes

Ultimately, 10 primary alternative routes were selected that were then specifically studied and evaluated by Atkins. The results of Atkin's efforts are presented in this EA in Sections 4.0 and 6.0. The primary alternative routes are shown on Figure 2-4. The primary routes constitute, for the

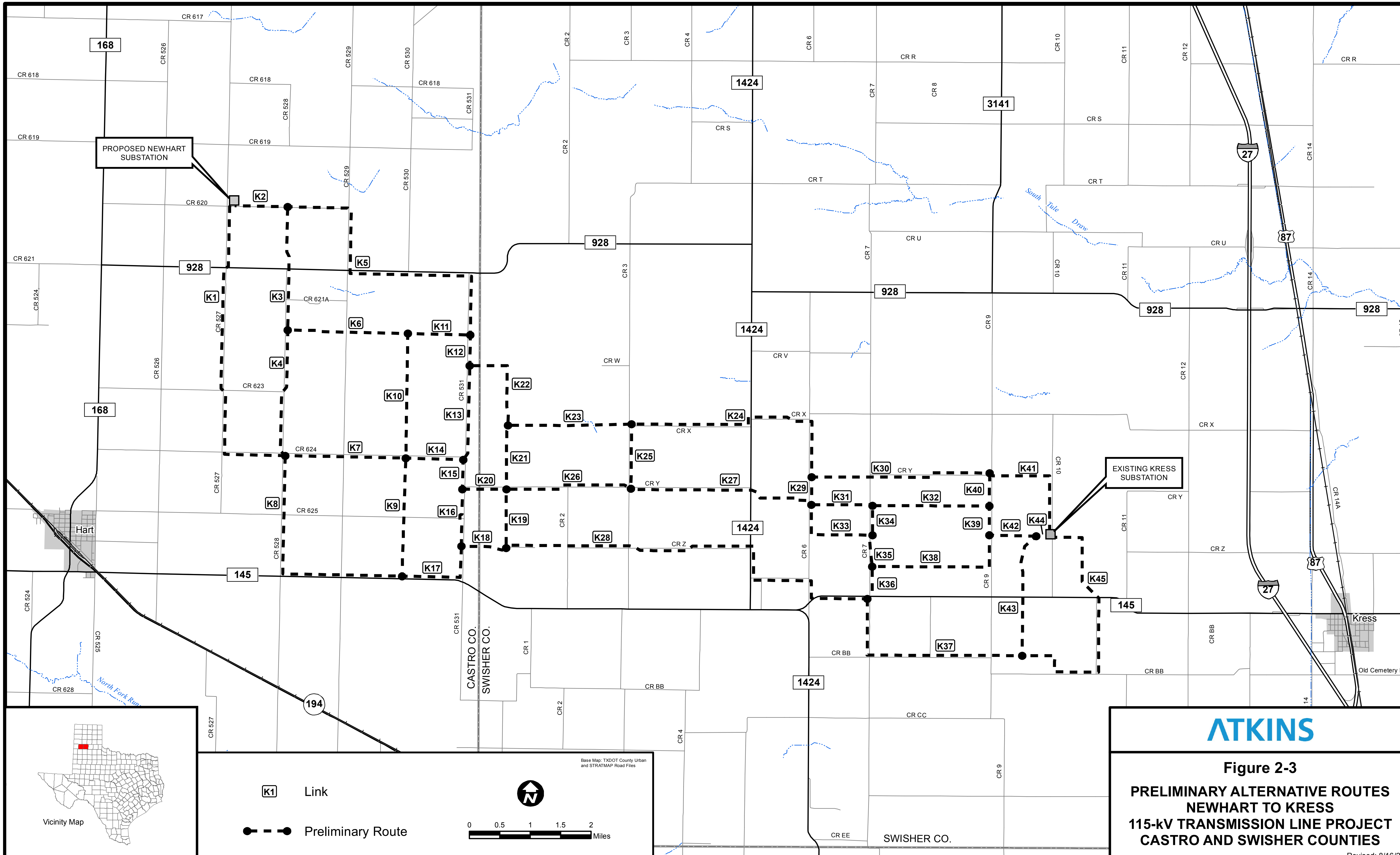

Figure 2-3

PRELIMINARY ALTERNATIVE ROUTES NEWHART TO KRESS 115-kV TRANSMISSION LINE PROJECT CASTRO AND SWISHER COUNTIES

Revised: 8/16/201

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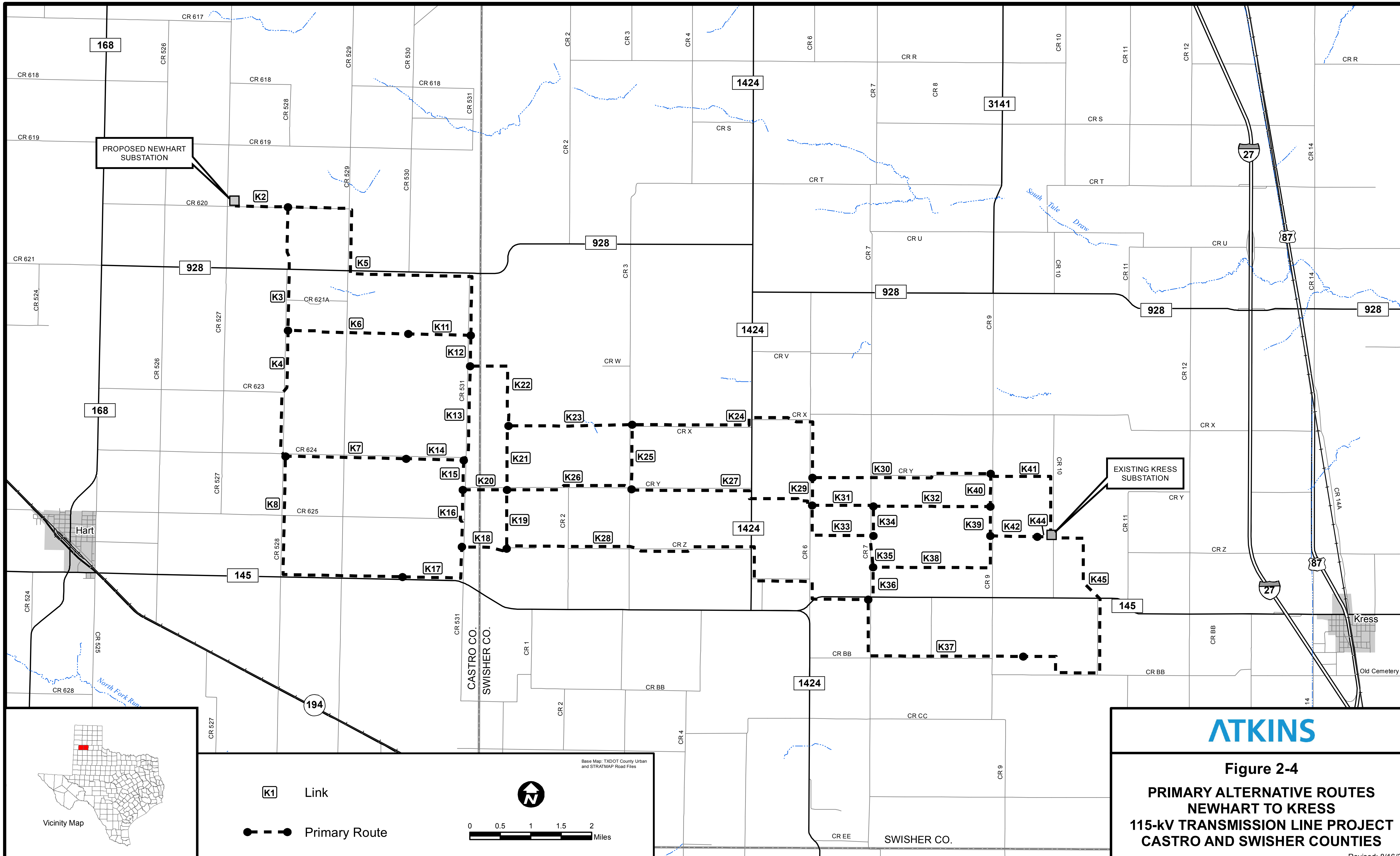

Figure 2-4

PRIMARY ALTERNATIVE ROUTES
NEWHART TO KRESS
115-kV TRANSMISSION LINE PROJECT
CASTRO AND SWISHER COUNTIES

Revised: 8/16/201

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Each of the alternative routes were examined in detail during April and June 2011 field visits conducted by Atkins and KW Land Specialists. In evaluating the alternative routes, 39 environmental criteria were considered. The goal of this evaluation was to select a top-ranked, and several alternative transmission line routes between the existing Kress Substation and the proposed Newhart Substation. Atkins' recommendations 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. After Atkins made its route recommendations, SPS completed further evaluations in which Atkins' environmental evaluations were considered in conjunction with SPS's criteria associated with constructability, maintenance, and operation. SPS's evaluation, and its selection of a route that best satisfied PUC criteria, is located in Section 6.2 of this document.

Table 2-1

Primary Alternative Route Composition and Length
Newhart to Kress Project

Route	Route Formula	Length (miles)
1	K2-K5-K12-K22-K23-K24-K30-K41	18.95
2	K2-K3-K4-K8-K17-K18-K28-K37-K45	25.82
3	K2-K5-K12-K22-K21-K26-K27-K31-K32-K39-K42-K44	18.79
4	K2-K3-K4-K7-K14-K15-K20-K26-K27-K31-K32-K39-K42-K44	18.82
5	K2-K5-K12-K22-K23-K24-K30-K40-K39-K42-K44	19.01
6	K2-K3-K6-K11-K12-K22-K23-K24-K29-K33-K35-K38-K42-K44	20.03
7	K2-K5-K12-K22-K21-K19-K28-K36-K38-K42-K44	20.83
8	K2-K3-K6-K11-K12-K13-K15-K16-K18-K28-K36-K38-K42-K44	20.89
9	K2-K3-K6-K11-K12-K22-K23-K25-K27-K31-K32-K39-K42-K44	18.74
10	K2-K3-K4-K7-K14-K15-K20-K26-K27-K31-K34-K35-K38-K42-K44	19.87

Note: For primary route locations, see Figure 2-4.

3.0 EXISTING ENVIRONMENT

3.1 PHYSIOGRAPHY AND GEOLOGY

3.1.1 Physiography

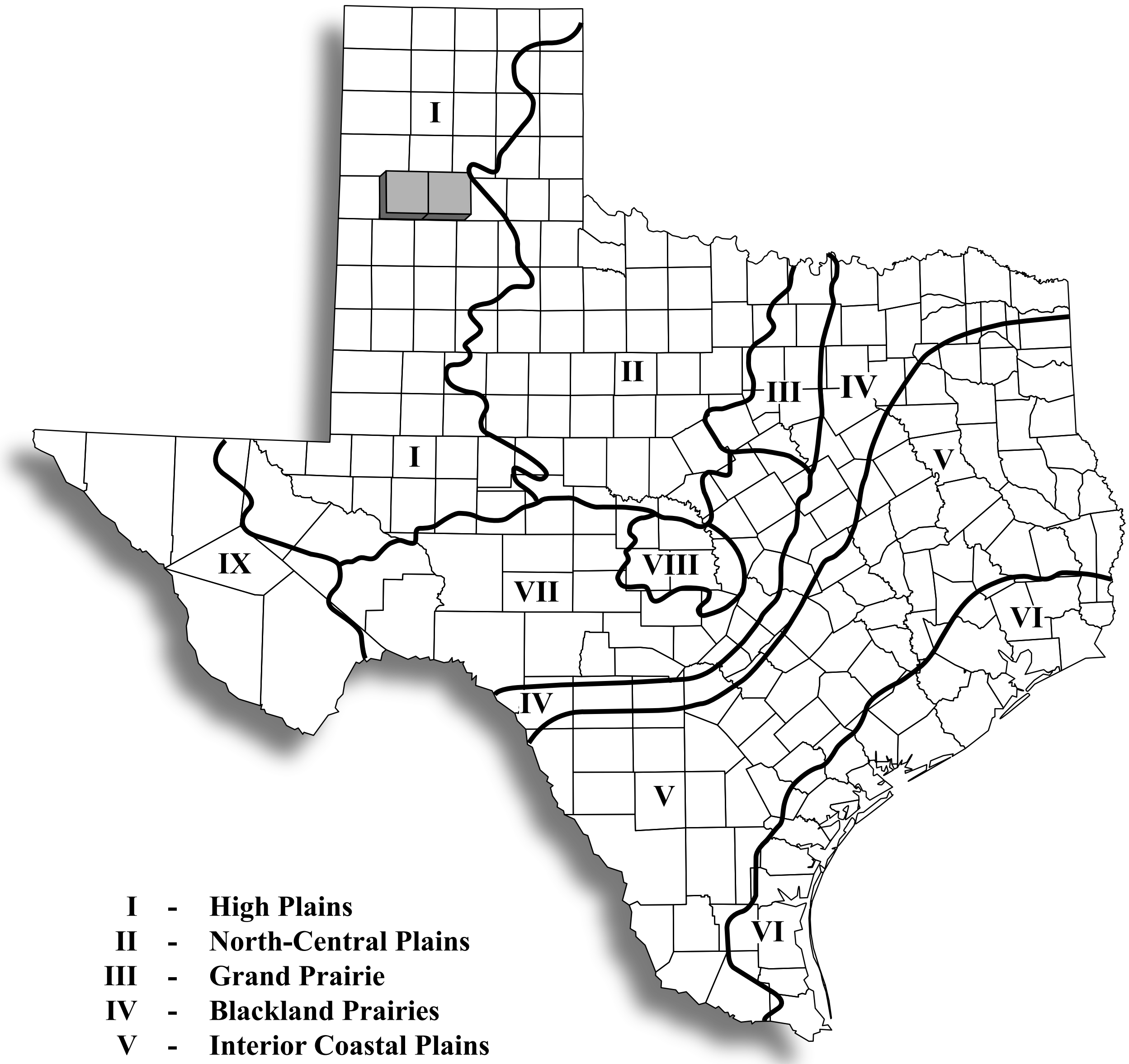
As shown on Figure 3-1, the study area counties are located within the Southern High Plains Physiographic Province of Texas, a subdivision of the High Plains Province (Bureau of Economic Geology [BEG], 1996). The Southern High Plains occur westward from the boundary between the Texas Panhandle and the State of New Mexico, north to the Canadian Breaks, east to the North-Central Plains and south to the Edwards Plateau, Stockton Plateau, and Basin and Range provinces.

The Southern High Plains of Texas form a nearly flat plateau ranging from 2,200 to 3,800 ft in elevation above mean sea level (msl). This area has also historically been referred to as the Llano Estacado, or pallisaded plains. This plateau is underlain by extensive stream deposits of sand and gravel, which form the Ogallala aquifer (BEG, 1996). The relatively flat surface of this region is abundantly pitted by sinks and depressions (playas) that were formed by processes causing the solution of limestone beds and deflation by wind of the remaining insoluble particles. Many of these solution-deflation depressions are aligned in parallel and/or perpendicular sets, indicating underlying joint fracturing within the Ogallala Formation. On the surface, windblown sands and silts form thick, rich soils and/or caliche. Numerous playa lakes are scattered across the treeless plains. Drainage on the High Plains is dominated by widespread, small, intermittent streams. At its eastern boundary, there is a westward-retreating escarpment capped by hard caliche. The headwaters of major rivers have incised the caprock in the region, such as the tributaries of the Red River in the vicinity of Palo Duro Canyon and Caprock Canyons state parks, which are located to the north and east of the study area, respectively.

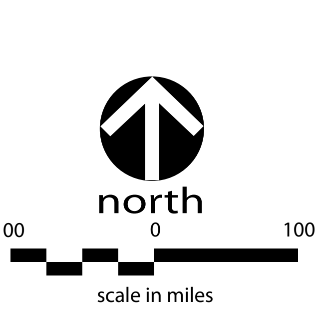
3.1.2 Geology

According to BEG (1968, 1978), study area geologic units include (youngest to oldest): Quaternary-age alluvium, windblown dunes and dune ridges, playa deposits, loess, the Blackwater Draw Formation (previously mapped as windblown cover sand); and the Tertiary-age Ogallala Formation.

Quaternary-age alluvium (gravel, sand, and silt) is present within study area floodplains located along South Tule Draw. Windblown dunes and dune ridges are present in the western portion of the study area and consist of shallow deposits of sand, silt, and caliche nodules. Playa deposits are randomly scattered across the entire study area and consist of gray-colored sandy clay and silt within shallow depressions. Loess, or windblown silt, is also present in the western portion of study area. The Blackwater Draw Formation is present in most of the study area excluding the far



I - **High Plains**
II - **North-Central Plains**
III - **Grand Prairie**
IV - **Blackland Prairies**
V - **Interior Coastal Plains**
VI - **Gulf Coastal Prairies**
VII - **Edwards Plateau**
VIII - **Central Texas Uplift**
IX - **Trans-Pecos Basin & Range**



Source: BEG, 1996

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Figure 3-1

LOCATION OF THE STUDY AREA COUNTIES
IN RELATION TO THE
PHYSIOGRAPHIC PROVINCES OF TEXAS

NEWHART TO KRESS 115-KV PROJECT

File: N:\Clients\U_Z\XCel_Energy\Newhart_projects\geo\figs\pdf\Report_Figures\Newhart_to_Kress\figure3-1.ai southwestern portion and consists of fine to medium grained quartz, silty, calcareous, locally clayey, caliche nodules, massive, pink to grayish-red, with a distinct soil profile. The Blackwater Draw Formation has a maximum thickness of up to 25 ft.

The Tertiary-aged Ogallala Formation outcrops in the study area primarily along South Tule Draw and North Fork Running Water Draw. This formation consists of various sequences of coarse-grained sand and gravel in the lower part, which grades upward into fine clay, silt, and sand. Gravel occurs in the basal section and ranges from cobble to pea-size. This formation contains some quartz gravel and caliche, with pebbles and cobbles of quartz, quartzite, and chert being common. The uppermost layer of the Ogallala Formation has a caliche "caprock" layer about 60 ft thick that formed about 1 million years ago after the surface stabilized and soils formed. Caliche is a hardened deposit of calcium carbonate that cements together other materials, including gravel, sand, clay, and silt. The sands are gray and red, fine to coarse-grained, and cemented locally by calcite and silica. Total thickness of the Ogallala Formation ranges from 75 to 350 ft. There are no reported geologic faults located in the study area or in the immediate surrounding area.

3.1.3 Mineral and Energy Resources

Caliche is the primary mineral resource located within the study area and is associated with sand and/or gravel deposits (BEG, 1979). This mineral resource occurs primarily within deposits located along South Tule Draw and North Fork Running Water Draw.

No major energy resources are known to occur within the study area. According to Railroad Commission of Texas (RRC) records, no oil and/or gas wells are documented within the study area (RRC, 2011). U.S. Geological Survey (USGS) mapping and RRC (2011) records, however, indicate a liquid petroleum pipeline and several natural gas pipelines in the study area.

3.2 SOILS

The study area occurs primarily within southeastern Castro County and southwestern Swisher County. The general soil maps of Castro and Swisher counties, published by Soil Conservation Service (SCS, now the Natural Resources Conservation Service [NRCS], 1974a, 1974b), provided the descriptions of the general soil associations within the study area.

3.2.1 Soil Associations

The NRCS defines a soil association as "a group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit." According to the county soil maps, six associations occur within the study area, the Acuff, Estacado, Lipan-Estacado, Mansker-Estacado-Bippus, Olton, and Pullman associations.

3.2.1.1 Acuff Association

The Acuff Association occurs within Castro County and consists of nearly level to gently sloping, noncalcareous, moderately permeable loams on uplands. This association is made up of approximately 70% Acuff soils and 30% other minor soils. The Acuff Association, which lacks prominent features, is characterized by a few slight rises and numerous playa lakes. These playas are shallow, surface depressional lakes that are ephemeral and filled by seasonal thunderstorms. Almost a third of the acreage of the Acuff Association is gently sloping and is situated on the upper rims of these playa lakes (SCS, 1974a). Acuff soils have a surface layer of brown loam up to 11 inches thick, which is underlain by about 5 inches of brown sandy clay loam. Below these surface layers is yellowish-red and light reddish-brown sandy clay loam to a depth of 52 inches, followed by pink, sandy clay loam to a depth of 80 inches. Currently, greater than 90% of this association is irrigated cropland, cultivated in cotton, corn, and wheat. Grain fields are utilized by pheasant for food and cover and are also seasonal feeding grounds of ducks and geese (SCS, 1974a).

3.2.1.2 Estacado Association

The Estacado Association occurs within Castro County and consists of nearly level to gently sloping, deep, calcareous, moderately permeable, loamy soils on uplands. Estacado soils make up more than 75% of the association and minor soils the remaining 25% (SCS, 1974a). Estacado soils have a surface layer of dark grayish-brown clay loams about 15 inches thick. The next layer is pale-brown and very pale-brown clay loam about 23 inches thick. Below this, to a depth of about 80 inches, is reddish-yellow clay loam. Minor soils in this association are mainly those of the Posey, Olton, Randall, Lipan, Drake, Acuff, and Mansker series. Most of this association is in cultivation and is irrigated. A few small areas are in native rangeland (SCS, 1974a).

3.2.1.3 Lipan-Estacado Association

The Lipan-Estacado Association occurs within Castro County and consists of nearly level to gently sloping, deep and calcareous, very slowly to moderately permeable, clayey and loamy soils in large basins. Lipan soils make up about 25% of the association, Estacado soils about 21%, and minor soils the remaining 54% (SCS, 1974a). Lipan soils have a surface layer of dark-gray and gray clay about 21 inches thick. The next layer is grayish-brown clay about 15 inches thick. Below this is light brownish-gray clay about 18 inches thick. The underlying material is white clay that ranges to light gray. Estacado soils have a surface layer of calcareous, dark grayish-brown clay loam about 15 inches thick. The next layer is pale-brown and very pale-brown clay loam about 23 inches thick. Below this, to a depth of about 80 inches, is reddish-yellow clay loam. Minor soils in this association are mainly those of the Randall, Berda, Drake, Acuff, Mansker, Pullman, Olton, and Lofton series. Most of this association is used for rangeland. The nearly level areas are cultivated, and are either irrigated or dry farmed (SCS, 1974a).

3.2.1.4 Mansker-Estacado-Bippus Association

The Mansker-Estacado-Bippus Association occurs within Swisher County and consists of nearly level to sloping, deep, moderately permeable, loamy soils of uplands and bottomlands. This association occupies side slopes and bottoms of draws and creeks. About 24% of the association is Mansker soils, 18% is Estacado soils, and 15% is Bippus soils. The remaining 43% consists of minor soils (SCS, 1974b). Mansker soils are calcareous and friable throughout. The surface layer is dark grayish-brown clay loam about 11 inches thick. The next layer extends to a depth of 90 inches. Estacado soils are calcareous and friable throughout. The surface layer is dark grayish-brown clay loam about 14 inches thick. The next layer is clay loam that extends to a depth of 85 inches. Bippus soils are calcareous and friable throughout. The surface layer is 24 inches thick. It is dark-brown loam in the upper 6 inches and dark grayish-brown clay loam in the lower part. The next layer is brown clay loam about 26 inches thick. The underlying layer extends to a depth of 60 inches. Minor soils of this association are mainly in the Pullman, Olton, Tulia, and Potter series. The soils of this association are used mostly for range (SCS, 1974b).

3.2.1.5 Olton Association

The Olton Association occurs within Castro County, consisting of nearly level to gently sloping, deep, noncalcareous, moderately slowly permeable clay loams and loams on uplands. This association is about 81% to 84% Olton soils and 16% to 19% other minor soils. Olton soils occur on mostly level areas, although some are found on the gently sloping areas around playa lakes (SCS, 1974a). The surface layer of Olton soils is about 9 inches of brown clay loam followed by approximately 28 to 30 inches of brown and reddish-brown clay loam. The underlying layer is about 22 to 30 inches of yellowish-red and reddish-brown clay loam. Below this, to a depth of around 60 to 76 inches, is a pinkish-white clay loam. This association is primarily used for irrigated agriculture and the main crops are cotton, corn, and wheat. A few areas are used for pastureland and rangeland (SCS, 1974a).

3.2.1.6 Pullman Association

The Pullman Association occurs within Castro and Swisher counties, consisting of nearly level to gently sloping, deep, noncalcareous, very slowly permeable, loamy soils on uplands. The landscape of this association lacks prominent features but is characterized by numerous playa lakes. This association is made up of about 89% Pullman soils and 11% minor soils (SCS, 1974a, 1974b). Pullman soils have a surface layer of dark-brown clay loam about 8 inches thick, followed by about 13 inches of dark brown clay. The third distinguishable layer is about 9 inches of brown clay followed by approximately 16 inches of yellowish-red clay. All of the above is underlain by a pink to reddish-yellow silty clay loam to a depth of 84 inches. Most of the dry-farmed acreage in Castro County is within the Pullman Association. The remainder of this association is in irrigated cropland, producing primarily corn, cotton, and wheat. A few areas of this association are used for rangeland (SCS, 1974a, 1974b).

3.2.2 Prime Farmland

The Secretary of Agriculture, in 7 USC 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. They have the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. Additional potential prime farmlands are those soils that meet most of the requirements of prime farmland but fail because they lack the installation of water management facilities (drainage), or they lack sufficient natural moisture (irrigation system). They would be considered prime farmland if these practices were installed.

According to the NRCS (2009), of the 575,565 acres (ac) within Castro County, 80.4% (462,909 ac) are prime farmland soils. Within Swisher County, which is approximately 577,530 ac, approximately 81.6% (471,004 ac) are prime farmland soils.

3.3 WATER RESOURCES

3.3.1 Surface Water

For surface water planning purposes, the Texas High Plains are defined as part of the Panhandle Region, which encompasses 37 counties located in the Canadian River Basin and portions of the Colorado, Brazos, and Red River basins (Texas Water Development Board [TWDB], 1997). A river basin consists of the entire land area drained by a stream and its tributaries. The study area lies in the west central portion of the Panhandle Region within the Brazos and Red River basins.

The Brazos River flows from immediately west of the New Mexico border southeastward across central Texas to the Gulf Coast where it empties into the Gulf of Mexico at Freeport. In Texas, this river basin drains a total area of approximately 42,865 square miles. The study area lies on the drainage divide between the Brazos River and the Red River, with most of the study area flowing into tributaries of the Brazos River. Surface water runoff within the Brazos River Basin varies greatly, due to its size and variation in rainfall from about 15 inches annually in the Texas Panhandle to 50 inches along the Gulf Coast. In addition, there are numerous playa lakes in the High Plains portion of the basin, which collect rainfall but do not contribute notably to runoff.

The Red River Basin drains approximately 24,297 ac in the Panhandle Region of Texas and forms the state boundary between northeast Texas and Oklahoma. The river's name comes from red-colored, clay farmland within its watershed. It begins in two branches (forks) in the Texas Panhandle and flows east along the Texas-Oklahoma border and briefly through southwestern Arkansas before turning south through northern Louisiana to empty into the Atchafalaya and Mississippi rivers. Land-surface features of the Red River Basin in Texas vary from nearly level prairie/farmland west of Amarillo, to rugged canyons/ridges east of Amarillo, rolling plains/prairie in the Wichita Falls area, and the gently rolling, wooded hills in northeast Texas. Rainfall increases noticeably across the basin from an average of about 15 inches near the Texas-New Mexico border to about 48 inches near the Texas-Arkansas border.

The only named drainages within the study area according to USGS topographic maps are South Tule Draw and North Fork Running Water Draw. Additional rainfall collects in the numerous playa lakes that are found throughout the study area (Fish et al., n.d.). These surface features do not contribute to runoff but do provide, to a small extent, groundwater recharge (TWDB, 1997). Playa lakes are discussed further in Section 3.6.1 (Aquatic Habitats and Species).

3.3.2 Groundwater

Most of the study area overlies the Ogallala Aquifer, one of the largest aquifers in the world, covering more than 35,000 square miles of the Texas High Plains. The Ogallala is the principal geologic formation in what is known as the High Plains Aquifer System, which underlies about 174,000 square miles of eight states. The smaller Dockum Aquifer occurs in the study area within Swisher County.

The Ogallala consists of unconsolidated clay, silt, sand, and gravel, with groundwater filling pore spaces between grains below the water table. The Ogallala was formed by fluvial deposition from streams that flowed eastward from the Rocky Mountains about 10 million years ago during the Pliocene epoch. The low valley areas were typically filled first by coarser materials such as gravels and coarse sand. As these valleys and basins filled, sediments overflowed to form broad aprons fed by braided streams that spread across a flat, level plain.

The Ogallala is an unconfined aquifer where recharge occurs primarily from infiltration of rainfall and snowmelt. Aquifer recharge rates fluctuate by the amount of precipitation, soil composition, and vegetation cover. Because rainfall and infiltration are low and evaporation is high, only about 1 inch of recharge reaches the water table annually, with the highest recharge occurring in playa lake basins and in outcrops of sandy soils. Regional groundwater flow in the aquifer is generally to the east-southeast (TWDB, 1997). Freshwater saturated thickness averages 95 ft. Water to the north of the Canadian River is generally fresh, with total dissolved solids typically less than 400 milligrams per liter (mg/l). However, water quality diminishes to the south with large areas containing total dissolved solids in excess of 1,000 mg/l. Naturally occurring high levels of arsenic, radionuclides, and fluoride in excess of the primary drinking-water standards are also present (TWDB, 2007). Most local communities use the Ogallala Aquifer as their sole source of drinking water, and average well yield is approximately 500 gallons per minute. Some hydraulic continuity occurs between the Ogallala Formation and the underlying Cretaceous, Triassic, and Permian formations in many areas of the High Plains (TWDB, 1997).

In 1994, total estimated use from the aquifer was 5.9 million acre-feet (ac-ft), of which 96% was used for irrigation. This amount of groundwater withdrawal is expected to continue, ultimately resulting in reduced well yields, irrigated acreage, and agricultural production (TWDB, 1997). TWDB (2007) estimated availability for 2010 at 5,969,260 ac-ft per year, decreasing to 3,534,124 ac-ft per year in 2060.

The Dockum Aquifer is classified as a confined or partially confined, minor aquifer, which covers approximately 26,000 square miles in Texas. It underlies the Ogallala Aquifer and overlays Permian-age deposits. Precipitation recharges the aquifer where it is exposed at the land surface around the eastern and southern edges of the aquifer. The confined portions of the aquifer receive some recharge by leakage from overlying and underlying geologic units. Regional groundwater flow in the aquifer is generally to the east (TWDB, 1995, 2003). The Dockum Aquifer comprises all water-yielding units within the Dockum Group of Triassic age. Groundwater is typically located in the sandstone and conglomerate units with the highest yields coming from the coarsest-grained deposits located at the middle and base of the group. The fine-grained deposits form less-permeable areas within the Dockum Group (TWDB, 1995, 2003).

The water quality in the Dockum Aquifer is generally poor, with fresh water in outcrop areas in the east to brine in the western subsurface portions of the aquifer. Naturally occurring radioactivity from uranium present within the aquifer has resulted in gross alpha radiation in excess of the state's primary drinking-water standard (TWDB, 2007). Concentrations of dissolved solids in the groundwater range from less than 1,000 mg/l near the eastern outcrop to over 20,000 mg/l in the deeper parts of the aquifer to the west. Comparatively high sodium concentrations pose a salinity hazard for soils, thereby limiting regional long-term use of the water for irrigation (TWDB, 1995, 2003). Groundwater from the aquifer is used for irrigation, municipal water supply, and oil field water-flooding operations, particularly in the southern High Plains (TWDB, 2007).

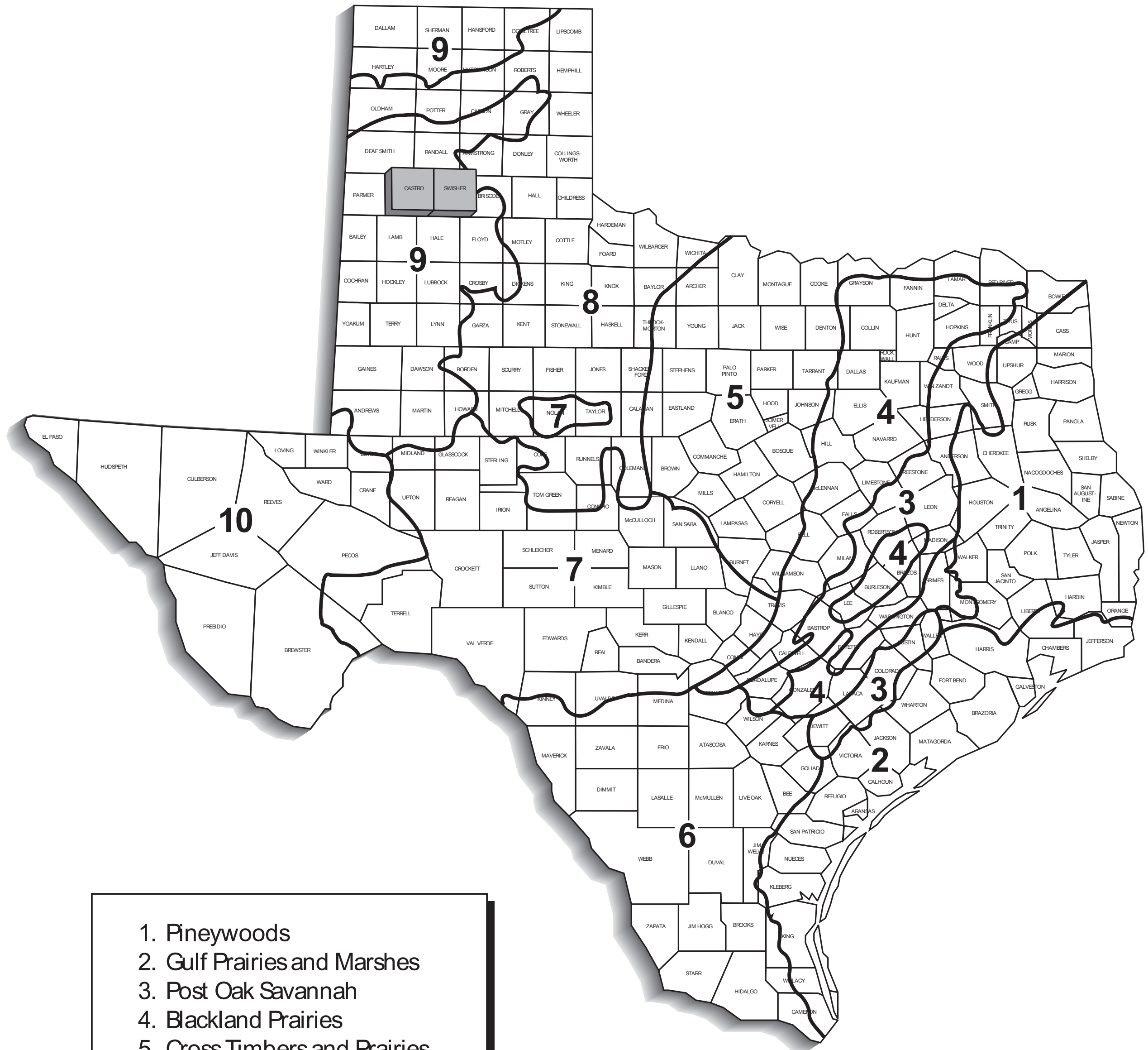
3.3.3 Floodplains

The Federal Emergency Management Agency (FEMA, 2009) has conducted detailed floodplain analyses for Castro and Swisher counties. The resulting Flood Insurance Rate Maps (FIRMs) indicate the limits of the 100-year floodplain within the study area. Based on FEMA mapping, 100-year floodplains within the study area occur along North Fork Running Water Draw, South Tule Draw and several of its unnamed tributaries, as well as areas surrounding the numerous playa lakes.

3.4 VEGETATION

3.4.1 Regional Vegetation

As shown on Figure 3-2, the study area counties fall within the High Plains Vegetational Area, which was delineated by Gould et al. (1960) and characterized by Hatch et al. (1990). This region is the southern extension of the North America Great Plains and is separated from the Rolling Plains to



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 THE STUDY AREA COUNTIES IN RELATION TO THE VEGETATIONAL AREAS OF TEXAS

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the east by the Llano Estacado Escarpment. Topographically, the High Plains Vegetational Area is a relatively level plateau characterized by shallow, surface depressional playa lakes, which individually can encompass up to 40 ac. These ephemeral waterbodies are periodically filled by seasonal thunderstorms.

The original vegetation of the High Plains region is described as predominantly mixed prairie and shortgrass prairie with tallgrass prairie occurring on deep, sandy soils. Typical native vegetation occurring on clay and clay loam sites include blue grama (*Bouteloua gracilis*), buffalograss (*Buchloe dactyloides*), and galleta (*Hillaria jamesii*), which are the principle plant species originally encountered in this region, prior to widespread agricultural development. Historically, sandy loam soils of the region supported little bluestem (*Schizachyrium scoparium*), western wheatgrass (*Elytrigia smithii*), sideoats grama (*Bouteloua curtipendula*), and sand dropseed (*Sporobolus cryptandrus*). While the High Plains area in general was characteristically treeless and brush free, today, sand sagebrush (*Artemisia filifolia*), western honey mesquite (*Prosopis glandulosa* var. *torreyana*), pricklypear (*Opuntia* sp.), and yucca (*Yucca* sp.) have invaded many sandy and sandy loam sites (Hatch et al., 1990). Currently, most of the High Plains is in irrigated cropland. Major crops produced in the High Plains include cotton, corn, sorghum, wheat, vegetables, and sugar beets.

3.4.2 Vegetation Community Types in the Study Area

According to McMahan et al. (1984), the only vegetation type at the plant association level within the study area is cropland. The crops vegetation type consists mostly of irrigated, cultivated cover crops or row crops providing food and/or fiber for either man or domestic animals. This vegetation type may also include grassland associated with crop rotations. Commercially important species within the study area include corn, cotton, wheat, and milo, as well as hay crops and other pasturage.

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 natural 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. The Texas Parks and Wildlife Department (TPWD) and the U.S. Fish and Wildlife Service (FWS) were contacted for information concerning the location of federally and state-listed plant species in the study area counties. Currently, 32 plant species are listed by the FWS as endangered, threatened, or candidate species in Texas, although one is proposed for delisting (FWS, 2011). None of these plant species are known from the vicinity of the study area, nor do their habitats extend into Castro or Swisher counties. Information provided at the state level by the TPWD Annotated County Lists of Rare

Species (TPWD, 2011a) also indicates that no endangered or threatened plant species have been listed in Castro or Swisher counties.

No sensitive plant communities have been specifically identified by either the FWS or TPWD. Within the study area, the only ecologically sensitive areas likely to be identified as such are communities associated with playa lakes.

3.4.4 Waters of the U.S., Including Wetlands

Plant communities adapted to flooding and low saturated soil conditions, and dominated by species considered to be wetland indicators by the USACE, may be considered ecologically sensitive. Characteristics of hydric habitats associated with playa lakes, which contribute to their ecological value and sensitivity, include high levels of productivity, species diversity, utilization by numerous wildlife species, high functional value as either wetland, wildlife, or endangered/threatened species habitat, and a high or predominant occurrence of wetland-indicator plant species. Hydric and aquatic habitats may be considered regulatory wetlands by the USACE.

The USACE regulates waters of the U.S., including wetlands, under Section 404 of the Clean Water Act. Waters of the U.S. include, but are not limited to, territorial seas, lakes, rivers, streams, oceans, bays, ponds, and other special aquatic features, including wetlands. The USACE and the Environmental Protection Agency (EPA) jointly define wetlands as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include bogs, seeps, marshes, swamps, forested bottomland wetlands, and other similar areas (40 CFR 230.3[t]). Wetlands are defined 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). The USACE (Environmental Laboratory, 1987) has established criteria for determining whether a waterbody is jurisdictional. Isolated waters and those not connected to the surface tributary system may not be within the USACE's jurisdiction. 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 Clean Water Act and may require coordination with the USACE to ensure compliance.

The FWS NWI maps encompassing the study area indicate the presence of wetland and/or open water habitat features throughout the study area. Features in the study area are classified as lakes and palustrine systems. Palustrine systems generally include all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, but within the study area the majority is Palustrine System Unconsolidated Bottom Class (PUB), which contains less than 30% vegetation cover.

3.5 WILDLIFE

3.5.1 Wildlife Habitats and Species

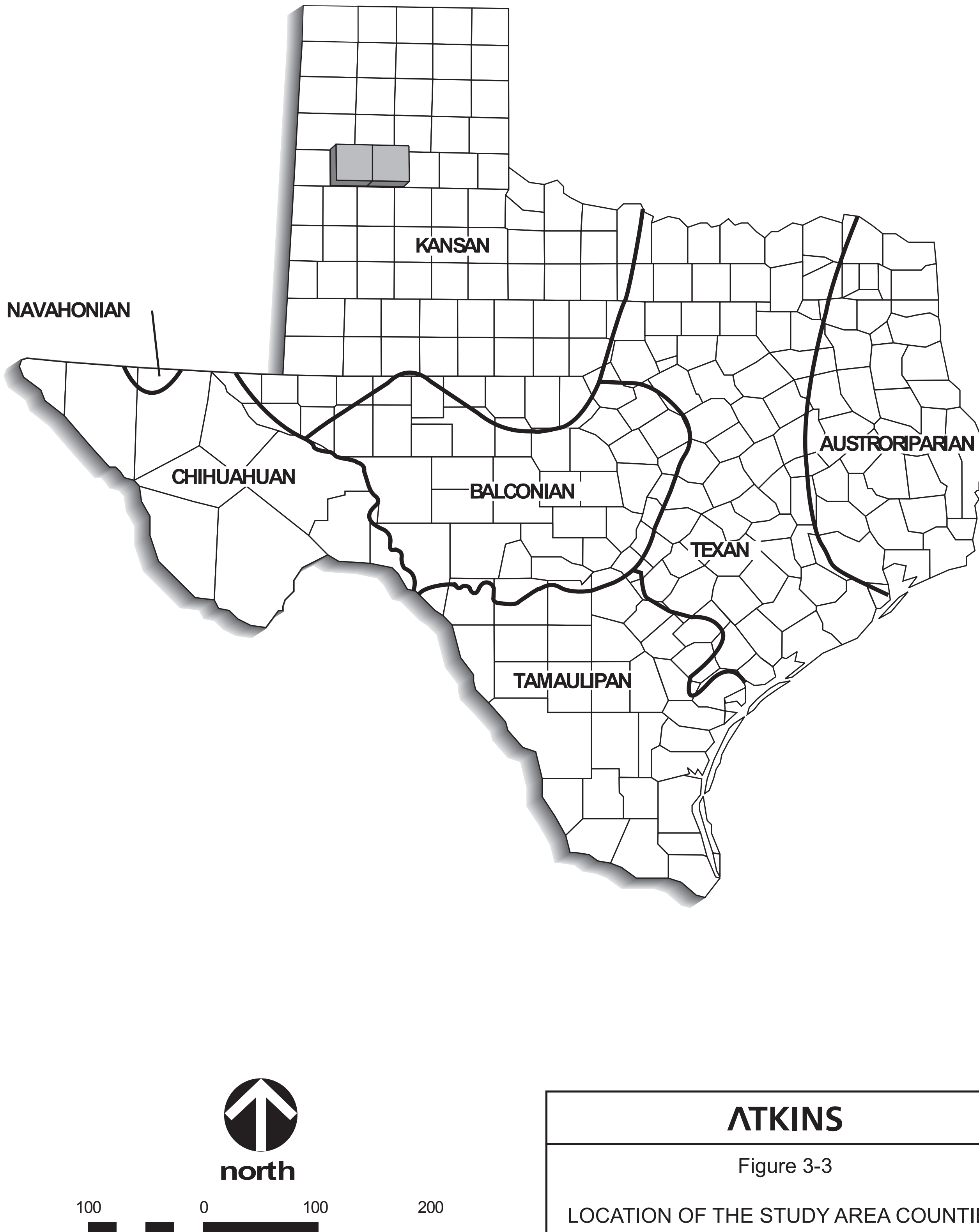
The study area counties, as shown on Figure 3-3, are situated within the Kansan Biotic Province of Texas (Blair, 1950). The Kansan Biotic Province in Texas extends south and east from the Oklahoma and New Mexico borders, eventually transitioning to the Chihuahuan, Balconian, and Texan biotic provinces. The Kansan includes three distinct biotic districts, the Mixed-grass Plains, Short-grass Plains, and Mesquite Plains districts. The study area is within the Short-grass Plains. Buffalo grass is the principal constituent and is the most important plant association within the Short-grass Plains District. Various species of grama grasses (*Bouteloua* spp.) are also important to this area (Blair, 1950). Characteristic faunal species of the area are discussed below. Because of extensive agricultural development in the study area, however, there is very little extant native grassland habitat remaining. The vegetation of the area, as described previously, is predominantly irrigated cropland. Wildlife species that occur include species that have historically occurred in the area, as well as others that are particularly adapted to this agricultural environment.

3.5.2 Amphibians and Reptiles

According to Blair (1950), only one species from the order caudata (newts, sirens, and salamanders), the barred tiger salamander (*Ambystoma tigrinum mavortium*), occurs within the Kansan Biotic Province. Although recent records of the smallmouth salamander (*Ambystoma texanum*) exist from the eastern edge of the province in Texas (Bartlett and Bartlett, 1999; Dixon, 2000), only the barred tiger salamander is reported in the study area counties (Dixon, 2000). At least 14 species from the order anura (frogs and toads), occur or have occurred in the Kansan Biotic Province (Blair, 1950). At least 14 lizard species and 31 snake species occur or have occurred in the Kansan Biotic Province (Blair, 1950). A representative list of amphibian and reptile species of potential occurrence in the study area counties is included in Table 3-1.

3.5.3 Birds

Avian species of potential occurrence in the study area include many year-round residents, migrants/ summer residents, and migrants/winter residents. Grassland species associated with agricultural lands are likely the most common in the general area throughout most of the year, while waterfowl and shorebirds associated with playa lakes are likely the most common during the winter migration months. A representative list of bird species of potential occurrence in the study area is included in Table 3-2.



Source: Blair, 1950

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Figure 3-3

LOCATION OF THE STUDY AREA COUNTIES
IN RELATION TO THE
BIOTIC PROVINCES OF TEXAS

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TABLE 3-1

REPRESENTATIVE LIST OF REPTILE AND AMPHIBIAN SPECIES OF POTENTIAL OCCURRENCE[1] IN THE STUDY AREA COUNTIES

Common Name[2]	Scientific Name[2]
FROGS AND TOADS	
Eastern cricket frog	*Acris crepitans crepitans*
Great Plains toad	*Anaxyrus cognatus*
Red-spotted toad	*Anaxyrus punctatus*
Texas toad	*Anaxyrus speciosus*
Woodhouse's toad	*Anaxyrus woodhousii*
Great Plains narrow-mouthed toad	*Gastrophryne olivacea*
Plains leopard frog	*Lithobates blairi*
American bullfrog	*Lithobates catesbeianus*
Spotted chorus frog	*Pseudacris clarkii*
Couch’s spadefoot	*Scaphiopus couchii*
Plains spadefoot	*Spea bombifrons*
SALAMANDERS	
Barred tiger salamander	*Ambystoma mavortium mavortium*
LIZARDS	
Prairie racerunner	*Aspidoscelis sexlineatus viridis*
Eastern collared lizard	*Crotaphytus collaris*
Great Plains earless lizard	*Holbrookia maculate maculata*
Texas horned lizard	*Phrynosoma cornutum*
Round-tailed horned lizard	*Phrynosoma modestum*
Great Plains skink	*Plestiodon obsoletus*
Prairie lizard	*Sceloporus consobrinus*
SNAKES	
Kansas glossy snake	*Arizona elegans elegans*
Eastern yellow-bellied racer	*Coluber constrictor flaviventris*
Western coachwhip	*Coluber flagellum testaceus*
Western diamond-backed rattlesnake	*Crotalus atrox*
Prairie rattlesnake	*Crotalus viridis*
Prairie ring-necked snake	*Diadophis punctatus arnyi*
Plains hog-nosed snake	*Heterodon nasicus*
Texas nightsnake	*Hypsiglena jani texana*

TABLE 3-1 (Cont'd)

Common Name[2]	Scientific Name[2]
Desert kingsnake	*Lampropeltis getula splendida*
Central Plains milksnake	*Lampropeltis triangulum gentilis*
Blotched water snake	*Nerodia erythrogaster transversa*
Great Plains ratsnake	*Pantherophis emoryi*
Bullsnake	*Pituophis catenifer sayi*
Long-nosed snake	*Rhinocheilus lecontei*
Variable groundsnake	*Sonora semiannulata semiannulata*
Desert massasauga	*Sistrurus catenatus edwardsii*
Western massasauga	*Sistrurus catenatus tergeminus*
Flat-headed snake	*Tantilla gracilis*
Plains black-headed snake	*Tantilla nigriceps*
Checkered gartersnake	*Thamnophis marcianus*
Arid land ribbonsnake	*Thamnophis proximus diabolicus*
TURTLES	
Yellow mud turtle	*Kinosternon flavescens*
Ornate box turtle	*Terrapene ornata ornata*
Red-eared slider	*Trachemys scripta elegans*

[1]According to Dixon (2000), Dixon and Werler (2005), and Bartlett and Bartlett (1999).
[2]Nomenclature follows Crother et al. (2008).

TABLE 3-2

REPRESENTATIVE LIST OF AVIAN SPECIES OF POTENTIAL OCCURRENCE[1]
IN THE STUDY AREA COUNTIES

Common Name[2]	Scientific Name[2]	Likely Seasonal Occurrence[1, 3]
Snow goose	*Chen caerulescens*	M, WR
Ross's goose	*Chen rossii*	M, WR
Canada goose	*Branta canadensis*	M, WR
Gadwall	*Anas strepera*	M, WR
American wigeon	*Anas americana*	M, WR
Mallard	*Anas platyrhynchos*	R
Northern shoveler	*Anas clypeata*	M, WR
Northern pintail	*Anas acuta*	R
Green-winged teal	*Anas crecca*	M, WR
Redhead	*Aythya americana*	M, WR
Ring-necked duck	*Aythya collaris*	M, WR
Ring-necked pheasant	*Phasianus colchicus*	R
Scaled quail	*Callipepla squamata*	R
Northern bobwhite	*Colinus virginianus*	R
Cattle egret	*Bubulcus ibis*	M, SR
Turkey vulture	*Cathartes aura*	M, SR
Mississippi kite	*Ictinia mississippiensis*	M, SR
Northern harrier	*Circus cyaneus*	M, WR
Swainson's hawk	*Buteo swainsoni*	M, SR
Red-tailed hawk	*Buteo jamaicensis*	R
American kestrel	*Falco sparverius*	R
American coot	*Fulica americana*	R
Sandhill crane	*Grus canadensis*	M, WR
Killdeer	*Charadrius vociferus*	R
Black-necked stilt	*Himantopus mexicanus*	M, SR
American avocet	*Recurvirostra americana*	M, SR
Lesser yellowlegs	*Tringa flavipes*	M
Least sandpiper	*Calidris minutilla*	M
Rock pigeon	*Columba livia*	R
Mourning dove	*Zenaida macroura*	R
Yellow-billed cuckoo	*Coccyzus americanus*	M, SR
Greater roadrunner	*Geococcyx californianus*	R
Burrowing owl	*Athene cunicularia*	R
Common nighthawk	*Chordeiles minor*	M, SR
Yellow-bellied sapsucker	*Sphyrapicus varius*	M, WR
Ladder-backed woodpecker	*Picoides scalaris*	R

TABLE 3-2 (Cont'd)

Common Name[2]	Scientific Name[2]	Likely Seasonal Occurrence[1, 3]
Western kingbird	*Tyrannus verticalis*	M, SR
Scissor-tailed flycatcher	*Tyrannus forficatus*	M, SR
Blue jay	*Cyanocitta cristata*	R
American crow	*Corvus brachyrhynchos*	R
Horned lark	*Eremophila alpestris*	R
Cliff swallow	*Petrochelidon pyrrhonota*	M, SR
Rock Wren	*Salpinctes obsoletus*	R
Bewick's wren	*Thryomanes bewickii*	R
Ruby-crowned kinglet	*Regulus calendula*	M, WR
American robin	*Turdus migratorius*	R
Northern mockingbird	*Mimus polyglottos*	R
Curve-billed thrasher	*Toxostoma curvirostre*	R
European starling	*Sturnus vulgaris*	R
Cedar waxwing	*Bombycilla cedrorum*	M, WR
Yellow-rumped warbler	*Dendroica coronata*	M, WR
Spotted towhee	*Pipilo maculatus*	M, WR
Cassin's sparrow	*Aimophila cassinii*	M, SR
Vesper sparrow	*Pooecetes gramineus*	M, WR
Lark sparrow	*Chondestes grammacus*	M, SR
Savannah sparrow	*Passerculus sandwichensis*	M, WR
Song sparrow	*Melospiza melodia*	M, WR
Lincoln's sparrow	*Melospiza lincolnii*	M, WR
White-crowned sparrow	*Zonotrichia leucophrys*	M, WR
McCown's longspur	*Calcarius mccownii*	M, WR
Northern cardinal	*Cardinalis cardinalis*	R
Red-winged blackbird	*Agelaius phoeniceus*	R
Western meadowlark	*Sturnella neglecta*	R
Brewer's blackbird	*Euphagus cyanocephalus*	M, WR
Common grackle	*Quiscalus quiscula*	M. SR
Great-tailed grackle	*Quiscalus mexicanus*	R
Brown-headed cowbird	*Molothrus ater*	R
Bullock's oriole	*Icterus bullockii*	M, SR
House finch	*Carpodacus mexicanus*	R
House sparrow	*Passer domesticus*	R

[1]According to Seyffert (2001); Lockwood and Freeman (2004).
[2]Nomenclature follows American Ornithologists' Union (AOU, 1998, 2000, 2002–2010).
[3]R – Resident: Occurring regularly in the same general area throughout the year. Implies breeding.
SR – Summer Resident: Implies breeding but may include nonbreeders.
WR – Winter Resident: Occurring during winter season.
M – Migrant: Occurs as a transient passing through the area either in spring or fall or both.

3.5.4 Mammals

At least 59 mammalian species occur or have occurred in the Kansan Biotic Province, of which three species and two subspecies are restricted to the province (Blair, 1950). A representative list of common mammals known to occur in Castro and Swisher counties is included in Table 3-3.

3.5.5 Important Species

As mentioned in Section 3.4.3, a species is considered 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 the criterion (a) or (b); (d) the species is critical to the structure and function of the ecological system; or (e) the species is a biological indicator.

The major threat to the ecoregion is fragmentation and degradation of native habitats resulting from the conversion of native habitats to agriculture use, urbanization, and overgrazing (TPWD, 2007a). The biological distinctiveness of the western short grasslands has been adversely affected through the development of dry land agriculture and is a major conservation issue (TPWD, 2007a). Nearly all the region is in farms and ranches. Protection from habitat loss and degradation is limited through protection within national grasslands and wildlife refuges (TPWD, 2007a). Species significantly affected by habitat loss and agricultural practices include the black-tailed prairie dog (*Cynomys ludovicianus*), black-footed ferret (*Mustela nigripes*), and the lesser prairie-chicken (*Tympanuchus pallidicinctus*).

According to TPWD (2008a), the black-tailed prairie dog is a keystone species that is an important part of the ecosystem. A keystone species is a species that other species depend upon for survival. The prairie dog's digging aerates and promotes soil formation, they clip back brush maintaining the short grass prairie, and provide food and shelter for as many as 170 different animals (TPWD, 2008a). Historically, millions of acres of Texas grassland were covered by black-tailed prairie dog towns. Prairie dog towns in Texas now occupy less than 1% of their historic range (TPWD, 2008a). Over the last 50 years, prairie dogs have been displaced by activities associated with producing livestock and farming. Many people consider prairie dogs a destructive nuisance species, and controlling methods such as poisoning, trapping, and shooting have been popular practices. Other causes for decline have included the pet trade and sylvatic plague (TPWD, 2008a). Consequently, their former range and numbers have been considerably reduced (Schmidly, 2004). Although the black-tailed prairie dog is not currently listed as threatened or endangered, attempts were made in the past to list the species, and it is a former candidate for listing. TPWD has initiated "The Texas Black-tailed Prairie Dog Watch," which encourages the public to participate in monitoring efforts that help to better understand population trends and develop more-effective conservation and management methods (refer to Section 3.5.6 for further discussion concerning endangered and threatened species).

TABLE 3-3

REPRESENTATIVE LIST OF MAMMALIAN SPECIES OF POTENTIAL OCCURRENCE[1]
IN STUDY AREA COUNTIES

Common Name[2]	Scientific Name[2]
XENARTHRANS	
Nine-banded armadillo	*Dasypus novemcinctus*
CHIROPTERA	
Big brown bat	*Eptesicus fuscus*
Brazilian free-tailed bat	*Tadarida brasiliensis*
CARNIVORES	
Coyote	*Canis latrans*
Swift fox	*Vulpes velox*
Red fox	*Vulpes vulpes*
Northern raccoon	*Procyon lotor*
Long-tailed weasel	*Mustela frenata*
American badger	*Taxidea taxus*
Striped skunk	*Mephitis mephitis*
Bobcat	*Lynx rufus*
ARTIODACTYLS	
Mule deer	*Odocoileus hemionus*
White-tailed deer	*Odocoileus virginianus*
RODENTS	
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*
Hispid pocket mouse	*Chaetodipus hispidus*
Ord’s kangaroo rat	*Dipodomys ordii*
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*

TABLE 3-3 (Cont'd)

Common Name[2]	Scientific Name[2]
Hispid cotton rat	*Sigmodon hispidus*
Eastern white-throated woodrat	*Neotoma leucodon*
Southern plains woodrat	*Neotoma micropus*
Porcupine	*Erethizon dorsatum*
LAGOMORPHS	
Desert cottontail	*Sylvilagus audubonii*
Eastern cottontail	*Sylvilagus floridanus*
Black-tailed jackrabbit	*Lepus californicus*

[1]According to Schmidly (2004).

[2]Nomenclature follows Manning et al. (2008).

Wildlife resources within the study area provide human benefits resulting from 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, such as hunting and trapping, are more easily quantifiable. Consumptive and nonconsumptive uses of wildlife are often enjoyed contemporaneously 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 (*Odocoileus virginianus*) is the most important big game mammal in Texas (Schmidly, 2004). The TPWD divides the state into ecological regions for white-tailed deer management. The study area counties fall within the High Plains Ecological Region and during the 2009–2010 hunting season, an estimated 1,803 deer were harvested within this ecological region (Purvis, 2010).

Mule deer (*Odocoileus hemionus*) are one of the most valued game animals in the Panhandle due to limited distribution, low numbers, and their unique appearance and behavior (TPWD, 2000). The mule deer population in Texas ranges from 150,000 during dry conditions to about 250,000 during wet periods. Approximately 80 to 85% of the population inhabits the Trans-Pecos Ecological Region while the remaining population inhabits the Panhandle and western Edwards Plateau regions (TPWD, 2000). In the High Plains Ecological Region, mule deer primarily in inhabit sandhill and draw habitats along with some mesquite flats. The majority of mule deer inhabit rough, broken land of the Rolling Plains along the Canadian River and Caprock Escarpment. During the 2009–2010 hunting season an estimated 2,393 mule deer were harvested in the High Plains Ecological Region (Purvis, 2010).

Waterfowl hunting on playa lakes and upland bird hunting on agricultural lands is of some economic importance in the region. Primary waterfowl species that are hunted in the study area vicinity include snow goose (*Chen caerulescens*), Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), gadwall (*Anas strepera*), green-winged teal (*Anas crecca*), American wigeon (*Anas americana*), northern shoveler (*Anas clypeata*), northern pintail (*Anas acuta*), redhead (*Aythya americana*), ring-necked duck (*Aythya collaris*), and sandhill crane (*Grus canadensis*). Primary upland game species include the mourning dove (*Zenaida macroura*), bobwhite (*Colinus virginianus*), scaled quail (*Callipepla squamata*), and ring-necked pheasant (*Phasianus colchicus*) (Purvis, 2007; Seyffert 2001, 2002; TPWD, 2007b, 2008b).

This region historically supported one of the most impressive migrations of the American bison (*Bos bison*) in the nation. Today, bison no longer migrate, but bison ranching is becoming increasingly popular (TPWD, 2007a) and may be of some economic importance for some ranchers.

3.5.6 Endangered and Threatened Species

The FWS and TPWD provided information concerning the potential occurrence and location of state and federally listed species for the study area counties. Table 3-4 lists 10 species that have a federal or state status of either threatened, endangered, proposed for listing, or candidate as indicated on the FWS Southwest Region Ecological Services County by County List (FWS, 2011), and/or on the TPWD Annotated County List of Rare Species (TPWD, 2011a) for Castro and Swisher counties. Inclusion on the list does not necessarily mean that a species occurs in the county, but only acknowledges the potential for occurrence, based on historic records, known ranges, and presence of potential habitat. The FWS affords complete protection under the Endangered Species Act (ESA) only to those species federally listed as endangered or threatened. Although not all state-listed species receive federal protection under the ESA, they do receive protection under state laws and other federal laws, such as the Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), chapters 67, 68, and 88 of the TPWD Code, and sections 65.171–65.184 and 69.01–69.14 of Title 31 of the Texas Administrative Code.

FWS (2011) and TPWD (2011a) identify three taxa in Table 3-4 as federally endangered and one as federally threatened. These are the endangered whooping crane (*Grus americana*), black-footed ferret (*Mustela nigripes*), and gray wolf (*Canis lupus*), and the threatened (due to similarity of appearance) black bear (*Ursus americanus*). In addition, the FWS identifies one taxa in Table 3-4, the lesser prairie-chicken (*Tympanuchus pallidicinctus*), as a candidate for federal listing as endangered or threatened. The mountain plover (*Charadrius montanus*) was previously proposed for listing as a threatened species, but on May 12, 2011, the FWS announced their decision to withdraw the proposal because they had determined that the species was not endangered or threatened throughout all, or a significant portion, of its range.

The whooping crane is a large wading bird that, in the last 50 years, has returned from the brink of extinction. Only four wild populations of whooping crane exist, the largest of which is the Aransas/Wood Buffalo population, which breeds in Wood Buffalo National Park in northern Canada and migrates annually to Aransas National Wildlife Refuge (NWR) and adjacent areas of the central Texas Coast in Aransas, Calhoun, and Refugio counties, where it winters (FWS, 1995; Lewis, 1995). There are three other smaller wild populations that include nonmigrating Florida and Louisiana populations, and another that migrates between Wisconsin and Florida. These are not self-sustaining and each is designated “experimental” rather than endangered. During migration, whooping cranes stop over at wetlands, fallow cropland, and pastures to roost and feed. Based on migration data compiled from a variety of information gathered from 1975 through 1999 (Austin and Richert, 2001), the study area is located outside of the FWS-designated migration corridor for the whooping crane. Although TPWD (2011a) includes the species on their list of migratory birds potentially occurring in the study area counties, the study area is west of the regular migration corridor of this species, and therefore it is unlikely to occur in the study area. However, it should be

TABLE 3-4

ENDANGERED AND THREATENED WILDLIFE SPECIES OF POSSIBLE OCCURRENCE IN CASTRO AND SWISHER COUNTIES[1]

Common Name[2]	Scientific Name[2]	Status[3]	
		FWS	TPWD
BIRDS			
Whooping crane	*Grus americana*	E	E
Mountain plover	*Charadrius montanus*	-[4]	-
Sprague's pipit	*Anthus spragueii*	C	-
Lesser prairie-chicken	*Tympanuchus pallidicinctus*	C	-
Bald eagle	*Haliaeetus leucocephalus*	-	T
Peregrine falcon	*Falco peregrinus*	-	T
White-faced ibis	*Plegadis chihi*	-	T
MAMMALS			
Gray wolf	*Canis lupus*	E	E
Black-footed ferret (extirpated)	*Mustela nigripes*	E	E
Black bear	*Ursus americanus*	T/SA; -	T
REPTILES			
Texas horned lizard	*Phrynosoma cornutum*	-	T

[1]According to TPWD (2011a) and FWS (2011).

[2]Nomenclature follows AOU (1998, 2000, 2002–2010), Crother et al. (2008), Manning et al. (2008), TPWD (2011a), and FWS (2011).

[3]E – Endangered; T – Threatened; T/SA- Threatened by similarity of appearance; DL – Federally delisted; PDL – Proposed for Federal delisting; PT – Proposed for Threatened; C – Federal candidate species; - – Not listed.

[4]The mountain plover had been proposed for listing as threatened, but the proposal was withdrawn by FWS on May 11, 2011 (76 FR 27756–27799).

noted that more than 400,000 sandhill cranes (and snow geese) migrate through and winter in the (Panhandle) region (Haukos and Smith, 1992). Whooping cranes are often observed accompanying sandhill flocks, sometimes making identification difficult.

The black-footed ferret is a large weasel that is associated primarily with prairie dogs (*Cynomys* spp.) and prairie dog towns. Historically, the species ranged throughout the Great Plains where they occurred in semi-arid grasslands and mountain basins in Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, and Wyoming (Campbell, 2003). In Texas, black-footed ferrets originally ranged throughout the northeastern third of the state, including the Panhandle, Trans-Pecos, and most of the Rolling Plains (Schmidly, 2004). The last Texas records of the species were from Bailey County (1963) (Schmidly, 2004). Most authorities consider the black-footed ferret extirpated from Texas, and therefore, it is highly unlikely that the species is present in the study area.

The gray wolf historically inhabited the western two-thirds of the state, but has been extirpated in Texas (Schmidly, 2004), with the last authenticated reports being recorded in Texas in December 1970. The gray wolf is recovering in portions of its northern range and experimental populations have been reintroduced in some locations throughout its historic range (NatureServe, 1996); however, its occurrence in the study area at the present time is highly unlikely.

The black bear is federally threatened due to its similarity of appearance within the historical range of Louisiana black bear (*Ursus americanus luteolus*) in eastern Texas. The Louisiana black bear inhabits bottomland hardwoods and large tracts of inaccessible forested areas (TPWD, 2011a). All other subspecies of black bear in Texas are not federally listed but are state-listed as threatened; however, all black bears should be treated as federally listed threatened due to their similarity of appearance to the Louisiana black bear. According to Schmidly (2004), black bears were once formerly widespread throughout the state, but are now restricted to remnant populations in mountainous areas of the Trans-Pecos region, specifically the Chisos Mountains of Big Bend National Park, where a resident breeding population of some 20 individuals is thought to occur. In October 2002, a road-killed black bear was found on Interstate Highway 40, east of Amarillo near Conway in Carson County (TPWD, 2010). Schmidly (2004) suggests that recent bear sightings in the Panhandle are stray New Mexico bears that have wandered into Texas. Based upon this information, it is possible that future sightings of wandering bears could occur again in the Panhandle region, and perhaps even in the study area.

The mountain plover (*Charadrius montanus*) is a medium-sized ground bird that nests in shallow depressions on the ground in high plains or shortgrass prairies, and is considered an uncommon to fairly common migrant in the western Panhandle (Seyffert, 2001). This species had been proposed for federal listing as threatened, but the proposal was withdrawn on May 11, 2011 (76 FR 27756–27799).

Sprague's pipit is a relatively small passerine endemic to the North American grasslands. It has a plain buff-colored face with a large eyering. Sprague's pipit is a ground nester that breeds and winters on open grasslands. It is closely tied with native prairie habitat and breeds in the north-central United States in Minnesota, Montana, North Dakota, and South Dakota as well as south-central Canada (FWS, 2010). During migration and winter in Texas, as elsewhere, Sprague's pipit may be found searching for insects and seeds in weedy fields and the vicinity of airports as well as in a wide variety of grasslands (Oberholser, 1974). Wintering Sprague's pipits are rare to locally uncommon in agricultural areas of north-central Texas, the Concho Valley, and the northwestern Edwards Plateau, and are rare migrants and casual winter residents through the remainder of the state (Lockwood and Freeman, 2004). They are rare spring and fall migrants in the Texas Panhandle (Seyffert, 2001). This species may pass through the study area during migration.

The lesser prairie-chicken is a medium-sized grayish brown grouse that inhabits rangelands dominated primarily by Harvard shin oak (*Quercus havardii*) or sand sagebrush. The species has one of the smallest population sizes and most restricted distributions of North American grouse and currently occurs in five states within the southern Great Plains, including southeastern Colorado, southwestern Kansas, the Panhandle, and northwestern counties of Oklahoma, southeastern New Mexico, and the northeastern and southwestern portions of the Texas Panhandle (Hagan, 2005). In Texas, the species currently occurs in two disjunct populations in the Panhandle (Lockwood and Freeman, 2004). The population on the western edge of the Panhandle extends from Deaf Smith County southward to Gaines and possibly Andrews counties, while the eastern population ranges from Lipscomb County south to Collingsworth County (Lockwood and Freeman, 2004). Human activities (i.e., excessive grazing of rangelands by livestock and conversion of native rangelands to cropland) and recurrent droughts have significantly reduced the population and the distribution of the species since the early 1900s. No areas identified by the Lesser Prairie-Chicken Interstate Working Group (LPCIWG, 2011) as the estimated occupied range of the lesser prairie-chicken are within the study area.

In addition to the state- and federally listed taxa discussed above, TPWD (2011a) identifies four taxa in Table 3-4 as state-listed (threatened). These are the bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), white-faced ibis (*Plegadis chihi*), and Texas horned lizard (*Phrynosoma cornutum*).

The bald eagle is present year-round in Texas, and individuals may include breeding, wintering, and migrating birds. In Texas, bald eagles breed along the Gulf Coast and on major inland lakes and reservoirs. Additional numbers of bald eagles winter in these habitats. Bald eagles prefer large bodies of water surrounded by tall trees or cliffs, which they use as nesting sites. In 2007, the FWS removed the bald eagle from the list of endangered and threatened wildlife (72 Federal Register 130:37345–37372, July 9, 2007); however, the bald eagle still receives federal protection under provisions of the BGEPA and the MBTA. According to TPWD (2011b), there are no documented bald eagle nests in the study area; however, the study area is within the general distribution pattern of this species. This species may occur in the study area as a winter migrant, and may utilize the study area for foraging, but is not a likely permanent or seasonal resident in the immediate vicinity.

The TPWD recently revised the status of the American peregrine falcon (*Falco peregrinus anatum*) from endangered to threatened, and dropped the Arctic peregrine falcon (*Falco peregrinus tundrius*) from the state endangered and threatened list altogether. The American peregrine falcon is a rare migrant statewide, and nests in the mountains of Trans-Pecos Texas. The Arctic peregrine falcon is an uncommon migrant statewide and an uncommon winter resident on the coastal prairies (Lockwood and Freeman, 2004). However, since the two subspecies are difficult to separate in the field, TPWD will only reference to the species level in the future. Seyffert (2001) indicates the peregrine falcon has been reported in 13 panhandle counties (including both Castro and Swisher) and identifies the species as a rare migrant/casual winter resident and summer visitor. Although TPWD has no records from the study area (TPWD, 2011b), this species probably occurs in the study area as a migrant or vagrant.

The white-faced ibis is a medium-sized wading bird that inhabits freshwater marshes, sloughs, and irrigated rice fields, but also frequents brackish and saltwater habitats (Ryder and Manry, 1994). In the Panhandle, the white-faced ibis is an uncommon to common migrant, summer visitor, and casual breeder. Although no TPWD (2011b) documented records exist for the study area, the white-faced ibis has been recorded in every Panhandle county except Childress, Collingsworth, Dallam, Lipscomb, and Roberts (Seyffert, 2001). The white-faced ibis could occur at playa lakes throughout the study area.

The Texas horned lizard occurs throughout the western half of the state in a variety of habitats, but prefers arid and semi-arid habitats in sandy loam or loamy sand soils that support patchy bunch-grasses, cacti, yucca, and various shrubs (Henke and Fair, 1998). It historically occurred throughout Texas, but over the past 20 years, it has almost vanished from the eastern half of the state, although it still maintains relatively stable numbers in west Texas. The Texas horned lizard has been documented in Castro and Swisher counties (Dixon, 2000) and may occur in small numbers in suitable habitat within the study area.

Under the federal ESA, the Secretary of the Interior may designate "critical habitat" for an endangered or threatened species. The ESA defines critical habitat under Section 3(5)(A) as ". . . the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of Section 4 of this act, on which are found those physical or biological features that are (I) essential to the conservation of the species, (II), which may require special management considerations or protection, and specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of the ESA . . . , upon a determination by the Secretary (of the Interior) that such areas are essential for the conservation of the species." No critical habitat has been designated in the study area for any endangered or threatened species.

3.6 AQUATIC ECOLOGY

3.6.1 Aquatic Habitats and Species

Section 3.3.1 lists and briefly discusses the surface waters that occur within the study area. According to USGS 7.5-minute quadrangle maps and the Playa Lakes Digital Database (Fish et al., n.d.), mainly seasonal aquatic habitats such as South Tule Draw, North Fork Running Water Draw, and numerous playa lakes occur. Middle Tule Draw parallels the northern portion of the study area, while South Tule Draw crosses the northern portion of the study area. South Tule Draw begins near Nazareth, Texas, and continues east to where it merges with Tule Creek. Tule Creek drops into Tule Canyon and continues until the canyon merges with Palo Duro Canyon, northwest of the study area where the creek merges with the Prairie Dog Town Fork of the Red River in Briscoe County. There are no streams designated by TPWD as ecologically sensitive (or significant) within the study area.

Playa lakes are arguably the most significant ecological feature in the Texas High Plains, although they only cover 2% of the region's landscape (TPWD, 2007b). Approximately 19,300 playas are found in the Texas High Plains, which is the highest density for the occurrence of playas in North America (TPWD, 2007b). The Playa Lakes Digital Database (Fish et al., n.d.) indicates that Castro County contains 610 playa lakes and Swisher County contains 873. Playas are circular-shaped, isolated wetlands that are primarily filled by rainfall, although some playas found in cropland settings may also receive water from irrigation runoff (TPWD, 2007b). Compared to other wetlands, playas go through frequent, unpredictable, wet/dry cycles. In wet years, they support the production of annual plants that produce a tremendous crop of seeds that are favored by dabbling ducks and other seed eating birds. The wet/dry nature of playas, along with their high plant production, means they produce an abundance of invertebrates. This productivity makes playas a haven for birds and other wildlife throughout the year. Playas provide aquatic habitat for spectacular numbers of resident and migratory cranes, waterfowl, and shorebirds (TPWD, 2007b). More than 115 bird species, including 20 species of waterfowl and 10 mammal species, have been documented in playas. Waterfowl nesting in the Playa Lakes Region of Texas produce up to 250,000 ducklings in wetter years. Several million shorebirds and waterfowl migrate through the Playa Lakes Region of Texas each spring and fall (Haukos and Smith, 1992). Representative avian species of potential occurrence in the study area are listed in Section 3.5.3.

3.6.2 Commercially or Recreationally Important Aquatic Species

No commercial fishing occurs within the study area. Also, no public access to recreational fishing is available in the study area.

3.7 SOCIOECONOMICS

This section presents a summary of the economic and demographic characteristics of the cities of Hart and Kress, as well as Castro and Swisher counties, and provides a brief comparison with the socioeconomic environment of the State of Texas and the region. Reviewed literature sources include publications of the U.S. Census Bureau, the Texas Workforce Commission (TWC), the U.S. Bureau of Labor Statistics (BLS), U.S. Department of Agriculture (USDA), and TWDB.

3.7.1 Population Trends

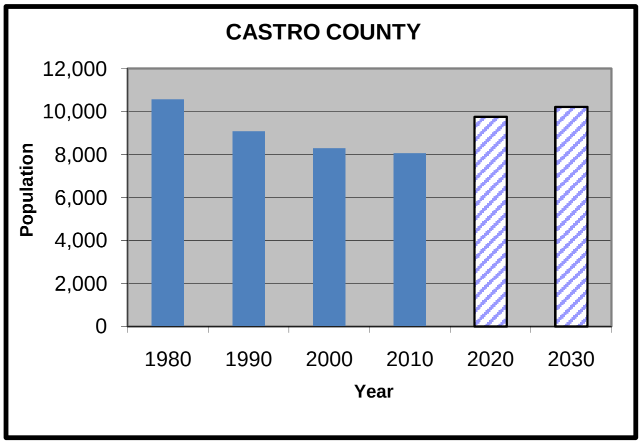
The population of Castro County in 1890 was only nine. However, the arrival of German settlers in the following decades and a rise in agricultural mechanization led to a steady growth in population to 4,720 in 1930, when the Great Depression and Dust Bowl drought then decreased the population slightly to 4,631. After World War II, the population grew again until 1980, when it hit an all-time high of 10,556 (Texas State Historical Association [TSHA], 2011).

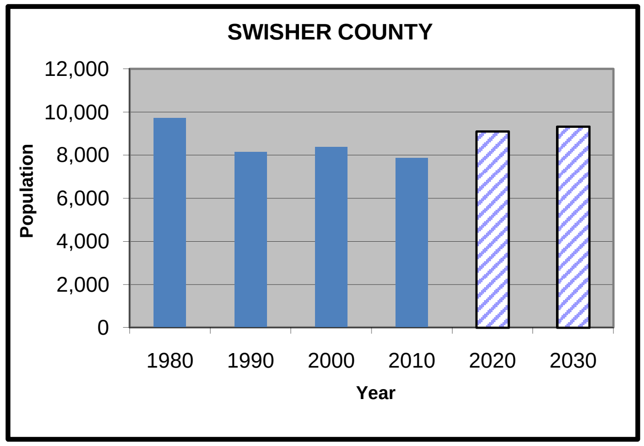
Similarly, the population of Swisher County in 1880 was only four. The construction of a Santa Fe Railroad branch line from Amarillo led to the creation of the towns of Happy and Kress, and a growth in population to 7,343 in 1930. The Great Depression and Dust Bowl reduced the population to 6,528 by 1940. After World War II, the population grew again until 1960, when it hit an all-time high of 10,607. Increased mechanization and agricultural consolidation led to a continuing decline in population until 1990, when the population was recorded at 8,133 (TSHA, 2011).

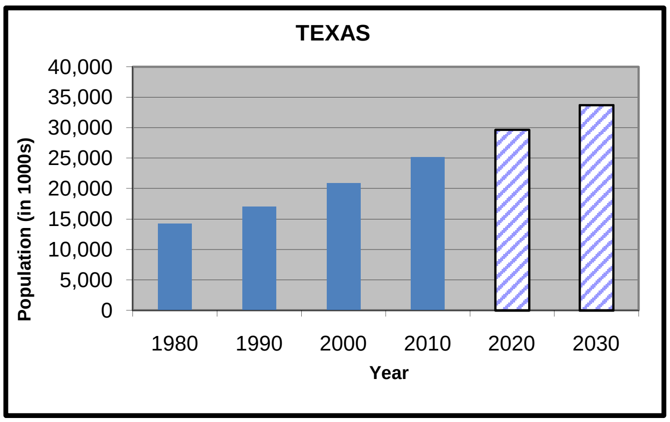
As shown on Figure 3-4, the population within the study area counties decreased steadily in Castro County and varied in Swisher County between 1980 and the present. Castro County's population, estimated at 10,556 in 1980, decreased by 14.1% in the 1980s; by 8.7% in the 1990s; and by 2.7% between 2000 and 2010. Swisher County's population, estimated at 9,723 in 1980, followed a different pattern; it decreased by 16.4% in the 1980s, rose by 3.0% in the 1990s, and shrunk by 6.3% between 2000 and 2010. The 2010 population of Castro County was 8,062, and for Swisher County it was 7,854. Population estimates for the City of Hart were unavailable for 1980, but the population in 1990, estimated at 1,221, decreased by 1.9% to 1,198 by 2000. Between 2000 and 2010, however, the population decreased much more drastically, by 7.0% to 1,114. Population estimates for the City of Kress were also unavailable for 1980, but the population in 1990, estimated at 739, increased by 11.8% to 826 by 2000. Between 2000 and 2010, however, the population shrunk by 13.4%, to 715 people. For comparison, the State of Texas's population grew steadily by 19.4% in the 1980s, by 22.8% in the 1990s, and by 20.6% between 2000 and 2010 (U.S. Census Bureau, 1983, 1990, 2000, 2011). The Texas State Data Center (TSDC) ranked the 254 counties and 1,510 incorporated communities in Texas in 2000 by population size, with a ranking of 1 having the largest number of residents. In 2000, Swisher and Castro counties ranked 177 and 178, respectively, out of 254 counties. The City of Hart ranked 843 out of 1,510 incorporated communities within the state (TSDC, 2000).

FIGURE 3-4

POPULATION TRENDS AND PROJECTIONS







Source: U.S. Census Bureau (1983, 1990, 2000, 2011); TWDB (2011).

The TWDB publishes population projections for Texas and its counties for the purpose of estimating future water demand. As shown on Figure 3-4 according to TWDB, projections of the population growth of the study area counties between 2010 and 2030 is expected to be more moderate compared to the state as a whole. The population is expected to increase by 26.8% in Castro County, by 18.8% in Swisher County, by 32.7% in the City of Hart, and by 28.7% in the City of Kress. For comparison, the population of the State of Texas is projected to increase by 34.1% between 2010 and 2030 (TWDB, 2011).

3.7.2 Employment

As shown on Figure 3-5, the labor force within the study area counties decreased continuously in Castro County and varied in Swisher County between 1980 and 2010. The labor force in Castro County decreased by 44 (1.1%) in the 1980s; by 67 (1.7%) in the 1990s; and by 287 (7.2%) between 2000 and 2010. The labor force in Swisher County was unavailable for the 1980s, but it grew by 163 (4.4%) in the 1990s and decreased by 303 (7.8%) between 2000 and 2010. For comparison, the labor force for the State of Texas grew by 30.7% in the 1980s, 20.4% in the 1990s, and by 17.9% between 2000 and 2010 (TWC, 2011a).

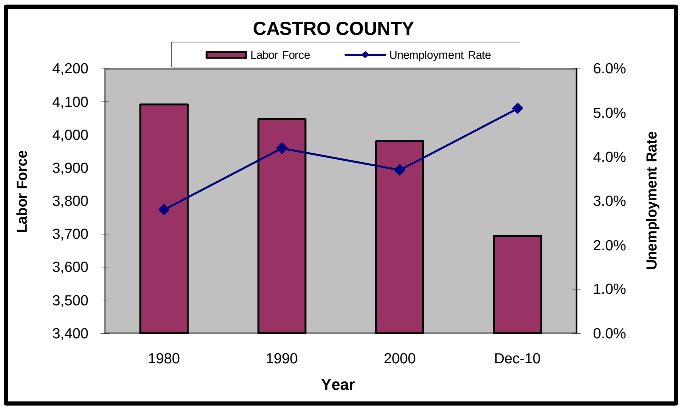
As shown on Figure 3-5, during the period from 1980 to December 2010 the study area counties usually experienced a lower unemployment rate when compared to the state. For Castro County, unemployment rates were recorded at 2.8% in 1980; 4.2% in 1990; 3.7% in 2000; and 5.1% in December 2010. The unemployment rate in Swisher County for 1980 was unavailable, but rates were recorded at 3.2% in 1990; 4.0% in 2000; and 6.1% in December 2010. For comparison, the unemployment rates for the State of Texas were 4.0% in 1980; 6.4% in 1990; 4.4% in 2000; and 8.0% in December 2010 (TWC, 2011a; BLS, 2011).

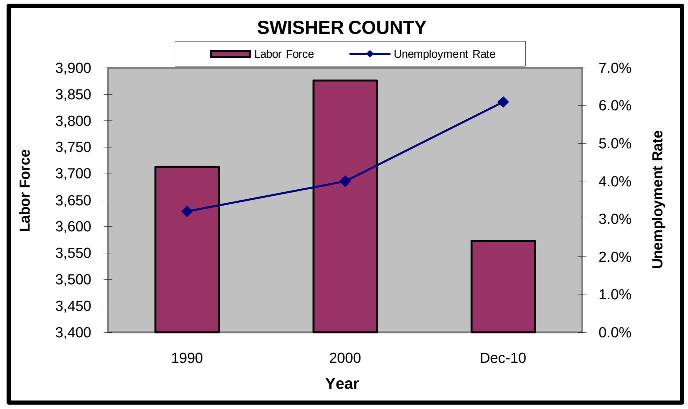
3.7.3 Leading Economic Sectors

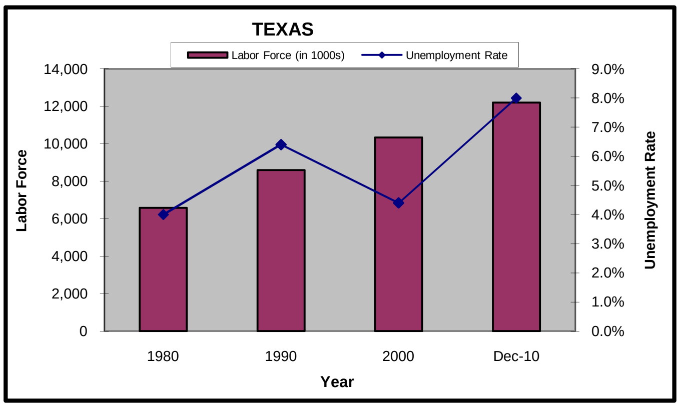
Covered employment data incorporate jobs that are located within the county and state. These data include workers who are covered by state unemployment insurance and most agricultural employees. Also included are all corporation officials, executives, supervisory personnel, clerical workers, wage earners, piece workers, and part-time workers. The data exclude employment covered by the Railroad Retirement Act, self-employed persons, and unpaid family workers. A comparison of the third quarter statistics for 2005 and 2010 for the study area counties reveals an 18.8% increase in the total number of jobs in Castro County. However, Swisher County experienced a decline of 9.4% in the total number of jobs between 2005 and 2010. For comparison, the total number of jobs statewide has increased approximately 6.0% during the same 5-year period (TWC, 2011b).

FIGURE 3-5

CIVILIAN LABOR FORCE AND UNEMPLOYMENT







Source: TWC (2011a).

As shown on Figure 3-6, in the third quarter of 2010, the three leading employment sectors in Castro County included natural resources and mining (33%), government (24%), and trade, transportation, and utilities (17%). Swisher County's three leading employment sectors are government (37%), trade, transportation, and utilities (20%), and natural resources and mining (18%). For comparison, the leading employment sectors for the State of Texas are trade, transportation, and utilities (20%), government (17%), professional and business services, as well as education and health services (both 13%) (TWC, 2011b).

3.7.4 Agriculture

Agriculture remains an important sector in the study area counties. In 2000, Castro County ranked first in the state and nineteenth in the nation in agricultural receipts (TSHA, 2011). According to the USDA's 2007 Census of Agriculture, the market value for agricultural products sold in 2007 for Castro and Swisher counties were $973,352,000 and $453,652,000, respectively. Castro County was ranked the second most productive county in the state, and Swisher County was ranked eighth. Both counties experienced a substantial increase in the market values of their agricultural production between 2002 and 2007 (USDA, 2007).

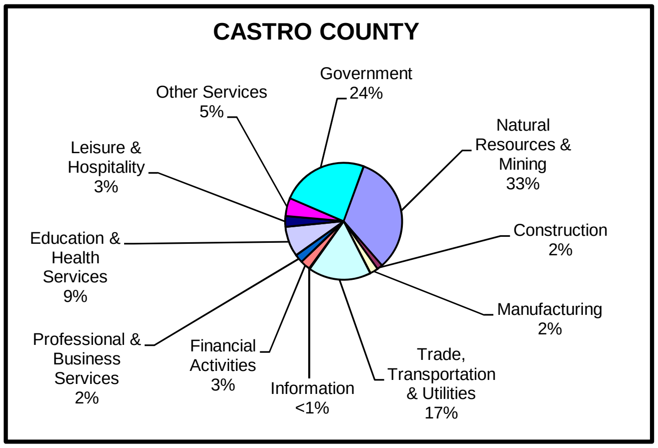
For Castro County in 2007, livestock sales accounted for approximately 85% ($826,485,000) of the total value for agricultural products, while crop sales accounted for approximately 15% ($146,866,000). The county's livestock inventory is heavily dominated by cattle, followed by sheep, horses, hogs, and goats, respectively. Corn for grain is the leading crop item, followed by wheat for grain, forage (hay and haylage, grass silage, and greenchop), cotton, and sorghum for grain, respectively (USDA, 2007).

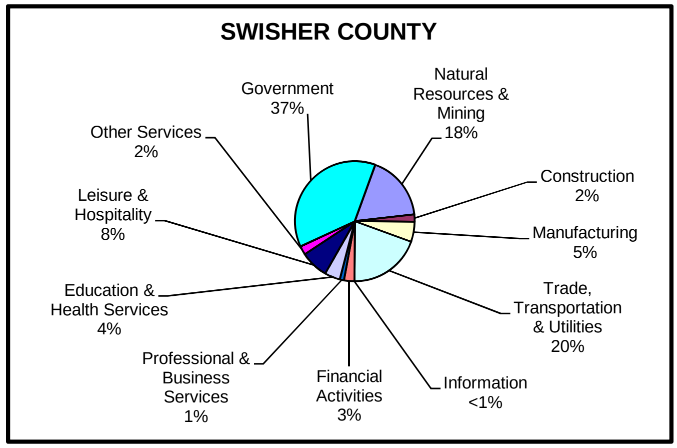
For Swisher County in 2007, livestock sales accounted for approximately 85% ($387,450,000) of the total value for agricultural products, while crop sales accounted for approximately 15% ($66,202,000). The county's livestock inventory is heavily dominated by cattle, followed by sheep, horses, goats, and layers, respectively. Wheat is the leading crop item, followed by cotton, sorghum, corn, and forage, respectively (USDA, 2007).

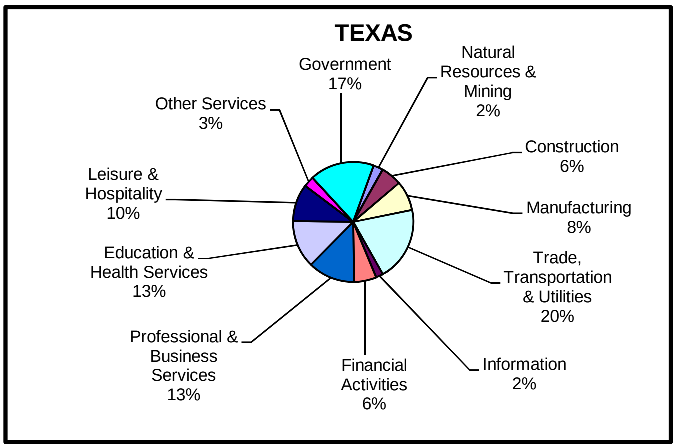
3.7.5 Community Values

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

FIGURE 3-6
COVERED EMPLOYMENT AND MAJOR EMPLOYMENT SECTORS
3RD QUARTER 2010







Source: TWC (2011b).

3.8 LAND USE, AESTHETICS, RECREATION, TRANSPORTATION, AND COMMUNICATION

3.8.1 Land Use

The study area is located in the Panhandle of northern Texas in parts of Castro and Swisher counties, including small portions of the incorporated communities of Hart and Kress. The only unincorporated community in the study area is Center Plains.

The study area counties are members of the Panhandle State Planning Region (Region 1), which is represented by the Panhandle Regional Planning Commission (PRPC). The PRPC spans 26 counties and is a voluntary association of cities, counties, and special districts that assist local governments in planning, developing, and implementing programs designed to improve the general health, safety, and welfare of the citizens of the Texas Panhandle (PRPC, 2011).

A review of the most recently published NRCS land-use estimates indicated that land use in the study area counties is predominately agricultural, with approximately 901,100 ac (78.2%) of the total land area for these counties. Cultivated cropland consists of approximately 682,300 ac (59.2%) and rangeland consists of approximately 218,800 ac (19.0%) of the total area for these counties. Approximately 65.6% of Castro County and 52.8% of Swisher County were devoted to cultivated cropland. Rangeland consisted of approximately 17.7% of Castro County and 20.2% of Swisher County. The remaining land uses were devoted to minor land cover, pastureland, urban land, roads, and small waterbodies (NRCS, 2000).

In Castro County in 2007, the top three crops in terms of acres in production included corn for grain (98,414 ac), wheat for grain (84,940 ac), and forage (land use for all hay and haylage, grass silage, and greenchop) (34,467 ac). In 2007, by far the predominant type of livestock in Castro County was cattle and calves, with over 530,890 cattle, followed by negligible numbers of sheep, horses, hogs, and goats (USDA, 2007).

In Swisher County in 2007, the top three crops in terms of acres in production included wheat for grain (94,340 ac), cotton (55,766 ac), and sorghum for grain (26, 655 ac). In 2007, cattle and calves dominated the top livestock inventory items, with over 216,270 head, followed by much smaller numbers of sheep, horses, goats, and layers (USDA, 2007).

While five independent school districts (ISDs) have jurisdictions within the study area (Hart ISD, Nazareth ISD, Kress ISD, Tulia ISD, and Silverton ISD), only one actually has schools located within or in close proximity of the study area boundaries. Hart ISD operates three schools within the city limits of Hart (Hart Elementary, Hart Junior High, and Hart High School) (Texas Education Agency, 2010).

Between 2000 and 2009, only seven single-family building permits were recorded within Castro County, with an average value per dwelling of $54,700. Swisher County only recorded one single-family building permit between 2000 and 2009, in 2007 with a value of $164,000 (Texas A&M University, 2011).

3.8.2 Aesthetic Values

Aesthetics is included as a factor for consideration in the evaluation of transmission facilities in Section 37.056(c)(4) of the Texas Utilities Code. The term aesthetics refers to the subjective perception of natural beauty in the landscape, and this section of the document attempts to define and measure the study area's scenic qualities. Consideration of the visual environment includes a determination of aesthetic values where the major potential effect of the project on the resource is considered aesthetic, or where the location of a transmission line could affect the scenic enjoyment of a recreation area.

Atkins's aesthetic analysis deals primarily with potential visual impacts to the public. Areas visible from major roads and highways, or publicly owned or accessible lands (parks or privately owned recreation areas open to the public, for example) are analyzed. Several factors are taken into consideration when attempting to define the potential impact to a scenic resource that would result from the construction of the proposed transmission line. Among these are:

- topographical variation (hills, valleys, etc.);
- prominence of water in the landscape;
- vegetation variety (forests, pasture, etc.);
- diversity of scenic elements;
- degree of human development or alteration; and
- overall uniqueness of the scenic environment compared to the larger region

Based on these criteria, Atkins is of the opinion that the study area exhibits a generally low degree of aesthetic quality for the region. The area is characterized by a relatively flat topography, and no major water features occur within the study area. Furthermore, the landscape has experienced a high degree of alteration due to agricultural, residential and commercial development and transportation corridors. As a result, the landscape exhibits a generally high level of human impact, primarily from widespread and extensive agricultural activities, often with accompanying circle-pivot irrigation, but also including highways, railways, and existing electrical transmission and distribution lines.

A description of the vegetation types located within the study area is discussed in more detail in Section 3.4.2. Generally, however, the study are has experienced a high degree of human development (agricultural and urban), which detracts from the overall aesthetic quality. Urban development within the study area is concentrated in and around the cities of Hart and Kress. Land use within the urbanized areas includes a variety of residential neighborhoods, commercial developments, transportation systems (highways and railways), civic uses, parks, and schools.

The Texas Historical Commission (THC) operates the Texas Heritage Trails Program, a statewide heritage tourism program based on 10 scenic driving trails originally created by the Texas Department of Transportation (TxDOT). This program operates throughout 10 regions of Texas and enables people to learn about, and be surrounded by, local customs, traditions, history, and culture of the different regions. The study area is located within the Texas Plains Region, which contains the Texas Plains Trail. This trail region stretches across 52 counties in the Panhandle of Texas and highlights the canyons, lakes, prairies, historic towns, and cultural and recreational opportunities of the region. The Texas Plains Trail runs through Castro County and several adjacent counties, but does not enter the study area (THC, 2011).

In 1998, TxDOT published a list of some of the best "Scenic Overlooks and Rest Areas" in Texas, each of which presented particularly strong aesthetic views or settings. A review of this list revealed that none of these locations are located within the study area (TxDOT, 1998).

3.8.3 Parks and Recreation

A review of the Texas Outdoor Recreation Inventory (TORI), the Texas Outdoor Recreation Plan (TORP), federal, state, and local maps, and a limited field reconnaissance identified no national, state, county, or city parks, forests/grasslands, wildlife refuges, wildlife management areas, preserves, or recreation areas within the study area boundaries (TPWD, 1984, 1990, 2011c; National Park Service, 2011).

3.8.4 Transportation/Aviation

The major transportation features within the study area are U.S. Interstate 27 (IH 27), U.S. Highway 87 (US 87), and State Highway 194 (SH 194). The study area also includes four farm-to-market (FM) roads and numerous county, city, private, and residential roads. IH 27 runs from its junction with IH 40 in Amarillo southward to State Loop (SL) 289 in Lubbock, extending 124 miles through five counties. It passes through the eastern portion of the study area in Swisher County. US 87 extends northwest from Port Lavaca for approximately 660 miles within Texas to Texline, on the Texas-New Mexico border. The highway then continues along this orientation all the way to its junction with IH 94 in Billings, Montana. In the general vicinity of the study area, US 87 runs concurrently with IH 27, but within the study area US 87 temporarily diverges from IH 27 to provide access to the cities of Tulia and Kress. SH 194 runs approximately 47 miles from SH 86 in Dimmitt southeast through Hart and three counties to FM 3466 in Plainview. Within the study area, SH 194 traverses the southwestern corner, through the City of Hart (TxDOT, 2011a).

A review of the Albuquerque and Dallas-Ft. Worth Sectional Aeronautical Charts (Federal Aviation Administration [FAA], 2011a), the Airport/Facility directory (FAA, 2011b), the TxDOT Airport Directory (TxDOT, 2011b), aerial photography, USGS maps, field reconnaissance, and internet sources revealed one FAA-registered airport and one private airport/landing strip within the study area (AirNav, 2011). The Joe Vaughn Spraying Airport (FAA-registered) is located near the eastern edge of the study area, north of the City of Kress, between IH 27 and US 87. This airport features one runway that measures 3,900 ft by 60 ft. In addition, an airstrip owned by Central Plains Spraying, Inc. (private) is located east of Hart near the southern boundary of the study area, on the north side of FM 145.

3.8.5 Communication Towers

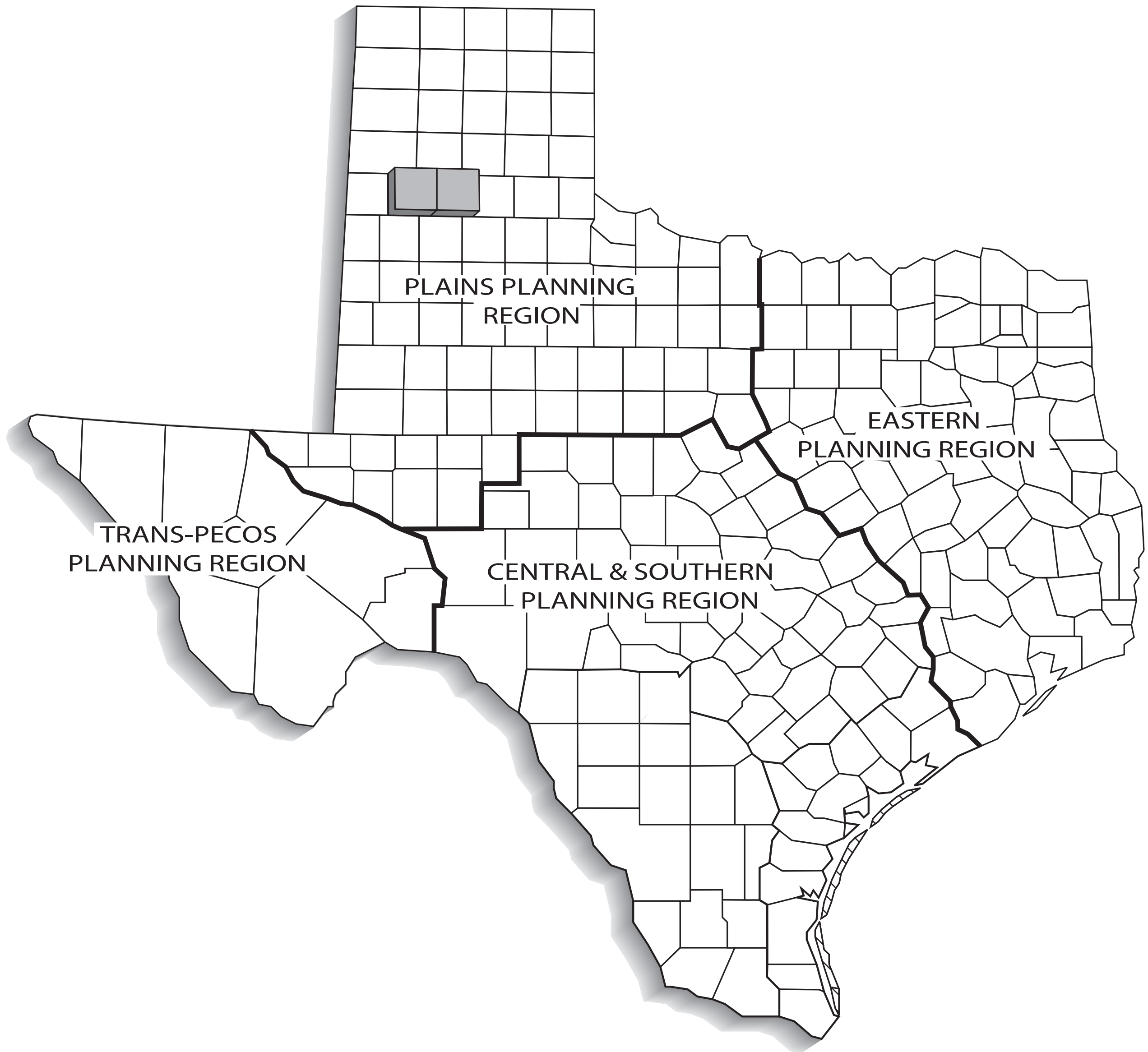
A search of the Federal Communications Commission (FCC) website revealed no AM, FM, or television towers within the study area boundaries. However, one AM tower (KTUE AM) is located near the northeast corner of the study area, in Tulia. One FM tower (KKFC FM) is also located near the western edge of the study area, in Hart, adjacent to SH 194 (FCC, 2011). A search for cellular communication towers located one within the study area boundaries, owned by SBA Structures, Inc., near the northwestern corner of the study area along FM 168. In addition, two cellular towers owned by American Towers, Inc., were located just south of Kress and just south of Tulia, respectively (Mobiledia, 2011).

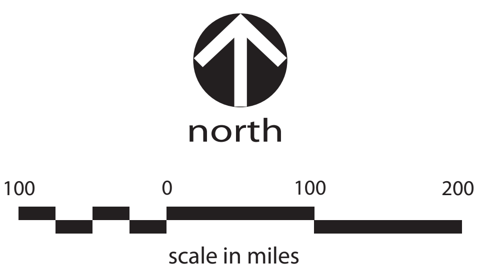
3.9 CULTURAL RESOURCES

3.9.1 Cultural Setting

Castro and Swisher counties are in the Plains Planning Region (Figure 3-7) 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 very flat, showing little vertical relief. Playa lakes, shallow depressions that collect runoff water into ponds, are scattered throughout the region. A brief description of the cultural chronology and major cultural developments of the region are presented below.

The generalized cultural chronology 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 archeological 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.





Source: Mercado-Allinger, et al., 1996

ATKINS

Figure 3-7

LOCATION OF THE STUDY AREA COUNTIES IN RELATION TO THE CULTURAL RESOURCES PLANNING REGIONS OF TEXAS

NEWHART TO KRESS 115-KV PROJECT

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3.9.1.1 Prehistoric Overview

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, the now-extinct bison, as well as smaller mammals. Plants were almost certainly consumed, but data regarding this aspect of subsistence are rare.

The Paleoindian period on the Llano Estacado is subdivided into a sequence of four main cultures (Holliday, 1987). From earliest to latest, these are the Clovis, Folsom, Plainview, and Firstview cultures (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 hunted 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) also report Clovis material at the Lubbock Lake site near Lubbock, Texas.

Following Clovis is the Folsom culture. The Folsom culture is characterized by the hunting of *Bison antiquus* 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 Lake Theo site (41BI70) (Harrison and Killen, 1978; Harrison and Smith, 1975).

The Plainview culture is similar to the Folsom culture in its use of *Bison antiquus*. The Plainview point, however, is 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 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 points. 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.

The Archaic period follows the Paleoindian and spans the period between 6500 B.C. to approximately A.D. 500. It is divided into the Early Archaic (6500 to 2000 B.C.) and Late Archaic (2000 B.C. to A.D. 500). The Early Archaic substage in the High Plains is characterized by a pattern of localized foraging for wild plant foods and small game. There is a notable absence of bison remains in area sites, and Dillehay (1974) surmises this as the first period of bison scarcity on the Southern Plains. Lithic artifacts that are common during the Early Archaic include stemmed dart points, gouges, grinding implements, hearthstones, and boiling pebbles (Hughes, 1991).

By about 2000 B.C., the Late Archaic substage is identified based largely on climatic changes to a more modern climate (Medithermal). The Late Archaic is represented by thousands of archeological sites, in sharp contrast to the few sites identified to date to the Early Archaic substage. During the Late Archaic, the primary mode of subsistence was bison hunting, even though assemblages dating to this substage 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 (Boyd, 1997; Hughes 1991). 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 Late Archaic assemblages include knives, key-shaped drills, bifacial and unifacial choppers, various types of scrapers, gravers, and denticulates. Bison kill sites have been the most common site investigated from this time period.

Beginning about A.D. 500, a wetter climate in the region ushered in the Late Prehistoric period. The Late Prehistoric period 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, pithouses, and more than likely, some gardening or horticulture (Boyd, 1997; Hughes, 1991). 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 and triangular Harrell points (Collins, 1969; Runkles, 1964; Suhm and Jelks, 1962; Turner and Hester, 1985).

Hughes (1991) defines this period as starting about A.D. 200 with the appearance of barbed arrow points 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 (Cruse, 1992). This transition also 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 margins. The latter consists of the Querecho and Maljamar phases.

The Lake Creek complex is a Plains Woodland culture that was first identified on the basis of excavations conducted at the Lake Creek site in Hutchinson County (Hughes, 1962). The identifying characteristics of this complex include cordmarked ceramics, Scallorn-like arrow points, and a lithic assemblage consisting of scrapers, retouched flakes, and a high frequency of one-handed cobble manos and basin-type slab metates. Features usually found at Lake Creek sites include storage pits and rock-lined hearths. These sites tend to be located on lesser tributaries, rather than along primary waterways in areas that appear to have been frequently flooded (Couzzourt, 1982; Cruse, 1992).

The Palo Duro complex, dating from about A.D. 200 to 1000, was initially recognized as a separate cultural complex by Hughes and Willey in 1978. The type site for the Palo Duro complex is the Deadman's Shelter site located in Tule Canyon below the juncture of Deadman's and Barber's creeks, now in McKenzie Reservoir (Hughes and Willey, 1978). Other sites that have been identified as Palo Duro complex sites include the Canyon City Club Cave in Randall County (Hughes, 1969), the Blue Clay site (Hughes and Willey, 1978), the Chalk Hollow site (Wedel, 1975), and the Kent Creek site (41HL66) (Cruse, 1992).

The artifact assemblage for Palo Duro sites consists primarily of Deadman's and Scallorn arrow points and Mogollon Brownware ceramics. Also included in the assemblage are small numbers of corner-notched dart points, high concentrations of slab metates and cobble manos, ovate-shaped knives, scrapers, and some bone tools. The lithic material used is predominantly local, but a few flakes of materials such as obsidian have been recovered at these sites. Sites dating to the Palo Duro complex are small open camps, rockshelters, or pithouses located along the eastern margins of the Texas Panhandle (Cruse, 1992).

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, 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 1100. It is characterized by a lack of houses. Locally made plain brownware, corner-notched arrow points, and small dart points are common artifacts at such sites. The Maljamar phase (A.D. 1100–1300) is characterized by pithouses, locally made plain and corrugated brownwares, several kinds of intrusive wares, and corner-notched and side-notched arrow points.

Beginning around A.D. 1100 or 1200 and coinciding with the appearance of side-notched triangular arrow points, the Late Prehistoric II marks the transition from a Woodland to a Village cultural lifestyle. This period marks the transition from pithouses to surface houses and subsistence regimes with a heavy reliance on horticulture (Hughes, 1991). The Plains Village culture developed out of the Plains Woodland cultures in the region and is often referred to as the Early Plains Village period (Baugh et al., 1984; Hofman, 1984). In the Texas Panhandle, the transition from a Woodland to a Plains Village cultural lifestyle occurred about A.D. 1200 with the Antelope Creek phase (A.D. 1200–1500) located principally along the Canadian River, and the Washita River phase (A.D. 1250–1450) located in western and central Oklahoma (Cruse, 1992). Characteristics of the Antelope Creek phase include Borger Cordmarked ceramics, Washita and Fresno arrow points, and rectangular structures with rock slab foundations. The economy during the Antelope Creek phase was based on bison hunting and horticulture.

The Washita River phase is characterized by a ceramic assemblage that is primarily plain wares and houses that are not slab lined. Some of the characteristics that it does share with the Antelope Creek phase are the use of Washita and Fresno arrow points and subsistence activities revolving around bison procurement and horticulture (Cruse, 1992; Hughes, 1991).

On the southern Llano Estacado the Ochoa phase dates between A.D. 1300 and 1450. It is characterized by jacal-like surface houses with rock and adobe foundations, side-notched triangular points, and locally made Ochoa Indented Brownware.

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 Athapaskan 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 Rocky Mountains from the Great Slave Area of Canada (Cruse et al., 1993).

The Athapaskans split into two prongs. The Western Athapaskans gradually evolved into the Navajo, San Carlos, Chiricahua, and Mescalero Apache. The Eastern Athapaskans 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 Apaches also engaged in limited agriculture with techniques learned from the Pueblos.

Spanish explorer Francisco Vázquez de Coronado crossed the northern Llano Estacado and Panhandle Plains between 1540 and 1542. The Eastern Apaches 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 Lot 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 indigenous groups that had extensive trading networks 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. Trade items such as glass beads, European-made ceramics, gun parts, and metal arrow points indicate contact with Europeans. The widespread adoption after 1598 of the Spanish mustang by the Plains cultures resulted in the removal of the eastern Apache from the Llano Estacado.

Historically, the project area lies in the Comancheria, the regions of Comanche dominance in the eighteenth and nineteenth century (Thurmond et al., 1981). From approximately A.D. 1700, the region's population grew to include Lipan Apache, various bands of Comanches 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 group 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).

3.9.1.2 Historic Overview

The Texas Panhandle was the Indians' domain until the Red River War of 1874 (Cruse, 2008). During this military campaign, the United States Army was commanded to drive the Indians in the Texas Panhandle to the Indian Territory. Comanche, Kiowa, and Southern Cheyenne Indians joined forces to fight against the army, 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).

From the mid-1870s to the early 1880s, pastores (sheepmen) from New Mexico began moving into this portion of Texas in search of grazing land and water for their sheep. Most pastores herded their flock on a seasonal basis along the upper Canadian River (Anderson, 2011). The pastores and their flocks followed old Indian trails and utilized the old Cibolero and Comanchero campsites on which they erected crude rock shelters. After the Red River War, an increasing number of pastores began entering the area. The pastores' yearly migration into the region contributed significantly to the population and economy of the Texas Panhandle in the early 1880s. However, shortly thereafter cattlemen began moving in the region in large numbers and began forcing the pastores out of the area by buying them out or restricting their grazing lands by fencing the previously free range (Rathjan, 2011).

3.9.1.2.1 Castro County

The area that is now Castro County was long the homeland of Apachean cultures until they were displaced by Comanches around 1700. The Comanches dominated the High Plains until they were defeated by the United States Army in the Red River War of 1874. However, no significant combat occurred in Castro County. By the mid-1870s, buffalo hunters were exterminating the herds, and ranching came to the county as the buffalo were exterminated. Although the county was established by the Texas legislature in 1876, no settlement occurred in the county until 1882 when the Capital Syndicate was awarded 3,000,000 ac in exchange for building a new state capitol in Austin. The southern and western parts of Castro County were included in this grant. The entirety of the land grant became the XIT Ranch, the largest ranch in the world in the 1880s. Other large ranches such as the 7-UP, T Anchor, Cross L, and Circle Cross ranches controlled large portions of Castro County. In 1891, Castro County was formally organized. The selling off of portions of the large ranches in the early twentieth century helped lead to an influx of German settlers. Along with the German settlers, other new settlers took up farming and ranching. After World War II, the use of underground irrigation served to again stimulate farming in the county. Transportation in general came relatively late to Castro County. In the 1930s, the Works Progress Administration constructed caliche auto roads near Dimmit. However, the first paved road was not completed until 1941 making Castro County the last Texas county to acquire a paved road. Today, the county is still largely a rural farming and ranching area (Abbe, 2011).

3.9.1.2.2 Swisher County

Like Castro County, Swisher County was once dominated by Apache, and later the Comanche, until the Red River War of 1874. Swisher County remained sparsely populated until Charles Goodnight's JA Ranch expanded into the county in 1883. Later, Goodnight created the Tule Ranch, which occupied the entire eastern part of the county. In 1890, the county was formally organized and Tulia was chosen as the county seat. Swisher County was formed from lands previously assigned to the Young and Bexar districts.

By the late 1890s, a small number of settlers began to take up school lands and begin stock-farming operations. The county had readily available groundwater, and although few crops were grown in the county, farming grew steadily during the early twentieth century. A branch of the Santa Fe Railroad from Amarillo reached Swisher County in 1906 and eventually connected to Plainview in Hale County. The line was completed to Lubbock in 1910, putting Tulia and Swisher County on a major north-south rail line. As the county continued to grow, so did the need for a useful road system. In 1920, the Ozark Trail, a highway network, came to Texas. The Trail crossed through Swisher and Castro counties along with five other counties in the Texas Panhandle. The Great Depression and the Dust Bowl of the 1930s diminished plains agriculture, and the population of Swisher County began to decrease. The stimulus of World War II and the development of large-scale irrigation in the area led to the revival of the county's economy. During the late 1950s and 1960s many feedlot operations were established and the county's population began to rise. However, the introduction of mechanization and agricultural consolidation later led to a continuing decline in the population through the 1990s (Abbe and Leffler, 2011).

3.9.2 Previous Investigations

Some of the more significant archeological investigations in Swisher county have been conducted at Tule Canyon (Malone, 1970) and McKenzie Reservoir (Hughes and Willey, 1978; Katz, 1998). Additional investigations in Swisher County include a reconnaissance survey for a proposed fiber optic cable (Goar and Lintz, 1999) and archival research for the evaluation of potential impacts for the U.S. Department of Energy National Waste Terminal Storage Program (Mercado-Allinger and Freeman, 1983). In 2003, Prewitt and Associates conducted a survey of two hiking-trail bridge locations in Mackenzie Park in Tulia. The survey only resulted in the recording of one new prehistoric site consisting of a single pottery sherd (Boyd, 2003).

The archeological research conducted in Castro County has been limited to surveys conducted for the Bailey County Electric Cooperative (Guffee, 1980, 1986), the Lower Running Water Draw Watershed Reservoir Project in Hale and Castro counties (Guffee and Hughes, 1974; Hughes and Guffee, 1976), the State Department of Highways and Public Transportation (1982, 1984), a proposed pipeline and water supply for the City of Nazareth (Hatfield, 2007), and for a survey of the historical and archeological resources of the Red River Basin above Denison Dam for the Soil Conservation Service (1975). In 1987 an archeological survey was conducted at the Happy site in Castro and Swisher counties for the then-proposed superconducting, super collider project. The survey covered approximately 95 square acres, and the only site recorded was in Swisher County (Kenmotsu, 1987).

3.9.3 Literature and Records Review

Research of available records and literature was conducted at the Texas Archeological Research Laboratory (TARL), J.J. Pickle Research Campus, The University of Texas at Austin, with the purpose of determining the location of previously recorded archeological sites (sites issued a trinomial/recorded at TARL) within the study area. The THC's on-line Restricted Archeological Sites Atlas files were also used to identify listed and eligible National Register of Historic Places (NRHP) properties and sites, NRHP districts, cemeteries (including Historic Texas Cemeteries), Official Texas Historical Markers (OTHM) (including Recorded Texas Historic Landmarks), State Archeological Landmarks (SALs), as well as any other potential cultural resources such as National Historic Landmarks, National Monuments, National Memorials, National Historic Sites, and National Historical Parks, to ensure the completeness of the study. As a secondary source of NRHP properties, the National Park Service's NRHP GIS Spatial Data was consulted. Additionally, TxDOT's database of NRHP-listed and -eligible bridges was also reviewed.

One OTHM commemorating Kress cemetery and one Historic Texas Cemetery (Kress Cemetery) were identified as being within the study area. Additionally, TxDOT identified approximately one or two off-system welded Warren pony-truss bridges as being within the Castro and Swisher counties area. However, NRHP eligibility status of these bridges is currently undetermined.

4.0 ENVIRONMENTAL IMPACTS OF THE ALTERNATIVE ROUTES

4.1 IMPACTS ON PHYSIOGRAPHY/GEOLOGY/SOILS

Construction of any of the primary alternative transmission line routes will have no significant effect on the physiographic or geologic features/resources of the area. The erection of the structures will require the removal and/or minor disturbance of small amounts of near-surface materials, but will have no measurable impact on the geologic resources or features along any of the alternative routes and no geologic hazards are anticipated to result from this project.

The construction and operation of transmission lines normally create very few long-term adverse impacts on soils. Transmission lines are not normally considered to be a conversion of farmland because the site can still be used after construction. The major potential impact upon soils from any transmission line construction would be the potential for erosion and soil compaction. The potential for soil erosion is generally greatest during the initial clearing of the ROW; however, SPS does employ erosion control measures during the clearing and construction process. Construction of the transmission line would require minimal amounts of clearing in areas that have already been cleared for pastures, crops, and existing road, railroad, transmission line and pipeline ROW. The most important factor in controlling soil erosion associated with construction activity is to revegetate areas that have potential erosion problems immediately following construction. Impacts from soil erosion caused by construction activity should be minimized due to the implementation of best management practices (BMPs) designed in the SWPPP.

Prime farmlands, as defined by the NRCS, are soils that are best suited for producing food, feed, forage, or fiber crops. The USDA recognizes the importance and vulnerability of prime farmlands throughout the nation and encourages the wise use and conservation of these soils where possible. The project would likely cross prime farmland soils. In addition to construction-related impacts described above, the major impact of the project on prime farmland soils would be the physical occupation of small areas by the support structures. These areas would not be available for agricultural production and could become obstacles to farm machinery. However, the majority of the ROW would be available for agricultural use once construction of the transmission line is completed.

4.2 IMPACTS ON WATER RESOURCES

4.2.1 Surface Water

Construction and operation of the transmission line would have little adverse impacts to surface water resources. Short-term disturbances resulting from construction activities would result primarily from increased erosion and accidental spills of petroleum and other chemical products. Additionally, activities such as clearing of vegetation may temporarily increase local stormwater runoff volumes and sediment loading. Potential impacts would be avoided whenever possible by spanning surface waters, diverting construction traffic around flowing streams via existing roads, and eliminating unnecessary clearing of vegetation. Although impacts would be avoided to the extent possible, unavoidable impacts could occur. Paralleling existing ROW would minimize these impacts, as would reducing vegetation removal around stream banks and minimizing ground disturbance. Although the possible impacts are anticipated to be minor and temporary, the use of erosion control measures, such as silt fences and selective clearing, and BMPs regarding the use of chemicals would also minimize potential impacts. Impacts occurring from construction of the proposed transmission line would, however, be short term and minor because of the relatively small area that would be disturbed at any particular time and the short duration of the construction activities.

There are no primary streams crossed by any of the alternative routes. Additionally, there are no unnamed intermittent or ephemeral streams crossed by any of the alternative routes, and therefore, no routes that parallel streams within 100 ft.

All of the alternative routes cross open waters (playa lakes, ponds, etc.). Total combined length of all open waters along an alternative route ranges from 0.55 mile (2,885 ft) by Route 4 to 1.21 miles (5,105 ft) of open water crossed by Route 6. Of these, routes 2, 7, and 10 cross the least number of playa lakes (3). In contrast, Route 9 crosses the most number of playa lakes (8).

4.2.2 Groundwater

No adverse impacts to groundwater are expected to occur from the construction, operation, and maintenance of the proposed transmission line. The amount of recharge area disturbed by construction is minimal when compared with the total amount of recharge area available for the aquatic systems in the region. Additionally, the accidental spillage of fuel, lubricants, or other petroleum products from normal operation of heavy equipment during construction activities is unlikely to result in any groundwater contamination. Any accidental spills would be promptly responded to in accordance with state and federal regulations. SPS will take all necessary precautions to avoid and minimize the occurrence of such spills.

4.2.3 Floodplains

Proposed construction could result in locating some transmission line structures within 100-year floodplains, particularly in the vicinity of playa lakes. These structures would be designed and constructed so as not to impede the flow of any waterway or create any hazard during flooding. Construction activities in floodplains would be limited to the project ROW, and efforts will be made to keep structures from being located in obvious flood channels. Some scour could occur around structures if flood-flow depths and velocities become great enough. However, this project should not have significant impacts on the function of the floodplains. No adverse effects from flooding to adjacent or downstream property owners are anticipated as a result of construction.

Although each of the alternative routes crosses 100-year floodplains, impacts would be minor. These lengths range from 1.87 miles (9,870 ft) crossed by Route 1 to 3.49 miles (18,420 ft) crossed by Route 6. Generally, water resources do not present a major constraint to transmission line construction, unless there are navigable river crossings and/or extensive wetlands that would warrant USACE permitting, or areas that would require extensive woodland clearing near streams, presenting potential erosion control problems.

4.3 IMPACTS ON TERRESTRIAL ECOSYSTEMS

4.3.1 Vegetation

Impacts to vegetation resulting from the construction and operation of transmission lines are primarily associated with the removal of existing woody vegetation within the ROW. However, cropland and rangelands consisting mostly of grasses and other herbaceous vegetation dominate the study area, with only scarce amounts of woody vegetation. Only minimal clearing would be necessary through croplands and rangelands. Sensitive plant communities, such as those found along riparian corridors and in wetlands, can often be spanned without the need for clearing. The linear extent of plant communities and potential wetlands crossed by the proposed alternative routes were determined using digital aerial photography, USGS 7.5-minute topographic maps, and FWS NWI maps, and are presented in Table 6-1 in Section 6.0.

Of the alternatives considered, Route 9 does not cross any woodland/brushland and would not require any clearing. Routes 7 and 8 would require the next least amount of upland woodland/ brushland clearing, at approximately 0.02 mile (80 ft). Route 2 would require more clearing of upland woodland/brushland than any of the other alternatives at approximately 0.11 mile. Bottomland/riparian woodlands are not crossed by any of the alternative routes.

Removal of vegetation in wetlands increases the potential for erosion and sedimentation, which can be detrimental to downstream plant communities and aquatic life. Any placement of fill material within waters of the U.S. would represent a permit action that may require notification to the USACE. More-detailed field studies would be required to verify the location and amount of jurisdictional wetlands that may be within the ROW of a preferred route. Precautions will be taken throughout the construction process to avoid and minimize impacts to wetlands. Depending on the size and vegetation type (forested, shrub/scrub, or herbaceous), these areas can be spanned in many instances, although they cannot always be avoided by construction equipment. Placement of rock berms, siltation fences, or brush downstream of disturbed areas would help dissipate the flow of runoff at stream and drainage crossings. Placement of silt fences or hay-bale dikes between streams and disturbed areas would also help prevent siltation into the waterway. After construction is complete, impacted herbaceous wetlands are likely to recover relatively quickly.

Areas that potentially support wetlands are crossed by all the alternative routes, with the exception of Route 2, which does not cross any wetlands. The amount of potential wetlands crossed by each route was based on FWS NWI maps. Of the alternative routes that cross potential wetlands, Route 1 crosses the least amount of wetlands (0.18 mile). In contrast, alternative routes 5, 6, and 9 cross the greatest amount of potential wetlands with a total combined length of 0.54 mile (2,825 ft). Although the total lengths of wetlands crossed by each of the alternative routes vary, any individual crossing length of a single wetland area by an alternative route is likely to be less than the average span length of this project.

Construction of the transmission line within the ROW would be performed to minimize adverse impacts to vegetation and to retain existing ground cover whenever practicable. Additionally, SPS would minimize damage to local vegetation and retain native ground cover wherever practicable. Clearing would occur only where necessary to provide access and working space, and to protect conductors. Where necessary, soil conservation practices would be undertaken to protect local vegetation and ensure a successful restoration program for areas disturbed during construction. Activities associated with electrical transmission facilities in jurisdictional wetlands are regulated by the USACE under the Clean Water Act. If necessary, SPS will coordinate with the USACE prior to clearing and construction to ensure compliance with Section 404 of the Clean Water Act in order to avoid, minimize, or mitigate for unavoidable impacts to waters of the U.S., including wetlands.

4.3.2 Endangered and Threatened Plant Species

No plants currently listed as endangered or threatened by the FWS or TPWD are known to occur along the proposed transmission line routes. Therefore, no significant impacts to any federally or state-protected plant species are expected to result from this project.

4.3.3 Wildlife

Typical impacts from transmission lines on wildlife can be classified as either short-term effects resulting from physical disturbance during clearing and construction, or long-term effects resulting from habitat modification or loss. The net effect on local wildlife of these two types of impacts is usually minor. Clearing of vegetation and other construction-related activities will directly and/or indirectly affect most animals that reside or wander within the transmission line ROW. Occasionally, albeit rarely, individuals of smaller, low mobility species (e.g., amphibians, small reptiles, and small mammals) may be permanently displaced, injured, or killed; however, most animals are mobile and avoid the construction area during active work periods, and recolonize to suitable and recovered habitats when construction is complete. The net effect from transmission line construction on local wildlife is typically minor.

Although larger, more-mobile species, such as birds, jackrabbits, and foxes may avoid the initial clearing and construction activities by moving into adjacent areas outside the ROW, these animals may be indirectly impacted by local habitat loss. Habitat changes within the ROW may reduce the carrying capacity of some species and increase it for others. For example, in woodlands, a linear clearing may slightly reduce population levels of strictly woodland-dwelling animals while increasing those populations preferring ecotonal or "edge" habitat. Edge species that typically benefit from such changes include recreationally important species such as white-tailed deer, northern bobwhite, and cottontail rabbits. 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 regrowth of vegetation in the ROW following construction would minimize the effects of this loss.

The increased noise and activity levels during construction could potentially disturb the daily activities (breeding, feeding, nesting, roosting, sheltering) of individuals inhabiting the areas within and adjacent to the ROW. However, these impacts are expected to be temporary in most cases. Although the normal behavior of many wildlife species may be disturbed during construction, no significant permanent impact to their populations should result. Dust and gaseous emissions should only minimally affect wildlife. Operational 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.

Construction of the proposed transmission line primarily within or adjacent to existing cleared ROW would reduce potential impacts to woodland/brushland-dwelling species. Additionally, because residents within the cleared ROW are acclimated to operation and maintenance activities, impacts should be temporary and minor, related primarily to construction activities and impacts caused by heavy machinery. Once construction is completed and the vegetation has recovered, most forms of wildlife will move back into the ROW.

Impacts on birds from electric transmission lines are considered to be both positive and negative. Much of the published information comes from the Avian Power Line Interaction Committee (APLIC), a collaboration of FWS and power companies to address issues of avian protection and electric power reliability. Positive impacts of transmission lines and structures on avian species, particularly raptors, include additional nesting and roosting sites and resting and hunting perches, particularly in open, treeless habitats (APLIC, 1996; Olendorff et al., 1981). The red-tailed hawk, turkey vulture, American crow, American kestrel, mourning dove, and eastern meadowlark are a few of the more common species that may take advantage of these benefits. In fact, it is believed that transmission lines have significantly contributed to the increased raptor populations in several areas of the U.S. (APLIC, 1996). Additionally, edge-adapted species (e.g., blue jay, some flycatchers, northern cardinal, northern bobwhite, northern mockingbird) may flourish along changed vegetation areas adjacent to transmission line ROWs (Rochelle et al., 1999). Structures (including single poles, H-frames, lattice towers, etc.) and lines are attractants to many bird species and may provide resting, hunting, and nesting foundations for birds that use open and edge habitats (APLIC, 1994, 2006).

Adverse impacts to avian species from electric transmission lines range from conductor, ground wire, and structure interactions (electrocution and/or collision) to habitat loss and fragmentation from ROW construction and maintenance. Sources of annual avian mortality estimates compared in APLIC (2006) and Erickson et al. (2005) indicate that the most significant anthropogenic (human-influenced) causes of avian mortality, other than habitat destruction, are window/building collisions (97 to 980 million), electric transmission line collisions (up to 174 million), vehicle collisions (60 to 100 million), cats (39 to 100 million), poisoning (72 million), communication towers (4 to 50 million), and wind turbines (10 to 40 thousand) (APLIC, 2006). Although electrocution from electric power lines (primarily distribution lines) may claim numbers of birds per year, electrocution impacts are highly unlikely for this project. Typically, electrocution is not a threat from electric transmission lines greater than 69 kV, as the distance between conductors or conductor and structure or ground wire are greater than the wingspan of most birds (i.e., greater than 6 ft) (APLIC, 1996, 2006).

The transmission line (structures and wires) could present a hazard to flying birds, particularly migrants. Collision may result in disorientation, crippling, or mortality (New York Power Authority, 2005). Mortality is directly related to an increase in structure height; number of guy wires, conductors, and ground wires; and/or use of solid or pulsating red lights (an FAA requirement on some structures) (Erickson et al., 2005). Collision hazards are greatest near habitat “magnets” (e.g., wetlands, open water, edges, and riparian zones) and during the fall when flight altitudes of dense migrating flocks are lower in association with cold air masses, fog, and 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, when they may have difficulty seeing obstructions (Electric Power Research Institute [EPRI], 1993). Most migrant species known to occur in the study area should be minimally affected during migration, since their normal flying altitudes are much greater than the heights of the proposed transmission line structures (Gauthreaux, 1978; Willard, 1978). For resident birds or for birds during periods of nonmigration, those most prone to collision are often the largest and most common in a given area (APLIC, 1994; Rusz et al., 1986); however, over time, these birds learn the location of transmission 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).

While waterfowl (ducks, geese, swans, cranes, shorebirds, etc.) are among the birds most susceptible to wire strikes (Erickson et al., 2005; Faanes, 1987), it has been estimated that wire strikes (including distribution lines) account for less than 0.1% of waterfowl nonhunting mortality, compared with 88% from diseases and poisoning and 7.4% because of the weather (Stout and Cornwell, 1976). In some areas, hunting may affect 20 to 30% of waterfowl populations (Thompson, 1978). The proposed transmission line may traverse areas of seasonally high waterfowl use, although impacts to migrant waterfowl should be minimal because their normal flying altitudes are considerably greater than the heights of the proposed transmission structures. Therefore, no significant impacts to waterfowl are anticipated.

Habitat loss and fragmentation are other potential adverse impacts from transmission line construction and maintenance. Several studies indicate woodland and grassland fragmentation have detrimental effects on some avian species that show a marked preference for large undisturbed and/or native habitat patches (Faaborg et al., 1992; Hagan et al., 1996; Herkert et al., 2003; Robbins et al., 1989; Rochelle et al., 1999; Terborgh, 1989). Species are not randomly distributed with regard to habitat patch size and fragmentation favors edge- and small-patch-adapted species. For those species dependent on larger patches and less adapted to edge, increases in woodland or forest edge effect can increase predation, brood parasitism, invasive species introduction, and reduce mating and nesting success. Changes in contiguous prairie habitats can do the same.

Collision potential and negative edge effects can be significantly reduced for some species through avian-safe routing and design (APLIC, 2006). Routing and individual structure placement to avoid intense bird use areas (e.g., communal foraging or roosting areas, rookeries, wetlands, etc.) and increasing line visibility are important considerations (APLIC, 1994, 2006; Avery, 1978; Beaulaurier, 1981). 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. If a 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 marking the wires. Increasing wire visibility using markers, such as orange aviation balls, black-and-white ribbons, spiral vibration dampers, or avian flight diverters, particularly at midspan, 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% compared with unmarked lines. Negative edge effects can be reduced through native revegetation of disturbed construction areas where necessary and appropriate for safe and reliable operation. Additionally, where lighting is required due to aviation concerns, use of white strobe lighting is preferred over other options, in order to reduce avian collision potential with taller facilities (Erickson et al., 2005). And lastly, nest management through platform design, equipment protection, and other physical disincentives to bird use and nesting can avoid negative impacts to birds and power reliability (APLIC, 2006).

The greatest potential to impact wildlife typically result from the destruction of woodland and wetland habitats. Woodlands, particularly, are relatively static environments that require greater regenerative time compared with cropland or emergent wetlands. In most cases, wetlands and small waterbodies can be spanned with little or no resulting impact to wildlife. In general, because vegetation provides habitat for wildlife, the preferred route from a vegetation standpoint is usually also the preferred route from a wildlife standpoint. However, as previously stated, there are no alternatives that cross any measureable length of bottomland/riparian woodland, and the routes only cross a minimal amount of upland woodland/brushland. Therefore, the greatest potential to impact wildlife would be crossing wetlands and open waters (including playa lakes), which would present the potential for wire strikes by migrating waterfowl and shorebirds. Of the alternatives considered, Route 2 does not cross any wetlands, while routes 2, 7, and 10 cross the least number of playa lakes (3). However, Route 4 crosses the least amount of open water (0.55 mile).

4.3.4 Endangered and Threatened Wildlife

Of the endangered or threatened terrestrial wildlife potentially occurring throughout the study area, only the state-listed (threatened) Texas horned lizard is likely to occur as a permanent resident where potential habitat is present. The study area is not located within the known occupied range of the lesser prairie-chicken or the black bear. The whooping crane, mountain plover, bald eagle, peregrine falcon, and white-faced ibis are either not expected to occur or nest in the study area, or expected to occur only as a nonbreeding winter resident, or expected to occur as a transitory migrant or post-breeding wanderer. The black-footed ferret and gray wolf are considered extirpated in Texas and would therefore not be affected by the project.

The Texas horned lizard could experience minor temporal disturbance during construction efforts; however, “take” as defined in Section 1.101(5) of the TPWD code is not anticipated. In many instances, potential habitats may be spanned and/or completely avoided. Overall, the proposed transmission line project should not adversely affect this species.

Endangered or threatened avian species that may migrate through the study area, such as the whooping crane, mountain plover, bald eagle, peregrine falcon, white-faced ibis, and other birds that receive protection under provisions of the BGEPA and the MBTA, may be affected by the presence of transmission lines. Larger birds are more prone to transmission line collisions because their large wingspans and lack of maneuverability make avoiding obstacles more difficult (APLIC, 1994). However, the normal flying altitudes of most migrant species are greater than the heights of the proposed transmission structures (Gauthreaux, 1978; Willard, 1978). Birds with keen eyesight, such as the bald eagle and peregrine falcon, are likely to see obstructions such as transmission lines and avoid collisions (Thompson, 1978).

Construction of the proposed transmission facility would not represent a significant impact to any endangered or threatened species that may occur in the study area. No known occupied habitat of federally listed endangered or threatened species is crossed by any of the alternative routes. Upon selection of a route, all species could be further assessed regarding presence and potential impacts prior to construction through ground surveys. Consultation with FWS would be requested should any federally listed endangered or threatened species be observed prior, and/or during, construction.

4.4 IMPACTS ON AQUATIC ECOSYSTEMS

Typical aquatic impacts related to the construction and operation of electric transmission facilities are often the result of changes in water quality or available habitat. These impacts are commonly caused by sedimentation, stormwater volume increases, accidental spills, and direct disruption of aquatic habitats from construction equipment or placement of structures. Sedimentation and turbidity caused by construction activities in or adjacent to streams, springs, or pools may clog respiratory or feeding structures, eliminate available habitat by covering bottom area, or inhibit the growth of plants, thus disrupting the food chain. These effects may be lethal to aquatic organisms such as insect larvae and other macroinvertebrates, mussels, and adult, juvenile, and larval fish. Placement of transmission facilities through bottomland/riparian woodland, adjacent to (within 100 ft) streams, and wetlands is more likely to result in increased sedimentation because removal of vegetation in these areas would increase the potential for soil and other substrates to enter the waterbody. However, the general absence of these habitats within the study area make potential impacts unlikely.

Increased stormwater runoff can scour drainage areas, reducing biodiversity in the area by disrupting habitat. Additionally, higher nutrient levels often occur following increased runoff, especially following clearing activities. Elevated nutrients can stimulate algal production and shift species assemblages or cause algal blooms that may lower the available oxygen concentrations in the water at night or on cloudy days. Removal of riparian vegetation would increase runoff to nearby waterbodies. Therefore, impacts occurring in bottomland/riparian woodland or adjacent wooded areas could have more of an effect than impacts in agricultural areas. Additionally, cropland often contains streams with heavier sediment loads and higher levels of fertilizer and pesticides than would be found in less disturbed wooded areas. As a result, aquatic habitats in these areas are often of lower ecological value because of low diversity and the presence of less desirable species.

The accidental spilling or dumping of toxic compounds may be lethal to organisms, nearby or downstream, that are sensitive to water quality. Some toxic chemicals may be ingested or absorbed by algae or other organisms in low trophic (feeding) levels and passed up the food chain, increasing toxicity in each trophic level until lethal concentrations are reached.

Direct disruption of aquatic habitats is not likely to occur as a result of the proposed project because most all waterbodies should be spanned (including potential wetlands and playa lakes) and erosion control measures would be practiced at all crossings to reduce potential impacts. The severity of impacts at water crossings would be reduced when the proposed route is located adjacent to existing ROW, especially where that ROW is already cleared.

All of the alternative routes cross one or more types of aquatic habitat, as previously discussed in Section 4.2.1 (Surface Water) and Section 4.3.1 (Vegetation). There are no streams crossed by any of the alternative routes and therefore there no routes which parallel streams within 100 ft. Total combined length of all open waters along an alternative route ranges from 0.55 mile by Route 4 to 1.21 miles of open water crossed by Route 6. Of these crossings, routes 2, 7, and 10, cross the least number of playa lakes (3). In contrast, Route 9 crosses the greatest number of playa lakes (8). Of the alternative routes considered, only Route 2 does not cross any wetlands. In contrast, alternative routes 5, 6, and 9 cross the greatest amount of potential wetlands with a total combined length of 0.54 mile.

Although the total lengths of aquatic habitats crossed by each of the alternative routes vary, any individual crossing length of a single aquatic habitat by an alternative route is likely to be less than the average span length capable by this project.

4.4.1 Endangered and Threatened Aquatic Species

No endangered and/or threatened aquatic species occur in the study area; therefore, no impacts to endangered and/or threatened aquatic species are anticipated.

4.5 SOCIOECONOMIC IMPACTS

4.5.1 Social and Economic Factors

Construction and operation of the proposed transmission line would benefit the residents of the region by enabling SPS to provide beneficial short- and long-term impacts, both directly and indirectly. During the course of this project, short-term job opportunities will be created to support the construction activities. Long term, the operation of SPS transmission facilities will require full-time SPS operations and maintenance staff in the region. Construction activities will require a significant amount of concrete, road-making, and other materials and supplies, which will be sourced from the region where appropriate.

The partial list of short-term and long-term impacts listed above should foster an increase in demand for other tertiary services including lodging, transportation, and restaurants. Subsequently, a portion of the project and ongoing wages would find their way into the local economy through purchases such as fuel, food, lodging, and possibly construction materials. A ROW easement payment would be made to individuals whose lands are crossed by the transmission line, based on appraised land values, and this would result in increased income to those landowners. SPS is also required to pay sales tax on purchases and are subject to paying local property tax on land or improvements. Since SPS would only require easements for the proposed line, none of this land would be taken off the tax rolls; however, the improvements made by SPS would add to the local tax base of the affected community.

4.5.2 Community Values

Adverse effects upon community values are defined as aspects of the proposed project that 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 per se.

Impacts on community values can be classified into two areas: (1) direct effects, or those effects that 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 that would result from the 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, their 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 parallel to existing transmission line ROW, length parallel to other compatible ROW, length parallel to property lines, ROW across cropland, 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 a 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." Atkins staff determined the number and distance of habitable structures within 300 ft of each route through the interpretation of aerial photographs, backed up by field reconnaissance, where possible.

Of the 10 alternative routes being evaluated, Route 6 has the fewest habitable structures within 300 ft of its centerline (zero), followed by routes 1, 5, 8, and 9 (three), and Route 7 (four). By comparison, routes 2 and 3 have the greatest number of habitable structures within 300 ft of their centerline (seven), followed by Route 4 (six) and Route 10 (five). However, some routes parallel existing transmission line ROW and consideration was given to the number of habitable structures that are currently within 300 ft of an existing transmission line. Therefore, a better method to evaluate impacts in this category would be to account for the number of habitable structures within 300 ft of "new" transmission line ROW. In this respect, Route 6 would still be the best alternative from this perspective, as it still has the fewest habitable structures located within 300 ft of its centerline (zero). In contrast, Route 2 would be the worst alternative route from this perspective having the most habitable structures within 300 ft (seven). Table 6-1 (in Section 6.0) presents detailed information pertaining to the number of habitable structures located within 300 ft of each of the alternative routes.

The least impact to land use generally results from locating new lines either within or parallel to existing transmission line ROW. As discussed previously, existing transmission lines within the study area provide several opportunities to parallel existing transmission line ROW. Route 2 parallels the greatest amount of existing transmission line ROW, with approximately 2.16 miles of its total length, followed by routes 7 and 8, with approximately 1.48 miles, and Route 1 with approximately 0.89 mile. The remaining routes (routes 3, 4, 5, 6, 9, and 10) do not parallel any existing transmission line ROW.

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, in fact, included in the PUC's transmission line certification criterion. In this respect, Route 2 parallels the greatest amount of compatible ROW with approximately 17.64 miles of its total length, followed by Route 10 with approximately 12.36 miles, and Route 4 with approximately 11.61 miles. Routes 9, 6, and 3 parallel the least amount of compatible ROW with approximately 5.18 miles, 7.07 miles, and 9.08 miles, respectively. One other important land-use criterion is the length of apparent property lines paralleled. In the absence of existing ROW, paralleling property lines or fence lines minimizes disruption to agricultural activities and creates less of a constraint to future development of a tract of land. Each alternative route was developed to parallel apparent property lines where feasible. For this project, the length of apparent property lines paralleled (not on existing ROW) ranges from a high of approximately 13.06 miles on Route 9, to a low of approximately 4.96 miles on Route 2.

Finally, the overall length of a particular alternative route can be an indicator of the relative level of land-use impacts. Generally, all other things being approximately equal, the shorter the route, the less land is crossed, which would usually result in fewer potential impacts. In this regard, Route 9 is the shortest alternative (approximately 18.74 miles), while Route 2 (approximately 25.82 miles) is the longest route. Table 6-1 (in Section 6.0) presents the overall length for each alternative route.

Agricultural activities constitute the most significant land use throughout the study area. Potential impacts to 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. Structures (and routes) located along field edges (property lines, roads, irrigation 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. Impacts to agricultural land uses can generally be ranked by degree of potential impact; forested land has the highest degree of impact, followed by cultivated cropland, and the least-potential impact occurs in areas where cultivation is not the primary use (pastureland/rangeland).

In this regard, Route 5 crosses the least amount of cropland with approximately 14.02 miles. In contrast, Route 2 would cross the most cropland with approximately 20.38 miles. 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. Length across pastureland/rangeland ranges from a low of approximately 1.38 miles on Route 7, to a high of approximately 3.26 miles on Route 6. 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 farming or grazing activities. Most existing agricultural land uses may be resumed following construction.

All of the alternative routes cross some cropland irrigated by center-pivot or other aboveground mechanical systems. Route 5 crosses the least amount of center-pivot or aboveground irrigation systems with approximately 1.43 miles, while Route 2 has the greatest length of ROW that crosses cropland irrigated by mechanical systems with approximately 2.59 miles. However, the alternative routes were developed to have a minimal impact on center-pivot mobile irrigation systems by locating the routes along field edges in order to span the traveling arc of the mobile systems, and thereby minimizing any potential impact.

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 U.S. and state highways that traverse the study area. Measurements were made to estimate the length of each alternative route that would fall within recreational or major highway foreground visual zones (FVZ) (defined as one-half 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. Where limited clearing is required in wooded areas, the brush and wood debris could have a temporary negative impact on the local visual environment. Permanent impacts from the project would include the views of the structures and lines themselves as well as views of cleared ROW.

No portions of any of the alternative routes would be located within the FVZ of either a U.S. or state highway. The FVZ 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). However, all of the routes have portions that are located within the FVZ of state-maintained farm-to-market (FM) roads. Routes 4 and 9 would have the least amount of ROW within the FVZ of FM roads with approximately 2.16 miles, while Route 2 would have the greatest amount of ROW within the FVZ of FM roads with 9.60 miles. None of the alternative routes are located within the FVZ of any park or recreational area.

4.6.3 Recreation

Potential impacts to recreational land would include the disruption or preemption of recreational activities. No parks or recreational areas exist within the study area, so none are crossed by any of the alternative routes. Therefore, no impacts to recreational areas are anticipated.

4.6.4 Transportation/Aviation

Potential impacts to 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. Such impacts, however, are usually temporary and short term. None of the alternative routes crosses a U.S. and/or state highway. However, the number of FM/RM road crossings ranges from a high of four on routes 2, 7, and 8, to a low of two on all remaining routes (routes 1, 3, 4, 5, 6, 9, and 10). SPS would be required to obtain road-crossing permits from TxDOT for any crossings of state-maintained roadways.

The proposed transmission line should have no significant effect on aviation operations within the study area. 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 helicopters. Typical structure heights for this project will range from approximately 80 to 140 ft, depending on location and design.

One FAA-registered airport, Joe Vaughn Spraying Airport, was identified within 20,000 ft of Route 2 (Segment K45). According to Atkins's preliminary calculations, construction of the proposed transmission line along Route 2 would not require FAA notification for the Joe Vaughn Spraying Airport. Following PUC approval of a route for the proposed transmission line, SPS will make a final determination of the need for FAA notification, based on specific route location and structure design. The result of this notification, and any subsequent coordination with the FAA, could include changes in the line design and/or potential requirements to mark and/or light the structures.

Additionally, a total of four private landing strips were identified within the study area from internet research, USGS topographic maps, field reconnaissance, landowner input, and public records. One active private airstrip is within 10,000 ft of segments K4, K7, and K8. Therefore, routes 2, 4, and 10 would have one private airstrip located within 10,000 ft of their centerlines. The remaining routes would not have any private landing strips located within 10,000 ft of their centerlines.

In addition, no heliports were identified within 5,000 ft of the alternative routes.

4.6.5 Communication

The proposed transmission line would have no significant impact on electronic communications in the study area. None of the alternative routes have any AM radio transmitters located within 10,000 ft of their centerline. Routes 1, 3, 5, and 7 each have an agricultural GPS antenna located within 2,000 ft. These electronic communication towers include commercial FM transmitters, cellular telephone towers, microwave relay stations, or other similar electronic installations.

4.6.6 Urban/Residential

The proposed transmission line would have no significant impact on urban or residential areas. While the study area includes fringes of the incorporated cities of Hart and Kress along the western and eastern borders, respectively, all of the proposed routes are several miles from both urban areas. The few rural habitable structures located within 300 ft of any given route are scattered and isolated, and not in any urban or residential setting.

4.7 CULTURAL RESOURCES IMPACTS

Any construction activity has the potential for adversely impacting cultural resource sites. Although this transmission line project is currently being conducted without the need for federal funding, permitting or assistance, federal guidelines established under Section 106 of the National Historic Preservation Act of 1966, as amended, provide useful standards for considering the severity of possible direct and indirect impacts. According to the Secretary of the Interior's Guidelines for protection of historical and archeological resources (36 CFR 800), adverse impacts may occur directly or indirectly when a project causes changes in archeological, architectural or cultural qualities that contribute to a resource's historical or archeological significance.

4.7.1 Direct Impacts

Direct impacts to 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 disturbance 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 that 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 archeological 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 Resource Impacts

Because the study area contains areas with a high probability of containing cultural resources sites, the proposed transmission line construction does have the potential to impact previously unrecorded archeological and historical sites. One method utilized by archeologists to assess an area for the potential occurrence of cultural resources is to identify high probability areas (HPAs). An HPA is an area that is considered to have a potential for containing previously unrecorded archeological sites. The identification of HPA is usually done by examining 7.5-minute topographic maps and sometimes aerial photography. When identifying HPAs, topography and the availability of raw material, water, and subsistence resources are all taken into consideration. Also examined are the geological processes in the immediate project area. These may be considered important because geologic events may protect the integrity of an archeological site by burying it within deep sediments, or alternately, destroying it through erosional processes. Locations that are usually identified as HPAs for the occurrence of prehistoric sites include water crossings, stream confluences, drainages, alluvial terraces, wide floodplains, upland knolls, and areas where lithic or other subsistence resources could be found. Historic sites would be expected adjacent to historic roadways and in areas with structural remains.

The designation of HPAs and the evaluation of the segments for their potential to contain previously unrecorded archeological sites were made on the basis of topographic maps and aerial photography. No Atkins archeologist visited the study area. Therefore, some of the designated HPAs (as well as direct and indirect impacts) may change if field archeologists conducted a visual reconnaissance or survey. In addition, the plotting accuracy for the previously recorded archeological sites is not necessarily precise. Most of these sites were plotted by field archeologists based on topographic features and manual measurements, which were then submitted to TARL for inclusion in their maps.

A review of the maps at TARL, the THC's Restricted Sites Archeological Atlas, and TxDOT's NRHP-listed and -eligible roads and bridges database identified previously recorded cultural resource sites within the study area. However, none of the resources identified are within 1,000 ft of any of the proposed alternatives.

Ten alternative routes were evaluated to determine the preferred route from a cultural resources perspective. Because no previously recorded cultural resources were identified as being within 1,000 ft of any of the proposed alternatives, the criteria used for ranking was based solely on the amount of HPA estimated along each of the routes. The amount of HPA estimated along Route 1 was approximately 5.36 miles, Route 2 approximately 7.40 miles, Route 3 approximately 4.73 miles, Route 4 approximately 5.59 miles, Route 5 approximately 5.89 miles, Route 6 approximately 8.99 miles, Route 7 approximately 6.65 miles, Route 8 approximately 7.64 miles, Route 9 approximately 6.46 miles, and Route 10 approximately 5.63 miles.

Therefore, the overall ranking from most to least preferred from a cultural resources perspective is as follows: routes 3, 1, 4, 10, 5, 9, 7, 2, 8, and 6.

5.0 PUBLIC INVOLVEMENT ACTIVITIES

5.1 CORRESPONDENCE WITH AGENCIES/OFFICIAL

Atkins contacted the following federal, state, and local agencies and officials by letter in May 2011 to solicit comments, concerns, and information regarding potential environmental impacts, permits, or approvals for the construction of the proposed 115-kV transmission line and substation within the study area. A map of the study area was included with each letter. An example of the letters mailed to the agencies/officials and copies of the responses received are included in Appendix A.

Federal

- USDA Farm Service Agency (FSA)
- Bureau of Land Management (BLM)
- Federal Emergency Management Agency (FEMA)
- Natural Resources Conservation Service (NRCS)
- U.S. Fish and Wildlife Service (FWS)
- U.S. Army Corps of Engineers (USACE), Fort Worth office
- Federal Aviation Administration (FAA)

State

- Texas Parks and Wildlife Department (TPWD)
- Texas General Land Office (GLO)
- Texas Commission on Environmental Quality (TCEQ)
- Texas Historical Commission (THC)
- Texas Water Development Board (TWDB)
- Texas Department of Transportation (TxDOT), Lubbock District
- TxDOT, Aviation Division
- TxDOT, Environmental Affairs Division

Local

- City of Kress
- City of Hart
- Happy Independent School District (ISD)
- Kress ISD
- Tulia ISD

- Swisher County Commissioners
- Castro County Commissioners
- Dimmitt ISD
- Hart ISD
- Nazareth ISD
- Castro County Farm Bureau
- Panhandle Regional Planning Commission

As of the date of this document, written replies to the letters sent in relation to the project were received from the following agencies/offices: FAA, FEMA, NRCS, USACE, FWS, Texas GLO, TxDOT Aviation Division, and TxDOT Lubbock District. Copies of all responses are included in Appendix A. In addition to letters sent to the agencies in May 2011, Atkins reviewed Texas Natural Diversity Database element occurrence records from the TPWD, TARL records, and the THC Sites Atlas to verify or update natural resource records for the study area. All agency comments, concerns, and information received were taken into consideration by Atkins and SPS in the preparation of this EA and in route selection. Additionally, the information received from the agencies will be taken into consideration by SPS before and during construction of the project. The following is a summary of the comments provided by federal, state, and local officials that have responded as of this writing.

The FAA responded by saying that they have received numerous letters from consultants on behalf of SPS requesting comments on proposed transmission lines, and to please accept their letter as their position on all proposed transmission lines. They then said to comment adequately on a proposed transmission line, they need: the specific routing; a graphic depicting the line's closest point of approach (CPA) to public and private use airports nearby; the elevation of the tallest structure at CPA to airport; an application of AC 7460 (Proposed Construction or Alteration of Objects That May Affect the Navigable Airspace) criteria; and a request from a federal agency project manager for FAA review. When they receive information and coordination from a federal agency having the authority to make the environmental determination, they will provide appropriate comments.

FEMA requested that the local floodplain administrator be contacted for the review and possible permit requirements for this project.

The GLO responded that it does not appear that they will have any environmental issues or land use constraints at the time of writing. They then asked to be contacted when a final route for the project has been determined, and they will assess the route and determine if the project will cross any streambeds or Permanent School Fund (PSF) land that would require an easement from their agency.

The NRCS said that the project should have no significant adverse impact on the environment or natural resources in the area, and that they do not require any permits, easements, or approvals for an activity such as this. They then noted that future correspondence should be addressed to Salvador Salinas, State Conservationist.

The TxDOT Aviation Division responded on behalf of all four proposed Newhart projects, and began by reiterating Title 14, US Code, Part 77 of the FAA Federal Aviation Regulations (FAR) that requires notice to the FAA if the facility to be constructed fits certain conditions. They then stated that there are two public-use airports in or near the Newhart-to-Kress study area (Joe Vaughn Spraying Airport and the Tulia/Swisher County Airport), and there are no heliports in or near any of the four study areas. They said that if any of the criteria of the FAR is met, the FAA must be notified in four copies using FAA form 7460-1, “Notice of Proposed Construction or Alteration.”

The TxDOT Lubbock District replied that at this time, they have no current projects, no plans for major construction projects and no environmental or land use constraints on state-maintained roadways within the study area boundaries. They said that inquiries regarding easements or ROW within the study area should be directed to the West Regional Right of Way Manager, John Wallis. They then stated that upon certification of a final route, all necessary permits for lines within the ROW or crossing ROW of a state-maintained roadway will be issued through the Lubbock District Maintenance Management office, and that their Utility Permit Coordinator can assist in setting up an account for online permit requests.

The USACE replied that the provided information does not indicate that a placement of dredged or fill material will be required, temporarily or permanently, into any “waters of the U.S.,” including jurisdictional wetlands. Therefore, the proposal is not subject to regulation pursuant to Section 404 of the Clean Water Act (CWA) and a Department of the Army (DOA) permit will not be required. Should the method of construction necessitate such a discharge into an aquatic area or stream, they suggest that portion of the project be resubmitted so that they may determine whether an individual DA permit is required. They then noted that although Section 404 CWA authorization is not required, it does not preclude the possibility that a real estate interest or other federal, state, or local permits may be required.

The FWS responded on behalf of all four proposed Newhart projects, by first reiterating the scope of the projects and then by listing their records of endangered and threatened species, as well as candidate and delisted species, in the four study area counties. They said to see their website for the general biology of these species, as well as updated county by county species lists. They then mentioned that although the bald eagle was removed from the federal threatened and endangered list, they are still afforded safeguards under the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act. They recommend that all construction activities be conducted in accordance with the Service’s National Bald Eagle Management Guidelines. They went on to say that the study areas do not lie within the 200-mile wide corridor extending from Canada to the Texas coast in which 94% of whooping crane sightings have occurred; however, the cranes may occur transiently in the study area. Although they are generally at higher altitudes, they fly at lower altitudes when seeking stop-over habitats and to forage or drink. For this reason, the Service is concerned with the possibility of whooping crane collisions with transmission lines, which are known to be the highest cause of mortality of fledglings. They went on to say that candidate species, such as the lesser prairie-chicken (LPC) are not afforded federal protection, but they recommend potential impacts to this species be considered during planning. Avoidance of tall structures and habitat fragmentation are concerns, and they recommend that the project sites be surveyed for the presence of the LPC. FWS also included a road survey protocol for the LPC and provided a contact for further LPC survey information. They then discussed how the proposed study areas may include several playa lakes and their importance to the Central Flyway for wintering waterfowl. The playas provide food sources for migrating waterfowl, as well as providing habitat for ground birds, mammals, reptiles, and amphibians, and are also important groundwater recharge zones. Therefore, they recommend that impacts to these areas be minimized to the greatest extent possible, and they enclosed general guidelines for linear utility construction.

5.2 PUBLIC MEETINGS

SPS held two open house meetings for the Newhart to Lampton 230-kV, the Newhart-Kress 115-kV, the Newhart-Castro 115-kV, and the Newhart-Swisher 115-kV projects. These meetings were held on the following dates and location:

- June 7, 2011, Hart Golden Group Building, 1202 Date Street, Hart, Texas
- June 9, 2011, Hart Golden Group Building, 1202 Date Street, Hart, Texas

Landowners along each of the alternative routes were invited, as well as local and elected officials. These meetings were intended to solicit comments from landowners, citizens, and public officials concerning the proposed projects. The meetings had the following objectives:

- To promote a better understanding of the proposed project including the purpose, need, and potential benefits and impacts;
- To inform and educate the public about the Newhart to Swisher 230-kV transmission line project, Newhart-Kress 115-kV project, Newhart-Castro 115-kV project, and;
- To ensure that the decision-making process accurately identifies and considers the values and concerns of the public and community leaders.

Rather than a formal presentation in a speaker-audience format, each meeting was held in an open-house format. Several information stations were set up around the meeting room. Each station was devoted to a particular aspect of the routing study and was manned by SPS representatives and/or Atkins staff. Large displays of maps, illustrations, photographs, and/or text explaining each particular topic were presented at the stations. Interested citizens and property owners were encouraged to visit each station in a particular order so the entire process and general project development sequence could be explained clearly. The open house or information station format is advantageous because it allows attendees to process information in a more relaxed manner and also allows them to focus on their particular areas of interest and ask specific questions. More importantly, the one-on-one discussions with SPS representatives and Atkins staff encourage more interaction from those citizens who might be hesitant to participate in a speaker-audience format.

At the first station, visitors signed in and were provided questionnaires and maps for reference. The questionnaire solicited comments on landowner/citizen concerns as well as evaluation of the information presented at the meetings. An example copy of the questionnaire is included in Appendix B. Completed questionnaires were received by SPS either at the meetings or later by email, mail, or fax. However, not all respondents answered every question.

Of the 54 citizens/landowners who signed in at the public meeting in Hart on June 7, and the 25 who signed in on June 9, 5 submitted questionnaires for the Newhart to Kress project. The first question asked respondents to rank ten factors in order of their importance. Not all respondents ranked every factor, some did not rank at all, and some used the same ranking more than once. Considered in the aggregate, the factors considered most important to least important were:

- Minimize the number of residences near the line
- Minimize length through cultivated fields
- Minimize the number of businesses near the line
- Minimize the number of public facilities (e.g., parks, schools, churches)/maintain reliable electric service (two different categories, tied)
- Minimize the length through rangeland
- Minimize the total length of the line
- Minimize the impact on wildlife
- Minimize the clearing of trees
- Minimize the cost of the line

The second question on the questionnaire asked respondents if they would like to comment further on any of the factors listed in the first question, or to identify any other factors that they feel should be considered. Two respondents (40%) responded to this question, one of which wanted to know what the effect on proposed wind farms in the area would be, and the other commented that the factors were hard to rank because they all effect everybody in one way or another, and to consider homes and the land.

The third question asked respondents if they had a concern with a particular transmission line segment, or several, and to describe their concern. Four (80%) of the respondents answered this question, with the following segments and comments:

- K26 – 1 respondent – effect on irrigation well
- K28 – 1 respondent – effect on cattle
- K36 – 2 respondents – effect on cattle, circle pivot irrigation
- K37 – 1 respondent – effect on cattle
- K38 – 1 respondent – effect on cattle

The fourth question asked respondents to rate the acceptability of a transmission line in respect to following four different types of land use features. These included roads/railroads, fence lines away from roads, section lines, and half-section lines. Respondents were asked to rank these as "preferable," "acceptable," or "unacceptable." Many respondents did not answer this question, or answered only parts of it, so totals do not equal 100%. Below is the breakdown of responses, along with the number of respondents who advocated for each respective choice.

Along roads/railroads:

- Preferable – 4 respondents (80%)
- Acceptable – 0 respondents (0%)
- Unacceptable – 0 respondents (0%)

Along fence lines away from roads:

- Preferable – 2 respondents (40%)
- Acceptable – 1 respondent (20%)
- Unacceptable – 0 respondents (0%)

Along section lines:

- Preferable – 2 respondents (40%)
- Acceptable – 1 respondent (20%)
- Unacceptable – 1 respondent (20%)

Along half-section lines:

- Preferable – 2 respondents (40%)
- Acceptable – 2 respondents (40%)
- Unacceptable – 0 respondents (0%)

The fifth question on the open house questionnaire was an inquiry about how each landowner was personally affected. The choices provided were "potential route is near my home," "potential route is across my land," "potential route is across land/farm," and "other, please specify." A space was provided for respondents to fill in if they chose “other.” Some of the respondents did not answer, and many chose more than one option, so totals do not equal 100%. Of the 5 respondents, 2 (40%) responded that a potential route is near their home, 4 (80%) responded that a potential route crosses their land, 2 (40%) responded that a potential route crosses land that they farm, and 1 (20%) chose “other.” The respondent who marked “other” stated that a potential segment was along the north boundary of her farm.

The sixth question asked respondents if they believed the meeting and the information provided was helpful for their understanding of the project. Checkboxes for “yes” or “no” were provided for both “meeting” and “information provided.” Some of the respondents did not answer this question, and some answered it only partially, so totals do not equal 100%. Of the 5 respondents, all 5 replied that the meeting was helpful, and none said it was not. When asked if the information provided was helpful, 4 (80%) replied that it was, none said it was not, and 1 (20%) did not reply.

The seventh and final question asked respondents for their names and contact information, but it also requested additional comments or questions. Only one respondent (20%) replied to this question, who commented that proposed wind farm leases could locate to other areas where there is less interference with proposed electrical lines.

6.0 ALTERNATIVE ROUTE EVALUATION AND SELECTION

6.1 ATKINS' ENVIRONMENTAL EVALUATION

The purpose of this study was to identify and evaluate the most viable alternative routes for SPS's proposed 115-kV transmission line between the proposed Newhart Substation and the existing Kress Substation and to recommend the routes having the least adverse impacts.

Atkins completed the environmental analysis of the 10 primary alternative routes (Section 4.0), the results of which are shown in Table 6-1. The environmental evaluation was a comparison of alternatives strictly from an environmental viewpoint, based upon the measurement of 39 separate environmental criteria and the consensus opinion of Atkins's group of evaluators. SPS used this information along with engineering, construction, maintenance, and operational factors to select the route that they felt best satisfied the PUC's statutory requirements and several alternate routes. Atkins's evaluation is discussed below.

Atkins professionals with expertise in different environmental disciplines (wildlife biology, plant ecology, land use/planning, and archeology) evaluated the 10 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 Atkins and SPS. Each Atkins 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 route that best satisfies a balance between the major environmental factors, as well as alternative routes, all based strictly upon the environmental data.

During the initial discussion of the 10 primary alternative routes (Figure 6-1), 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 recommended route was reached by comparing the advantages and disadvantages of these routes and recommending one least-impacting route, and several alternative routes.

The best route from a land use standpoint would be the route that affects the fewest number of habitable structures, parallels the largest amount of existing ROW and property lines possible, and crosses the least amount of cropland. From a land use perspective, Alternative Route 5 represents the best route, as it affects the second-least amount of habitable structures (3), parallels the most existing ROW and property lines as a percentage of its overall length (18.59 miles, 97.79%), and crosses the least amount of cropland (14.02 miles). Route 1 also affects the second-least amount of habitable structures (3), parallels the third-most existing ROW and property lines as a percentage of its overall length (18.51 miles, 97.68%), and crosses the third-least amount of cropland

TABLE 6-1

ENVIRONMENTAL DATA FOR PRIMARY ROUTE EVALUATION

NEWHART TO KRESS 115-kV TRANSMISSION LINE PROJECT

	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6	Route 7	Route 8	Route 9	Route 10
Land Use										
1 Length of alternative route	18.95	25.82	18.79	18.82	19.01	20.03	20.83	20.89	18.74	19.87
2 Number of habitable structures[1] within 300 ft of ROW centerline	3	7	7	6	3	0	4	3	3	5
3 Number of newly affected habitable structures within 300 ft of ROW centerline	3	7	6	5	3	0	4	3	2	4
4 Length of ROW paralleling existing transmission line ROW	0.89	2.16	0.00	0.00	0.00	0.00	1.48	1.48	0.00	0.00
5 Length of ROW paralleling other existing ROW (highways, pipelines, railways, etc.)	10.31	17.64	9.08	11.61	11.28	7.07	10.57	10.22	5.18	12.36
6 Length of ROW paralleling apparent property lines (not following existing ROW) [2]	7.31	4.96	9.18	6.63	7.31	12.17	8.30	8.50	13.06	6.71
7 Total length of ROW paralleling all existing transmission line and other ROW (including apparent property lines)	18.51	24.76	18.25	18.24	18.59	19.23	20.35	20.20	18.24	19.08
8 Length of ROW crossing parks/recreational areas[3]	0	0	0	0	0	0	0	0	0	0
9 Number of additional parks/recreational areas[3] within 1,000 ft of ROW centerline	0	0	0	0	0	0	0	0	0	0
10 Length of ROW crossing cropland	14.18	20.38	15.28	14.16	14.02	14.61	16.83	16.23	14.44	15.36
11 Length of ROW crossing rangeland	2.37	2.22	1.59	2.11	2.96	3.26	1.38	1.87	2.42	1.80
12 Length of ROW crossing cropland with mobile irrigation systems	1.81	2.59	1.49	2.16	1.43	1.65	2.20	2.28	1.69	2.29
13 Number of pipeline crossings	3	7	4	5	3	3	4	5	4	5
14 Number of transmission line crossings	3	5	1	1	1	1	3	3	1	1
15 Number of U.S. and state highway crossings	0	0	0	0	0	0	0	0	0	0
16 Number of farm-to-market (FM) and ranch-to-market (RM) road crossings	2	4	2	2	2	2	4	4	2	2
17 Number of FAA-registered airfields within 20,000 ft of ROW centerline	0	1	0	0	0	0	0	0	0	0
18 Number of private airstrips within 10,000 ft of ROW centerline	0	1	0	1	0	0	0	0	0	1
19 Number of heliports within 5,000 ft of ROW centerline	0	0	0	0	0	0	0	0	0	0
20 Number of commercial AM radio transmitters within 10,000 ft of ROW centerline	0	0	0	0	0	0	0	0	0	0
21 Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 ft of ROW centerline	1	0	1	0	1	0	1	0	0	0
22 Number of water wells within ROW	12	26	14	18	11	10	22	20	8	20
Aesthetics										
23 Estimated length of ROW within foreground visual zone[4] of U.S. and state highways	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24 Estimated length of ROW within foreground visual zone[4] of FM/RM roads	4.12	9.60	4.16	2.16	4.12	4.13	8.58	6.59	2.16	4.16
25 Estimated length of ROW within foreground visual zone[4] of parks/recreational areas[3]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ecology										
26 Length of ROW crossing upland woodland/brushland	0.10	0.11	0.09	0.09	0.10	0.10	0.02	0.02	0.00	0.09
27 Length of ROW crossing bottomland/riparian woodland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28 Length of ROW crossing potential wetlands[5]	0.18	0.00	0.45	0.35	0.54	0.54	0.45	0.35	0.54	0.35
29 Length of ROW crossing known occupied habitat of federally listed endangered or threatened species	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30 Number of stream/river crossings	0	0	0	0	0	0	0	0	0	0
31 Length of ROW paralleling (within 100 ft) streams	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32 Length of ROW crossing open water (playa lakes[6], ponds, etc.)	0.66	0.74	0.71	0.55	0.97	1.21	0.82	0.99	1.14	0.70
33 Number of playa lake[6] crossings	5	3	5	4	5	6	3	5	8	3
34 Length of ROW crossing 100-year floodplains	1.87	2.61	2.58	2.60	2.57	3.49	3.02	3.45	3.45	2.41
Cultural Resources										
35 Number of recorded cultural resources sites crossed by ROW	0	0	0	0	0	0	0	0	0	0
36 Number of additional recorded cultural resources sites within 1,000 ft of ROW centerline	0	0	0	0	0	0	0	0	0	0
37 Number of NRHP-listed or -determined eligible sites crossed by ROW	0	0	0	0	0	0	0	0	0	0
38 Number of additional NRHP-listed or -determined eligible sites within 1,000 ft of ROW centerline	0	0	0	0	0	0	0	0	0	0
39 Length of ROW crossing areas of high archeological/historical site potential	5.36	7.40	4.73	5.59	5.89	8.99	6.65	7.64	6.46	5.63

Note: All length measurements in miles.

[1]Single-family and multi-family dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, schools, or other structures normally inhabitated by humans or intended to be inhabited by humans on a regular basis.

[2]Property lines created by existing road, highways, or railroad ROW are not "double-counted" in the "length of route parallel to property lines" criteria.

[3]Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church.

[4]One-half mile, unobstructed.

[5]As mapped by the U.S. Fish and Wildlife Service National Wetland Inventory.

[6]As mapped by the Texas Tech University Playa Lakes Digital Database for the Texas Portion of the Playa Lakes Joint Venture Region.

Route	Route Formula
1	K2-K5-K12-K22-K23-K24-K30-K41
2	K2-K3-K4-K8-K17-K18-K28-K37-K45
3	K2-K5-K12-K22-K21-K26-K27-K31-K32-K39-K42-K44
4	K2-K3-K4-K7-K14-K15-K20-K26-K27-K31-K32-K39-K42-K44
5	K2-K5-K12-K22-K23-K24-K30-K40-K39-K42-K44
6	K2-K3-K6-K11-K12-K22-K23-K24-K29-K33-K35-K38-K42-K44
7	K2-K5-K12-K22-K21-K19-K28-K36-K38-K42-K44
8	K2-K3-K6-K11-K12-K13-K15-K16-K18-K28-K36-K38-K42-K44
9	K2-K3-K6-K11-K12-K22-K23-K25-K27-K31-K32-K39-K42-K44
10	K2-K3-K4-K7-K14-K15-K20-K26-K27-K31-K34-K35-K38-K42-K44

(14.18 miles). On the contrary, Alternative Route 2 affects the most habitable structures (7), affects the largest amount of cropland (20.38 miles) and water wells (26) of any of the alternative routes, and is the longest route (25.82 miles). Alternative Route 2 is the worst route from a land use perspective.

The best route from an ecological standpoint would be the route with the least impact to wildlife. Alternative routes crossing wetlands and open waters (playa lakes) present the greatest potential for wire strikes by migrating waterfowl and shorebirds. From an ecological perspective, Alternative Route 1 was selected as the best route as it crosses the third-least amount of wetlands (0.18 miles), crosses the second-least distance of open water (0.66 miles), and is the fourth-shortest route (18.95 miles). In contrast, Route 2 would be the worst choice from an ecological standpoint because it crosses the sixth-largest distance of open water (0.74 miles) and is over 2 miles longer than any of the other alternative routes (25.82 miles).

Because no previously recorded cultural resources sites were identified as being crossed or within 1,000 ft of any of the alternative routes, the primary consideration in ranking from a cultural resources perspective was based solely upon the amount of HPA estimated along each of the alternative routes. The most favorable route from a cultural resources perspective is Route 3 because this route has approximately 4.73 miles of HPA, compared to Route 1 with 5.36 miles of HPA (ranked second) and Route 4 with 5.59 miles of HPA (ranked third). Alternatively, routes 8 and 6 are estimated to have approximately 7.64 miles and 8.99 miles of HPA, respectively. Therefore, Route 6 is the least favorable route from a cultural resources perspective.

Following the evaluation by discipline, the group of Atkins' evaluators discussed the relative importance and sensitivity of the various criteria as applied to the 10 primary alternative routes and the study area. Among these alternatives the environmental and land use data from Table 6-1 was used to determine the best overall route. Following this decision, the group selected Alternative Route 1 as the consensus route and then agreed on a consensus ranking for the remaining alternatives, starting with the least-impacting alternative route. This ranking is shown in Table 6-2. The decision to recommend Alternative Route 1 was based primarily on the following advantages for Alternative Route 1 among the objective criteria:

- parallels the third-largest amount of existing ROW and property lines by percentage;
- contains the second-fewest number of habitable structures within 300 ft;
- affects the fourth-least amount of water wells;
- crosses third-shortest length of cropland;
- contains the second-shortest length within the FVZ of FM roads;
- crosses the second-shortest distance of open water;
- crosses the third-shortest length of wetlands;

TABLE 6-2

ATKINS' ENVIRONMENTAL RANKING
NEWHART-KRESS PROJECT

Ranking	Land Use	Ecology	Cultural Resources	Project Manager	Consensus
1st	5	1	3	9	1
2nd	1	4	1	6	9
3rd	9	3	4	1	5
4th	7	9	10	5	6
5th	6	5	5	8	7
6th	8	10	9	4	8
7th	4	7	7	10	4
8th	3	8	2	7	3
9th	10	6	8	3	10
10th	2	2	6	2	2

- and crosses the second-shortest length of HPA.

Atkins' project manager for the Newhart to Kress project reviewed all of the data and evaluations produced by the task managers 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, Atkins recommends Alternative Route 1 as the route that best satisfies PUC environmental criteria, and the remaining routes as alternates. Considering all pertinent factors, it is Atkins' 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.

6.2 SPS'S ROUTE SELECTION

To select its route for the proposed Newhart to Kress Project, SPS based its review on potential environmental impacts, land use, engineering constraints, maintenance and construction considerations, public input/community values, estimated costs, system operations, and landowner/agency 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 Route __ as the route they believed best satisfies PUC statutory criteria for granting a CCN.

TABLE 6-3

HABITABLE STRUCTURES AND OTHER LAND-USE FEATURES
IN THE VICINITY OF SPS's ALTERNATIVE ROUTE 1
NEWHART TO KRESS 115-kV TRANSMISSION LINE PROJECT

No.	Structure/Feature	Distance from Centerline (ft)	Direction
2	Single-family Residence	145	Northeast
3	Single-family Residence	203	West
4	Single-family Residence	280	West
19	GPS Tower	288	East

Note: All habitable structures and other land-use features are located on Figure 6-1 (map pocket).

TABLE 6-4

HABITABLE STRUCTURES AND OTHER LAND-USE FEATURES
IN THE VICINITY OF SPS's ALTERNATIVE ROUTE 2
NEWHART TO KRESS 115-kV TRANSMISSION LINE PROJECT

No.	Structure/Feature	Distance from Centerline (ft)	Direction
1	Central Plains Spraying Inc. Airport	1,665	West
5	Single-family Residence	202	West
6	Single-family Residence	143	West
7	Single-family Residence	162	South
8	Single-family Residence	147	South
9	Single-family Residence	174	South
15	Single-family Residence	126	North
16	Single-family Residence	107	South
18	Joe Vaughn Spraying Airport (FAA Registered)	19,067	East

Note: All habitable structures and other land-use features are located on Figure 6-1 (map pocket).

TABLE 6-5

HABITABLE STRUCTURES AND OTHER LAND-USE FEATURES
IN THE VICINITY OF SPS's ALTERNATIVE ROUTE 3
NEWHART TO KRESS 115-kV TRANSMISSION LINE PROJECT

No.	Structure/Feature	Distance from Centerline (ft)	Direction
2	Single-family Residence	145	Northeast
3	Single-family Residence	203	West
4	Single-family Residence	280	West
12	Abandoned Single-family Residence	94	Southeast
13	Single-family Residence	122	North
14	Single-family Residence	217	East
17	Single-family Residence	73	North
19	GPS Tower	288	East

Note: All habitable structures and other land-use features are located on Figure 6-1 (map pocket).

TABLE 6-6

HABITABLE STRUCTURES AND OTHER LAND-USE FEATURES
IN THE VICINITY OF SPS's ALTERNATIVE ROUTE 4
NEWHART TO KRESS 115-kV TRANSMISSION LINE PROJECT

No.	Structure/Feature	Distance from Centerline (ft)	Direction
1	Central Plains Spraying Inc. Airport	7,650	West
5	Single-family Residence	202	West
11	Abandoned Single-family Residence	243	North
12	Abandoned Single-family Residence	94	Southeast
13	Single-family Residence	122	North
14	Single-family Residence	217	East
17	Single-family Residence	73	North

Note: All habitable structures and other land-use features are located on Figure 6-1 (map pocket).

TABLE 6-7

HABITABLE STRUCTURES AND OTHER LAND-USE FEATURES
IN THE VICINITY OF SPS's ALTERNATIVE ROUTE 5
NEWHART TO KRESS 115-kV TRANSMISSION LINE PROJECT

No.	Structure/Feature	Distance from Centerline (ft)	Direction
2	Single-family Residence	145	Northeast
3	Single-family Residence	203	West
4	Single-family Residence	280	West
19	GPS Tower	288	East

Note: All habitable structures and other land-use features are located on Figure 6-1 (map pocket).

TABLE 6-8

HABITABLE STRUCTURES AND OTHER LAND-USE FEATURES
IN THE VICINITY OF SPS's ALTERNATIVE ROUTE 7
NEWHART TO KRESS 115-kV TRANSMISSION LINE PROJECT

No.	Structure/Feature	Distance from Centerline (ft)	Direction
2	Single-family Residence	145	Northeast
3	Single-family Residence	203	West
4	Single-family Residence	280	West
15	Single-family Residence	126	North
19	GPS Tower	288	East

Note: All habitable structures and other land-use features are located on Figure 6-1 (map pocket).

TABLE 6-9

HABITABLE STRUCTURES AND OTHER LAND-USE FEATURES
IN THE VICINITY OF SPS's ALTERNATIVE ROUTE 8
NEWHART TO KRESS 115-kV TRANSMISSION LINE PROJECT

No.	Structure/Feature	Distance from Centerline (ft)	Direction
10	Mobile Home	107	East
11	Abandoned Single-family Residence	90	West
15	Single-family Residence	126	North

Note: All habitable structures and other land-use features are located on Figure 6-1 (map pocket).

TABLE 6-10

HABITABLE STRUCTURES AND OTHER LAND-USE FEATURES
IN THE VICINITY OF SPS's ALTERNATIVE ROUTE 9
NEWHART TO KRESS 115-kV TRANSMISSION LINE PROJECT

No.	Structure/Feature	Distance from Centerline (ft)	Direction
13	Single-family Residence	122	North
14	Single-family Residence	217	East
17	Single-family Residence	73	North

Note: All habitable structures and other land-use features are located on Figure 6-1 (map pocket).

TABLE 6-11

HABITABLE STRUCTURES AND OTHER LAND-USE FEATURES
IN THE VICINITY OF SPS's ALTERNATIVE ROUTE 10
NEWHART TO KRESS 115-kV TRANSMISSION LINE PROJECT

No.	Structure/Feature	Distance from Centerline (ft)	Direction
1	Central Plains Spraying Inc. Airport	7,650	West
5	Single-family Residence	202	West
11	Abandoned Single-family Residence	243	North
12	Abandoned Single-family Residence	94	Southeast
13	Single-family Residence	122	North
14	Single-family Residence	217	East

Note: All habitable structures and other land-use features are located on Figure 6-1 (map pocket).

7.0 LIST OF PREPARERS

This Environmental Assessment was prepared for SPS by Atkins. SPS provided Section 1.0, Description of the Proposed Project, and SPS's Route Selection (Section 6.2). Atkins employees with primary responsibilities for preparation of this document include the following:

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8.0 REFERENCES

Abbe, D.R. 2011. Handbook of Texas Online, s.v. "Castro County," http://www.tshaonline.org/handbook/online/articles/hcc08 (accessed March 20, 2011).

Abbe, D.R., and J. Leffler. 2011. Handbook of Texas Online, s.v. "Swisher County," http://www.tshaonline.org/handbook/online/articles/hcs18 (accessed March 19, 2011).

AirNav. 2011. Airport Search. http://www.airnav.com/airports/search.html.

Anderson, H.A. 2011. Handbook of Texas Online, s.v. “Pastores,” http://wwwtshaonline.org/handbook/online/articles/arp01.html (accessed April 04, 2011).

American Ornithologists’ Union (AOU). 1998. Check-list of North American birds. 7th edition. Allen Press, Inc. Lawrence, Kansas.

———. 2000. 42nd supplement to the check-list of North American birds. Auk 117:847–858.

———. 2002. 43rd supplement to the check-list of North American birds. Auk 119:897–906.

———. 2003. 44th supplement to the check-list of North American birds. Auk 120:923–931.

———. 2004. 45th supplement to the check-list of North American birds. Auk 121:985–995.

———. 2005. 46th supplement to the check-list of North American birds. Auk 122:1026–1031.

———. 2006. 47th supplement to the check-list of North American birds. Auk 123:926–936.

———. 2007. 48th supplement to the check-list of North American birds. Auk 124:1026–1031.

———. 2008. 49th supplement to the check-list of North American birds. Auk 125:758–768.

———. 2009. 50th supplement to the check-list of North American birds. Auk 126:705–714.

———. 2010. 51st supplement to the check-list of North American birds. Auk 127(3):726–744.

Austin, J.E., and A.L. Richert. 2001. A comprehensive review of the observational and site evaluation data of migrant whooping cranes in the United States, 1943–99. U.S. Geological Survey, Northern Prairie Wildlife Research Center, Jamestown, North Dakota and State Museum, University of Nebraska, Lincoln. 136 pp.

Avian Power Line Interaction Committee (APLIC). 1994. Mitigating bird collisions with power lines: the state of the art in 1994. Edison Electric Institute, Washington, D.C. 77 pp. + apps.

———. 1996. Suggested practices for raptor protection on power lines. The state-of-the-art in 1996. Edison Electric Institute (EEI)/Raptor Research Foundation, Washington, D.C. 125 pp. + apps.

———. 2006. Suggested practices for raptor protection on power lines. The state-of-the-art in 2006 Edison Electric Institute (EEI)/Raptor Research Foundation, Washington, D.C. 140 pp. + apps.

Avery, M.L. (editor). 1978. Impacts of transmission lines on birds in flight: proceedings of a workshop. Oak Ridge Associated Universities. Oak Ridge, Tennessee. Inter-agency Agreement No. 40-570-76 between U.S. Department of the Interior and U.S. Department of Energy. FWS/OBS-78/48. 151 pp.

Bartlett, R.D., and P.P. Bartlett. 1999. A field guide to Texas reptiles and amphibians. Gulf Publishing Company, Houston, Texas.

Baugh, T.T. (editor), S.M. Berta, P. Flynn, J.A. Harrington, and M.C. Moore. 1984. Archaeology of the mixed grass prairie phase I: Quartermaster Creek, Oklahoma Archaeological Survey, Archaeological Resource Survey Report No. 20. Norman.

Beaulaurier, D.L. 1981. Mitigation of bird collisions with transmission lines. Bonneville Power Administration, Portland, Oregon.

Biesaart, L.A., W.R. Roberson, and L.C. Spotts. 1985. Prehistoric archeological sites in Texas, a statistical overview. Texas Historical Commission, Office of the State Archeologist Special Report 28. Austin.

Blair, W.F. 1950. The biotic provinces of Texas. Texas Journal of Science 2:93–117.

Boyd, D.K. 1997. Caprock Canyonlands archeology: a synthesis of the late prehistory and history of Lake Alan Henry and the Texas Panhandle-Plains. Reports of Investigations No. 110, 2 vols. Prewitt & Associates, Inc. Austin.

———. 2003. Archeological Survey of Two Hiking Trial Bridge Locations, Mackenzie Park, Tulia, Swisher County, Texas. Letter Report No. 629. Antiquities Permit No. 3206. Prewitt and Associates, Inc., Austin.

Bureau of Economic Geology (BEG). 1968. Geologic atlas of Texas. Plainview Sheet. The University of Texas at Austin.

———. 1976. Mineral resources of Texas. The University of Texas at Austin, Bureau of Economic Geology.

———. 1978. Geologic atlas of Texas. Clovis Sheet. The University of Texas at Austin.

———. 1979. Energy resources of Texas. The University of Texas at Austin, Bureau of Economic Geology.

———. 1996. Physiographic Map of Texas. The University of Texas at Austin.

Bureau of Labor Statistics (BLS). 2011. Local Area Unemployment Statistics. http://www.bls.gov/data/.

Campbell, L. 2003. Endangered and threatened animals of Texas: their life history and management. Endangered Resource Branch, Texas Parks and Wildlife Department, Austin.

Collins, M.B. 1966. The Andrews Lake sites: evidence of semi-sedentary prehistoric occupation in Andrews County, Texas. Transactions of the Second Regional Archeological Symposium for southeastern New Mexico and Western Texas, Bulletin 2, pp. 27-43. Lea County Archeological Society Hobbs, New Mexico.

———. 1968. The Andrews Lake locality: new archaeological data from the Southern Llano Estacado, Texas. M.A. Thesis, Department of Anthropology, The University of Texas at Austin.

———. 1969. A note on brad corner-notched projectile points used in bison hunting in western Texas. South Plains Archeological Society News Bulletin 21:2–4.

———. 1971. A review of Llano Estacado archeology and ethnohistory. Plains Anthropologist 16(52):85–104.

Corley, J.A. 1965. Proposed eastern extension of the Jornada Branch of the Mogollon. Transactions of the First Regional Symposium for Southeastern New Mexico and Western Texas, Bulletin 1, pp. 31-36. Lea County Archeological Society, Hobbs, New Mexico.

Couzzourt, J.E. 1982. Archaeological testing at Cal Farley's Boys Ranch, Oldham County, Texas. Transactions of the 17th Regional Archaeological Symposium for Southeastern New Mexico and Western Texas, pp. 57-134. Midland Archaeological Society, Midland, Texas.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. Performed for Office of Biological Services, Fish and Wildlife Service, U.S. Department of the Interior. FWS/OBS-79/31.

Crother, B.I., J. Boundy, F.T. Burbrink, J.A. Campbell, K. De Queiroz, D.R. Frost, R. Highton, J.B. Iverson, F. Kraus, R.W. McDiarmid, J.R. Mendelson III, P.A. Meylan, T.W. Reeder, M.E. Seidel, S.G. Tilley, and D.B. Wake. 2008. Scientific and standard English names of amphibians and reptiles of North America north of Mexico: with comments regarding confidence in our understanding. Society for the Study of Amphibians and Reptiles, Herpetological Circular 37. January 2008. 84 pp.

Cruse, J.B. 1992. Archeological investigation at the Kent Creek Site (41HL66). Panhandle Archeological Society Publication No. 6. Amarillo.

———. 2008. Battles of the Red River War: Archeological perspectives on the Indian campaign of 1874. Texas A&M University Press. College Station.

Cruse, J.B, C.S. Weed and M.E. Cruse. 1993. Cultural resources survey of the proposed 21.6 mile loop storage to Red River 20 inch Pipeline, Gaines and Dawson Counties, Texas. EMANCO, Inc. Report of Archaeological Investigations No. 29.

Dillehay, T.D. 1974. Late quaternary bison population changes on the southern plains. Plains Anthropologist 19(65):180–196.

Dixon, J.R. 2000. Amphibians and reptiles of Texas. Texas A&M University Press, College Station.

Dixon, J.R., and J.E. Werler. 2005. Texas snakes: a field guide. Texas Natural History Guides. University of Texas Press, Austin.

Electric Power Research Institute (EPRI). 1993. Proceedings: avian interactions with utility structures. International Workshop, Miami, Florida, 13–16 September 1992. EPRI TR-103268, Palo Alto, California.

Environmental Laboratory. 1987. Corps of Engineers wetland delineation manual. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi. Technical Report Y-87-1.

Erickson, W.P., G.D. Johnson, and D.P. Young, Jr. 2005. A summary and comparison of bird mortality from anthropogenic causes with an emphasis on collisions. USDA Forest Service Gen. Tech. Rep. PSW-GET-191:1029–1042. Western Ecosystems Technology, Inc., Cheyenne, Wyoming.

Faaborg, J., M. Brittingham, T. Donovan, and J. Blake. 1992. Habitat fragmentation in the temperate zone: a perspective for managers. In: D.M. Finch and P.W. Stangel (editors). Status and management of neotropical migratory birds. USDA Forest Service General Technical Report RM-229. Fort Collins, Colorado.

Faanes, C.A. 1987. Bird behavior and mortality in relation to power lines in prairie habitats. Fish and Wildlife Technical Report 7, U.S. Fish and Wildlife Service, Washington, D.C. 24 pp.

Federal Aviation Administration (FAA). 1975. Federal Aviation Regulations, Part 77. Notification of Proposed Construction or Alteration on Airport. http://www.faa.gov/airports/central/engineering/part77/. Washington, D.C.

———. 2011a. National Aeronautical Charting Office. Ft. Worth and Albuquerque Sectional Charts. http://skyvector.com/.

———. 2011b. Airport/Facility Directory. http://aeronav.faa.gov/afd.asp?cycle=afd_10MAR2011&eff=03-10-2011&end=05-05-2011. Effective March 10, 2011.

Federal Communication Commission (FCC). 2011. FCC Search Tools. AM, FM, and TV tower search. http://www.fcc.gov/searchtools.html

Federal Emergency Management Agency (FEMA). 2009. Map Service Center at http://msc.fema.gov/webapp/wcs/stores/servlet/QuickOrderResultView

Figgins, J.D. 1927. The antiquity of man in America. Natural History 27(3):229–239.

Fish and Wildlife Service (FWS), U.S. Department of the Interior. 1995. Threatened and endangered species of Texas. Austin. June 1995.

———. 2010. U.S. Fish and Wildlife Service Endangered Species. Mountain Plover. http://www.fws.gov/mountain-prairie/species/birds/mountainplover/. Last updated June 30, 2010.

———. 2011. Endangered species list: list of species by county for Texas. http://www.fws.gov/southwest/es/EndangeredSpecies/.

Fish, E.B., E.L. Atkinson, C.H. Shanks, and C.M. Brenton. n.d. Playa Lakes Digital Database for the Texas Portion of the Playa Lakes Joint Venture Region. Department of Range, Wildlife, and Fisheries Management. http://www.rw.ttu.edu/gstlab/playas.pdf

Gauthreaux, S.A., Jr. 1978. Migratory behavior and flight patterns. In: M.L. Avery (editor), Impacts of Transmission Lines on Birds in Flight – Proceedings of a Workshop. Pp. 12–26. U.S. Fish and Wildlife Service, Washington, D.C.

Goar, T.R., and C. Lintz. 1999. Cultural Resource Reconnaissance Survey for a Proposed Enron Fiber Optic Line, Segment A: North Panhandle to Dallas, Texas. Antiquities Permit No. 2088. TRC Mariah and Associates, Albuquerque.

Gould, F.W., G.O. Hoffman, and C.A. Rechenthin. 1960. Vegetational areas of Texas. Texas Agricultural Extension Service. L-492.

Guffee, E. 1980. Bailey County Electric Cooperative Association, archeological survey of proposed line construction in Bailey, Castro, and Parmer counties, Texas. Rural Electrification Letter Report on file at the Texas Historical Commission, Austin.

———. 1986. Cultural resources assessment: Bailey County Electric Cooperative Association, Proposed Electrical Lines, between Muleshoe and Sunnyside, Castro and Lamb counties, Texas. Survey Report on file at the Texas Historical Commission, Austin.

Guffee, E. and J. Hughes. 1974. An archeological survey in the Running Water Draw Watershed, Castro County, Texas. Kilgore Research Center, West Texas State University Report on file at the Texas Historical Commission, Austin.

Hagan, C.A. 2005. Lesser prairie-chicken (*Tympanuchus pallidicinctus*). The birds of North America online (A. Poole, editor). Cornell Laboratory of Ornithology, Ithaca. Retrieved from The Birds of North American online database: hhttp://bna.birds.cornell.edu/BNA/account/Lesser_Prairie-Chicken/.

Hagan, J.M., W.M. Vander Haegen, and P.S. McKinley. 1996. The early development of forest fragmentation effects on birds. Conservation Biology 10(1):188–202.

Hatch, S.L., K.N. Gandhi, and L.E. Brown. 1990. Checklist of the vascular plants of Texas. Texas Agricultural Experiment Station, College Station.

Harrison, B.R., and H.C. Smith. 1975. A test excavation of the Lake Theo site, Briscoe County, Texas. Panhandle-Plains Historical Review 48:70-108.

Harrison, B.R., and K.L Killen. 1978. Lake Theo: a stratified, early man bison butchering and camp site, Briscoe County, Texas, Archeological Investigations, Phase II. Panhandle-Plains Historical Museum, West Texas State University, Canyon.

Hatfield, Virginia. 2007. A Phase I Archeological Survey of an Approximately 6,650 feet Proposed Pipeline and Water Supply Wall in Nazareth, Castro County, Texas. Effigy Archeological Services, Inc., Lubbock.

Haukos. D.A., and L.M. Smith. 1992. Waterfowl Management Handbook: 13.3.7. Ecology of Playa Lakes. U.S. Fish and Wildlife Service, Washington, D.C. Fish and Wildlife Leaflet 13.

Henke, S.E., and W.S. Fair. 1998. Management of Texas horned lizards. Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville. Management Bulletin No. 2.

Herkert, J.R., D.L. Reinking, D.A. Wiedenfeld, M. Winter, J.L. Zimmerman, W.E. Jensen, E.J. Finck, R.R. Koford, D.W. Wolfe, S.K. Sherrod, M.A. Jenkins, J. Faaborg, and S. K. Robinson. 2003. Effects of prairie fragmentation on the nest success of breeding birds in the midcontinental United States. Cons. Bio. 17(2):587–594.

Hester, J.J. 1972. Blackwater Locality No. 1: a stratified early man site in eastern New Mexico. Dallas. Fort Burgwin Research Center, Southern Methodist University.

Hofman, J.L. 1984. The Plains Villagers: the Custer phase. In Prehistory of Oklahoma, edited by Robert Bell, pp. 287–306. Academic Press, New York.

Holliday, V.T. 1987. Cultural chronology in Lubbock Lake: late quaternary studies on the southern high plains. Texas A&M University Press, College Station.

Hughes, J.T. 1962. Lake Creek: a Woodland site in the Texas Panhandle. Bulletin of the Texas Archeological Society 32:65–84.

———. 1969. The Canyon City Club Cave, Randall County, Texas. Manuscript on file at the Texas Historical Commission. Austin.

———. 1991. Prehistoric cultural development on the Texas High Plains. Bulletin of the Texas Archeological Society 60:1-56.

Hughes, J.T., and E. Guffee. 1976. Summary report on backhoe testing in the Lower Running Water Draw Watershed, Hale and Castro Counties, Texas. Kilgore Research Center, West Texas State University Report on file at the Texas Historical Commission, Austin.

Hughes, J.T., and P.S. Willey. 1978. Archeology at Mackenzie Reservoir. Texas Historical Commission, Archeological Survey Report No. 24. Austin.

Johnson, E., and V.T. Holliday. 1985. A Clovis age megafaunal processing station at the Lubbock Lake Landmark. Current Research in the Pleistocene No. 2:17–19.

Katz, S.R. 1998. Intensive archaeological survey of a proposed ATV Trail at Lake MacKenzie, Briscoe and Swisher Counties, Texas.

Kenmotsu, N.A. 1987. Superconducting Super Collider: a report of potential project effects to National Register or eligible prospect at the Happy sites, Castro and Swisher, Counties, Texas. Report on file at the Texas Historical Commission, Austin.

Lesser Prairie-Chicken Interstate Working Group (LPCIWG). 2011. Playa Post – Updated Data Available for Lesser Prairie-Chicken Range Boundary. http://www.pljv.org/playa_post/2011/february.html

Lewis, J.C. 1995. Whooping crane (*Grus americana*). In: The birds of North America, No. 153 (A. Poole and F. Gill, editors). The Academy of Natural Sciences, Philadelphia, and the American Ornithologist's Union, Washington, D.C.

Lockwood, M.W., and B. Freeman. 2004. The TOS handbook of Texas birds. Texas A&M University Press, College Station.

Malone, J.M. 1970. Archeological reconnaissance in the MacKenzie Reservoir area of Tule Canyon. Archeological Survey Report No. 8. Texas Historical Survey Committee and Texas Water Development Board. Austin.

Manning, R.W., C. Jones, and F.D. Yancey II. 2008. Annotated Checklist of Recent land mammals of Texas. Museum of Texas Tech University. Number 278. 28 October 2008.

McMahan, C.A., R.G. Frye, and K.L. Brown. 1984. The vegetation types of Texas, including cropland. Texas Parks and Wildlife Department, Wildlife Division.

Mercado-Allinger, P.A., and M.D. Freeman. 1983. Phase I Cultural Resource File Search and Evaluation of Potential Impacts for the U.S. Department of Energy National Waste Terminal Storage Program. Letter Report No. 235. Prewitt & Associates, Austin.

Mercado-Allinger, P.A., N.A. Kenmotsu, and T.K. Perttula. 1996. Archeology in the central and southern planning region, Texas: a planning document. Division of Antiquities Protection Cultural Resource Management Report 7. Texas Historical Commission, Austin.

Mobiledia. 2011. Cell Phone Towers. http://www.cellreception.com/towers/.

NatureServe. 1996. Comprehensive Species Report, s.v. "red wolf," and "gray wolf." NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.0. NatureServe, Arlington, Virginia. http://www.natureserve.org/explorer.

National Park Service. 2011. Find a park. U.S. Department of the Interior. http://www.nps.gov/findapark/index.htm.

Natural Resources Conservation Service (NRCS). 2000. Summary Report 1997 National Resources Inventory. U.S. Department of Agriculture, Washington, D.C. Revised December 2000.

———. 2009. Soil Data Mart. Query for Prime Farmland Soils in Castro and Swisher counties. <http://soildatamart.nrcs.usda.gov/> (accessed 21 March 2011).

New York Power Authority. 2005. Estimates of bird mortality associated with transmission lines. Niagara Power Project FERC No. 2216. 24 pgs. http://niagara.nypa.gov/ALP%20working%20documents/finalreports/IS14.pdf

Oberholser, H.C. 1974. The bird life of Texas. 2 vols. University of Texas Press, Austin.

Olendorff, R.R., A.D. Miller, and R.N. Lehman. 1981. Suggested practices for raptor protection on power lines. The state-of-the-art in 1981. Raptor Research Foundation, St. Paul. 111 pp.

Panhandle Regional Planning Commission (PRPC). 2011. Home page and programs. http://www.theprpc.org/.

Purvis, J. 2007. Small game harvest survey results 1986–87 through 2006–07. Texas Parks and Wildlife Department, Austin. 14 June.

———. 2010. Big game harvest survey results 2000-01 thru 2009–10. Texas Parks and Wildlife Department, Austin, Texas. 2 July.

Railroad Commission of Texas (RRC). 2009. GIS public map viewer of oil/gas wells and pipelines. http://gis2.rrc.state.tx.us/public/startit.htm (accessed March 17, 2011).

Rathjan, F.W. 2011. Handbook of Texas Online, s.v. “Panhandle,” http://www.tshaonline.org/handbook/online/articles/PP/ryp1.html (accessed April 04, 2011).

Robbins, C.S., D. Dawson, and B. Dowell. 1989. Habitat area requirements of breeding forest birds of the Middle Atlantic states. Wildlife Monographs No. 103. The Wildlife Society, Blacksburg, Virginia.

Rochelle, J.A., L.A. Lehmann, and J. Wisniewski. 1999. Forest fragmentation: wildlife and management implications. 303+ pages.

Runkles, F.A. 1964. The Garza site: a Neo-American campsite near Post, Texas. Bulletin of the Texas Archeological Society 35:101–125.

Rusz, P.J., H.H. Prince, R.D. Rusz, and G.A. Dawson. 1986. Bird collisions with transmission lines near a power plant cooling pond. Wildlife Society Bulletin 14:441–444.

Ryder, R.A., and D.E. Manry. 1994. White-faced ibis (*Plegadis chihi*). *In* The Birds of North America, No. 130 (A. Poole and F. Gill, editors). The Academy of Natural Sciences, Philadelphia and The American Ornithologists’ Union, Washington D.C.

Schmidly, D.J. 2004. The mammals of Texas, revised edition. University of Texas Press, Austin.

Sellards, E.H. 1938. Artifacts associated with fossil elephant. Bulletin of the Geological society of America 49:999-1010.

———. 1955. Fossil bison and associated artifacts from Milnesand, New Mexico. American Antiquity 20(4):336–344.

Sellards, E.H., G.L. Evans, and G.E. Meade. 1947. Fossil bison and associated artifacts from Plainview, Texas. Bulletin of the Geological Society of America 58:927–954.

Seyffert, K.D. 2001. Birds of the Texas Panhandle. Texas A&M University Press, College Station.

———. 2002. Birds of the High Plains and Rolling Plains of Texas: a field checklist. Texas Parks and Wildlife Department, Austin. PWD BK W7000-760 (3/02).

Soil Conservation Service (SCS). 1974a. U.S. Department of Agriculture. Soil survey of Castro County, Texas. In cooperation with the Texas Agricultural Experiment Station.

———. 1974b. U.S. Department of Agriculture. Soil survey of Swisher County, Texas. In cooperation with the Texas Agricultural Experiment Station.

———. 1975. Historical and Archeological Resources, Red River Basin above Denison Dam, Texas portion. Soil Conservation Service, Fort Worth.

State Department of Highways and Public Transportation (SDHPT). 1982. Letter Report: US 60 from 2.0 miles Northeast of the Texas-New Mexico State Line to the Castro-Deaf Smith County Line, Cultural Resource Assessment. SDHPT, Austin.

———. 1984. Letter Report: FM 3458 from FM 145, 0.7 miles East of the Castro County Line, South to FM 303, 2.3 miles West of Dodd, Cultural Resource Assessment, Castro County. SDHPT, Austin.

Stout, J., and G.W. Cornwell. 1976. Nonhunting mortality of fledged North American waterfowl. Journal of Wildlife Management 40(4):681–693.

Suhm, D.A. 1958. A review of central Texas Archeology. Bulletin of the Texas Archeological Society 29:63–107.

Suhm, D.A., and E.B. Jelks. 1962. Handbook of Texas archeology: type descriptions. Texas Memorial Museum Bulletin No. 4. Austin.

Terborgh, J. 1989. Where have all the birds gone?: essays in the biology and conservation of birds that migrate to the American tropics. Princeton University Press, New Jersey. 207 pp.

Texas A&M University. 2011. Real Estate Center, Texas Market Reports, Building Permit Activity. http://recenter.tamu.edu/mreports/.

Texas Education Agency. 2010. School District Locator, map. Updated July 2010. http://wgisprd.tea.state.tx.us/SDL/.

Texas Department of Transportation (TxDOT). 1998. Texas Highways Magazine: Volume 45, No. 8. Scenic Overlooks and Rest Areas. Austin, Texas. August 1998.

———. 2011a. Texas Highway Designation Files. http://www.dot.state.tx.us/tpp/search/query.htm.

———. 2011b. Texas Airport Directory. http://www.dot.state.tx.us/travel/airport_directory.htm.

Texas Historical Commission (THC). 2011. Texas Plains Trail Region. Plan your trip, regional map. http://www.texasplainstrail.com/index.aspx?page=9.

Texas Parks and Wildlife Department (TPWD). 1984. 1985 Texas Outdoor Recreation Plan (TORP). Comprehensive Planning Branch, Parks Division.

———. 1990. Texas Outdoor Recreation Inventory (TORI).

———. 2000. Mule deer management in Texas. Texas Parks and Wildlife Department, Austin.

———. 2007a. Panhandle Wildlife Management. <http://www.tpwd.state.tx.us/landwater/land/habitats/high_plains/>. Last modified 9 February 2007.

———. 2007b. Panhandle Playa Lakes. <http://www.tpwd.state.tx.us/landwater/land/habitats/high_plains/wetlands/playa.phtml>. Last modified 9 February 2007.

———. 2008a. Texas Black-tailed Prairie Dog Watch. <http://www.tpwd.state.tx.us/learning/texas_nature_trackers/black_tailed_prairie_dog/>. Last modified 29 September 2008.

———. 2008b. 2008–2009 Texas Hunting Season Dates, Grouped by County. <http://www.tpwd.state.tx.us/huntwild/hunt/season/county_listing/>. Last modified 14 August 2008.

———. 2010. Texas Natural Diversity Database (NDD) Rare Species shapefiles and element occurrence records. Received May 6, 2010.

———. 2011a. Rare, Threatened, and Endangered Species of Texas by County. http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species/

———. 2011b. Texas Natural Diversity Database (NDD) Rare Species shapefiles and element occurrence records. Received March 15, 2011.

———. 2011c. Find a park. Texas State Parks – Interactive Travel Regions Map. http://www.tpwd.state.tx.us/spdest/findadest/.

Texas State Data Center (TSDC). 2000. Population in 1990 and 2000, Numerical and Percent Change in Population from 1990 to 2000 in Counties and Places in Texas – Ranked by Population Size, 2000. http://txsdc.utsa.edu/subjindex/index.php#P.

Texas State Historical Association (TSHA). 2011. The Handbook of Texas Online. http://www.tshaonline.org/handbook.

Texas Water Development Board (TWDB). 1995. Report 345. Major and Minor Aquifers of Texas.

———. 1997. Water for Texas, a consensus-based update to the State Water Plan. Volume 2, Technical Planning Appendix. Austin. August 1997.

———. 2003. Report 359. The Groundwater Resources of the Dockum Aquifer in Texas

———. 2007. Water for Texas, a consensus-based update to the State Water Plan. Volume 2, Technical Planning Appendix. Austin. January 2007.

———. 2011. Population Projections Data: Final TWDB Board-Approved population projections for the year 2000 through 2060. County Population Projections. http://www.twdb.state.tx.us/wrpi/data/proj/2012popproj.asp.

Texas Workforce Commission (TWC). 2011a. Unemployment rates and labor force statistics, 1990, 2000 and December 2010 data. http://www.tracer2.com/cgi/dataanalysis/?PAGEID=94.

———. 2011b. Quarterly census of employment and wages, third quarter 2005 and 2010 data. http://www.tracer2.com/cgi/dataanalysis/?PAGEID=94.

Thompson, L.S. 1978. Transmission line wire strikes: mitigation through engineering design and habitat modification. In: M.L. Avery (editors), Impacts of Transmission Lines on Birds in Flight: Proceedings of a Workshop. Pp. 27–52. Oak Ridge Associated Universities, Oak Ridge, Tennessee. Interagency Agreement No. 40-570–76.

Thurmond, J.P., M.D. Freeman, and S.L. Andrews. 1981. A preliminary assessment of the cultural resources in the Brazos Natural Salt Pollution Control Project, Kent, King, and Stonewall Counties, Texas. Reports of Investigations No. 18. Prewitt & Associates, Inc. Austin.

Tunnell, C. 1977. Fluted projectile point production as revealed by lithic specimens from the Adair-Steadman site in northwest Texas. In Paleoindian Lifeways, edited by Eileen Johnson. West Texas Museum Association. Lubbock.

Turner, E.S., and T. R. Hester. 1985. A field guide to stone artifacts of Texas Indians. 2nd edition. Texas Monthly Press, Austin.

U.S. Census Bureau. 1983. United States Census 1980. General Social and Economic Characteristics. Washington, D.C.

———. 1990. United States Census 1990. American Factfinder. General Population and Housing Characteristics: 1990. http://factfinder.census.gov/servlet/DatasetMainPageServlet?_ds_name=DEC_1990_STF1_&_program=DEC&_lang=en. Washington, D.C.

———. 2000. United States Census 2000. American Factfinder. Population, Housing Units, Area, and Density: 2000. http://factfinder.census.gov/servlet/GCTTable?_bm=y&-geo_id=04000US48&-_box_head_nbr=GCT-PH1&-ds_name=DEC_2000_SF1_U&-format=ST-2. Washington, D.C.

———. 2011. Population and Housing Occupancy Status, by County and by Place. http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

U.S. Department of Agriculture (USDA). 2007. The 2007 Census of Agriculture – State and County Profiles. National Agricultural Statistics Service. http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/Texas/index.asp.

Wedel, W.R. 1975. Chalk Hollow: culture sequence and chronology in the Texas Panhandle. Actas del XLI Congreso Internacional de Americanistas 1:271–278. Mexico, D.F.

Willard, D.E. 1978. The impact of transmission lines on birds (and vice versa). In: M.L. Avery (editor), Impacts of Transmission Lines on Birds in Flight – Proceedings of a Workshop. Pp. 3–7. U.S. Fish and Wildlife Service, Washington, D.C.

Wormington, H.M. 1957. Ancient man in North America. Museum of Natural History, Popular Series No. 4. Denver.

Appendix A

Agency Correspondence

ATKINS

Atkins North America, Inc.
909 E Southeast Loop 323, Suite 360
Tyler, Texas 75701-9612

Telephone: +1.903.509.1552
Fax: +1.903.509.1599

www.atkinsglobal.com/northamerica

May 17, 2011

Name
Address
City, TX Zip

RE: Proposed Newhart to Kress 115kV Electric Transmission Line Project
Castro and Swisher Counties, Texas

Dear Name,

Southwestern Public Service Company (SPS) (a division of Xcel Energy) is proposing to construct a new 115 kilovolt (kV) electric transmission line in Castro and Swisher Counties, Texas. The proposed transmission line will be approximately 14 miles long, depending upon the route approved by the Public Utility Commission of Texas (PUC). The proposed transmission line will connect the proposed Newhart Substation (located approximately 5 miles northeast of the City of Hart, Texas at the northeast intersection of County Road (CR) 620 and CR 527) to the existing Kress Substation (located approximately 4 miles west of U.S. Interstate 27 in the southeast corner of Section 15 on the west side of CR 10). Please see the enclosed map.

SPS has retained the firm of Atkins, an environmental planning consultant, to prepare an Environmental Assessment (EA) and Alternative Route Analysis to support an application for a Certificate of Convenience and Necessity (CCN) from the PUC. Atkins is currently in the process of gathering data on the existing environment and identifying environmental and land use constraints within the study area that will be used in the creation of an environmental and land use constraint map for the proposed project. SPS and Atkins will identify potential alternative routes that consider environmental and land use constraints.

We are requesting that your office provide any information concerning environmental and land use constraints within the project study area. Your comments will be an important consideration in the evaluation of alternative routes and in the assessment of impacts. Upon certification of a final route for the proposed project, SPS will determine the need for other approvals and/or permits. If your jurisdiction has approvals and/or permits that would apply to these projects, please identify them in response to this inquiry. If permits are required from your office, SPS will contact your office following certification of a final route for the proposed project.

Thank you for your assistance with this electric transmission line project. Please contact me at 903.312.2779 or brandy.smart@atkinsglobal.com if you have any questions or require additional information. Your earliest reply will be appreciated.

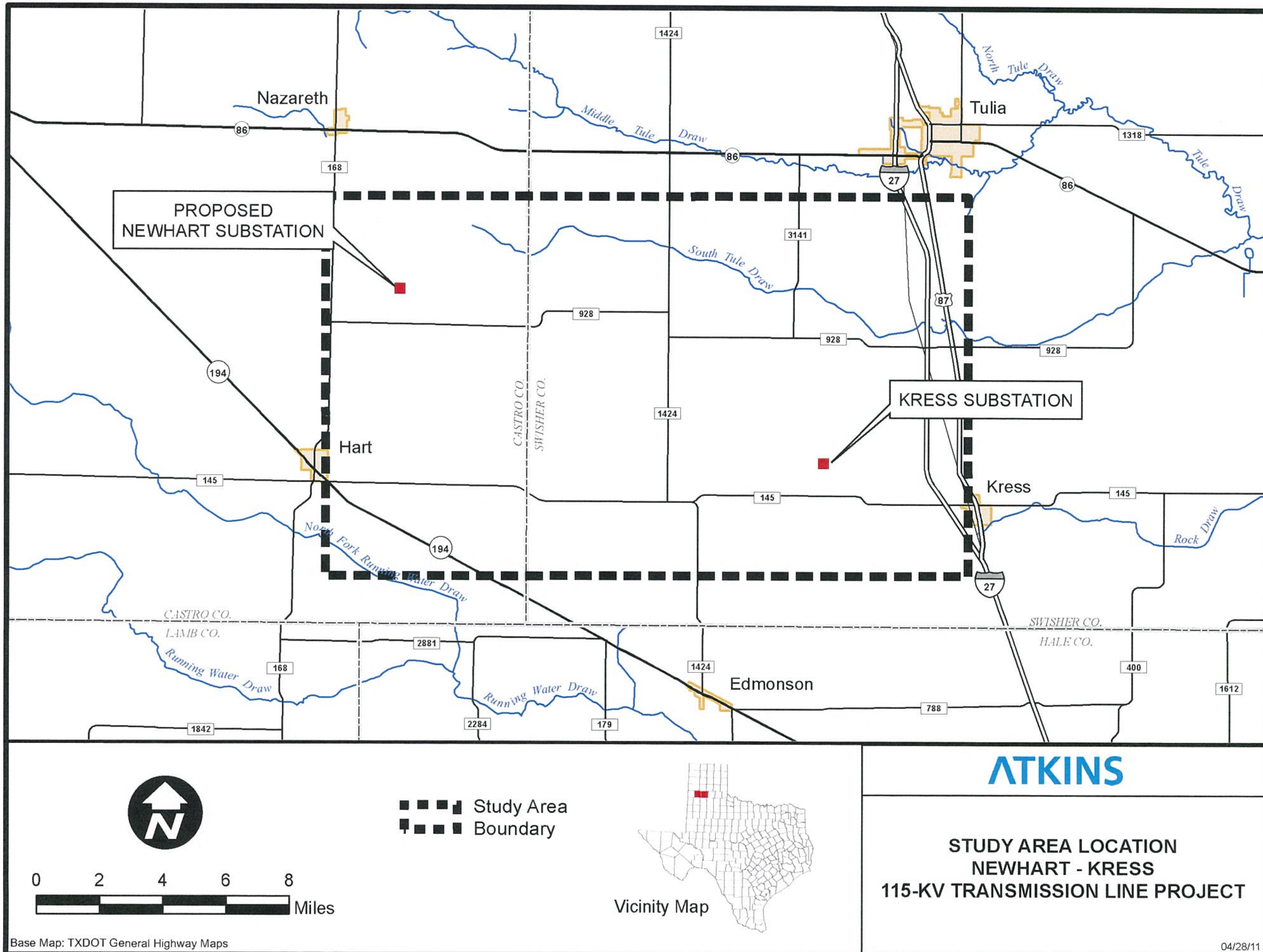
Sincerely,

Brandy Smart

Brandy Smart
Sr. Project Manager

Attachment

cc: Lance Kenedy, Xcel Energy



STUDY AREA LOCATION
NEWHART - KRESS
115-KV TRANSMISSION LINE PROJECT

ATKINS

Base Map: TXDOT General Highway Maps

04/28/11

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MAILING LIST

Mayor Esther Mount
City of Kress
PO Box 236
Kress, TX 79052

Dr. Billy Howell
Superintendent
Happy ISD
400 N. W 3rd
P O Box 458
Happy, TX 79042

Steve Post
Superintendent of Schools
Tulia ISD
702 NW 8TH ST
Tulia, TX 79088

Harold Keeter
County Judge
Swisher County
119 South Maxwell
Tulia, TX 79088

Joe Bob Thompson
Commissioner, Precinct 2
Swisher County
119 South Maxwell
Tulia, TX 79088

Tim Reed
Commissioner, Precinct 4
Swisher County
119 South Maxwell
Tulia, TX 79088

Horace McLain
Precinct 1 Commissioner
Castro County
100 East Bedford, Room 111
Dimmitt, TX 79027

W. A. Baldridge
Precinct 3 Commissioner
Castro County
608 West Grant Street
Dimmitt, TX 79027

Les Miller
Superintendent
Dimmitt ISD
608 W Halsell St
Dimmit, TX 79027-1798

James Oliver
Superintendent
Nazareth ISD
PO Box 189
101 S First Ave
Nazareth, TX 79063-0189

Jason Cantrill
Castro County Farm Bureau
304 North Broadway St.
Dimmitt, TX 79027

Jerry Patterson
Texas Land Commissioner
Texas General Land Office
1700 N. Congress Ave. Suite 935
Austin, TX 78701

Marcelino Sanchez
Program Manager
Texas Airport Development Office (FAA)
2601 Meacham Blvd.,
Fort Worth, TX 76137

Kathy Boydston
Program Director
Texas Parks and Wildlife Department
4200 Smith School Rd.
Austin, TX 78744-3291

Robert E. Mace
Deputy Executive Administrator for Planning -
Water Science and Conservation
Texas Water Development Board
P.O. Box 13231
Austin, TX 78711-3231

David Fulton
Director
TxDOT, Aviation Division
125 E. 11th St.
Austin, TX 78701-2483

MAILING LIST

Gary Pitner
Executive Director
Panhandle Regional Planning Commission
415 Southwest Eighth Avenue
Amarillo, TX 79105

Tony Russell
Regional Administrator
Federal Emergency Management Agency
800 N. Loop 288
Denton, TX 76209-3698

Tom Cloud
Field Supervisor
U.S. Fish and Wildlife Service
711 Stadium Drive, Suite 252
Arlington, TX 76011

Stephen Brooks
Chief, Regulatory Office
U.S. Army Corps of Engineers , Fort Worth
District
819 Taylor Street, Room 3A37
Fort Worth, TX 76102-0300

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

Airports Division
Southwest Region
Arkansas, Louisiana,
New Mexico, Oklahoma,
Texas

2601 Meacham Boulevard
Fort Worth, Texas 76137

JUN 10 2011

Ms. Brandy Smart
Atkins North America, Inc.
909 E. Southeast Loop 323, Suite 360
Tyler, TX 75701-9612

Dear Ms. Smart:

The Federal Aviation Administration (FAA) has received numerous letters from consultants on behalf of Xcel Energy requesting comments on various proposed electric transmission lines in the state of Texas. We have responded to past letters with the same basic responses. Please accept this letter as our position on all proposed transmission lines you are currently working on as well as any future proposals.

FAA Advisory Circular (AC) 70/7460.2 (AC 7460), *Proposed Construction or Alteration of Objects That May Affect the Navigable Airspace*, provides information to anyone proposing to erect or alter an object that may affect the navigable airspace. To comment adequately on a proposed transmission line we need the following information:

1. The specific routing of the proposed transmission line.

2. A graphic depicting transmission line's closest point of approach (CPA) to public and private use airports within the study area.

3. The elevation of the tallest structure at CPA to airport.

4. An application of AC 7460 criteria to the transmission line. Information about submission of Form 7460 is found at https://oeaaa.faa.gov/oeaaa/external/portal.jsp.

5. A request from a Federal agency project manager for FAA review of the proposed project. None of your previous correspondence cited the Federal agency that will be making the environmental determination for any of the proposed projects. Please provide the agency and Federal project manager's telephone number and address when you submit Form 7460.

When we receive information and coordination from a Federal agency having the authority to make the environmental determination on the transmission lines, we will provide appropriate comments.

Sincerely,

Kelvin L. Solco
Manager, Airports Division

U. S. Department of Homeland Security
FEMA Region 6
800 North Loop 288
Denton, TX 76209-3698

FEMA

FEDERAL EMERGENCY MANAGEMENT AGENCY
REGION VI
MITIGATION DIVISION

PUBLIC NOTICE REVIEW/ENVIRONMENTAL CONSULTATION

☐ We have no comments to offer. ☒ We offer the following comments:

WE WOULD REQUEST THAT THE LOCAL FLOODPLAIN ADMINISTRATOR BE CONTACTED FOR THE REVIEW AND POSSIBLE PERMIT REQUIREMENTS FOR THIS PROJECT.

REVIEWER:

Mayra G. Diaz
Floodplain Management and Insurance Branch DATE: 6/2/2011
940-898-5541

ATKINS

Atkins North America, Inc.
909 E Southeast Loop 323, Suite 360
Tyler, Texas 75701-9612

Telephone: +1.903.509.1552
Fax: +1.903.509.1599

www.atkinsglobal.com/northamerica

May 17, 2011

Tony Russell
Regional Administrator
Federal Emergency Management Agency
800 N. Loop 288
Denton, TX 76209-3698

RE: Proposed Newhart to Kress 115kV Electric Transmission Line Project
Castro and Swisher Counties, Texas

Dear Tony Russell,

Southwestern Public Service Company (SPS) (a division of Xcel Energy) is proposing to construct a new 115 kilovolt (kV) electric transmission line in Castro and Swisher Counties, Texas. The proposed transmission line will be approximately 14 miles long, depending upon the route approved by the Public Utility Commission of Texas (PUC). The proposed transmission line will connect the proposed Newhart Substation (located approximately 5 miles northeast of the City of Hart, Texas at the northeast intersection of County Road (CR) 620 and CR 527) to the existing Kress Substation (located approximately 4 miles west of U.S. Interstate 27 in the southeast corner of Section 15 on the west side of CR 10). Please see the enclosed map.

SPS has retained the firm of Atkins, an environmental planning consultant, to prepare an Environmental Assessment (EA) and Alternative Route Analysis to support an application for a Certificate of Convenience and Necessity (CCN) from the PUC. Atkins is currently in the process of gathering data on the existing environment and identifying environmental and land use constraints within the study area that will be used in the creation of an environmental and land use constraint map for the proposed project. SPS and Atkins will identify potential alternative routes that consider environmental and land use constraints.

We are requesting that your office provide any information concerning environmental and land use constraints within the project study area. Your comments will be an important consideration in the evaluation of alternative routes and in the assessment of impacts. Upon certification of a final route for the proposed project, SPS will determine the need for other approvals and/or permits. If your jurisdiction has approvals and/or permits that would apply to these projects, please identify them in response to this inquiry. If permits are required from your office, SPS will contact your office following certification of a final route for the proposed project.

Thank you for your assistance with this electric transmission line project. Please contact me at 903.312.2779 or brandy.smart@atkinsglobal.com if you have any questions or require additional information. Your earliest reply will be appreciated.

Sincerely,

Brandy Smart
Sr. Project Manager

Attachment

cc: Lance Kenedy, Xcel Energy

	Action	Info
Date Rec'd:		
Rec'd by:		
Director		
Deputy		
X.		
Analyst		
AD		
DOD		
MIT		
MGT		
NP		
File		
Suspense Date:		

TEXAS GENERAL LAND OFFICE

JERRY PATTERSON, COMMISSIONER

May 27, 2011

Brandy Smart
Atkins North America, Inc.
909 E Southeast Loop 323, Suite 360
Tyler, Texas 75701-9612

Re: Proposed Newhart to Kress 115-kV Electric Transmission Line Project
Castro and Swisher Counties, Texas

Dear Ms. Smart:

On behalf of Commissioner Patterson, I would like to thank you for your letter concerning the above referenced project.

Using your map depicting the project preliminary study area, it does not appear that the General Land Office will have any environmental issues or land use constraints at this time.

When a final route for this proposed project has been determined, please contact me and we can assess the route and determine **if the project will cross any streambeds or Permanent School Fund (PSF) land** that would require an easement from our agency.

In the interim, if you would like to speak to me further on this project, feel free to contact me at (512) 463-8180 or by email at glenn.rosenbaum@glo.texas.gov.

Again, thank you for your time.

Sincerely,

Glenn Rosenbaum

Glenn Rosenbaum
Team Leader, R-O-W Department
Asset Inspection

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
101 South Main
Temple, TX 76501-7602

June 2, 2011

Ms. Brandy Smart
Sr. Project Manager
Atkins North America, Inc.
909 E. Southeast Loop 323, Suite 360
Tyler, TX 75701-9612

Dear Ms. Smart:

We have reviewed the information pertaining to the proposed construction of a new 115 kilovolt (kV) electric transmission line that will connect the proposed Newhart Substation to the existing Kress Substation in Castro and Swisher Counties, Texas.

This project should have no significant adverse impact on the environment or natural resources in the area. We do not require any permits, easements, or approvals for an activity such as this.

Thank you for the opportunity to review these proposed projects.

Note: Future correspondence should be addressed to Salvador Salinas, State Conservationist.

Sincerely,

For SALVADOR SALINAS
State Conservationist

Texas Department of Transportation

AVIATION DIVISION
125 E. 11TH STREET • AUSTIN, TEXAS 78701-2483 • 512/416-4500 • FAX 512/416-4510

Ms. Brandy Smart
Atkins North America, Inc.
909 E Southeast Loop 323
Suite 360
Tyler, Texas 75701-9612

June 2, 2011

Dear Ms. Smart,

I received your letters dated May 17, 2010 concerning SWS projects for:

Proposed Newhart-to-Swisher 230 kV ETL
Proposed Newhart-to-Kress 115 kV ETL
Proposed Newhart-to-Castro 115 kV ETL
Proposed Newhart-to-Lampton 115 kV ETL

Title 14, US Code, Part 77 of the Federal Aviation Administration's (FAA) Federal Aviation Regulations (FAR) requires notice to the FAA if the facility to be constructed fits either of the below listed conditions:

77.13 A 2 (ii) 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of each airport specified in paragraph (a)(5) of this section with its longest runway greater than 3,200 feet in actual length, excluding heliports. (ii) 50 to 1 for a horizontal distance of 10,000 feet from the nearest point of the nearest runway of each airport specified in paragraph (a)(5) of this section with its longest runway no more than 3,200 feet in actual length, excluding heliports.

77.13(1) Any construction or alteration of more than 200' above the surface of the ground at its location

There are two public use airport in or near the Newhart-to-Swisher 230 kV ETL and the Newhart-to-Kress 115 kV ETL study areas; Joe Vaughn Spraying Airport (K29F) at Airport Reference Point (ARP) 34-23-45.2330N / 101-46-01.6510W, with the longest runway 3900 feet. Tulia / Swisher County Airport at ARP 34-34-00.5690N / 101-46-53.2600W, with the longest runway 4900 feet.

There is one public use airport in or near the Newhart-to-Castro 115 kV ETL study area; Dimmitt Municipal Airport (T55) at ARP 34-34-00.2480N / 102-19-21.7010W, with the longest runway 5500 feet.

There are no public use airports in or near the Newhart-to-Lampton 115 kV ETL study area.

There are no public use heliports in or near any of the above study areas.

If any of the criterions FAR 77.13(1) or 77.13 A 2 (ii) is met, the FAA must be notified in four copies using FAA Form 7460-1, "Notice of Proposed Construction or Alteration".

This form and supporting documents are available at <www.faa.gov/airports_airtraffic/airports/> - Obstruction Evaluations (Part 77) - Airspace/Landing Area Forms.

Sincerely,

William B. Gunn
Compliance

ATKINS

Atkins North America, Inc.
909 E Southeast Loop 323, Suite 360
Tyler, Texas 75701-9612

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www.atkinsglobal.com/northamerica

May 17, 2011

David Fulton
Director
TxDOT, Aviation Division
125 E. 11th St.
Austin, TX 78701-2483

RE: Proposed Newhart to Kress 115kV Electric Transmission Line Project
Castro and Swisher Counties, Texas

Dear David Fulton,

Southwestern Public Service Company (SPS) (a division of Xcel Energy) is proposing to construct a new 115 kilovolt (kV) electric transmission line in Castro and Swisher Counties, Texas. The proposed transmission line will be approximately 14 miles long, depending upon the route approved by the Public Utility Commission of Texas (PUC). The proposed transmission line will connect the proposed Newhart Substation (located approximately 5 miles northeast of the City of Hart, Texas at the northeast intersection of County Road (CR) 620 and CR 527) to the existing Kress Substation (located approximately 4 miles west of U.S. Interstate 27 in the southeast corner of Section 15 on the west side of CR 10). Please see the enclosed map.

SPS has retained the firm of Atkins, an environmental planning consultant, to prepare an Environmental Assessment (EA) and Alternative Route Analysis to support an application for a Certificate of Convenience and Necessity (CCN) from the PUC. Atkins is currently in the process of gathering data on the existing environment and identifying environmental and land use constraints within the study area that will be used in the creation of an environmental and land use constraint map for the proposed project. SPS and Atkins will identify potential alternative routes that consider environmental and land use constraints.

We are requesting that your office provide any information concerning environmental and land use constraints within the project study area. Your comments will be an important consideration in the evaluation of alternative routes and in the assessment of impacts. Upon certification of a final route for the proposed project, SPS will determine the need for other approvals and/or permits. If your jurisdiction has approvals and/or permits that would apply to these projects, please identify them in response to this inquiry. If permits are required from your office, SPS will contact your office following certification of a final route for the proposed project.

Thank you for your assistance with this electric transmission line project. Please contact me at 903.312.2779 or brandy.smart@atkinsglobal.com if you have any questions or require additional information. Your earliest reply will be appreciated.

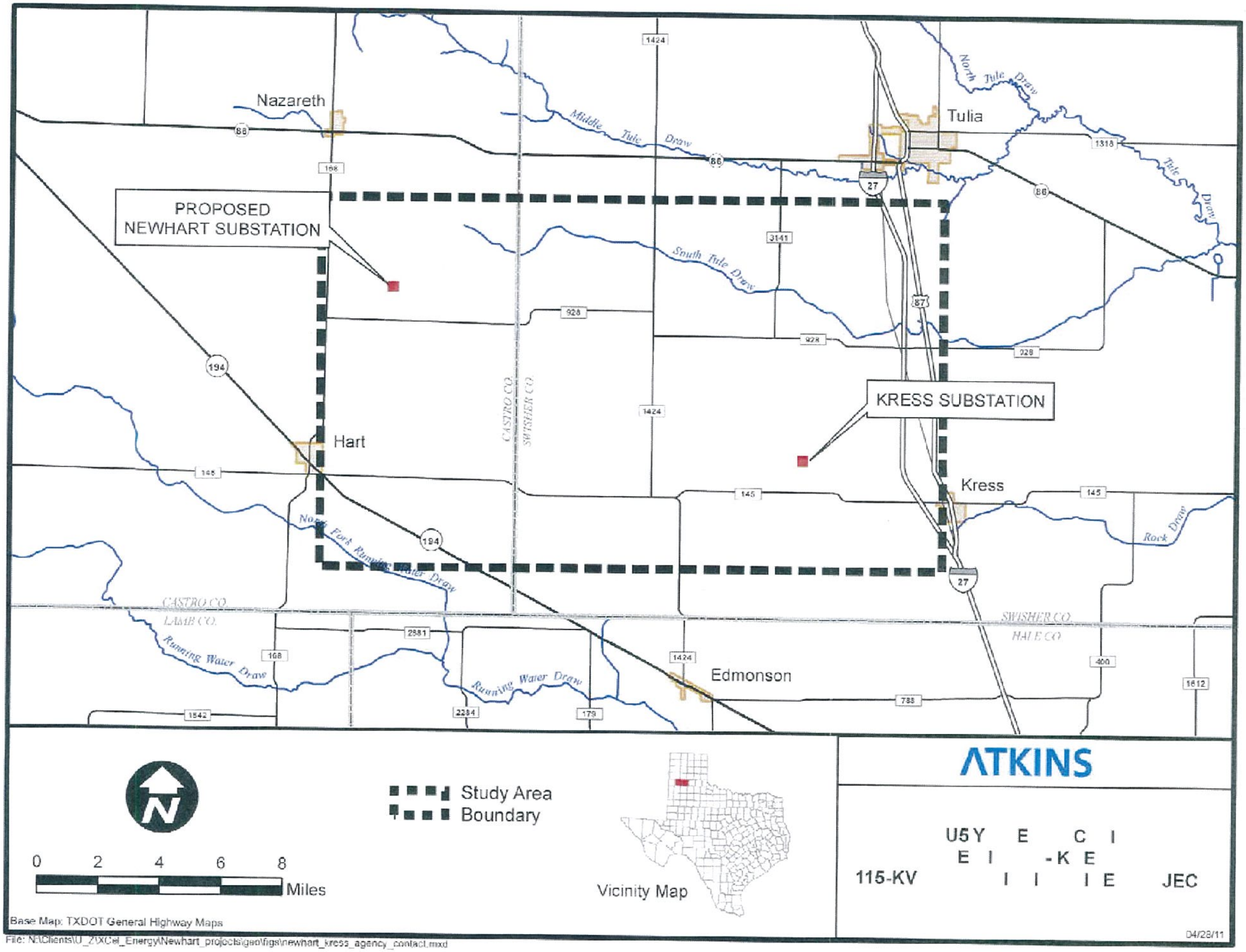
Sincerely,

Brandy Smart

Brandy Smart
Sr. Project Manager

Attachment

cc: Lance Kenedy, Xcel Energy



Base Map: TXDOT General Highway Maps

File: N:\Clients\U_Z\XCel_Energy\Newhart_projects\geo\figs\newhart_kress_agency_contact.mxd

Texas Department of Transportation
135 Slaton Road
Lubbock, TX 79404-5201

June 2, 2011

Brandy Smart
Sr. Project Manager
Atkins
909 E. Southeast Loop 323, Suite 360
Tyler, TX 75701-9612

Re: Proposed Newhart to Kress 115-kV Electric Transmission Line Project
Castro and Swisher Counties, Texas

Dear Mrs. Smart:

The Lubbock District has received and reviewed your Proposed Newhart to Kress 115-kV Electric Transmission Line Project, Castro and Swisher Counties, Texas. At this time, the Lubbock District has no current projects, no plans for major construction projects and no environmental or land use constraints on state maintained roadways within the "Study Area Boundary" illustrated on your attached Study Area Location Map, dated 04/28/2011.

Inquiries regarding easements or Right of Way within the study area should be directed to the West Regional Right of Way Manager, John Wallis, at 806-748-4587 or John.Wallis@txdot.gov.

Upon certification of a final route, all necessary permits for lines within the Right of Way or crossing the Right of Way of a state maintained roadway will be issued through the Lubbock District Maintenance Management office. Linda Parker, Lubbock District Utility Permit Coordinator, can assist you in setting up an account for our online permit request process at that time. She can be reached at 806-748-4407 or Linda.Parker@txdot.gov.

If you have any questions or concerns, please feel free to contact me at 806-748-4483.

Sincerely,

P.E.

Michael Stroope, P.E.
Maintenance Engineer

Cc: Douglas Eichorst, P.E. District Engineer
Ted Moore, P.E. Director of Maintenance
Mike Craig, P.E. Plainview Area Engineer
John Wallis, RCW ROW Manager
Linda Parker, Utility Permit Coordinator
File

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101ST EAST AVENUE
TULSA, OKLAHOMA 74128-4609

June 3, 2011

Regulatory Office

PROJECT NAME: Proposed Newhart to Kress 115kV Electric Transmission Line Project
Castro and Swisher Counties, Texas

CORPS POC: Karla Roberts, 918-669-7400

Ms. Brandy Smart
Atkins North America, Inc.
909 E Southeast Loop 323, Suite 360
Tyler, TX 75701-9612

Dear Ms. Smart:

Please reference your correspondence of May 17, 2011, regarding the above listed project.

The provided information does not indicate that a placement of dredged or fill material will be required, permanently or temporarily, into any "waters of the United States," including jurisdictional wetlands. Therefore, your proposal is not subject to regulation pursuant to Section 404 of the Clean Water Act (CWA), and a Department of the Army (DA) permit will not be required. Should your method of construction necessitate such a discharge into an aquatic area or tributary stream, we suggest that you resubmit that portion of your project so that we may determine whether an individual DA permit will be required.

Although Section 404 CWA authorization is not required, this does not preclude the possibility that a real estate interest or other Federal, State, or local permits may be required.

A "Customer Service Survey" is available at http://per2.nwp.usace.army.mil/survey.html if you would like to describe your experience with the U.S. Army Corps of Engineers Regulatory Program.

Sincerely,

Karla Roberts

For David A. Manning
Chief, Regulatory Office

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
WinSystems Center Building
711 Stadium Drive, Suite 252
Arlington, Texas 76011

In Reply Refer to:
21420-2011-TA-0255
21420-2011-TA-0256
21420-2011-TA-0257
21420-2011-TA-0258

June 3, 2011

Ms. Brandy Smart
Atkins North America, Inc.
909 East Southeast Loop 323, Suite 360
Tyler, Texas 75701-9612

Dear Ms. Smart:

This responds to your four letters, dated May 17, 2011, requesting information on threatened and endangered species and other sensitive fish and wildlife resources regarding Southwestern Public Service Company's proposed Newhart to Swisher 230 kV transmission line project (21420-2011-TA-0255), Newhart to Castro 115 kV transmission line project (21420-2011-TA-0256), Newhart to Kress 115 kV transmission line project (21420-2011-TA-0257) and the Newhart to Lampton 115 kV transmission line project (21420-2011-TA-0258) in Castro, Hale, Lamb and Swisher Counties, Texas. We are providing this information to assist you in assessing and avoiding impacts to federally listed threatened and endangered species, wetlands, and other fish and wildlife resources. It is our understanding that the proposed projects would involve the installation of approximately 16 miles of 230 kV transmission line between the proposed Newhart Substation in Castro County and the existing Swisher Substation in Swisher County, 21 miles of 115 kV transmission line between proposed Newhart Substation and the existing Castro Substation in Castro County, 14 miles of 115 kV transmission line between the proposed Newhart Substation and the existing Kress Substation in Swisher County, and 18 miles of 115 kV transmission line between the proposed Newhart Substation and the existing Lampton Substation in Lamb County.

Threatened and Endangered Species

Our records indicate that the following federally listed endangered (E), candidate (C), and delisted (DL) species are known to occur in Castro, Hale, Lamb and Swisher Counties, Texas:

bald eagle (*Haliaeetus leucocephalus*) – DL – All Counties
lesser prairie-chicken (*Tympanuchus pallidicinctus*) – C – Castro, Lamb, Swisher
whooping crane (*Grus americana*) – E – All Counties

for information on the general biology of these species, as well as updated county by county species lists, visit our website at: http://fws.gov/southwest/es.

The bald eagle was removed from the federal threatened and endangered species list on August 8, 2007. However, bald eagles are still afforded safeguards under the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act. We recommend all construction activities be conducted in accordance with the Service's National Bald Eagle Management Guidelines which may be accessed at the following address: http://www.fws.gov/migratorybirds/baldeagle.htm.

The project area does not lie within the 200-mile wide corridor extending from Canada to the Texas Coast in which 94% of whooping crane sightings have occurred during their annual migration; however, whooping cranes may occur transiently in the project area while searching for stop-over habitat. Although whooping crane migratory flights are generally at altitudes of between 1,000 and 6,000 feet, they fly at lower altitudes when seeking stop-over habitats such as reservoirs, large ponds, rivers and wetlands. They will often make low flights up to two miles from a stop-over site to forage late in the day or in early morning. They may also interrupt migration flights to drink and/or forage in agricultural fields or wetlands for brief periods and may be at low altitudes during mid-day. For these reasons, the Service is concerned with the possibility of whooping crane collisions with transmission lines, which are known to be the highest cause of mortality of fledged whooping cranes.

Candidate species, such as the lesser prairie-chicken (LPC), are not afforded federal protection under the Endangered Species Act (ESA); however, we recommend that potential impacts to this species be considered during project planning. Research has shown that the LPC demonstrates avoidance of tall, vertical structures. Therefore, fragmentation of LPC habitat by tall vertical structures could negatively affect this species and impact their future status under the ESA. The LPC's estimated occupied range overlaps a large portion of northwestern Lamb County. Although the LPC's range has been estimated from the best available information, it may not precisely delineate the exact range of this species. Therefore, due to the proximity of the project area to the estimated range of the LPC, we recommend that the project sites be surveyed for the presence of the LPC and its preferred habitat. Enclosed is an example of a road survey protocol for the LPC that you may find useful. For further LPC survey information please contact Heather Whitlaw, Southern Plains Coordinator, at 806-742-4968.

Wetlands and Wildlife Habitat

The proposed project areas may include several playa lakes. The Playa Lakes Region of Texas is second only to the Texas Gulf Coast as the most important sector of the Central Flyway for wintering waterfowl. Even small to medium-sized playas often support important food sources for waterfowl during winter stays or migration, in addition to providing habitat for ground birds (quail, turkey), mammals, reptiles, and amphibians. Waste grains and stubble available in nearby croplands further increase food supplies and provide protective cover. Additionally, these wetlands are important groundwater recharge zones. Therefore, we recommend that impacts to these areas be minimized to the greatest extent possible. We have enclosed some general guidelines for linear utility construction to assist you in designing the proposed action to minimize effects to fish and wildlife resources.

We appreciate the opportunity to comment on the transmission line projects and look forward to working together in the future for the benefit of our fish and wildlife resources. If we can further assist you or answer any questions, please contact John Morse of my staff at (817) 277-1100. Please refer to the Service Consultation numbers provided above in any future correspondence regarding these projects.

Sincerely,

Tom Cloud

Thomas J. Cloud, Jr.
Field Supervisor

Enclosures

Lesser Prairie Chicken Road Survey Protocol

Dates of Survey – Routes should be surveyed from April 1st till the end of April.

Starting Time – Routes should be started approximately 20 minutes before sunrise and completed around 9:00 – 9:30 AM. Do not survey after 9:30 AM.

Survey Routes – Survey routes should be arranged in an east to west fashion as much as possible. Routes should be driven from east to west.

Top of Survey Form - Please fill in the top of the survey form to the best of your ability.

Survey Methodology – It is assumed for these surveys that when Lesser Prairie Chickens (LPC's) are booming you can hear the birds for approximately one mile. Please try and follow this methodology as best as possible.

1. Once the route has been started, drive one mile, stop shut off vehicle, get out of vehicle and listen for three minutes.
2. If chicken booming is detected, mark the "Chicken Present" box on the Field Survey Form and record the location, direction the booming was coming from, time and location in UTM using GPS information. If the observer marks the positive locations with waypoints (preferred) then the observer will record the waypoint number.
3. After three minutes, drive another mile stop and turn off the vehicle and listen for three minutes until the survey route is completed.
4. If you observe LPC's between stops record the number in the "Comments" section of the Field Survey Form. If you observe chickens booming at a stop also record the number of birds. Or if there is any other information such as heavy background noise such as traffic, oil field activity, irrigation motors or tractors, record that information in the "Comments" section.

Surveys should be completed or no longer run after 9:30 AM. If the route is not finished it should be finished the next day before new routes are assigned and started.

Data Collection –Data collection should be done in UTM (either zone 13 or 14; see attached map), NAD 83 and the units are meters. This will allow the data to be projected onto DRG's or DOQ's without doing conversions.

Weather – Do not conduct surveys when winds exceed 20 mph or if raining. Light drizzle is acceptable.

LESSER PRAIRIE CHICKEN ROAD SURVEY

COUNTY: ______________________ DATE OF SURVEY: ______________________

OBSERVER: ______________________ SURVEY ROUTE: ______________________

START: TIME ________ WIND mph ________ Direction ________ TEMP ________

END: TIME ________ WIND mph ________ Direction ________ TEMP ________

STOP NUMBER	TIME AT STOP	CHICKENS HEARD		CHICKENS SEEN	Location	WAY PT #	Comments
		PRESENT	DIRECTION				
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

General Recommendations for Avoiding and/or Minimizing Environmental Impacts from Utility Construction

The U.S. Fish and Wildlife Service places a high priority on the conservation of wetlands and riparian corridors due to the inherent value and significant level of benefits these areas provide to a multitude of fish and wildlife species. In addition to the food, shelter, and habitat they provide to fish and wildlife, these areas also furnish invaluable ecological services to the watershed and the community. They act as a buffer zone for pollutants and sediment entering the stream via storm water runoff. They also prevent erosion, and provide a pervious surface to facilitate the percolation of storm water to prevent flooding.

The best method of avoiding and/or minimizing environmental impacts caused by linear utility construction is to utilize existing right-of-way (transmission line, highway, pipeline, etc.) for the new route. This often eliminates or greatly reduces the need to clear wildlife habitat for construction. The following additional recommendations for avoiding and/or minimizing construction related impacts commonly associated with utility projects should also be considered, especially when using existing right-of-way is not possible. These are only general recommendations; details for avoiding and minimizing all potential impacts should take into account specific project and site descriptions at each sensitive area. The development of specific mitigating measures for anticipated environmental impacts should focus on protecting the integrity of stream banks, riparian zones, and wetlands.

- **Route alignment should be adjusted where necessary to avoid wetland impacts and to avoid losses of moderate-aged to mature-aged trees.** Utilizing existing right-of-ways reduces environmental impacts usually associated with utility construction. However, where proposed routes would require new right-of-way, minor adjustments in route alignment could minimize impacts to fish and wildlife habitat. Route modification should include avoiding wetlands and crossing creeks and streams where the riparian corridor is at its minimum width.

- **Temporary workspaces at stream crossings should be placed outside of the riparian zone of the respective stream.** Temporary workspaces are often needed where routes cross creeks, streams, roads, railways, or other linear obstacles. Should temporary workspaces be necessary they should not be located within the riparian zone of creeks, streams, or other water bodies. They should also not be located within wetlands.

- **Temporary right-of-ways within or adjacent to riparian areas should be hand cleared.** Clearing of permanent right-of-way and the construction and installation of utilities require the use of heavy machinery. In riparian and other wooded areas, the use of heavy machinery and other equipment is often detrimental to the underground root system of adjacent trees not intended for removal. Oaks are particularly sensitive to ground disturbance caused by heavy equipment and often die when their roots are damaged. Temporary areas cleared by machinery may also reduce subsequent revegetation by native hardwoods due to the damaged root mat from which new saplings originate. Therefore, we recommend temporary workspaces and right-of-ways within or adjacent to riparian corridors be cleared with chainsaws to avoid additional tree loss and encourage new hardwood growth following construction.

- **All temporary right-of-ways and workspaces should be revegetated immediately**

following construction with native vegetation appropriate to habitat type. It is important that disturbed areas be revegetated following construction activities to prevent erosion, reduce sedimentation, and decrease the chance of non-native, invasive plant species from becoming established. Species commonly used for soil stabilization are listed in the Texas Department of Agriculture's (TDA) Native Tree and Plant Directory, available from TDA at P.O. Box 12847, Austin, Texas, 78711.

- **Right-of-way width should be reduced to the minimum amount necessary.** New right-of-way projects usually include a temporary right-of-way for allowing access for equipment and workspace for construction. The environmental consequences of using temporary right-of-ways may be minimal, especially when they are located adjacent to roads or occur in pastures and agricultural areas. However, at stream crossings, temporary right-of-ways may remove valuable wildlife habitat. For these areas, additional workspace should be placed outside of the riparian corridor and every effort be made to avoid clearing more vegetation than is necessary to install the utility.

- **Unavoidable wetland impacts should be mitigated through in-kind creation or restoration of wetland areas that establish similar functions and values of the affected wetlands.** Federal policy provides that wetland losses be mitigated to restore lost habitat values of equal or greater value to fish and wildlife resources. This includes restoring or creating areas that retain the primary hydrological characteristics of the affected wetlands and revegetating the disturbed land with native plant species appropriate to habitat type.

We also recommend all areas that would be avoided using these or other measures (e.g., mature trees, riparian areas) be marked with orange guard fence or flagged prior to construction to prevent accidental clearing by work crews. All mitigation measure developed for a specific project should be incorporated into the Environmental Assessment for the proposed project as well the project plans to ensure implementation by the contractor. Additionally, if impacts to wetlands, creeks, streams, or other water bodies are anticipated, you should contact the appropriate U.S. Army Corps of Engineers office to determine if a permit is required by that Agency prior to commencement of construction activities.

Appendix B

Public Involvement

Siting and Land Rights
P. O. Box 1261
Amarillo, TX 79105-1261
Telephone: (806) 378-2132
Facsimile: (806) 378-2142

May 24, 2011

Name
Address
City, State

Re: Newhart-Kress 115 kV Transmission Line Project

Dear Sir or Madam:

Southwestern Public Service Company (SPS), a subsidiary of Xcel Energy, Inc., is proposing to construct a new 115 kilovolt (kV) electric transmission line in Castro and Swisher counties, Texas. The proposed transmission line will be approximately 14 miles long, depending upon the route approved by the Public Utility Commission of Texas (PUCT). The proposed transmission line will connect the proposed Newhart Substation (located approximately five miles northeast of Hart, Texas at the northeast intersection of County Roads 620 and 527) to the existing Kress Substation (located approximately four miles west of U.S. Interstate 27 in the southeast corner of Section 15 on the west side of County Road 10). Please see the enclosed map.

You are receiving this notice because one or more of the preliminary alternative routes may require an easement or other property interest across your property, or the centerline of one of the preliminary alternative routes may come within 300 feet of your property.

SPS is committed to routing the proposed transmission line in a manner consistent with the values of the local communities, the Texas Utilities Code, the PUCT Rules and Policies, and the need to provide reliable electric service to this area of north Texas.

SPS is hosting two public open houses to solicit input to help determine the preferred route for the proposed transmission line as well as to share information about routing alternatives.

June 7 and June 9
5:30 – 7:30 p.m. Hart Golden Group building 1202 Date Street Hart, TX 79043

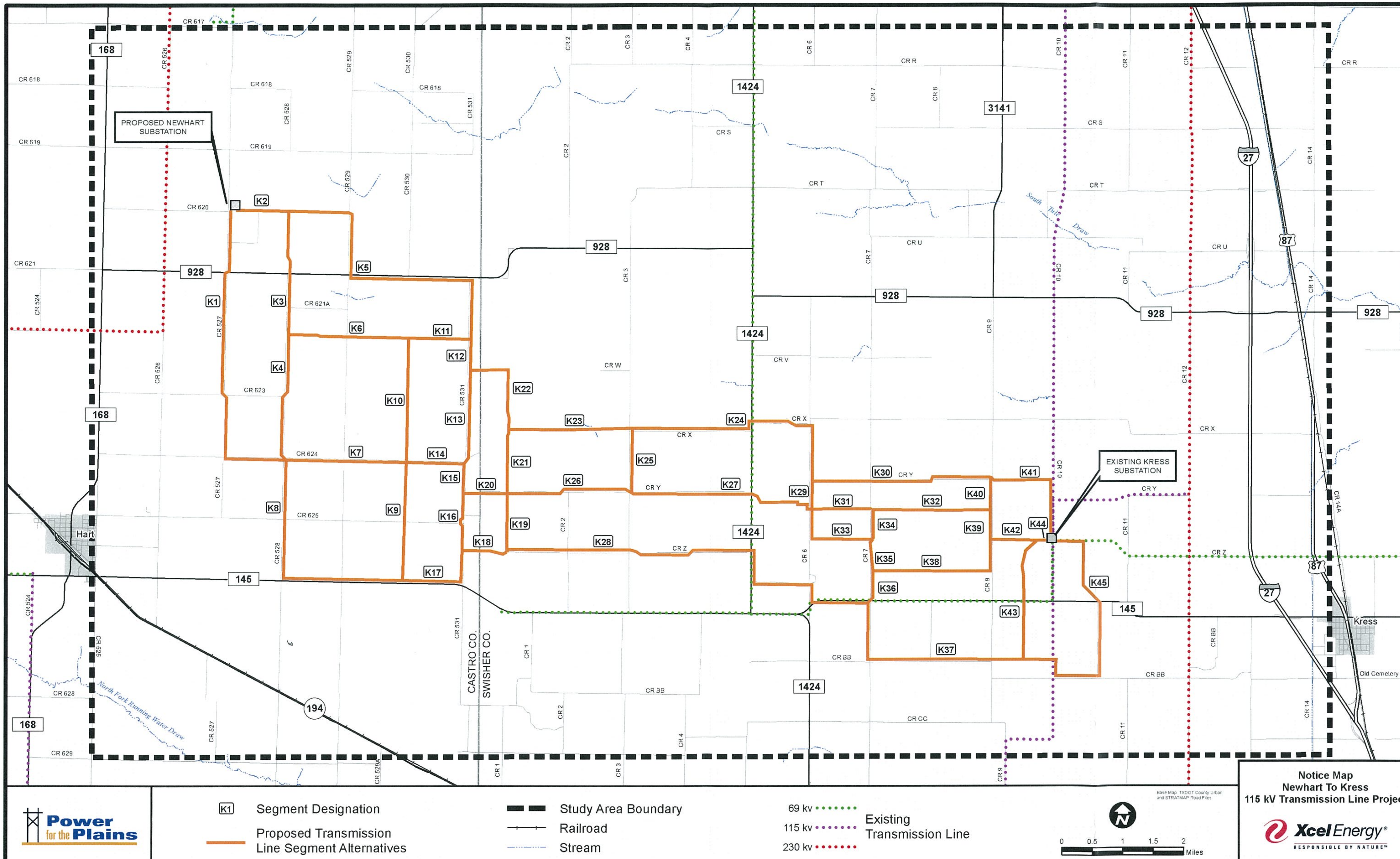
Preliminary alternative routes have been identified and are shown as dashed lines on the attached map. Maps with greater detail will be available at the open house.

Individuals attending the public open houses will have an opportunity to ask questions and provide information regarding the proposed transmission line routes. These preliminary alternative routes are subject to modification based on further study and information received at the public open houses.

Additional project information, including detailed route segment maps, is posted at www.powerfortheplains.com. If you have any questions concerning the open houses, please contact Brad Sparks at (806) 378-2132.

Sincerely,

Brad Sparks
Xcel Energy


Notice Map
Newhart To Kress
115 kV Transmission Line Project
Xcel Energy
RESPONSIBLE BY NATURE
Power for the Plains
Segment Designation
Proposed Transmission Line Segment Alternatives
Study Area Boundary
Railroad
Stream
69 kv
115 kv
230 kv
Existing Transmission Line
0 0.5 1 1.5 2 Miles
PROPOSED NEWHART SUBSTATION
EXISTING KRESS SUBSTATION
Hart
Kress
CASTRO CO.
SWISHER CO.
North Fork Running Water Draw
South Tule Draw

Xcel Energy®
RESPONSIBLE BY NATURE™

Power for the Plains

Siting and Land Rights
P.O. Box 1261
Amarillo, TX 79105-1261
Telephone: (806) 378-2132
Facsimile: (806) 378-2142

PROPOSED NEWHART TO SWISHER 230 kV TRANSMISSION LINE PROJECT PUBLIC OPEN HOUSE MEETING

THURSDAY
JUNE 9, 2011
5:30 PM – 7:30 PM
HART GOLDEN GROUP BUILDING
1202 DATE STREET
HART, TX 79043

This questionnaire is designed to help you identify issues related to routing of a proposed 230 kV overhead electric transmission line for the Newhart to Swisher transmission line project. Your answers will assist the study team in understanding public interests and concerns, and will allow the team to incorporate this information in the route selection process. Please complete this questionnaire **after** you have reviewed the information presented in tonight's meeting. Thank you for your input.

LINE ROUTING CONSIDERATIONS

1. The routing of a transmission line involves many considerations. Please rank the following factors in the order of their importance to you. Indicate the most important factor with the number "1", second most important with the number "2", and so on.

_______ a. Minimize total length of the line
_______ b. Minimize length through cultivated fields
_______ c. Minimize length through rangeland
_______ d. Minimize the number of residences near the line
_______ e. Minimize the number of businesses near the line
_______ f. Minimize the number of public facilities (e.g. parks, schools, churches)
_______ g. Minimize the clearing of trees
_______ h. Minimize the impact on wildlife
_______ i. Minimize the cost of the line
_______ j. Maintain reliable electric service

2. If you would like to comment further on any of the above factors or identify any other factors that you feel should be considered, please use the space below.

____

____

____

3. If you have a concern with a particular transmission line segment(s) shown on the display of potential routes, please indicate the segment number and describe your concern.

Segment No.	Concern
__________	______________________________________
__________	______________________________________
__________	______________________________________

4. The route alternatives cross several land use types and follow different land use features. Please rate the acceptability of a transmission line in respect to each of the following locations from 1 (preferable) to 3 (unacceptable). Circle the appropriate number for each location.

	Preferable	Acceptable	Unacceptable
a. Along roads/railroads	1	2	3
b. Along fence lines away from roads	1	2	3
c. Along section lines	1	2	3
d. Along 1/2 section lines	1	2	3

ADDITIONAL INFORMATION

5. Which of the following applies to your situation?

______ a. Potential route is near my home
______ b. Potential route is across my land
______ c. Potential route is across land I farm
______ d. Other, please specify ______________________________

6. Do you believe this meeting and the information provided was helpful for your understanding of the project?

Meeting	______ yes	______ no
Information Provided	______ yes	______ no

7. Your name, address, and phone number are optional, but would be very useful should we need to contact you regarding an issue.

Name ______________________________
Address ______________________________
Phone Number ______________________________

ADDITIONAL COMMENTS OR QUESTIONS

____

____

____

Xcel Energy®
RESPONSIBLE BY NATURE™

Power for the Plains

Siting and Land Rights
P.O. Box 1261
Amarillo, TX 79105-1261
Telephone: (806) 378-2132
Facsimile: (806) 378-2142

Proposed Newhart Transmission Line Projects
PUBLIC OPEN HOUSE MEETING

TUESDAY AND THURSDAY
JUNE 7 AND 9, 2011
5:30 PM – 7:30 PM
HART GOLDEN GROUP BUILDING
1202 DATE STREET
HART, TX 79043

Welcome and thank you for attending the public open house meeting for the following proposed electric transmission line projects:

Newhart to Swisher 230 kV Transmission Line Project
Newhart to Lampton 115 kV Transmission Line Project
Newhart to Castro 115 kV Transmission Line Project
Newhart to Kress 115kV Transmission Line Project

The purpose of this open house is for Xcel to present information, answer your questions about the projects, and receive your ideas and concerns. You will notice that there are several exhibits around the room. We encourage you to take advantage of this opportunity to talk with the various representatives of Xcel, our routing and environmental consultant, Atkins, and our property ownership abstractor, KW Land Services. Xcel and their contractor representatives can provide information based on their particular area of expertise. Please spend as much time as you need to address any issues you may have at each exhibit. Since this is an open house meeting, there may be times when one particular exhibit is very crowded. Please bear with us and we will make every attempt to address your concerns.

Newhart to Swisher 230 kV Transmission Line Project

The Newhart-Swisher 230 kilovolt (kV) transmission line will maintain electric reliability in Castro, Parmer, Swisher, Bailey, Lamb and Hale counties as customer load growth and new generation resources are added to the transmission grid. The proposed project consists of about 16 miles of new 230 kV transmission line that will connect the proposed Newhart Substation (located about five miles northeast of Hart, Texas, at the northeast intersection of County Roads 620 and 527) to the existing Swisher Substation (located about one mile west of Interstate 27 at the northwest corner of the intersection of County Roads Y and 12). The exact length of the line depends on the route approved by the Public Utility Commission of Texas (PUCT). A Certificate of Convenience and Necessity will be filed with the PUCT in late 2011. The proposed in-service date is 2013-2014.

The proposed 230 kV line will be constructed of steel structures. The structures, which are between 80 and 140 feet tall, will be spaced 500 and 800 feet apart. Typically, a 90-foot right-of-way will be required.

Newhart to Lampton 115 kV Transmission Line Project

The Newhart-Lampton 115 kV transmission line will maintain electric reliability in Castro, Parmer, Swisher, Bailey, Lamb and Hale counties as customer load growth and new generation resources are added to the transmission grid. The proposed project consists of about 18 miles of new 115 kV transmission line that will connect the proposed Newhart Substation (located about five miles northeast of Hart, Texas, at the northeast intersection of County Roads 620 and 527) to the existing Lampton Substation (located about one mile northeast of Olton, Texas, at the southwest intersection of County Roads 104 and 321). The exact length of the line depends on the route approved by the Public Utility Commission of Texas (PUCT). A Certificate of Convenience and Necessity will be filed with the PUCT in late 2011. The proposed in-service date is 2013-2014.

The proposed 115 kV line will be constructed of steel structures. The structures, which are between 70 and 140 feet tall, will be spaced 500 and 800 feet apart. Typically, a 70-foot right-of-way will be required.

Newhart to Castro 115 kV Transmission Line Project

The Newhart-Castro 115 kV transmission line will maintain electric reliability in Castro, Parmer, Swisher, Bailey, Lamb and Hale counties as customer load growth and new generation resources are added to the transmission grid. The proposed project consists of about 21 miles of new 115 kV transmission line that will connect the proposed Newhart Substation (located about five miles northeast of Hart, Texas, at the northeast intersection of County Roads 620 and 527) to the existing Castro Substation (located about five miles southwest of Dimmitt, Texas, northeast of the intersection of County Roads 507 and 617). The exact length of the line depends on the route approved by the Public Utility Commission of Texas (PUCT). A Certificate of Convenience and Necessity will be filed with the PUCT in late 2011. The proposed in-service date is 2013-2014.

The proposed 115 kV line will be constructed of steel structures. The structures, which are between 70 and 140 feet tall, will be spaced 500 and 800 feet apart. Typically, a 70-foot right-of-way will be required.

Newhart to Kress 115 kV Transmission Line Project

The Newhart-Kress 115 kV transmission line will maintain electric reliability in Castro, Parmer, Swisher, Bailey, Lamb and Hale counties as customer load growth and new generation resources are added to the transmission grid. The proposed project consists of 14 miles of new 115 kV transmission line that will connect the proposed Newhart Substation (located about five miles northeast of Hart, Texas, at the northeast intersection of County Roads 620 and 527) to the existing Kress Substation (located about four miles west of Interstate 27 in the southeast corner of Section 15 on the west side of County Road 10). The exact length of the line depends on the route approved by the Public Utility Commission of Texas (PUCT). A Certificate of Convenience and Necessity will be filed with the PUCT in late 2011. The proposed in-service date is 2013-2014.

The proposed 115 kV line will be constructed of steel structures. The structures, which are between 70 and 140 feet tall, will be spaced 500 and 800 feet apart. Typically, a 70-foot right-of-way will be required.

Additional project information, including detailed route segment maps, is posted at www.powerfortheplains.com. If you have any questions concerning the open houses or routing, please contact either Lance Kenedy at (806) 378-2435 or Scott Morris at (806) 378-2378.

Thank you again for attending this open house!

Appendix B

Public Involvement