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PUC DOCKET NO. 49347

APPLICATION OF AEP TEXAS INC. TO AMEND ITS CERTIFICATE OF CONVENIENCE AND NECESSITY FOR THE THREE RIVERS TO BORGLUM TO TULETA 138-KV TRANSMISSION LINE IN LIVE OAK AND BEE COUNTIES, TEXAS	§	BEFORE THE
	§	
	§	PUBLIC UTILITY COMMISSION
	§	
	§	OF TEXAS

APPLICATION

APRIL 5, 2019

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APPLICATION OF AEP TEXAS INC. TO AMEND ITS CERTIFICATE OF CONVENIENCE AND NECESSITY FOR THE THREE RIVERS TO BORGLUM TO TULETA 138-KV TRANSMISSION LINE IN LIVE OAK AND BEE COUNTIES

DOCKET NO. 49347

Submit seven (7) copies of the application and all attachments supporting the application: If the application is being filed pursuant to P.U.C. SUBST. R. 25.101(b)(3)(D) or P.U.C. SUBST. R. 25.174, include in the application all direct testimony. The application and other necessary documents shall be submitted to:

Public Utility Commission of Texas
Attn: Filing Clerk
1701 N. Congress Ave.
Austin, Texas 78711-3326

Applicant AEP Texas Inc. (AEP Texas) request that all parties serve copies of all pleadings, discovery, correspondence, and other documents on the following representative:

Service Contact:

Jerry Huerta
State Bar No. 24004709

AEP Service Corp

400 W. 15th Street, Suite 1520
Austin, Texas 78701

(512) 481-3323 (Telephone)
(512) 481-4591 (Facsimile)

jnhuerta@aep.com

Attorney for AEP Texas Inc.

1. **Applicant (Utility) Name:** AEP Texas Inc.

   Certificate Number: 30028[1]

   Street Address: 539 North Carancahua
   Corpus Christi, Texas 78401

   Mailing Address: 539 North Carancahua
   Corpus Christi, Texas 78401

2. **Please identify all entities that will hold an ownership interest or an investment interest in the proposed project but which are not subject to the Commission's jurisdiction.**

   There are no entities that will hold an ownership interest or an investment interest in the proposed project but which are not subject to the Commission's jurisdiction.

3. **Person to Contact:** Randal E. Roper, PE

   Title/Position: Regulatory Case Manager – AEP Texas

   Phone Number: (512) 481-4572

   Mailing Address: 400 W. 15th Street, Suite 1520
   Austin, Texas 78701

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   Alternate Contact: Mel Eckhoff

   Title/Position: Regulatory Consultant – AEP Service Corp

   Phone Number: (512) 391-2979

   Mailing Address: 400 W. 15th Street, Suite 1520
   Austin, Texas 78701

   Email Address: mleckhoff@aep.com

   Legal Counsel: Jerry Huerta – AEP Service Corp

   Phone Number: (512) 481-3323

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   Austin, Texas 78701

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[1] Certificate Number 30028 was assigned to AEP Texas Central Company, which with AEP Texas North Company, merged with their immediate parent company AEP Utilities, Inc. effective December 31, 2016. The merger was approved by the Public Utility Commission of Texas on December 1, 2016 in P.U.C. Docket No. 46050; SOAH Docket No. 473-16-4822 – *Application of AEP Texas Central Company, AEP Texas North Company, and AEP Utilities, Inc. for Approval of Merger.*
As of January 2017, the merged company is doing business as AEP Texas.

4. Project Description:

Name or Designation of Project:

Application of AEP Texas Inc. to Amend its Certificate of Convenience and Necessity for the Three Rivers to Borglum to Tuleta 138-kV Transmission Line in Live Oak and Bee Counties (Project)

Provide a general description of the project, including the design voltage rating (kV), the operating voltage (kV), the CREZ Zone(s) (if any) where the project is located (all or in part), any substations and/or substation reactive compensation constructed as part of the project, and any series elements such as sectionalizing switching devices, series line compensation, etc. For HVDC transmission lines, the converter stations should be considered to be project components and should be addressed in the project description.

AEP Texas Inc. (AEP Texas) is proposing to construct a new 138-kV transmission line project that will be comprised of two transmission line segments. The first segment will begin at the existing AEP Texas Three Rivers Substation located northeast of the City of Three Rivers on State Highway 72 in Live Oak County, Texas. This segment of the transmission line project will extend southeast until it reaches the proposed AEP Texas Borglum Substation to be located south of the City of Beeville on United States Highway 181 Business in Bee County, Texas. This portion of the project is referred to as the Three Rivers to Borglum Segment, or the TRB Segment and will be designed and constructed as a single-circuit 138-kV line. The second segment of the project will begin at the proposed Borglum Substation and will continue in a northerly direction until it reaches the existing AEP Texas Tuleta Substation located north of the community of Tuleta in Bee County. This portion of the project is referred to as the Borglum to Tuleta Segment, or the BT Segment and will be designed and constructed as a double-circuit 138-kV line. The second circuit will accommodate the rebuild of the existing Tuleta to Normanna to Beeville 69-kV line. Separate routes have been developed and evaluated for each segment, and the routing data will be presented separately for each segment throughout this application.

If the project will be owned by more than one party, briefly explain the ownership arrangements between the parties and provide a description of the portion(s) that will be owned by each party. Provide a description of the responsibilities of each party for implementing the project (design, Right-Of-Way acquisition, material procurement, construction, etc.).

Not applicable. The Project that is the subject of the application will be solely owned by AEP Texas.

If applicable, identify and explain any deviation in transmission project components from the original transmission specifications as previously approved by the Commission or recommended by a PURA §39.151 organization.

There are no transmission specifications that have been previously approved by the Commission for this Project. There have been no deviations in the Project components from the original transmission specifications previously recommended by ERCOT (a PURA § 39.151 organization).

5. Conductor and Structures:

Conductor Size and Type

The conductor to be used for the Project is 795 KCM ACSS 26/7 (Drake)

Number of Conductors per Phase

The Project will be constructed with one (1) conductor per phase.

Continuous Summer Static Current Rating (A)

The Continuous Summer Static Current Rating for the Project is 2025 Amps

Continuous Summer Static Line Capacity at Operating Voltage (MVA)

The Continuous Summer Static Line Capacity at Operating Voltage for the Project is 484 MVA

Continuous Summer Static Line Capacity at Design Voltage (MVA)

The Continuous Summer Static Line Capacity at Design Voltage for the Project is 484 MVA

Type and Composition of Structures

The Project will be constructed using steel or concrete single-pole structures.

Height of Typical Structures

Typical structures will range in height between 90 to 110 feet above grade.

Estimated Maximum Height of Structures

The estimated maximum height of structures for the Project is 110 feet above grade.

Explain why these structures were selected; include such factors as landowner preference, engineering considerations, and costs comparisons to alternate structures that were considered. Provide dimensional drawings of the typical structures to be used in the project.

AEP Texas has selected single-pole structures for construction of the Project. Landowners prefer single-pole structures from an aesthetic perspective and because the smaller footprint reduces the impact on their property as compared to a two-pole H-frame structure or lattice-structure construction. H-frame construction might also require a three-pole structure and anchor guys at angle locations, further increasing the footprint of the structures. Single-pole structures can be constructed at a cost that is comparable to H-frame or lattice structures for 138-kV operation, but with much higher landowner acceptance.

Dimensional drawings of the structures are included as Figures 1-2 through 1-7 of the *Three Rivers – Borglum - Tuleta Transmission Line Project Environmental Assessment, Alternative Route Analysis.* This document, prepared by AEP Texas routing consultant POWER Engineers, Inc. (POWER), is also referred to in this application as the "EA," and is included as Attachment 1 of this application.

For joint applications, provide and separately identify the above-required information regarding structures for the portion(s) of the project owned by each applicant.

6. Right-of-way:

Miles of Right-of-Way

The miles of right-of-way for the 21 TRB alternative routes range from approximately 28.32 miles for Route TRB-8 to approximately 46.70 miles for Route TRB-15.

The miles of right-of-way for the 11 BT alternative routes range from approximately 21.66 miles for Route BT-1 to approximately 37.52 miles for Route BT-2.

Miles of Circuit

The TRB Segment will be a single-circuit line; therefore, the number of miles of circuit is the same as the number of miles of right-of-way and ranges from 28.32 to 46.70 miles.

The BT Segment will be a double-circuit line; therefore, the number of miles of circuit ranges from 43.32 to 75.04 miles.

A table that shows the miles of right-of-way and the miles of circuit for each route is included as Attachment 2 of this application.

Width of Right-of-Way

The typical right-of-way is 100 feet wide.
Temporary easements might be required in some areas for additional working space during construction.

Percent of Right-of-Way Acquired

Some of the links used for the TRB Segment of the Project consist of rebuilding an existing 69-kV transmission line in the existing right-of-way. Links that utilize existing easements represent right-of-way that has already been acquired. The percent of right-of-way that has been acquired for the TRB Segments ranges from zero percent (0%) on Routes TRB-2 and TRB-16 to 78.05 % on Route TRB-8. Route TRB-8 is a 28.32 mile route that would include rebuilding 22.10 miles of the existing 69-kV line. Although the routes will utilize the existing transmission line right-of-way, the easements might need to be supplemented to accommodate the new 138-kV line.

The percent of right-of-way that has been acquired for the BT Segments is zero percent (0) for all routes.

For joint applications, provide and separately identify the above-required information for each route for the portion(s) of the project owned by each applicant.

Not applicable. This is not a joint application.

Provide a brief description of the area traversed by the transmission line. Include a description of the general land uses in the area and the type of terrain crossed by the line.

The area traversed by the alternative routes being evaluated (study area) for this Project is in the vicinity of Beeville Texas and encompasses approximately 375 square miles within portions of Bee and Live Oak counties.

The study area is located within the Interior Coastal Plains sub-province of the Gulf Coastal Prairies Physiographic Province. Elevations within the study area range between approximately 110 feet above mean sea level (amsl) in the southern portions to approximately 470 feet amsl in the northwestern portions of the study area.

The study area is primarily rural with residential development concentrated in the cities of Beeville and Three Rivers. The predominant land use within the study area is rangeland and cropland. The majority of the study area has been impacted by land improvements associated with agriculture, residential structures, roadways, oil and gas activities, and various utility corridors. Overall, the study area viewscape consists of open rangeland/pastureland.

7. Substations or Switching Stations:

List the name of all existing HVDC converter stations, substations or switching stations that will be associated with the new transmission line. Provide documentation showing that the owner(s) of the existing HVDC converter stations, substations and/or switching stations have agreed to the installation of the required project facilities.

Three Rivers Substation – The western portion of the TRB Segment of the Project will terminate at the existing AEP Texas Three Rivers Substation, which is located northeast of the City of Three Rivers, on the east side of State Highway 72 in Live Oak County.

Tuleta Substation – The northern portion of the BT Segment Project will terminate at the existing AEP Texas Three Rivers Substation, which is located north of the community of Tuleta, on the east side of U.S. Highway 181 in Bee County.

No existing HVDC converter stations are associated with the Project.

List the name of all new HVDC converter stations, substations or switching stations that will be associated with the new transmission line. Provide documentation showing that the owner(s) of the new HVDC converter stations, substations and/or switching stations have agreed to the installation of the required project facilities.

Borglum Substation – The eastern portion of the TRB Segment of the Project and the southern portion of the BT Segment of the Project will terminate at the new Borglum Substation, which is proposed to be located south of the City of Beeville on Business U.S. Highway 181 in Bee County.

No new HVDC converter stations are associated with the Project.

8. Estimated Schedule:

Estimated Dates of:	Start	Completion
Right-of-way and Land Acquisition	April 2020	June 2021
Engineering and Design	January 2021	October 2021
Material and Equipment Procurement	March 2021	January 2022
Construction of Facilities	June 2021	August 2022
Energize Facilities	----------	August 2022

9. Counties:

For each route, list all counties in which the route is to be constructed.

All routes filed in this application and any route selected for the construction of this Project will be located in Live Oak and Bee counties.

10. Municipalities:

For each route, list all municipalities in which the route is to be constructed.

A very short portion of Routes BT-1, BT-3, BT-5, BT-6, BT-8, and BT-9 is located within the incorporated boundary of the City of Beeville. Approximately 64 feet of routing Link E4 is located in the City of Beeville where the link crosses the southbound frontage road of U.S. Highway 181 at its intersection with S. Emily Dr. Link E4 is used in all of the above listed BT routes.

For each applicant, attach a copy of the franchise, permit or other evidence of the city's consent held by the utility, if necessary or applicable. If franchise, permit, or other evidence of the city's consent has been previously filed, provide only the docket number of the application in which the consent was filed. Each applicant should provide this information only for the portion(s) of the project which will be owned by the applicant.

Not Applicable. The transmission line routing does not utilize public right-of-way.

11. Affected Utilities:

Identify any other electric utility served by or connected to facilities in this application.

The transmission line that is the subject of this application will not be directly connected to any other electric utility.

Describe how any other electric utility will be affected and the extent of the other utilities' involvement in the construction of this project. Include any other utilities whose existing facilities will be utilized for the project (vacant circuit positions, ROW, substation sites and/or equipment, etc.) and provide documentation showing that the owner(s) of the existing facilities have agreed to the installation of the required project facilities.

No other electric utility is involved in the construction of this project. The Project does not utilize existing facilities owned by any other electric utility.

12. Financing:

Describe the method of financing this project. For each applicant that is to be reimbursed for all or a portion of this project, identify the source and amount of the reimbursement (actual amount if known, estimated amount otherwise) and the portion(s) of the project for which the reimbursement will be made.

The Project will be financed through a combination of debt and equity.

13. Estimated Costs:

Provide cost estimates for each route of the proposed project using the following table. Provide a breakdown of "Other" costs by major cost category and amount. Provide the information for each route in an attachment to this application.

	Transmission Facilities	**Substation Facilities**
Right-of-way and Land Acquisition		
Engineering and Design (Utility)		
Engineering and Design (Contract)		
Procurement of Material and Equipment (including stores)		
Construction of Facilities (Utility)		
Construction of Facilities (Contract)		
Other (all costs not included in the above categories)		
Estimated Total Cost		

Tables showing the estimated cost of the transmission facilities and substation facilities for this Project are included as Attachment 3 of this application.

For joint applications, provide and separately identify the above-required information for the portion(s) of the project owned by each applicant.

Not applicable. This is not a joint application.

14. Need for the Proposed Project:

For a standard application, describe the need for the construction and state how the proposed project will address the need. Describe the existing transmission system and conditions addressed by this application. For projects that are planned to accommodate load growth, provide historical load data and load projections for at least five years. For projects to accommodate load growth or to address reliability issues, provide a description of the steady state load flow analysis that justifies the project. For interconnection projects, provide any documentation from a transmission service customer, generator, transmission service provider, or other entity to establish that the proposed facilities are needed. For projects related to a Competitive Renewable Energy Zone, the foregoing requirements are not necessary; the applicant need only provide a specific reference to the pertinent portion(s) of an appropriate commission order specifying that the facilities are needed. For all projects, provide any documentation of the review and recommendation of a PURA §39.151 organization.

Live Oak County Texas is currently served by two 138-kV lines terminating at the AEP Texas Sigmor 138-kV Station. The Sigmor 138-kV Station then serves as a source to the underlying 69-kV system through a nearby AEP Three Rivers 138-kV Station. The two 138-kV lines terminating at the Sigmor 138-kV Station are:

- San Miguel – Sigmor 138-kV line (28 miles)
- Lon Hill – Orange Grove – Sigmor 138-kV line (66 miles)

The current transmission system is not able to reliably serve this area if either of the above lines is removed from service in order to perform scheduled maintenance or the result of other outage conditions. The purpose of this Regional Planning Group (RPG) submission is to request that ERCOT review various proposals addressing this reliability issue and endorse a transmission project that will reinforce the area and allow future planned maintenance to occur.

In 2013, the San Miguel – Sigmor 138-kV transmission line that is owned by South Texas Electric Cooperative, Inc. (STEC) required maintenance to replace poles, insulators, and other hardware. Maintenance on the transmission line breaker at the STEC San Miguel Station was also required. To accommodate the maintenance outage of the San Miguel – Sigmor 138-kV line, even during off-peak seasonal conditions, a large industrial customer in the area was required to significantly decrease load demand. In addition, the underlying 69-kV system had to be sectionalized in order to prevent overloads and low bus voltages in the event that a forced outage occurred while the 138-kV line was out of service. This reconfiguration of the transmission network also put approximately 80 MW of load in the Live Oak County area at risk of being disconnected should that forced outage occur.

The Electric Reliability Council of Texas (ERCOT) granted the line outage for the San Miguel – Sigmor 138-kV line contingent on the system adjustments described above, and scheduled it for October 2013. On October 15th, system adjustments were completed, the San Miguel – Sigmor line was opened, and the required maintenance began.

On October 21st, the static shield wire of the Lon Hill - Orange Grove 138-kV line failed and faulted one of the phase conductors, causing the Orange Grove – Sigmor 138-kV line to trip and lock open. Approximately 80 MW of load loss resulted from this forced outage that included a large industrial customer and seventeen (17) substations with load connected.

AEP Service Corporation (AEPSC) on behalf of AEP Texas submitted a proposal to ERCOT Regional Planning Group (RPG) to address the reliability of the Live Oak County area electric system. ERCOT is responsible for identifying the necessary transmission system improvements to provide a reliable and adequate transmission network in most of Texas, including this area. ERCOT studied the proposal submitted by AEPSC and conducted an independent review of five options, which included adding additional autotransformers, upgrading existing lines, and constructing other new transmission lines.

These five options are described in the report of ERCOT's Independent Review and in the response to Question No. 15 of this application. ERCOT determined that Option 4 most effectively resolved the reliability issues in the Live Oak County area.

After being reviewed by the ERCOT RPG and the ERCOT Technical Advisory Committee, the ERCOT Board of Directors recommended that the Project that is the subject of this application was needed to support the reliability of the ERCOT regional transmission system.

A copy of the proposal submitted to the ERCOT RPG by AEPSC on behalf of AEP Texas is included in this application as Attachment 4a. A copy of ERCOT's Independent Review is included in this application as Attachment 4b. A copy of the letter to AEP signifying the recommendation of the ERCOT Board of Directors is included in this application as Attachment 4c.

15. Alternatives to Project:

For a standard application, describe alternatives to the construction of this project (not routing options). Include an analysis of distribution alternatives, upgrading voltage or bundling of conductors of existing facilities, adding transformers, and for utilities that have not unbundled, distributed generation as alternatives to the project. Explain how the project overcomes the insufficiencies of the other options that were considered.

Transmission Alternatives

- Option 1: New 345/138-kV Substation on the Lon Hill – Pawnee 345-kV Line with new 138-kV Line to Three Rivers 138-kV Station
    - Construct a new three breaker ring bus, 345/138-kV Substation on the existing 345-kV line from Pawnee to Lon Hill
    - Install an autotransformer at the new 345/138-kV Substation with an emergency rating of approximately 540 MVA
    - Construct approximately 15 miles of new 138-kV transmission line from the new Substation to the existing Three Rivers Station with an emergency rating of approximately 534 MVA
    - Rebuild the Pettus - Normanna – Beeville 69-kV line on a double circuit capable structure with an emergency rating of approximately 180 MVA
    - Upgrade the Sigmor – George West 138-kV line with an emergency rating of approximately 486 MVA
- Option 2: New Pawnee – Three Rivers 138-kV Line
    - Construct approximately 22 miles of new 138-kV transmission line from the existing Pawnee Station to the existing Three Rivers Station with an emergency rating of approximately 534 MVA
    - Rebuild the Pettus - Normanna – Beeville 69-kV line on a double circuit capable structure with an emergency rating of approximately 180 MVA
    - Upgrade the Sigmor – George West 138-kV line with an emergency rating of approximately 486 MVA
- Option 3: New Tuleta – Three Rivers 138-kV Line
    - Construct approximately 24 miles of new 138-kV transmission line from the existing Tuleta Station to the existing Three Rivers Station with an emergency rating of approximately 534 MVA.
- Option 4: New 138-kV Beeville Substation with New Tuleta – Beeville 138-kV Line and Beeville – Three Rivers 69-kV line rebuild and convert to 138-kV
    - Construct a new 138-kV Beeville Substation near the existing Beeville 69-kV Station
    - Install a new 138/69-kV autotransformer at the new Beeville 138-kV Station with an emergency rating of approximately 143MVA
    - Construct a new 138/69-kV double circuit transmission line from Tuleta to Beeville with emergency ratings approximately 360/180 MVA. Attempt to utilize existing Right of Way of the Pettus – Normanna – Beeville 69-kV transmission line where possible

- Using existing Right of Way where possible, rebuild and convert the existing Beeville – Three Rivers 69-kV transmission line to 138 kV with an emergency rating of approximately 360 MVA.

- Option 5: New 138-kV Beeville Substation with New Tuleta – Beeville 138-kV Line and Beeville – Three Rivers 69-kV line rebuild and convert to 138 kV
  - Construct a new 138-kV Beeville Substation near the existing Beeville 69-kV Station
  - Install a new 138/69-kV autotransformer at the new Beeville 138-kV Station with an emergency rating of approximately 143 MVA
  - Construct a new 138/69-kV double circuit transmission line from Tuleta to Beeville with emergency ratings approximately 360/180 MVA. Attempt to utilize existing Right of Way of the Pettus – Normanna – Beeville 69-kV transmission line where possible
  - Using existing Right of Way where possible, rebuild and convert the existing Beeville – Three Rivers 69-kV transmission line to 138-kV with an emergency rating of approximately 360 MVA.

Ultimately, ERCOT determined that Option 4 most effectively resolved the reliability issues in the Live Oak County area.

Distribution Alternatives

Distribution alternatives were not considered a viable solution to address the transmission related reliability issues addressed by the Project.

Distributed Generation

AEP Texas is not a bundled utility and cannot own or control the amount or location of distributed generation.

16. Schematic or Diagram:

For a standard application, provide a schematic or diagram of the applicant's transmission system in the proximate area of the project. Show the location and voltage of existing transmission lines and substations, and the location of the construction. Locate any taps, ties, meter points, or other facilities involving other utilities on the system schematic.

A schematic of the transmission system in the proximate area of the Project is included with this application as Attachment 5.

17. Routing Study:

Provide a brief summary of the routing study that includes a description of the process of selecting the study area, identifying routing constraints, selecting potential line segments, and the selection of the routes. Provide a copy of the complete routing study conducted by the utility or consultant. State which route the applicant believes best addresses the requirements of PURA and P.U.C. Substantive Rules.

A copy of the complete environmental assessment and routing study that was prepared by POWER Engineers is included as Attachment 1 of this application. This study is titled *Three Rivers – Borglum - Tuleta Transmission Line Project Environmental Assessment, Alternative Route Analysis.* (EA). The EA presents the analysis that was conducted by POWER Engineers and the land use and environmental data for all of the routes that were considered for this Project.

The objective of the EA was to identify and evaluate an adequate number of geographically diverse alternative transmission line routes that comply with the routing criteria in PURA and the P.U.C.'s Substantive Rules, and ultimately recommend to AEP Texas the routes that POWER Engineers determined best address the requirements of PURA and the P.U.C.'s Substantive Rules from a land use and environmental standpoint. AEP Texas and POWER Engineers utilized a comprehensive transmission line routing and evaluation methodology to delineate and evaluate alternative transmission line routes.

As discussed below, the study approach utilized by POWER Engineers for this EA consisted of project scoping and study area delineation, data collection, constraint mapping, preliminary alternative route identification, review and adjustment of alternative routes following field review, consideration of open-house input, alternative route analysis and impact assessment, and finally the recommendation by POWER Engineers of alternative routing to AEP Texas, including the primary alternative routes determined to best address the requirements of PURA and the P.U.C.'s Substantive Rules from a land use and environmental perspective.

The first step in the selection of alternative routing options was to select a study area. This area needed to encompass the Project endpoints and include a sufficiently large area within which feasible and geographically diverse alternative routes could be delineated. The study area for this Project is in the vicinity of Beeville Texas and encompasses approximately 375 square miles within portions of Bee and Live Oak counties.

The study area for the Project was defined based on the Project endpoints. The study area is shown on Figure 2-1 of the EA.

POWER Engineers used data in the delineation and evaluation of routes that were drawn from a variety of sources, including published literature (documents, reports, maps, aerial photography, etc.), and information from local, state and federal agencies. Recent (2016) National Agriculture Inventory Program color aerial photographs, Environmental Systems Research Institute (ESRI)-hosted imagery from the Texas Orthoimagery Program (2016), U.S. Geological Survey (USGS) 7.5 minute quadrangle topographic maps, Texas Department of Transportation (TxDOT) county highway maps, FWS National Wetlands Inventory maps, Texas Natural Diversity Database (TXNDD), Federal Emergency Management Agency maps, and ground reconnaissance surveys were used throughout the selection and evaluation of routes.

Ground reconnaissance of the study area and computer-based evaluation of digital aerial imagery was utilized for both refinement and evaluation of routes. Though the data collection effort was concentrated in the early stages of the Project, it was ongoing and continued throughout the evaluation process.

A constraint mapping process was used in the selection and refinement of possible alternative routes. The geographic locations of environmentally sensitive and other restrictive areas within the study area were located and considered during transmission line route delineation. These constraints were mapped on a topographic representation of the area created on a USGS 7.5 minute quadrangle topographic base maps, and on aerial photography. The environmental and land-use constraints topographic maps are included in Attachment 1 of this application as Figures 3-3a and 3-3b, (located in Map Pockets in the EA).

Using the constraint maps, electrical system maps, field inspections, and input from AEP Texas, POWER Engineers designated numerous preliminary routing link options that took into consideration environmental and land use constraints. These preliminary alternative routing link options are shown on Figure 3-1 of the EA. The principal criteria used to locate these preliminary routing link option alternatives were using or paralleling existing transmission facilities, paralleling existing road right-of-way, paralleling apparent property lines, and avoiding residential and commercial development.

In order to solicit public input about the Project, AEP Texas presented these preliminary alternative routing options to the public at two open-house meetings held in the area in May 2017.

After the public meeting, AEP Texas and POWER Engineers evaluated public comments (both written and verbally communicated at the public meetings), performed additional reviews to address areas of concern that were discussed at the public meetings, and discussed some revisions to the preliminary routing options. In response to the public input and landowner concerns, several links were modified to reduce impacts to habitable structures, and other constraints to the greatest extent practicable.

Based on information obtained from the public meetings, meetings and communications with local, state, and federal agencies, further field review, additional communications with property owners, and discussions with AEP Texas project team, POWER Engineers identified the primary alternative links.

The primary alternative links were then used by POWER Engineers with input from AEP Texas project team to develop the primary alternative routes for evaluation. POWER Engineers identified potentially affected resources and considered each during this route development process. In evaluating these identified primary alternative routes, POWER Engineers considered 41 environmental and land-use criteria. These criteria are listed in Table 2-1 of the EA.

POWER Engineers professionals with expertise in different environmental disciplines (wildlife biology, land use/planning, and archaeology) and the POWER Engineers project manager evaluated the primary alternative routes. Evaluations were based on environmental and land use conditions present along each primary alternative route. Each POWER Engineers staff person independently analyzed the environmental data for each primary alternative route from the perspective of their own technical discipline. The evaluators then met as a group and discussed their independent results. The group reached a consensus regarding the relationship and relative sensitivity among the major environmental factors, and ranked the top five primary alternative routes based strictly on the environmental and land use data and shared discussion. Based upon this ranking, POWER Engineers recommended a route that best addresses the requirements of PURA and P.U.C. Substantive Rules from an environmental and land use perspective, and the results are shown in Table 5-1 of the EA.

The consensus opinion of POWER Engineers evaluators was to recommend Route TRB-8 and BT-1 as the routes that best addresses the requirements of PURA and P.U.C. Substantive Rules from an environmental and land use perspective.

AEP Texas considered all of the certification criteria in PURA and the P.U.C. Substantive Rules, input from the public, and the environmental and land use recommendation of its routing consultant, POWER Engineers. AEP Texas also evaluated each primary alternative route from an engineering, design, construction, operations, and maintenance perspective, and considered the estimated cost for each of the primary alternative routes. AEP Texas determined that Routes TRB-19 and BT-1 provide the best balance of routing characteristics and best addresses the requirements of PURA and P.U.C. Substantive Rules. Data and a discussion of these determinations are included with this application as Attachment 6.

18. Public Meeting or Public Open House:

Provide the date and location for each public meeting or public open house that was held in accordance with P.U.C. Proc. R. 22.52. Provide a summary of each public meeting or public open house including the approximate number of attendants, and a copy of any survey provided to attendants and a summary of the responses received. For each public meeting or public open house provide a description of the method of notice, a copy of any notices, and the number of notices that were mailed and/or published.

AEP Texas hosted two public open-house meetings in May of 2017 to solicit comments from landowners and other interested residents regarding the preliminary alternative links. A meeting was held on May 22nd at the Three Rivers Elementary School in the City of Three Rivers, and on May 23rd at the Beeville Community Center in the City of Beeville.

A notice of the public open-house meetings was mailed to 685 landowners who own property located within 300 feet of the preliminary alternative routing links. This notice included a map of the study area depicting the preliminary alternative routing links, a question and answer sheet, and a diagram of typical 138-kV transmission line structures. An example of the notice letter and a copy of the attachments are provided in Appendix B of the EA.

A total of 41 individuals attended the public open house meeting in Three Rivers according to the sign-in sheet, with 38 submitting questionnaire responses at the meeting. A total of 109 individuals attended the public open house meeting in Beeville according to the sign-in sheet, with 80 submitting questionnaire responses at the meeting.

At the public meetings, each information station was devoted to a particular aspect of the routing study and was manned with personnel representing AEP Texas and/or POWER Engineers. Displays, maps, illustrations, and photographs were used to explain each particular topic that was presented. Large aerial photographic maps were used to present the routing links being considered to the attendees and obtain input. A geographic information system (GIS) station was also available for a detail view of property and additional discussion. Interested citizens and property owners were encouraged to visit each station in order so that the process could be explained in the general sequence of development. The information station format is advantageous because it allows attendees to process information in a relaxed manner and also allows them to focus on their particular interest and ask specific questions. Importantly, the one-on-one discussions with AEP Texas representatives and POWER Engineers staff encourage more interaction from those citizens who might be hesitant to participate in a speaker/audience format.

Additional information concerning the open-house meeting is contained in Appendix B of the EA, which is included as Attachment 1 of this application.

19. Routing Maps:

Base maps should be a full scale (one inch = not more than one mile) highway map of the county or counties involved, or other maps of comparable scale denoting sufficient cultural and natural features to permit location of all routes in the field. Provide a map (or maps) showing the study area, routing constraints, and all routes or line segments that were considered prior to the selection of the routes. Identify the routes and any existing facilities to be interconnected or coordinated with the project. Identify any taps, ties, meter points, or other facilities involving other utilities on the routing map. Show all existing transmission facilities located in the study area. Include the locations of radio transmitters and other electronic installations, airstrips, irrigated pasture or cropland, parks and recreational areas, historical and archeological sites (subject to the instructions in Question 27), and any environmentally sensitive areas (subject to the instructions in Question 29).

Routing maps are provided in the EA. Figures 3-3a and 3-3b (located in Map Pockets in the EA) are topographic-based maps (scale of 1 inch = 2,000 feet) that show the study area, all routing links, routing constraints and other environmental and land use features, and existing transmission lines. Figures 5-1a and 5-1b (located in Map Pockets in the EA) are aerial-based maps (scale of 1 inch = 2,000 feet) that show the study area, all routing links, routing constraints and other environmental and land use features, and existing transmission lines. Figure 3-1 of the EA shows the preliminary alternative routing links that were presented at the open houses, and Figure 3-2 shows the primary alternative routing links evaluated for the Project.

Provide aerial photographs of the study area displaying the date that the photographs were taken or maps that show (1) the location of each route with each route segment identified, (2) the locations of all major public roads including, as a minimum, all federal and state roadways, (3) the locations of all known habitable structures or groups of habitable structures (see Question 19 below) on properties directly affected by any route, and (4) the boundaries (approximate or estimated according to best available information if required) of all properties directly affected by any route.

Figures 5-1a and 5-1b (located in Map Pockets in the EA) are aerial-photograph based maps (scale of 1 inch = 2,000 feet) that show the study area, all routing links, existing transmission lines, other environmental and land use features, and the locations of all known habitable structures or groups of habitable structures located within 300 feet of the route centerlines.

Aerial-photograph-based maps (scale of 1 inch = 500 feet) are included in this application as Attachment 7, Sheets 1 through 9, and show the approximate boundaries of all properties that are directly affected by all routes according to the best information available from county tax appraisal district records.

For each route, cross-reference each habitable structure (or group of habitable structures) and directly affected property identified on the maps or photographs with a list of corresponding landowner names and addresses and indicate which route segment affects each structure/group or property.

A cross reference table that shows the landowner name and address, the property identification number and the habitable structure identification number from the landownership maps in Attachment 7, Sheets 1 through 9, and the routing links associated with the landowners and habitable structures is included as Attachment 8 of this application.

20. Permits:

List any and all permits and/or approvals required by other governmental agencies for the construction of the proposed project. Indicate whether each permit has been obtained.

AEP Texas will coordinate with all of the appropriate local, state, and federal agencies with jurisdiction regarding the construction of the transmission facilities associated with this Project. AEP Texas and/or POWER Engineers have initiated contact with and provided information about the Project to various agencies. Some input from these agencies have been incorporated in this application; however, requests for permits and/or approvals will not be submitted to the appropriate agencies until the final alignment of the approved route is determined. None of the following potential permits, approvals, requirements, easements, or clearances has been obtained.

- Floodplain development permits and road crossing permits might be required by the counties in which the approved route is located, depending on the location of the transmission line structures.
- Permits for crossing roads, highways, and/or other properties owned or maintained by Texas Department of Transportation will be obtained as necessary.
- Cultural resource clearance will be obtained from the Texas Historical Commission for the proposed Project right-of-way as necessary.
- A Storm Water Pollution Prevention Plan (SWPPP) might be required by the Texas Commission on Environmental Quality (TCEQ). AEP Texas or its contractor will submit a Notice of Intent to the TCEQ at least 48 hours prior to the beginning of construction; and will have the SWPPP on site at the initiation of clearing and construction activities.
- A Miscellaneous Easement from the Texas General Land Office will be obtained as necessary for any right-of-way that crosses a state-owned riverbed or navigable stream.
- Notification to the Federal Aviation Administration (FAA) might be required depending on the alignment of the approved route, structure locations, and structure designs. Requirements to alter the design of the structures or potential requirements to mark and/or illuminate the line will be coordinated with the FAA.
- Permits or other requirements associated with possible impacts to endangered/threatened species will be coordinated with the U.S. Fish and Wildlife Service as necessary.
- Permits or other requirements associated with possible impacts to waters of the U.S. under the jurisdiction of the U.S. Army Corps of Engineers (USACE) will be coordinated with the USACE as necessary. None of the routing links for this Project crosses property that is owned by the USACE, and no easements on USACE property will be necessary.

21. Habitable structures:

For each route list all single-family and multi-family dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline if the proposed project will be constructed for operation at 230kV or less, or within 500 feet of the centerline if the proposed project will be constructed for operation at greater than 230kV. Provide a general description of each habitable structure and its distance from the centerline of the route. In cities, towns or rural subdivisions, houses can be identified in groups. Provide the number of habitable structures in each group and list the distance from the centerline of the route to the closest and the farthest habitable structure in the group. Locate all listed habitable structures or groups of structures on the routing map.

General descriptions of the habitable structures that are within 300 feet of the centerline of each route and the distances from the centerlines are provided in Section 5 of the EA and in Tables 5-3 through 5-34 of the EA. The habitable structures that are located within 300 feet of the routes are shown on Figure 5-1 (located in Map Pockets in the EA) and on Attachment 7, Sheets 1 through 6. Details regarding the number of habitable structures that are within 300 feet of the centerline of the alternative routes are included in Tables 4-1 and 4-2, and in Section 4.2.1 of the EA.

TRB Routes

The number of habitable structures that are within 300 feet of the centerlines of the 21 TRB alternative routes ranges from a high of 46 on Route TRB-5 to 10 on Route TRB-17.

BT Routes

The number of habitable structures that are within 300 feet of the centerlines of the 11 BT alternative routes ranges from a high of 44 on Route BT-5 and BT-6 to 6 on Route BT-11.

22. Electronic Installations:

For each route, list all commercial AM radio transmitters located within 10,000 feet of the center line of the route, and all FM radio transmitters, microwave relay stations, or other similar electronic installations located within 2,000 feet of the center line of the route. Provide a general description of each installation and its distance from the center line of the route. Locate all listed installations on a routing map.

For each alternative route, the number of commercial AM radio transmitters within 10,000 feet of right-of-way centerline and the number of electronic installations (including commercial FM transmitters, cellular telephone towers, microwave relay stations, or other similar electronic installations) within 2,000 feet of the right-of-way centerline are provided in Tables 4-1 and 4-2 of the EA. General descriptions of the electronic installations and the distances from the centerlines of the routes are provided in Section 4.2.6 of the EA and in Tables 5-3 through 5-34 of the EA, and are shown on Figures 3-3a, 3-3b, 5-1a, and 5-1b (located in Map Pockets in the EA).

None of the TRB or BT Routes would have a significant impact on electronic installations or operations in the study area.

TRB and BT Routes

There is one commercial AM radio tower located within 10,000 feet of the centerlines of all of the 21 TRB alternative routes and all of the 11 BT alternative routes.

TRB Routes

The number of FM radio transmitters, microwave relay station, or other similar electronic installations located within 2,000 feet of TRB routes ranges from four (4) on Route TRB-5 to zero (0) on Routes TRB-12, TRB-14, TRB-15, TRB-16, and TRB-17.

BT Routes

The number of FM radio transmitters, microwave relay station, or other similar electronic installations located within 2,000 feet of BT routes ranges from one (1) for nine (9) BT alternative routes to zero (0) for Routes BT-2 and BT-7

23. Airstrips:

For each route, list all known private airstrips within 10,000 feet of the center line of the project. List all airports registered with the Federal Aviation Administration (FAA) with at least one runway more than 3,200 feet in length that are located within 20,000 feet of the center line of any route. For each such airport, indicate whether any transmission structures will exceed a 100:1 horizontal slope (one foot in height for each 100 feet in distance) from the closest point of the closest runway. List all listed airports registered with the FAA having no runway more than 3,200 feet in length that are located within 10,000 feet of the center line of any route. For each such airport, indicate whether any transmission structures will exceed a 50:1 horizontal slope from the closest point of the closest runway. List all heliports located within 5,000 feet of the center line of any route. For each such heliport, indicate whether any transmission structures will exceed a 25:1 horizontal slope from the closest point of the closest landing and takeoff area of the heliport. Provide a general description of each listed private airstrip, registered airport, and heliport; and state the distance of each from the center line of each route. Locate and identify all listed airstrips, airports, and heliports on a routing map.

According to Federal Aviation Administration (FAA) Regulations, Title 14 Code of Federal 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 feet from the nearest point of the nearest runway of a public or military airport having at least one runway longer than 3,200 feet (FAA, 1975).

If a runway is less than 3,200 feet, 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 feet. 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 feet from the nearest point of the nearest landing and takeoff area for heliports. In addition, FAA Regulations require notification of the construction of any object that is greater than 200 feet above ground level and within three miles of an airport with a runway more than 3,200 feet in length. Typical structure heights for this Project will be approximately 90 feet to 110 feet, depending on location and design.

Following P.U.C. approval of a route for the proposed transmission line, AEP Texas 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.

General descriptions of the airports, airstrips, and heliports are provided in Section 4.2.5. Tables 4-1 and 4-2 of the EA identify the number of airports, airstrips, and heliports for each of the alternative routes. The airports are shown on Figures 3-3a, 3-3b, 5-1a, and 5-1b (located in Map Pockets in the EA); and the distances from the centerlines of the routes are provided in Tables 5-3 through 5-34 in the EA.

TRB and BT Routes

There are no FAA-registered airports where there is not a runway more than 3,200 feet in length located within 10,000 feet of any of the TRB or BT alternative routes. There are also no heliports located within 5,000 feet of any of the TRB or BT alternative routes.

TRB Routes

There are two public FAA registered airports with at least one runway longer than 3,200 feet located within 20,000 feet of TRB alternative routes, Beeville Municipal County Airport and Chase Field Industrial Airport. The Beeville Municipal County Airport is located within 20,000 feet of all of TRB routes and Chase Field Industrial Airport is located within 20,000 feet of Routes TRB-14, TRB-15, and TRB-16.

There is a private airstrip, Terminal D Ranch, located within 10,000 feet of 16 of the TRB alternative routes.

BT Routes

There are two public FAA registered airports with at least one runway longer than 3,200 feet located within 20,000 feet of all of the BT alternative routes, the Beeville Municipal County Airport and Chase Field Industrial Airport.

There is a private airstrip, The Flats, located within 10,000 feet of all of the BT alternative routes.

24. Irrigation Systems:

For each route identify any pasture or cropland irrigated by traveling irrigation systems (rolling or pivot type) that will be traversed by the route. Provide a description of the irrigated land and state how it will be affected by each route (number and type of structures etc.). Locate any such irrigated pasture or cropland on a routing map.

None of the TRB or BT alternative routes cross any land with known traveling irrigation systems.

25. Notice:

Notice is to be provided in accordance with P.U.C. Proc. R. 22.52.

A. Provide a copy of the written direct notice to owners of directly affected land. Attach a list of the names and addresses of the owners of directly affected land receiving notice.

A sample copy of the written direct notice and enclosures that were mailed to owners of directly affected land is provided in Attachments 9a through 9f. A list of the names and addresses of these landowners is provided in Attachment 9g.

B. Provide a copy of the written notice to utilities that are located within five miles of the routes.

A sample copy of the written notice to utilities that are located within five miles of the proposed Project is provided in Attachment 10a. The list of the names and addresses of these utilities is provided in Attachment 10b.

C. Provide a copy of the written notice to county and municipal authorities, and the Department of Defense Siting Clearinghouse. Notice to the DoD Siting Clearinghouse should be provided at the email address found at http://www.acq.osd.mil/dodsc/.

Sample copies of the written notice to county and municipal authorities are provided as Attachment 11a. The list of the names and addresses of these authorities is provided in Attachment 11b. Verification of notice to the DoD Siting Clearinghouse is provided in Attachment 11c.

D. Provide a copy of the notice that is to be published in newspapers of general circulation in the counties in which the facilities are to be constructed. Attach a list of the newspapers that will publish the notice for this application. After the notice is published, provide the publisher's affidavits and tear sheets.

A sample copy of the notice to be published in newspapers of general circulation in the counties in which the proposed facilities are to be constructed is provided in Attachment 12a. A list of the newspapers that will publish the notice for this application is provided as Attachment 12b.

In addition to the notices described above, 16 Tex. Admin. Code § 22.52 requires AEP Texas to provide notice of this application to the Office of Public Utility Counsel. A copy of that notice is included in this application as Attachment 13.

For a CREZ application, in addition to the requirements of P.U.C. Proc. R. 22.52 the applicant shall, not less than twenty-one (21) days before the filing of the application, submit to the Commission staff a "generic" copy of each type of alternative published and written notice for review. Staff's comments, if any, regarding the alternative notices will be provided to the applicant not later than seven days after receipt by Staff of the alternative notices. Applicant may take into consideration any comments made by Commission staff before the notices are published or sent by mail.

Not Applicable. This is not a CREZ application.

26. Parks and Recreation Areas:

For each route, list all parks and recreational areas owned by a governmental body or an organized group, club, or church and located within 1,000 feet of the center line of the route. Provide a general description of each area and its distance from the center line. Identify the owner of the park or recreational area (public agency, church, club, etc.). List the sources used to identify the parks and recreational areas. Locate the listed sites on a routing map.

POWER Engineers performed a review of federal and state databases, and county and local maps to identify parks and/or recreational areas within the study area. Reconnaissance surveys were also conducted to identify any additional park or recreational areas that are located within the study area.

TRB and BT Routes

None of the TRB or BT alternative routes cross any parks or recreational areas, or are located within 1,000 feet of any park or recreational area.

27. Historical and Archeological Sites:

For each route, list all historical and archeological sites known to be within 1,000 feet of the center line of the route. Include a description of each site and its distance from the center line. List the sources (national, state or local commission or societies) used to identify the sites. Locate all historical sites on a routing map. For the protection of the sites, archeological sites need not be shown on maps.

To identify the historical and archeological sites in the study area, POWER Engineers researched the available records and literature at the Texas Archeological Research Laboratory, J.J. Pickle Research Campus, at the University of Texas at Austin. In addition, the Texas Historical Commission's Archeological Sites Atlas (TASA) files were used to identify listed and eligible National Register of Historical Places (NRHP) properties and sites, NRHP districts, cemeteries, Official Texas Historical Markers, State Archeological Landmarks, and 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. To identify areas with a high probability for the occurrence of cultural resources, POWER Engineers used 7.5-minute topographic maps and aerial photography.

General descriptions of the historical and archeological resources are provided in Section 4.4 of the EA. The distances from the centerline of the alternative routes is shown in Tables 5-3 through 5-34 of the EA. For the protection of the sites, archeological sites are not shown on the maps.

Because a cultural resource survey has not been conducted for most of the alternative routes, additional cultural resources sites that have not yet been recorded or evaluated might also exist within these corridors. Consequently, the potential of impacting undiscovered cultural resources exists along many of the alternative routes. To assess this potential, high probability areas (HPA) for additional, unrecorded prehistoric resources were identified by a professional archeologist by reviewing aerial, soil, and topographic maps. Topography, availability of water and other natural resources are all taken into consideration to determine HPA, as well as the effects of geologic processes on archeological deposits.

Water crossings, stream confluences, closed depressions capable of holding water, stream terraces, wide floodplains, and areas near previously recorded sites are all typical HPA, as well as lithic resource outcroppings, and the locations of other resources. HPA are defined using these considerations were mapped using GIS and the length of each alternative route across the HPA was tabulated for use in comparison of the alternative routes. The TASA was also reviewed to identify areas where prehistoric resources have been documented in the vicinity of the study area.

TRB and BT Routes

None of the TRB or BT alternative routes cross or are located within 1,000 feet of any NRHP listed property. No cemeteries are crossed or located within 1,000 feet of any of the 16 alternative routes.

TRB Routes

There are seven archeological sites recorded within 1,000 feet of the TRB alternative route centerlines. One of the recorded archeological sites, which is a campsite, is crossed by six of the TRB routes. The number of additional archeological sites within 1,000 feet of the TRB alternative route centerlines ranges from six (6) on five (5) of the TRB routes to zero (0) on 14 of the TRB routes. No adverse impacts are anticipated for any of the previously recorded cultural resources from any of the alternative routes. It is anticipated that potential impacts to these sites will be mitigated through careful selection of routing alternatives and/or engineering design and construction measures that will protect the sites. Descriptions of the sites are included in Section 4.4.4 of the EA, and Table 4-5 identifies the routes within 1,000 feet and the distance to the centerline of the alternative routes. None of the sites have been formally assessed for listing on the NRHP.

All of the TRB alternative routes cross high probability areas (HPAs) for potential archeological sites or other prehistoric cultural resources. The length of right-of-way across HPAs for the TRB routes range from 8.67 miles for Route TRB-7 to 17.53 miles for Route TRB-15.

BT Routes

There are no recorded archeological sites crossed or located within 1,000 feet of any of the BT routes.

All of the BT alternative routes cross high probability areas (HPAs) for potential archeological sites or other prehistoric cultural resources. The length of right-of-way across HPAs for the BT routes range from 11.59 miles for Route BT-1 to 23.28 miles for Route BT-2.

28. Coastal Management Program:

For each route, indicate whether the route is located, either in whole or in part, within the coastal management program boundary as defined in 31 T.A.C. §503.1. If any route is, either in whole or in part, within the coastal management program boundary, indicate whether any part of the route is seaward of the Coastal Facilities Designation Line as defined in 31 T.A.C. §19.2(a)(21). Using the designations in 31 T.A.C. §501.3(b), identify the type(s) of Coastal Natural Resource Area(s) impacted by any part of the route and/or facilities.

This application does not includes facilities located within the coastal management program boundary as defined in 31 T.A.C. § 503.1.

29. Environmental Impact:

Provide copies of any and all environmental impact studies and/or assessments of the project. If no formal study was conducted for this project, explain how the routing and construction of this project will impact the environment. List the sources used to identify the existence or absence of sensitive environmental areas. Locate any environmentally sensitive areas on a routing map. In some instances, the location of the environmentally sensitive areas or the location of protected or endangered species should not be included on maps to ensure preservation of the areas or species. Within seven days after filing the application for the project, provide a copy of each environmental impact study and/or assessment to the Texas Parks and Wildlife Department (TPWD) for its review at the address below. Include with this application a copy of the letter of transmittal with which the studies/assessments were or will be sent to the TPWD.

Wildlife Habitat Assessment Program
Wildlife Division
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, Texas 78744

The EA that was conducted by POWER Engineers is included with this application as Attachment 1. Data used by POWER Engineers in the delineation and evaluation of alternative routes were drawn from a variety of sources, including published literature (documents, reports, maps, aerial photography, etc.), and information from local, state, and federal agencies. Recent (2014) National Agriculture Inventory Program color aerial photographs, 2010-2011 Environmental Systems Research Institute (ESRI) aerial photography, U.S. Geological Survey (USGS) 7.5 minute quadrangle topographic maps, Texas Department of Transportation (TxDOT) county highway maps, FWS National Wetlands Inventory maps, Texas Natural Diversity Database (TXNDD), Federal Emergency Management Agency maps, and ground reconnaissance surveys were also used throughout the selection and evaluation of alternative routes. Ground reconnaissance of the study area and computer-based evaluation of digital aerial imagery was 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 and continued up to the point of final alternative route option selections.

A copy of the letter of transmittal of the application, including the EA for this Project, to the TPWD is included in this application as Attachment 14a. An affidavit verifying that the application and EA were sent to TPWD is included in this application as Attachment 14b.

30. Affidavit:

Attach a sworn affidavit from a qualified individual authorized by the applicant to verify and affirm that, to the best of their knowledge, all information provided, statements made, and matters set forth in this application and attachments are true and correct.

The sworn affidavit of the AEP Texas project manager for this Project is included with this application as Attachment 15.

CCN Application – List of Attachments

1	Environmental Assessment and Alternative Route Analysis
2	Estimated Lengths of Alternative Route
3	Estimated Costs of Alternative Routes and Substations
4a	AEP Submission to ERCOT RPG
4b	ERCOT Independent Review
4c	ERCOT RPG Letter Accepting the Project
5	Diagram of Existing Transmission System
6	PURA and PUC Rules Best Route
7	Property Ownership Map
8	Landowner – Habitable Structure Cross-Reference Table
9a	Notice – Landowner Letter
9b	Notice – Map
9c	Notice – Route Descriptions
9d	Notice – PUC Landowner Brochure
9e	Notice – Protest/Comment Form
9f	Notice – Intervenor Form
9g	Notice – Landowner List
10a	Notice – Utilities Letter *
10b	Notice – Utilities List
11a	Notice – County and Municipal Officials Letter *
11b	Notice – County and Municipal Officials List
11c	Notice – Department of Defense Siting Clearinghouse
12a	Notice – Newspaper Publication
12b	Notice – Newspaper Publication List
13	Notice – Office of Public Utility Counsel *
14a	Letter of Transmittal of Application to the Texas Parks and Wildlife Department
14b	Affidavit Verifying Transmittal of Application to the Texas Parks and Wildlife Department
15	Application Affidavit of AEP Texas Project Manager

* Excluding Map and Route Descriptions provided in Attachment 9

September 2018

AEP TEXAS, INC.

Three Rivers - Borglum - Tuleta Transmission Line Project
Environmental Assessment and Alternative Route Analysis

Bee and Live Oak Counties, Texas

PROJECT NUMBER:
142467,142468

PROJECT CONTACT:
Lisa Barko Meaux
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281-765-5507

POWER ENGINEERS

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Three Rivers - Borglum – Tuleta Transmission Line Project

PREPARED FOR: *AEP TEXAS, INC.*

PREPARED BY: *POWER ENGINEERS, INC.*
HOUSTON, TEXAS

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APPENDICES:

FIGURES:

TABLES:

ACRONYMS AND ABBREVIATIONS

AEP Texas	American Electric Power Texas, Inc.
AM radio	Amplitude modulation radio
amsl	above mean sea level
ANSI	American National Standards Institute
BEG	Bureau of Economic Geology
BGEPA	Bald and Golden Eagle Protection Act
BMP(s)	Best Management Practices(s)
BP	Before Present
BT	Borglum to Tuleta
CCN	Certificate of Convenience and Necessity
CFR	Code of Federal Regulations
CLF	civilian labor force
CMP	Coastal Management Program
CR	County Road
CWA	Clean Water Act
DoD	Department of Defense
EA	Environmental Assessment and Alternative Route Analysis
ESA	Endangered Species Act
ESSS	Ecologically Significant Stream Segments
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FM	Farm-to-Market Road
FM radio	Frequency modulation radio
FPPA	Farmland Protection Policy Act
GIS	Geographic Information Systems
GLO	General Land Office
HPA	high probability area
HTC	Historic Texas Cemeteries
IH	Interstate Highway
ISD	Independent School District
IPaC	Information for Planning and Consultation
kV	kilovolt
MBTA	Migratory Bird Treaty Act
NAIP	National Agricultural Imagery Program
NCED	National Conservation Easement Database
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NOI	Notice of Intent

NOT	Notice of Termination
NPS	National Park Service
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
NWP	Nationwide Permit
OPGW	optical ground wires
OTHM	Official Texas Historical Marker
PEM	palustrine emergent
PFO	include palustrine forested
POWER	POWER Engineers, Inc.
PSS	palustrine shrub/scrub
PUB	ponds
PUC	Public Utility Commission of Texas
PURA	Public Utility Regulatory Act
ROW	right-of-way
RRC	Railroad Commission of Texas
RTHL	Recorded Texas Historic Landmark
SAL	State Antiquities Landmark
SCS	Soil Conservation Service
SH	State Highway
SHPO	State Historic Preservation Office
SWPPP	Stormwater Pollution Prevention Plan
TAC	Texas Administrative Code
TARL	Texas Archeological Research Laboratory
TASA	Texas Archeological Sites Atlas
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
THSA	Texas Historical Sites Atlas
TLC	Texas Land Conservancy
TNC	The Nature Conservancy
TNRIS	Texas Natural Resources Information System
TOP	Texas Orthoimagery Program
TPWC	Texas Parks and Wildlife Code
TPWD	Texas Parks and Wildlife Department
TRB	Three Rivers to Borglum
TSS	Texas Speleological Survey
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
TXNDD	Texas Natural Diversity Database
TXSDC	Texas State Delta Center
US	United States
USACE	United States Army Corps of Engineers
USBOC	United States Bureau of the Census

U.S.C.	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
US Hwy	United States Highway
VORTEC	VHF Omnidirectional Range/Tactical Aid to Navigation
WAVES	Woman Accepted for Volunteer Emergency Service

1.0 DESCRIPTION OF THE PROPOSED PROJECT

1.1 Scope of the Project

AEP Texas Inc. (AEP Texas) is proposing to construct a new 138-kV transmission line project that will be comprised of two different transmission line segments. The first segment will begin at the existing AEP Texas Three Rivers Substation located northeast of the City of Three Rivers on State Highway (SH) 72 in Live Oak County, Texas. This segment of the transmission line project will extend southeast until it reaches the proposed AEP Texas Borglum Substation to be located south of the City of Beeville on United States Highway (US Hwy) 181 Business in Bee County, Texas. This portion of the project is referred to as the Three Rivers to Borglum Segment, or the TRB Segment. The second segment of the project will begin at the proposed Borglum Substation and will continue in a northerly direction until it reaches the existing AEP Texas Tuleta Substation located north of the community of Tuleta in Bee County. This portion of the project is referred to as the Borglum to Tuleta Segment, or the BT Segment. Figure 1-1 in this document is a map of the project vicinity and includes the locations of the existing and proposed substations. The TRB Segment will be a single-circuit 138-kV transmission line and could include rebuilding portions of an existing AEP Texas 69-kV transmission line. The BT Segment will be a double-circuit transmission line to accommodate a new 138-kV circuit and an existing 69-kV circuit. Depending on which routes are selected in this process, the total length of both segments of the proposed project would be approximately 50 to 80 miles long.

AEP Texas contracted POWER Engineers, Inc. (POWER) to prepare this Environmental Assessment and Alternative Route Analysis (EA). This EA will support AEP Texas' application to amend its Certificate of Convenience and Necessity (CCN) to be submitted to the Public Utility Commission of Texas (PUC). This EA may also be used to support any additional federal, state, or local permitting activities that might be required prior to construction of the proposed project.

This EA discusses the environmental and land use constraints identified within the project study area, documents routing methodologies, documents public involvement, and provides an evaluation of alternative routes from an environmental and land-use perspective. The EA also provides the basis for AEP Texas to identify an alternative route that best addresses the requirements under the Public Utility Regulatory Act (PURA) and 16 Texas Administrative Code (TAC) § 25.101.

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Figure 1-1 Project Vicinity

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To assist POWER in its evaluation of the proposed project, AEP Texas provided POWER with the project endpoints and information regarding the need for the project, proposed construction practices, transmission line design, clearing methods, right-of-way (ROW) requirements and maintenance procedures for the proposed project.

1.2 Purpose and Need

The project is needed to support the load growth in the Live Oak County and Bee County area, and to improve system reliability. The Electric Reliability Council of Texas (ERCOT) is responsible for identifying the necessary transmission system improvements to provide a reliable and adequate transmission network in most of Texas, including this area. ERCOT has determined that the load growth in Live Oak County and Bee County has created the need for transmission improvements in this area. In addition, overloading conditions on the existing transmission line system make it difficult to perform maintenance on the existing system without exposing consumers to the loss of load if another system facility is unexpectedly taken out of service. ERCOT has determined that new 138-kV transmission line segments and a new substation near the City of Beeville are required to address transmission facility overloads caused by the increase in electrical load in the area.

1.3 Description of Proposed Design and Construction

1.3.1 Loading, Weather Data, and Design Criteria

AEP Texas' proposed 138-kV transmission line is located in the American National Standards Institute (ANSI) National Electrical Safety Code (NESC) Light Loading Zone and will be designed to meet or exceed NESC 2017 loading criteria (ANSI C2-2017). Depending on the type of structure used, various combinations of unbalanced vertical, transverse (wind), and longitudinal loadings (with and without ice) were analyzed as to the effects on the structures. The typical structure for this project will be either a steel or concrete structure design and will vary between 90 to 110 feet in height, depending on clearance requirements. The new 138-kV transmission line will utilize 795 KCM ACSS 26/7 (Drake) conductors with optical ground wires (OPGW).

1.3.2 Structural and Geotechnical

All structure components, conductors, and overhead ground wires will be designed using the appropriate overload capacity factors, strength reduction factors, and tension limits as given in NESC 2017 and the manufacturer's recommended strength ratings for hardware. In conjunction with NESC 2017, AEP Texas'

transmission line engineering standards will be used. The NESC Light Loading Zone design criteria, and extreme wind and ice loading conditions will be utilized to determine tension sags for all wires.

All structures will be designed to support conductors and shield wires as specified above. The configuration of the conductor and shield wires will provide maximum lightning protection and the appropriate clearances for operation of a 138-kV transmission line. The geometry of a typical monopole tangent structure and turning structure configuration are shown respectively on Figures 1-2 through 1-7. Both single-circuit structures and double-circuit structures are shown on Figures 1-2 through 1-7. Geotechnical considerations will include soil borings and in-situ soils testing to provide the parameters for foundation design and/or the embedment depth required for new structures.

1.4 Construction Considerations

Projects of this type require surveying and ROW clearing, foundation installation, structure assembly and erection, conductor and shield wire installation, and cleanup when the project is completed. The following information regarding these activities was provided to POWER by AEP Texas.

1.4.1 Clearing

Required clearing of the ROW will be performed by the contractor under the direction of AEP Texas. Available methods of disposal are mulching, brush piling, and salvaging. Trees in the ROW will be cleared to permit safe construction of the line. Clearing will be accomplished to comply with North American Electric Reliability Corporation (NERC) reliability standards. Stumps will be cut to ground level and left in place. The ROW will be utilized for access during construction operations, with only a few cases where ingress and egress through private property is necessary to access the ROW. In these cases, existing private roads will be used where possible. Temporary culverts might be installed to cross creeks and tributaries, where necessary.

Clearing plans, methods, and practices are extremely important for success in any program designed to minimize the impacts of electric transmission lines on the natural environment. The following factors thoughtfully implemented and applied to this project will help meet this goal:

- Clearing will be performed in a manner that will maximize the preservation of natural beauty and the conservation of natural resources, and minimize disturbance to the landscape.
- Clearing will be performed in a manner that will minimize impacts to waters in the area of the activity.

- The time and method of clearing ROW will take into account soil stability, the protection of natural vegetation and sensitive habitats, the protection of adjacent resources such as natural habitat for plants and wildlife, and the prevention of sedimentation deposition in watercourses.
- AEP Texas will use the most efficient and effective method to remove undesirable vegetation species. Hydro axes and flail mowers may be used in clearing operations where such use will preserve the cover crop of grass, and similar vegetation. If deemed appropriate, United States Environmental Protection Agency (USEPA)-approved herbicides will be applied and handled in accordance with the manufactures' published recommendations and specifications, and as directed by appropriate qualified staff.

1.4.2 Construction

The following is a description of typical construction methods for transmission line projects. After regulatory approval and design of the transmission line is finalized, ROW is obtained and then cleared of trees, etc., according to AEP Texas ROW clearing specifications. Structure locations are marked for construction. Steel or concrete pole sections and associated line construction hardware are transported to the site, usually to each structure location; some assembly occurs on the ground, and sections are then lifted into place. Monopole structures can be either direct embedded or installed on concrete anchor bolt foundations, depending on the soil condition and design requirements. Once all of the steel or concrete structures have been erected, the process of conductor stringing begins. This is done by pulling the conductors through stringing blocks or pulleys, which are attached to the insulators on the structures. This process is repeated for all three conductor assemblies and static wires (OPGW) assembly. Once all of the conductors have been pulled through, the wire is then tensioned based on wire sag data. The wire is then permanently "clipped" into conductor clamps located at the attachment end of the insulator.

Construction operations will be conducted with attention to the preservation and enhancement of natural beauty and the conservation of natural resources. The following criteria will be used to attain this goal. These criteria are subject to adjustment according to the rules and judgments of any public agencies whose lands might be crossed by the proposed transmission line or that may have regulatory authority over the construction activities.

1. Clearing and grading of construction areas such as storage areas, setup sites, etc., will be minimal. These areas will be graded in a manner that will minimize erosion and conform to the natural topography.

2. Soil that has been excavated during construction and not used will be evenly backfilled onto a cleared area or removed from the site and disposed of properly. The backfilled soil will be sloped gradually to conform to the terrain and the adjacent land. If natural seeding will not provide ground cover in a reasonable length of time, appropriate reseeding will be performed.
3. Erosion control devices will be constructed where necessary to reduce soil erosion in the ROW.
4. Construction crews will take care to minimize damage to the ROW by minimizing the number of pathways traveled.
5. Roads will not be constructed on unstable slopes.
6. Clearing and construction activities near streambeds will be performed in a manner to minimize damage to the natural condition of the area. Stream banks will be restored as necessary to minimize erosion.
7. Efforts will be made to prevent and remediate, accidental oil spills and other types of incidental release, particularly while performing work near streams, lakes, and reservoirs.
8. Mitigative measures will be taken to prevent the possibility of accidentally starting forest/range fires.
9. Mitigative measures will be taken to protect natural features and cultural resources identified along the ROW.
10. If endangered species habitat is present, guidance from the United States Fish and Wildlife Service (USFWS) will be obtained prior to all clearing and construction activities.
11. Soil disturbance during construction will be kept to a minimum, and restorative measures will be taken in a reasonable length of time.
12. Compliance with any applicable permit or regulatory approval.

1.4.3 Cleanup

The cleanup operation involves the leveling of all disturbed areas to existing contours, the removal of all construction debris, and the restoration of or compensation for, any items damaged by project construction.

The following criteria provide for the cleanup of construction debris and the restoration of the project's natural setting. Further requirements might be imposed by public agencies and/or private property owners whose land the transmission line crosses or who might have regulatory authority over the cleanup activities.

1. If site factors make it unusually difficult to establish a protective vegetative cover, other restoration procedures will be used, such as the use of gravel, rocks, concrete, etc.

2. Sears, cuts, fill, or other aesthetically degraded areas will be allowed to seed naturally or might be reseeded with native species to reduce erosion, restore a natural appearance, and to provide food and cover for wildlife.
3. If temporary roads are removed, the original contours will be restored.
4. Construction equipment and supplies will be dismantled and removed from the ROW when construction is complete.
5. Clearing down to the mineral soil might be required for road access. In this case, water diversion berms, velocity dissipaters, or other erosion-control devices will be used to reduce erosion potential.
6. Construction waste will be removed prior to completion of the project and disposed of properly.
7. Replacement of soil adjacent to a water crossing for access roads will be at slopes less than the normal angle of repose for the soil type involved and will be stabilized/revegetated to avoid erosion.
8. Activities will comply with any applicable permit or regulatory approval.

1.5 Maintenance Considerations

AEP Texas provided the following information regarding maintenance of the facilities to POWER. Maintenance of the facilities will include periodic inspection of the transmission line, repair of damaged structures due to structural component failures, accidents, or natural phenomena such as wind or lightning. In areas where treatment of vegetation within the ROW is required, mowing, pruning, and/or application of USEPA-approved herbicides will be conducted as required. While maintenance patrols will vary, aerial patrols and foot patrols will be performed periodically. Due to existing land-use practices in cropland areas and properly managed grazing lands, little or no vegetation control will be required. The major maintenance item will be the trimming of trees that pose a potential danger to the conductors or structures in order to provide a safe and reliable power line.

1.6 Agency Actions

Numerous federal, state, and local regulatory agencies and organizations have developed rules and regulations regarding the routing and potential impacts associated with the construction of the proposed project. This section describes the major regulatory agencies and additional issues that are involved in project planning and permitting of transmission lines in Texas. POWER solicited comments from various regulatory entities during the development of this document, and records of correspondence and additional discussions with these agencies and organizations are provided in Appendix A.

1.6.1 Public Utility Commission of Texas

The PUC regulates the routing of transmission lines in Texas under Section 37.056(c)(4)(A)-(D) of PURA. The PUC regulatory guidelines for routing transmission lines in Texas include:

- 16 TAC § 25.101(b)(3)(B)
- 16 TAC § 22.52(a)(4)
- Policy of prudent avoidance
- CCN application requirements

This EA has been prepared by POWER in support of AEP Texas' CCN application for this project to be filed at the PUC for its consideration.

1.6.2 United States Army Corps of Engineers

The United States Army Corps of Engineers (USACE) is directed by Congress under Section 10 of the Rivers and Harbors Act of 1899 (33 United States Code [U.S.C.] § 403) and Section 404 of the Clean Water Act (CWA) (33 U.S.C. § 1344) to implement these statues. Under Section 10, the USACE regulates all work or structures in or affecting the course, condition or capacity of navigable waters of the United States (US). The intent of this law is to protect the navigable capacity of waters important to interstate commerce. Under Section 404, the USACE regulates the discharge of dredged and fill material into all waters of the US, including associated wetlands. The intent of this law is to protect the nation's waters and aquatic ecosystems from the indiscriminate discharge of material capable of causing pollution and to restore and maintain their chemical, physical, and biological integrity.

The proposed project is located within the jurisdiction of the USACE – Galveston District. Review of the National Hydrology Dataset and National Wetland Inventory (NWI) maps indicated numerous surface waters of the US and associated areas of potential wetlands within the study area. Upon PUC approval of a route, additional coordination, jurisdictional wetland verifications and permitting with the USACE – Galveston District for a Section 404 Permit might be required. Based on the project footprint and construction techniques proposed, the construction of the project will likely meet the criteria for the Nationwide Permit (NWP) No. 12 - Utility Line Activities, which apply to activities associated with any cable, line, or wire for the transmission of electrical energy. If the proposed impacts of the project exceed the criteria established under General Condition 13 or other regional conditions listed under the NWP 12, then a Regional General Permit might be required. An Individual Permit is not anticipated for this project.

1.6.3 United States Fish and Wildlife Service

The USFWS is charged with the responsibility for enforcement of federal wildlife laws and providing comments on proposed construction projects with a federal nexus under the National Environmental Policy Act (NEPA) and within the framework of several federal laws including the Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and Bald and Golden Eagle Protection Act (BGEPA). POWER requested a USFWS Information for Planning and Consultation (IPaC) review and official species list to identify potentially occurring federally protected species and designated critical habitats within the study area (Consultation Code: 02ETTXX0-2016-SLI-1037). POWER also reviewed the Texas Natural Diversity Database (TXNDD) records of federal and state listed species occurrences, rare vegetation communities, and/or species of concern. POWER considered these during the route development process. The absence of recorded occurrences for individual listed species is not an indication that the species or potential suitable habitat for the species is not present along the approved route.

Upon PUC approval of a route and prior to construction, surveys will be completed as determined necessary to identify any potentially suitable habitat for federally listed species. If suitable habitat is identified, informal consultation with the USFWS – Texas Coastal Ecological Services Field Office might be completed to determine the need for any required species-specific surveys and/or permitting under Section 7 or Section 10 of the ESA.

1.6.4 Federal Aviation Administration

According to Federal Aviation Administration (FAA) regulations, Title14 Code of Federal Regulations (CFR) Part 77.9, the construction of a transmission line requires FAA notification if a transmission tower structure height will exceed 200 feet or the height of an imaginary surface extending outward and upward at one of the following slopes:

- A 100:1 slope for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of each airport described in paragraph (d) of 14 CFR 77.9 having at least one runway longer than 3,200 feet; excluding heliports;
- A 50:1 slope for a horizontal distance of 10,000 feet from the nearest runway of a public or military airport described in paragraph (d) of 14 CFR 77.9 where its longest runway is no longer than 3,200 feet in length, excluding heliports; or
- A 25:1 slope for a horizontal distance of 5,000 feet for heliport described in paragraph (d) of 14 CFR 77.9.

Paragraph (d) of 14 CFR 77.9 includes public-use airports listed in the Airport/Facility Directory (currently the Chart Supplement), public-use or military airports under construction, airports operated by a federal agency or Department of Defense (DoD), or an airport or heliport with at least one FAA-approved instrument approach procedure.

Notification is not required for structures that will be shielded by existing structures of a permanent and substantial nature or by natural terrain or topographic features of equal or greater height, and will be located in a congested area of a city, town, or settlement where the shielded structure will not adversely affect safety in air navigation.

The PUC CCN application also requires listing private airports within 10,000 feet of any alternative route centerline. Following PUC approval of a route for the proposed transmission line, AEP Texas will make a final determination of the need for FAA notification, based on specific structure locations and design. If any of the FAA notification criteria are met for the approved route, a Notice of Proposed Construction or Alteration, FAA Form 7460-1, will be completed and submitted to the FAA Southwest Regional Office in Fort Worth, Texas, at least 30 days prior to construction. The result of this notification, and any subsequent coordination with the FAA could include changes in line design and/or potential requirements to mark and/or light the structures.

1.6.5 Texas Parks and Wildlife Department

The Texas Parks and Wildlife Department (TPWD) is the state agency with the primary responsibility for protecting the state's fish and wildlife resources in accordance with the Texas Parks and Wildlife Code Section 12.0011(b). POWER solicited comment from TPWD during the scoping phase of the project, and a copy of this EA will be submitted to TPWD when the CCN amendment application is filed with the PUC. Once the PUC approves a route, additional coordination with TPWD may be necessary to determine the need for any additional surveys, and to avoid or minimize any potential adverse impacts to sensitive habitats, threatened or endangered species, and other state regulated fish and wildlife resources.

1.6.6 Floodplain Management

Floodplain maps published by the Federal Emergency Management Agency (FEMA) were reviewed to identify the mapped 100-year floodplains within the study area. The mapped 100-year floodplains are typically associated with the larger creeks and streams. The 100-year floodplain represents a flood event that has a one percent chance of being equaled or exceeded for any given year. The construction of the proposed transmission line is not anticipated to create any significant permanent changes in the existing

topographical grades and will not significantly increase the stormwater runoff within the study area due to increased areas of impermeable surfaces. Coordination with the study area counties floodplain administrators may be required after PUC route approval to determine if any permits or mitigation is necessary.

1.6.7 Texas Commission on Environmental Quality

The Texas Commission on Environmental Quality (TCEQ) is the state agency with the primary responsibility for protecting the state's water quality. The construction of the project will require a Texas Pollution Discharge Elimination System General Construction Permit (TXR150000) as implemented by the TCEQ under the provisions of Section 402 of the CWA and Chapter 26 of the Texas Water Code. More than five acres of land disturbance is anticipated during construction of the project for all alternative routes; therefore, the construction will be considered a "Large Construction Project" under the TXR150000 General Construction Permit. A Stormwater Pollution Prevention Plan (SWPPP) will be developed and implemented during construction activities, a site notice will be posed and notification sent to the Municipal Separate Sewer System Operator (if applicable). The submittal of a Notice of Intent (NOI) and Notice of Termination (NOT) to the TCEQ is also required.

1.6.8 Texas Historical Commission

Cultural resources are protected by federal and state laws if they have some level of significance under the criteria of the National Register of Historic Places (NRHP) (36 CFR Part 60) or under state guidance (TAC, Title 13, Part 2, Chapter 26.7-8). The Texas Historical Commission (THC) was contacted by POWER to identify known cultural resource sites within the study area boundary. POWER also reviewed Texas Archeological Research Laboratory (TARL) records for known locations of cultural resource sites. Once a route is approved by the PUC, additional coordination with the THC might determine the need for any archeological surveys or additional permitting requirements. Even if no additional surveys are required, AEP Texas proposes to implement an unanticipated discovery procedure during construction activities. If artifacts are discovered during construction, activities will cease near the discovery, and AEP Texas will notify the State Historic Preservation Office (SHPO) for additional consultation.

1.6.9 Texas Department of Transportation

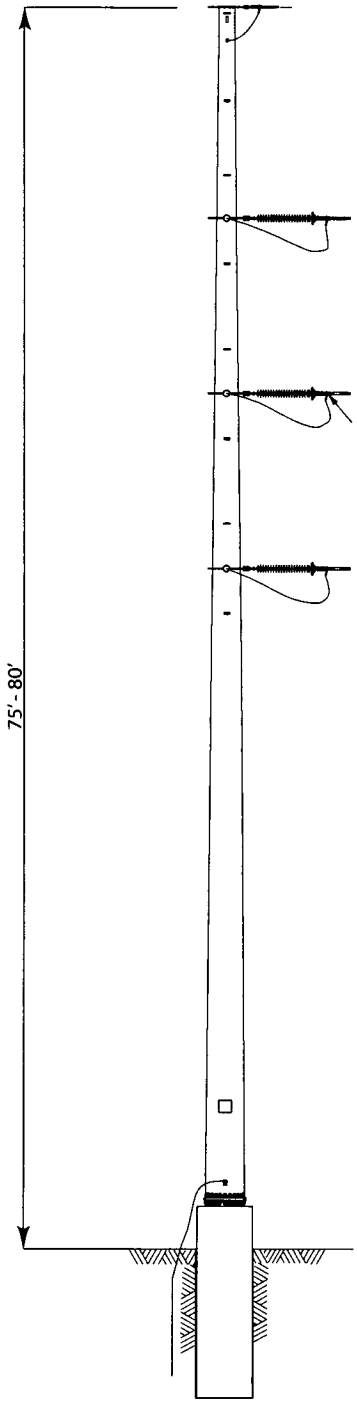
The Texas Department of Transportation (TxDOT) has been notified of the proposed project. If the route approved by the PUC crosses or occupies TxDOT ROW, it will be constructed in accordance with the rules, regulations, and policies of TxDOT. Best Management Practices (BMPs) will be used as required to minimize erosion and sedimentation resulting from construction. Revegetation will occur as required

under the "Revegetation Special Provisions" and contained in TxDOT Form 1023 (Rev. 9-93). Traffic control measures will comply with applicable portions of the Texas Manual of Uniform Traffic Control Devices.

1.6.10 Texas General Land Office

The Texas General Land Office (GLO) requires a miscellaneous easement for ROWs within any state-owned riverbeds or navigable streams or tidally influenced waters. Coordination with the GLO will be completed after PUC approval of a route.

The Texas Land Commissioner administers the Texas Coastal Management Program (CMP) under the GLO, which has the responsibility for implementing the Texas CMP. This program intends to help ensure the environmental and economic well-being of the Texas coast through proper management of coastal natural resource areas. The Texas CMP has federal and state project and permit action review processes to evaluate consistency with the program. The proposed project is not located within the Coastal Management Zone and no permitting action will be required under this program.



THREE RIVERS - BORGLUM - TULETA TRANSMISSION LINE PROJECT

Figure 1-2

Three Rivers - Borglum Typical 138-kV
Single Circuit Dead-end Structure

AEP TEXAS
An AEP Company
BOUNDLESS ENERGY

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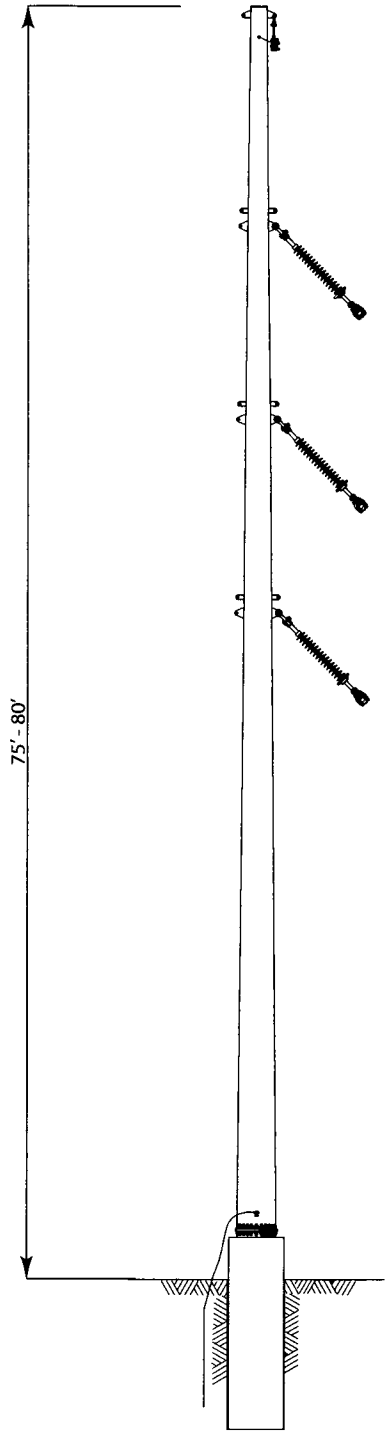


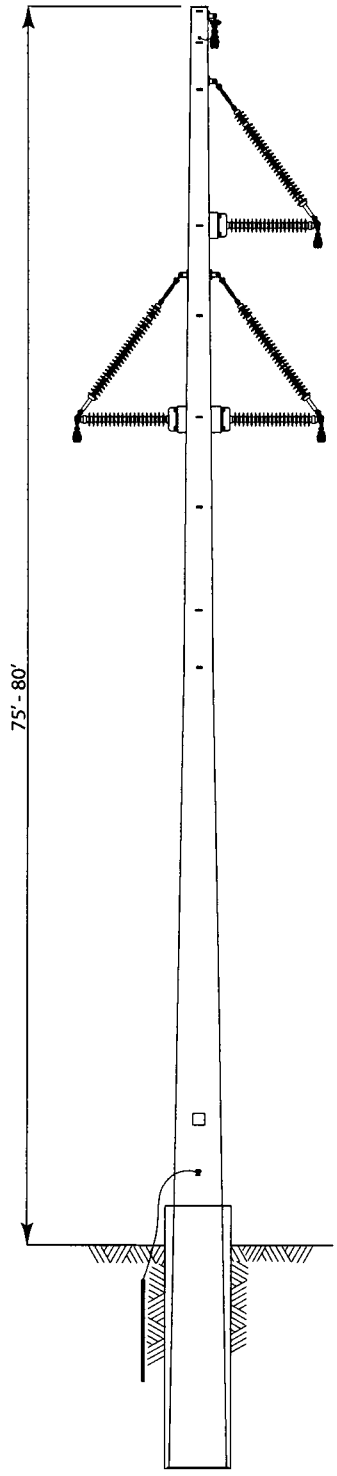
THREE RIVERS - BORGLUM - TULETA TRANSMISSION LINE PROJECT

Figure 1-3

Three Rivers - Borglum Typical 138-kV
Single Circuit Running Angle Structure

AEP TEXAS
An AEP Company
ROUNDLESS ENERGY

POWER ENGINEERS



THREE RIVERS - BORGLUM - TULETA TRANSMISSION LINE PROJECT

Figure 1-4

Three Rivers - Borglum Typical 138-kV
Single Circuit Braced Post Structure

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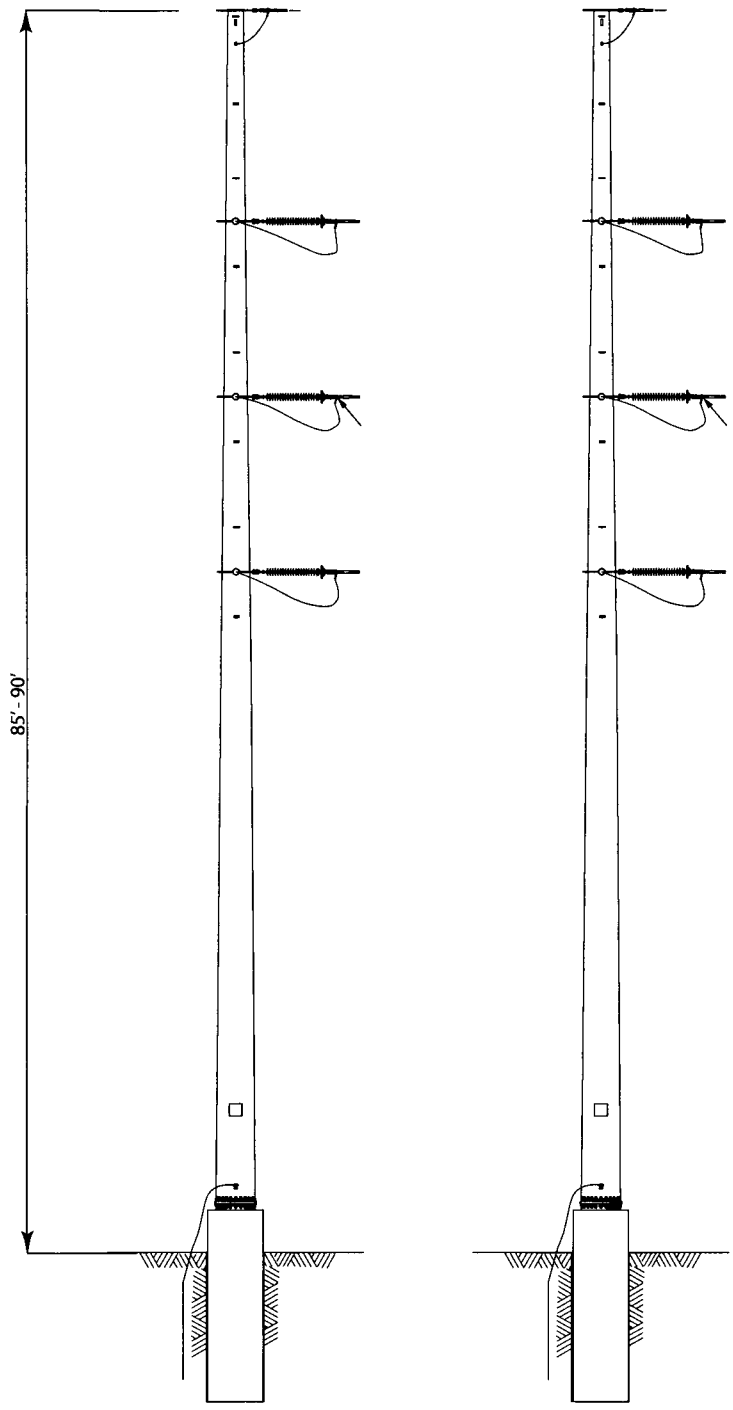

THREE RIVERS - BORGLUM - TULETA TRANSMISSION LINE PROJECT

Figure 1-5

Borglum - Tuleta Typical 138-kV
Double Circuit Dead-end Structure

AEP TEXAS
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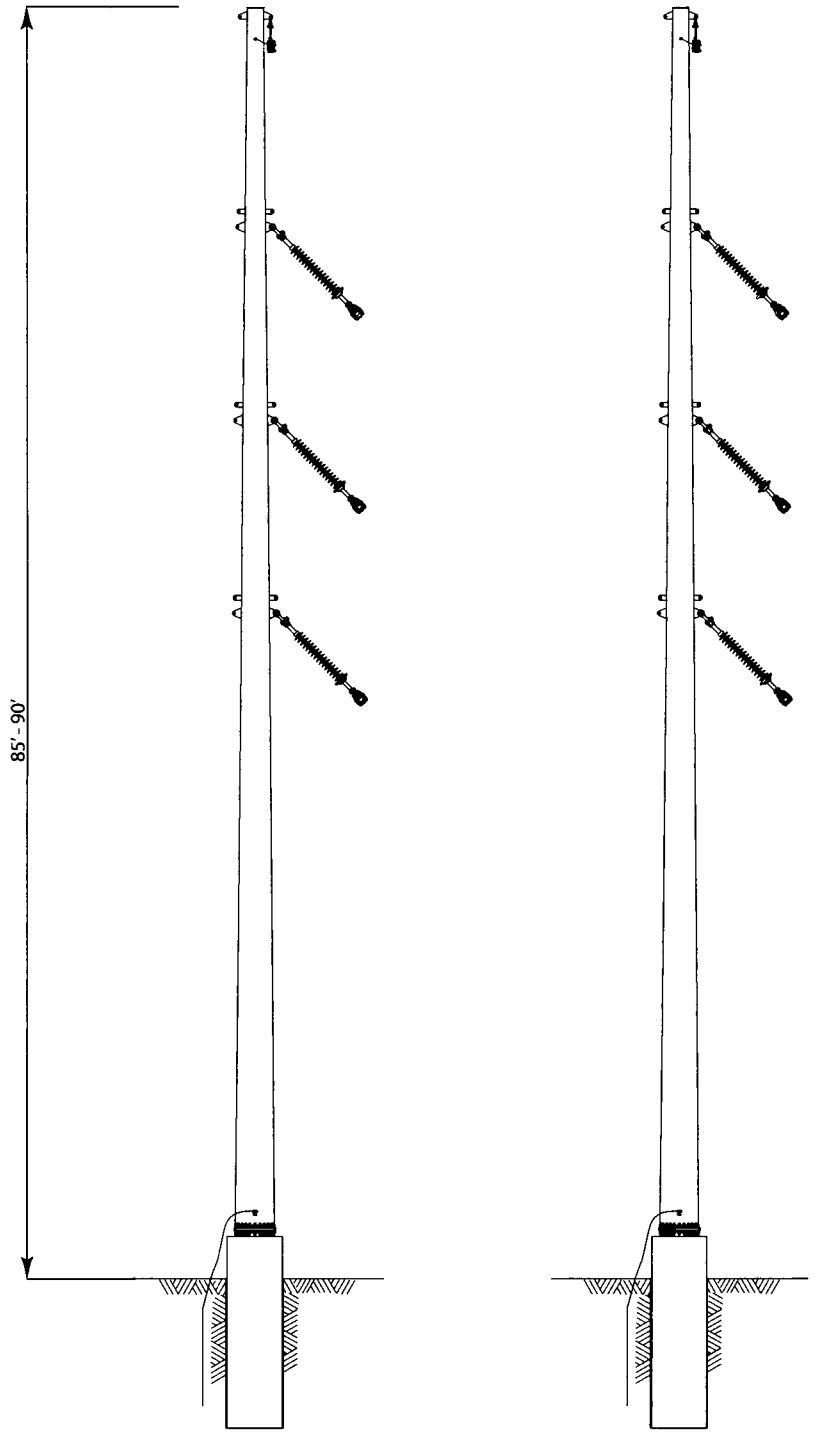

THREE RIVERS - BORGLUM - TULETA TRANSMISSION LINE PROJECT

Figure 1-6

Borglum - Tuleta Typical 138-kV
Double Circuit Running Angle Structure

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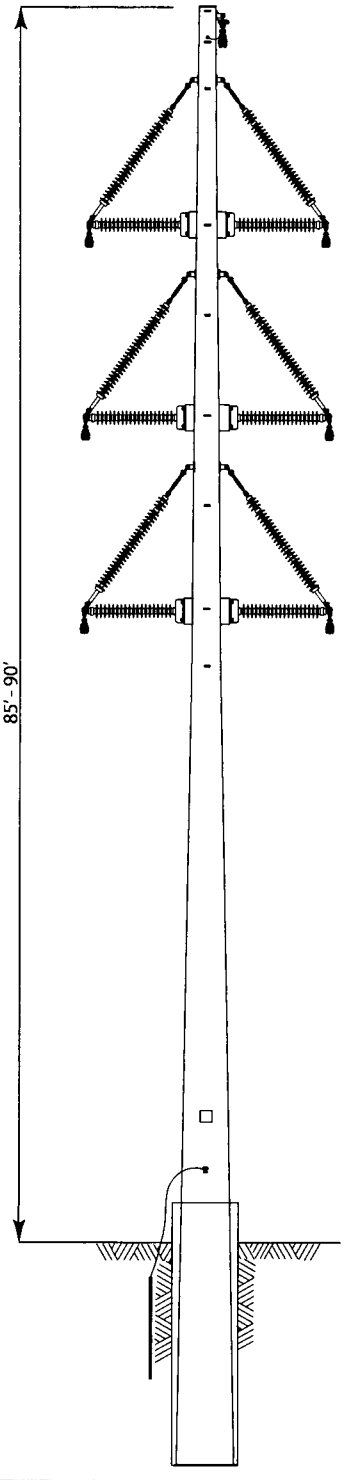

THREE RIVERS - BORGLUM - TULETA TRANSMISSION LINE PROJECT

Figure 1-7

Borglum - Tuleta Typical 138-kV
Double Circuit Braced Post Structure

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2.0 DESCRIPTION OF THE STUDY AREA

2.1 Routing Study Methodology

The objective of this EA/Routing Study was to develop alternative routes that provide geographic diversity and comply with Section 37.056(c)(4)(A)-(D) of the Texas Utilities Code, 16 TAC § 22.52 (a)(4), and 16 TAC § 25.101(b)(3)(B), including the PUC's Policy of prudent avoidance. The study methodology utilized by POWER for this EA included study area delineation based on the project endpoints; identification and characterization of existing land use and environmental constraints; and identification of areas of potential routing opportunity located within the study area. POWER identified potentially affected resources and considered each during the route development process. Regulatory agency, local officials, and public meeting input were also considered during the alternative route development process. Modifications and additions of preliminary alternative links were made while considering resource sensitivities and public input. Feasible and geographically diverse alternative routes were then selected for analysis and comparison using evaluation criteria to determine potential impacts to existing land use and environmental resources. The EA development process culminated with the ranking of the alternative routes from an environmental and land use perspective. With this recommendation from POWER, AEP Texas also will consider all of the certification criteria in PURA and the PUC Substantive Rules, engineering and construction constraints, grid reliability and security issues, and estimated costs. AEP Texas will identify one alternative route that it believes best addresses the requirements of PURA and PUC Substantive Rules and will describe such selection in the CCN application. This alternative route, as well as other alternative routes that provide geographic diversity and sufficient routing options, will all be submitted to the PUC in the CCN application.

2.1.1 Study Area Boundary Delineation

The study area is in the vicinity of Beeville in central Texas within portions of Bee and Live Oak counties. The study area set boundaries for the data collection process and was defined to include feasible geographically diverse alternatives for the location of the transmission lines between the project endpoints. Major physiographic features, jurisdictional boundaries, sensitive land uses, and existing utility corridors helped to define the study area boundaries (see Figure 2-1).

The extent of the project endpoints and the study area are described below and illustrated in Figure 2-1. The western portion of the study area is oriented in an east to west direction with the existing AEP Texas Three Rivers Substation located in the western portion of the study area and the proposed AEP Texas Borglum Substation located in the eastern portion of the study area. The eastern portion of the study area is oriented in a north to south direction with the proposed Borglum Substation located in the southern portion of the study area and the existing AEP Texas Tuleta Substation located in the northern portion of the study area. More specifically, the AEP Texas

Three Rivers Substation is located northeast of the City of Three Rivers, on the east side of SH 72 in Live Oak County. The AEP Texas Borglum Substation is proposed south of the City of Beeville on Business US Hwy 181 in Bee County and the AEP Texas Tuleta Substation site is located north of the community of Tuleta, on the east side of US Hwy 181 in Bee County.

The western boundary of the study area is defined by the existing AEP Texas Three Rivers Substation site. The northern boundary of the study area is defined by the existing AEP Texas Tuleta Substation site. The eastern and southern study area boundaries are defined to provide adequate space for the development of a set of geographically diverse routing alternatives east to west and the need to minimize land use conflicts within the study area.

2.1.2 Base Map Development

After delineation of the study area, a project base map, overlain on United States Geological Survey (USGS) 7.5 minute topographic maps and aerial photography (TOP 2015), was prepared and used to display resource data for the project area. Resource data categories and factors that were determined appropriate for interpretation and analysis were selected and mapped. The base map provides a broad overview of various resource locations indicating obvious routing constraints and areas of potential routing opportunities.

Data typically displayed on the base map includes:

- Major land jurisdictions and uses.
- Major roads (including county roads [CRs], farm-to-market roads [FMs], US Hwys, State Highways [SHs], and Interstate Highways [IHs]).
- Existing transmission line and pipeline corridors.
- Airports, private airstrips and communication facilities.
- Parks and wildlife management areas.
- Major political subdivision boundaries.
- Lakes, reservoirs, rivers, and ponds.

Figure 2-1 Project Vicinity

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2.1.3 Evaluation Criteria

Land use and environmental evaluation criteria were developed to reflect accepted practices for routing electric transmission lines in the state of Texas (see Table 2-1). Emphasis was placed on acquiring information identified in Section 37.056(c)(4)(A)-(D) of the Texas Utilities Code, the PUC CCN application, and 16 TAC § 25.101, including the policy of prudent avoidance. Evaluation criteria were further refined based on data collection, reconnaissance surveys, and public input. The alternative route development process was conducted with consideration and incorporation of the evaluation criteria.

Evaluation criteria data were reviewed, tabulated, and compared (see Section 4.0) for each resulting primary alternative route and, among other factors, were ultimately used for the recommendation of the best alternative routes from an environmental and land use perspective, and the identification of the alternative route that POWER determined best addresses the applicable requirements under PURA and PUC Substantive Rules (see Section 5.0) from an environmental and land use perspective.

TABLE 2-1 LAND USE AND ENVIRONMENTAL EVALUATION CRITERIA

EVALUATION CRITERIA
Land Use
Length of primary alternative route (miles)
Total number of habitable structures[1] within 300 feet of ROW centerline
Length of ROW using existing transmission line ROW
Length of ROW parallel and adjacent to existing transmission line ROW
Length of ROW parallel to other existing ROW (roadways, railways, etc.)
Length of ROW parallel and adjacent to apparent property lines[2]
Length of ROW across parks/recreational areas[3]
Number of additional parks/recreational areas[3] within 1,000 feet of ROW centerline
Length of ROW across cropland
Length of ROW across pasture/rangeland
Length of ROW across land irrigated by traveling systems (rolling or pivot type)
Length of ROW parallel to existing pipeline ROW <500 feet from ROW centerline
Number of pipeline crossings
Number of transmission line crossings
Number of US and state highway crossings
Number of farm-to-market (FM) road crossings
Number of cemeteries within 1,000 feet of ROW centerline
Number of FAA registered airports with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline
Number of FAA registered airports having no runway more than 3,200 feet in length located within 10,000 feet of ROW centerline
Number of private airstrips within 10,000 feet of ROW centerline
Number of heliports within 5,000 feet of ROW centerline
Number of commercial AM radio transmitters within 10,000 feet of ROW centerline

TABLE 2-1 LAND USE AND ENVIRONMENTAL EVALUATION CRITERIA

EVALUATION CRITERIA
Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline
Aesthetics
Estimated length of ROW within foreground visual zone[4] of US and state highways
Estimated length of ROW within foreground visual zone[4] of FM roads
Estimated length of ROW within foreground visual zone[4][5] of parks/recreational areas[3]
Ecology
Length of ROW across upland woodlands/brushlands
Length of ROW across bottomland/riparian woodlands
Length of ROW across NWI mapped wetlands
Length of ROW across known habitat of federally listed endangered or threatened species
Length of ROW across open water (lakes, ponds)
Number of stream crossings
Number of river crossings
Length of ROW parallel (within 100 feet) to streams or rivers
Length of ROW across 100-year floodplains
Cultural Resources
Number of recorded cultural resources sites crossed by ROW
Number of additional recorded cultural resource sites within 1,000 feet of ROW centerline
Number of NRHP listed properties crossed by ROW
Number of additional NRHP listed properties within 1,000 feet of ROW centerline
Length of ROW across areas of high archeological site potential
Notes:
[1]Single-family and multi-family dwellings, and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline of a transmission project of 230-kV or less.
[2]Apparent property boundaries created by existing roads, highways, or railroad ROWs are not "double-counted" in the length of ROW parallel to apparent property boundaries criteria. Appraisal district information was readily available for Bee County, but boundary information used should not be considered as exact location.
[3]Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church within 1,000 feet of the centerline of the project.
[4]One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of Interstates, US and state highway criteria are not "double-counted" in the length of ROW within the visual foreground zone of FM roads criteria.
[5]One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of parks/recreational areas may overlap with the total length of ROW within the visual foreground zone of interstates, US and state Highway criteria and/or with the total length of ROW within the visual foreground zone of FM roads criteria.

2.1.4 Data Collection and Constraints Mapping

Several methodologies were utilized to collect and review environmental and land use data, including incorporation of readily available Geographic Information System (GIS) coverage with associated metadata; review of maps and published literature; review of files and records from numerous federal, state, and local regulatory agencies; meetings with stakeholders; and reconnaissance surveys of the study area. Data collected for each resource area were mapped within the study area utilizing GIS layers.

Maps and data layers reviewed include USGS 7.5 minute topographic maps (USGS 2016a), NWI maps, FEMA floodplain data (FEMA 2016), Texas Natural Resources Information System (TNRIS), Railroad Commission of Texas ([RRC] 2016a), TXNDD, and TxDOT county highway maps. Appraisal district parcel boundary data was available for both Bee and Live Oak counties and was used to identify apparent property boundaries as potential paralleling opportunity areas. Refined and updated parcel boundary information was also provided by AEP Texas contractor CDS Muery. USGS 7.5 minute topographic maps and aerial photography (TOP 2015) were used as the background for several of the scaled project maps, including the initial base map, the field maps, the public involvement display boards, and the environmental and land use constraints maps.

2.1.5 Agency Consultation

A list of federal, state, and local regulatory agencies, elected officials, and organizations to receive a consultation letter regarding the proposed project was developed. The purpose of the consultation letter was to inform the various agencies and officials of the proposed project and provide them with an opportunity to provide feedback regarding resources and potential issues within the study area. POWER used the Bee and Live Oak County websites and telephone confirmations to identify local officials. Consultation letters were sent in June 2016. Copies of correspondence with the various regulatory agencies, elected officials, and organizations are included in Appendix A.

Federal, state, and local agencies/officials contacted include:

- United States Army Corps of Engineers (USACE)
- United States Environmental Protection Agency (USEPA)
- United States Fish and Wildlife Service (USFWS)
- Federal Aviation Administration (FAA)
- Federal Emergency Management Agency (FEMA)
- Natural Resource Conservation Service (NRCS)
- Railroad Commission of Texas (RRC)
- Texas Commission on Environmental Quality (TCEQ)
- Texas Department of Transportation (TxDOT) – Aviation Division, Environmental Affairs Division, Planning and Programming, and District Engineer
- Texas General Land Office (GLO)
- Texas Historical Commission (THC)
- Texas Parks and Wildlife Department (TPWD)
- Texas Water Development Board (TWDB)

- Bee County Farm Bureau
- Bee County Historical Commission
- Bee County Officials (County Judge and Commissioners Court)
- Live Oak County Farm Bureau
- Live Oak County Historical Commission
- Live Oak County Officials (County Judge and Commissioners Court)
- City of Beeville Mayor
- City of Three Rivers Mayor
- Beeville Independent School District
- George West Independent School District
- Pettus Independent School District
- Three Rivers Independent School District

2.1.6 Reconnaissance Surveys

Reconnaissance surveys of the study area were conducted by POWER personnel from publicly accessible areas to confirm the findings of the research and data collection activities, identify changes in land use occurring after the date of available aerial photography, and to identify potential unknown constraints that might not have been previously noted in the data. Reconnaissance surveys of the study area were conducted on October 4th and 5th, 2016 and May 22nd and 23rd, 2017.

2.2 Community Values

The term "community values" is included as a factor for the consideration of transmission line route approval under Section 37.056(c)(4)(A) of the Texas Utilities Code. The PUC CCN application requires information concerning the following items related to community values:

- Public open-house meeting.
- Approvals or permits required from other governmental agencies.
- Brief description of the area traversed.
- Habitable structures within 300 feet of the centerline for a 138-kV transmission line.
- Amplitude modulation (AM) radio and frequency modulation (FM) radio, microwave, and other electronic installations in the area.
- FAA registered airstrips, private airstrips, and heliports located in the area.
- Irrigated pasture or croplands utilizing center-pivot or other traveling irrigation systems.
- Parks and recreation areas.

- Historical and archeological sites.

In addition, POWER also evaluated the proposed project for community values and resources that might not be specifically listed by the PUC, but that might be of importance to a particular community as a whole. The term "community values" is not formally defined in PUC rules. However, in several dockets the PUC and their Staff have used the following as a working definition: the term "community values" is defined as *a shared appreciation of an area or other natural resource by a national, regional, or local community*. Examples of a community resource would be a park or recreational area, historical or archeological site, or a scenic vista (aesthetics). POWER mailed consultation letters to various local elected and appointed officials, and assisted AEP Texas personnel in hosting two public open house meetings to identify and collect information regarding community values and community resources.

2.3 Land Jurisdiction

Jurisdiction does not necessarily represent land ownership. Potential conflicts that could arise from crossing jurisdictional boundaries were evaluated in this study. The study area is located within the jurisdictional boundaries of Bee and Live Oak counties. A portion of the City of Beeville is located within the study area. Additionally, the unincorporated communities of Normanna, Oakville, Ray Point, and Tuleta are located within the study area.

2.4 Land Use

Land uses within the study area were identified and placed into the following categories: urban/developed, planned land use, agriculture, oil and gas facilities, transportation/aviation/utility features, communication towers, and parks and recreation areas. The primary sources of land use information were obtained from interpretation of aerial photographs, USGS topographical maps, and vehicular reconnaissance surveys from accessible public viewpoints. Planned land use features were limited to known features obtained from governmental entities and mobility authorities.

2.4.1 Urban/Developed

The urban/developed classification represents concentrations of surface disturbing land uses, which include habitable structures and other developed areas characterized with low, medium and high intensities. The various levels of development include a mix of institutional, commercial, and/or industrial land uses. Developed low, medium, and high intensity areas were identified using aerial photograph interpretation and reconnaissance surveys. These classifications are described below:

- **Developed Low Intensity** areas typically include rural settings with single-family housing units.
- **Developed Medium Intensity** areas typically include single-family housing units that are grouped in residential subdivisions and might include peripheral commercial structures.
- **Developed High Intensity** includes highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses, and commercial/industrial parks. Areas with the highest concentration of development are typically located within or near the towns and communities in the study area.

The majority of the study area is in a rural setting with the exception of the areas associated with the cities of Beeville and Three Rivers. The study area is predominantly rangeland/pastureland; therefore, most of the habitable structures in these portions of the study area are associated with rural ranch properties which would be considered low intensity development. Portions of the cities of Beeville and Three Rivers are composed of medium intensity residential and commercial development. No developed high intensity areas are present in the study area. Habitable structures were identified using aerial photographs (TOP 2016; NAIP 2016), Google Earth, and reconnaissance surveys. The PUC definition of a habitable structure was used for this routing study. 16 TAC § 25.101(a)(3) defines habitable structures as "structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis. Habitable structures include, but are not limited to, single-family and multi-family dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, and schools."

Schools

The study area is located within the following five school districts: Beeville Independent School District (ISD), George West ISD, Pettus ISD, Skidmore-Tynan ISD, and Three Rivers ISD. Only one school was identified within the study area (TEA 2016).

2.4.2. Planned Land Use

The planned land use component identifies objectives and/or policies regarding land use goals and plans, including conservation easements, managed lands, and proposed developments. Cities and counties typically prepare comprehensive land use plans to provide strategic direction by goals and objectives for the individual city or county. City and county websites were reviewed and correspondence was submitted to local and county officials to identify potential planned land use conflicts. The City of Beeville did not have comprehensive land use plan, nor do any of the other communities located within the study area.

Conservation Easements

A conservation easement is a restriction property owners voluntarily place on specified uses of their property to protect natural, productive or cultural features. The property owner retains legal title to the property and determines the types of uses to allow or restrict. The property can still be bought, sold and inherited, but the conservation easement is tied to the land and binds all present and future owners to its terms and restrictions. Conservation easement language will vary as to the individual property owner's allowances for additional developments on the land. The land trusts facilitate the conservation easement and ensure compliance with the specified terms and conditions.

A review of non-governmental groups (e.g., National Conservation Easement Database [NCED], The Nature Conservancy [TNC], Texas Land Conservancy [TLC]) that are land trusts and hold a database for conservation easements within Texas indicated that there are no conservation easements within the study area (NCED 2016; TNC 2016; TLC 2016).

2.4.3 Agriculture

Agriculture is a significant segment of the economy throughout Texas, and the study area counties have active agricultural sectors. According to the United States Department of Agriculture's (USDA) National Agricultural Statistics Service's 2012 Census of Agriculture, the total market value for agricultural products sold for both study area counties was $43,957,000, a 27 percent decrease from the 2007 market value. Both of the counties in the study area experienced a decrease of total market value of agricultural products from 2007 to 2012. Livestock sales accounted for the majority of agricultural sales in both counties. The number of farms in the study area counties increased slightly from 1,848 in 2007 to 1,866 in 2012 (an increase of one percent) (USDA 2012). Detailed agricultural information for the study area counties is provided in Table 2-2.

TABLE 2-2 AGRICULTURE

COUNTY	TOTAL MARKET VALUE OF AGRICULTURAL PRODUCTS			DISTRIBUTION OF PRODUCTS (2012)		NUMBER OF FARMS		
	2007	2012	Change	Crop Sales	Livestock Sales	2007	2012	Change
Bee County	$39,203,000	$26,044,000	-34%	38%	62%	952	974	2%
Live Oak County	$20,968,000	$17,913,000	-15%	16%	84%	896	892	0%

Source: USDA 2012.

2.4.4 Oil and Gas Facilities

Data was obtained from the RRC (RRC 2016a) which provided a GIS layer for existing oil and gas wells, pipelines, and supporting facilities. Data point categories were reviewed and included the following types: permitted locations, oil, gas, injection/disposal, shut-in, horizontal drain hole, and sidetrack well surface locations.

The 2016 RRC dataset along with aerial photograph interpretation and field reconnaissance were used to identify and map existing oil and gas related facilities.

2.4.5 Transportation/Aviation/Utility Features

Transportation Features

Federal, state, and local roadways were identified using TxDOT county transportation maps, TNRIS data, and field reconnaissance surveys. The roadway transportation system within the study area includes the following major roadways: IH 37, US Hwy 59, US Hwy 181, SH 72, and SH 202. The roadway transportation within the study area also includes the following FM roads: FM 351, 673, 796, 799, 888, 1349, 1358, 1596, and 2824. Numerous county and local roads (paved and unpaved) were also identified in both study area counties (TxDOT 2016a).

TxDOT's "Project Tracker" which contains detailed information by county for every project which is or could be scheduled for construction was reviewed to identify any state roadway projects planned within the study area. The TxDOT Project Tracker indicated that there are five roadway repair/maintenance projects in Bee County that are located within the study area. There is also one bridge replacement project to FM 1358 and one roadway widening project, to the north bound lanes of IH 37, in Live Oak County that are located within the study area (TxDOT 2016b).

The railroads identified within the study area include one abandoned railroad, which is primarily parallel to US Hwy 181 located in the central portion of the study area.

Aviation Facilities

POWER reviewed the San Antonio Sectional Aeronautical Chart (FAA 2016a) and the Chart Supplement for the South Central US (formerly the Airport/Facility Directory) (FAA 2016b) to identify FAA registered facilities within the study area subject to notification requirements listed in 14 CFR Part 77.9. Facilities subject to notification requirements listed in 14 CFR Part 77.9 include public-use airports listed in the Airport/Facility Directory (currently the Chart Supplement), public-use or military airports under construction, airports operated by a federal agency or DoD, or an airport or heliport with at least one FAA-approved instrument approach procedure.

The Chart Supplement for the South Central US used in conjunction with the San Antonio Sectional Aeronautical Chart, contains all public-use airports, seaplane bases and heliports, military facilities, and selected private-use facilities specifically requested by the DoD for which a DoD Instrument Approach Procedure has been published in the US Terminal Procedures Publication.

POWER also received correspondence from TxDOT's Aviation Division which also lists public-use facilities within the study area (Appendix A).

Two public-use FAA registered airports were identified within the study area. The Beeville Municipal County Airport is located in the central portion of the study area, on the south side of US Hwy 59, and features two runways: 1) a 4,553 foot long paved runway and 2) a 2,251 foot long turf runway. The Chase Field Industrial Airport is located in the southeastern portion of the study area, on the south side of SH 202, and features three paved runways at approximately 8,000 feet long each (FAA 2016b).

No public-use heliports or heliports with an instrument approach procedure are listed for the study area in the Chart Supplement for the South Central US (FAA 2016b).

In addition, POWER also reviewed the FAA database (FAA 2016c), the AirNav website (AirNav 2016), USGS topographic maps, recent aerial photography, and conducted field reconnaissance from publicly accessible areas to identify private-use airstrips and private-use heliports not subject to notification requirements listed in 14 CFR Part 77.9. Two private-use airstrips, Terminal D Ranch and The Flats, were identified within the study area.

Utility Features

Utility features reviewed include existing electrical transmission lines, distribution lines, pipelines, water and gas/oil wells, and water and gas/oil storage tanks. Data sources used to identify existing electrical transmission and distribution lines include utility company and regional system maps, Platts data (Platts 2016), aerial imagery (NAIP 2016), USGS topographic maps, additional available planning documents, and field reconnaissance surveys. Transmission lines identified within the study area include one 345-kV transmission line and seven 69-kV transmission lines. Distribution lines are prevalent throughout the developed portions of the study area; however, these features were not mapped or inventoried. In addition, numerous pipelines and water wells are located throughout the study area (RRC 2016a; TWDB 2016a).

2.4.6 Communication Towers

Review of the Federal Communication Commission (FCC) database indicated that there is one AM radio transmitter identified within the study area (FCC 2016). The FCC also indicates that there are 12 FM radio transmitters/microwave towers/other electronic installations identified within the study area (FCC 2016).

2.4.7 Parks and Recreation Areas

The PUC recognizes parks and recreational areas as those owned by a governmental body or an organized group, club, or church. Federal and state database searches and county/local maps were reviewed to identify any parks

and/or recreational areas within the study area. Reconnaissance surveys were also conducted to identify any additional park or recreational areas.

National/State/County/Local Parks

No national or state parks were identified within the study area (National Park Service [NPS] 2016a; TPWD 2016a). No local parks were identified within the study area. Additional recreational activities such as hunting and fishing might occur on private properties throughout the study area, but are not considered to be open to the general public.

Wildlife Viewing Trails

Review of the TPWD *Great Texas Wildlife Trails Central Texas Coast* indicates that there are no wildlife viewing trails located within the study area (TPWD 2016b).

2.5 Socioeconomics

The study area covers approximately 375 square miles in Bee and Live Oak counties. This section presents a summary of economic and demographic characteristics for these counties and describes the socioeconomic environment of the study area. Literature sources reviewed include publications of the United States Bureau of the Census (USBOC), and the Texas State Data Center (TXSDC).

2.5.1 Population Trends

Both Bee and Live Oak counties experienced a population decrease between 2000 and 2010 of two percent and six percent, respectively. By comparison, population at the state level increased by nearly 21 percent during the 2000s (USBOC 2000 and 2010).

According to TXSDC projections, Bee County is projected to experience population growth during the next 30 years. Live Oak County is projected to experience population growth during the next 20 years. However, during the decade between 2030 and 2040 Live Oak County is projected to experience a population reduction. The largest population increases over the next three decades are projected to be in Bee County at 5.5 percent, 4.4 percent, and 1.8 percent, respectively. The population increases for 2010 to 2020 and 2020 to 2030 in Live Oak County is projected to occur at 1.8 percent and 0.1 percent, respectively. The population decreases for the next decade is projected to be at 1.8 percent. By comparison, the population of Texas is expected to experience population increases of 15 percent, 13 percent, and 12 percent over the next three decades, respectively (TXSDC 2014). Table 2-3 presents the past population trends and projections for Bee and Live Oak counties and for the state of Texas.

TABLE 2-3 POPULATION TRENDS

STATE/COUNTY	PAST		PROJECTED		
	2000	2010	2020	2030	2040
Texas	20,851,820	25,145,561	28,813,282	32,680,217	36,550,595
Bee County	32,359	31,861	33,629	35,119	35,743
Live Oak County	12,309	11,531	11,736	11,745	11,531

Sources: USBOC 2000 and 2010; TXSDC 2014.

2.5.2 Employment

From 2000 to 2014, the civilian labor force (CLF) in Bee County increased, while the CLF in Live Oak County decreased. Bee County saw an increase in its CLF from 2000 to 2014 of two percent (193 people). Live Oak County saw a decrease in CLF of eight percent (339 people). By comparison, the CLF at the state level grew by 30 percent (2,961,031 people) over the same time period (USBOC 2000 and 2014). Table 2-4 presents the CLF for the study area counties and the state of Texas for the years 2000 and 2014.

Between 2000 and 2014, only one of the study area counties experienced an increase in its unemployment rate. The Live Oak County unemployment rate increased from a low of 5.8 percent in 2000, to a high of 6.2 percent in 2014. Bee County experienced a decrease in unemployment from 8.0 percent to 7.3 percent during the same timeframe. By comparison, the state of Texas also experienced an increase in the unemployment rate over the same period. The state's unemployment rate increased from 6.1 percent in 2000, to 7.7 percent in 2014 (USBOC 2000 and 2014). Table 2-4 presents the employment and unemployment data for the study area counties and the state of Texas for the years 2000 and 2014.

TABLE 2-4 CIVILIAN LABOR FORCE AND EMPLOYMENT

STATE/COUNTY	2000	2014
Texas		
Civilian Labor Force	9,830,559	12,791,590
Employment	9,234,372	11,809,010
Unemployment	596,187	982,580
Unemployment Rate	6.1%	7.7%
Bee County		
Civilian Labor Force	10,804	10,997
Employment	9,944	10,191
Unemployment	860	806
Unemployment Rate	8.0%	7.3%
Live Oak County		
Civilian Labor Force	4,505	4,166
Employment	4,244	3,906
Unemployment	261	260

TABLE 2-4 CIVILIAN LABOR FORCE AND EMPLOYMENT

STATE/COUNTY	2000	2014
Unemployment Rate	5.8%	6.2%

Source: USBOC 2000 and 2014.

2.5.3 Leading Economic Sectors

The major occupations in Bee County in 2014 are listed under the category of service occupations, followed by the category of sales and office occupations. The major occupations in Live Oak County in 2014 are listed under the category of management, business, science, and arts occupations, followed by the category of sales and office occupations (USBOC 2014). Table 2-5 presents the number of persons employed in each occupation category during 2014 in the study area counties.

TABLE 2-5 OCCUPATIONS IN THE COUNTIES WITHIN THE STUDY AREA

OCCUPATION	BEE COUNTY	LIVE OAK COUNTY
Management, business, science, and arts occupations	2,116	1,070
Service occupations	2,905	715
Sales and office occupations	2,163	884
Natural resources, construction, and maintenance occupations	1,548	541
Production, transportation, and material moving occupations	1,459	696

Source: USBOC 2014.

In 2000 and 2014, the industry group employing the most people in Bee County was educational services, and health care and social assistance. In 2000 and 2014, the industry group employing the most people in Live Oak County was also educational services, and health care and social assistance. Table 2-6 presents the number of persons employed in each of the industries in the study area counties for the years 2000 and 2014.

TABLE 2-6 INDUSTRIES IN THE COUNTIES WITHIN THE STUDY AREA

INDUSTRY GROUP	BEE COUNTY		LIVE OAK COUNTY	
	2000	2014	2000	2014
Agriculture, forestry, fishing and hunting, and mining	846	1,101	532	616
Construction	690	676	362	237
Manufacturing	522	396	382	378
Wholesale trade	216	153	73	120
Retail trade	1,041	1,316	421	369

TABLE 2-6 INDUSTRIES IN THE COUNTIES WITHIN THE STUDY AREA

INDUSTRY GROUP	BEE COUNTY		LIVE OAK COUNTY	
	2000	2014	2000	2014
Transportation and warehousing, and utilities	398	596	283	214
Information	110	71	59	38
Finance and insurance, and real estate and rental and leasing	494	308	140	261
Professional, scientific and management, and administrative and waste management services	445	410	193	141
Educational services, and health care and social assistance	2,218	2,344	764	689
Arts, entertainment, and recreation, and accommodation and food services	653	639	333	285
Other services, except public administration	546	853	252	265
Public administration	1,765	1,328	450	293

Source: USBOC 2000 and 2014.

2.6 Cultural Resources

Section 37.056(c)(4)(A-D) of the Texas Utilities Code incorporates historical and aesthetic values as a consideration when evaluating proposed electric transmission facilities. The PUC Standard Application for a CCN further stipulates that known historical sites within 1,000 feet of an alternative route will be listed, mapped, and their distance from the centerline of the alternative route documented in the application filed for consideration. Archeological sites within 1,000 feet of a route will be listed and their distance from the centerline documented, but they are not shown on maps for the protection of the site. The sources consulted to identify known sites (national, state, or local commission) must also be listed.

The THC is the state agency for historic preservation. The THC, working in conjunction with TARL, maintains records of previously recorded cultural resources and records of previous field investigations in Texas. POWER reviewed restricted-access cultural resource information from the THC's on-line Texas Archeological Sites Atlas (TASA) (THC 2016a), and GIS shapefiles acquired from TARL (dated June 2, 2016), to identify and map the locations of previously recorded cultural (archeological and historical) resources within the study area. Previously recorded cultural resource site data available online from the Texas Historical Site Atlas (THSA) (THC 2016b) was also obtained to identify locations of designated historical sites, cemeteries, and Official Texas Historical Markers (OTHMs) within the study area. TxDOT's historic bridges database was also reviewed for bridges that are listed or determined eligible for listing on the NRHP. At the national level, NPS websites and data centers were reviewed to identify locations and boundaries for nationally designated historic landmarks, NRHP-listed properties, trails and battlefield monuments.

Together, archeological and historical sites are often referred to as cultural resources. Under the NPS' standardized definitions, cultural resources include districts, sites, buildings, structures, or objects important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. For this study, cultural resources have been divided into three major categories: archeological resources, historical resources, and cemeteries. These three categories correlate to the organization of cultural resource records maintained by the THC and TARL.

Archeological resources are locations on the ground surface or buried within the earth where human activity has measurably altered or left deposits of physical remains (e.g., burned rock middens, stone tools, petroglyphs, house foundations, bottles). Archeological resources can date to either prehistoric times or the historic era.

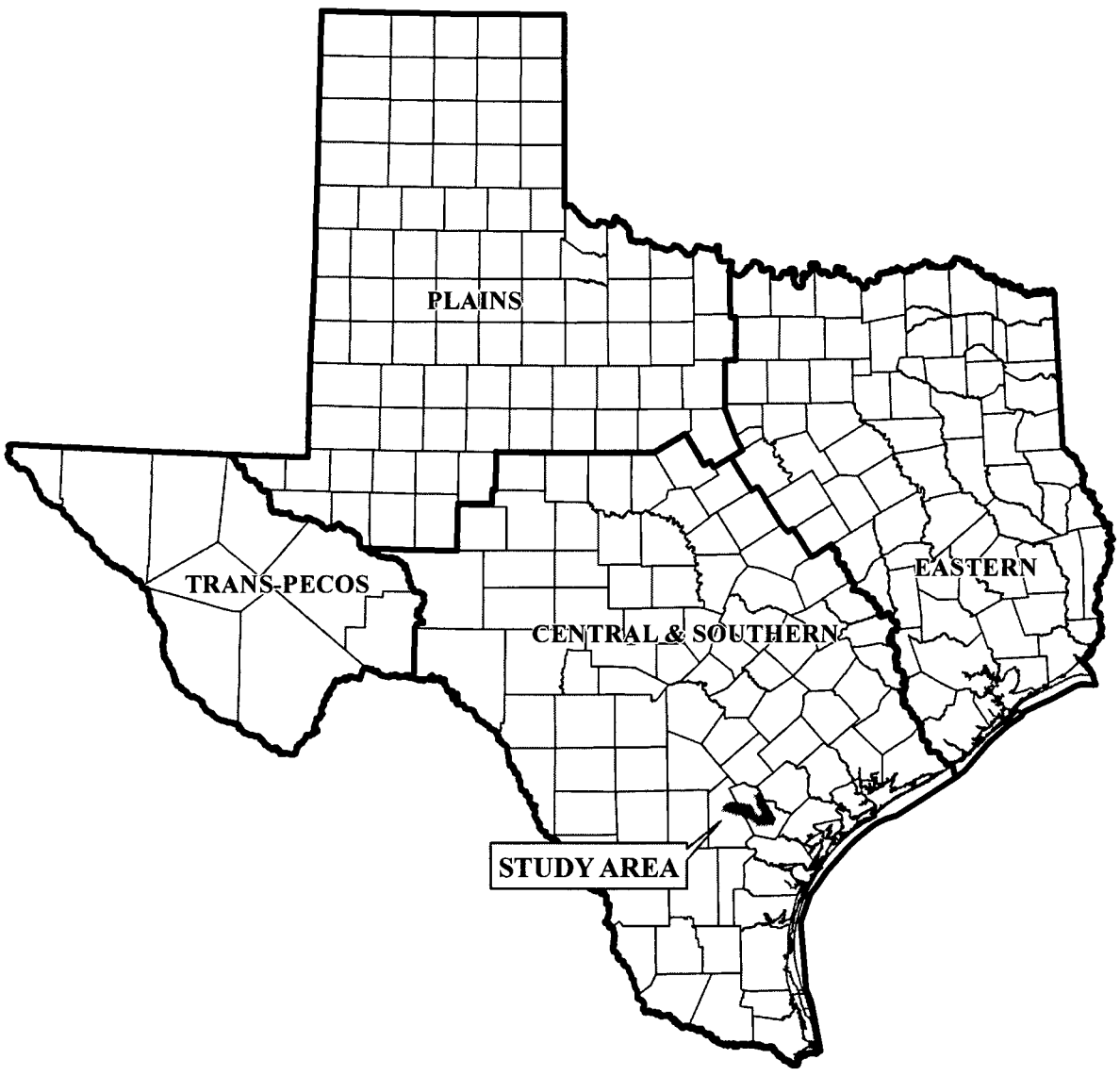
Historical Resources typically include standing buildings (e.g., houses, barns, outbuildings), but can also include structures (dams, canals, bridges, roads, silos), and districts that are non-archeological in nature.

Cemeteries are places of intentional human interment and might include large public burial grounds with multiple burials, small family plots with only a few burials, or individual grave sites. In some instances, cemeteries might be designated as Historic Texas Cemeteries by the THC and might be recognized with an OTHM. Other cemeteries might also be documented as part of the THC's Record, Investigate, and Protect program.

2.6.1 Cultural Background

Prehistory

Pertulla (2004) includes the study area in the northern portion of the South Texas Plains archeological region of Texas, and the THC (Mercado-Allinger et al. 1996) places the study area in the Central and Southern Planning Region (Figure 2-2). The study area is near, and thus shares culture histories with the Central Texas Region to the north, the Savannah and Prairie Region to the east, and the Coastal Texas region to the south. The following culture history is drawn primarily from Hester's (1995) discussion of South Texas prehistory, unless otherwise noted. Like most of Texas, the prehistory of South Texas is divided into three broad periods of cultural development based on technological changes evident in the archeological record, and on broad changes in the physical and cultural environment. These periods, the Paleoindian, Archaic and Late Prehistoric Periods, are discussed below, followed by a discussion of the study area following the arrival of Europeans. All dates pertaining to the prehistory of the area are given as approximate years before present (BP).



0 50 100 150 200 250
Miles

Source Mercado- Allinger et al , 1996

Legend

Cultural Resource Planning Region Boundary

County Boundary

THREE RIVERS - BORGLUM - TULETA
TRANSMISSION LINE PROJECT

Figure 2-2

Location of the Study Area
In Relation to the
Cultural Resource
Planning Regions of Texas

AEP TEXAS

POWER ENGINEERS

Paleoindian Period (12,000 BP-8,800 BP)

The Paleoindian period is the earliest generally accepted period of human occupation in North America. During this period, prehistoric populations exploited now-extinct giant mammals, such as ancient bison (*Bison antiquus*) and mammoth (*Mammuthus columbi*), although recent emphasis has been placed on the wide diversity of plants and animals exploited by these early groups (Collins 1995 and 2002). Late Pleistocene fauna and possibly associated lithic materials have been reported at the Buckner Ranch Site (41BE2) on the Berclair Terrace in Bee County near its border with Goliad County. The Paleoindian Period coincided with the end of the last major North American glaciation, known geologically as the Late Pleistocene, and with the beginning of the Holocene.

In South Texas, the Paleoindian tradition is represented by fluted projectile points and specialized blade production (Hester 1995). Sites containing diagnostic dart point types such as Clovis, Folsom, Plainview, and Angostura are often attributed to this early period of human occupation in South Texas and elsewhere. The late Paleoindian period corresponds to a greater variety of point styles, including smaller side-notched points that are believed to reflect a more diverse hunting strategy. Climate changes including a warming trend at the end of the Pleistocene contributed to the extinction of Pleistocene mega-fauna and regional changes in flora and fauna.

Archaic Period (8,800 BP-1,250 BP)

The Archaic Period in South Texas followed the Paleoindian period and is distinguished by cultural adaptations to the changing North American environment. These adaptations include a shift to the hunting of smaller game, plant gathering, and an emphasis on the exploitation of marine resources in coastal zones. The hunting and gathering lifestyle is epitomized by the Archaic tradition. Human population density gradually increased throughout the long-lasting Archaic Period that is generally subdivided into three subperiods: Early, Middle, and Late.

Because Early Archaic archeological sites are rare in South Texas, the settlement patterns and subsistence strategies of this period are poorly understood. Early Archaic groups were likely organized into small hunting and gathering bands, and were similar to their Paleoindian predecessors in their lifestyle and population density. Typical food resources probably consisted of deer, mussels, small game, fish, and acorn nuts. Hester (1989, 2004) divides the Early Archaic into two widespread horizons. The earlier corner-notched horizon includes Martindale, Uvalde, Baker, Bandy dart points, and Guadalupe tools. The later basal-notched horizon includes Bell, Andice, and early triangular bifaces.

The Middle Archaic Period (4,500 BP to 2,400 BP) has a distinct lithic technology separating it from the earlier periods. Dart points from this period, such as the Abasolo and Tortugas types, differ from the stemmed points of the Early Archaic Period. Pedernales, Langtry, Kinney, and Bulverde dart points are also Middle Archaic dart

point types (Turner and Hester 1999). Distally-beveled "gouges" are common during the Middle Archaic, and appear to be used largely for woodworking (Hester 1995). Although the population density remained low, the Middle Archaic is marked by growing populations and increased population density from earlier periods. During the Middle Archaic, open campsites located along waterways were typical and large and small game made up a large part of the diet (Hester 1995). Site densities in South Texas increased markedly during the Middle Archaic, possibly reflecting a decrease in group mobility and/or an increase in territoriality among groups (Black 1989). Cemeteries dating to the end of the Middle Archaic suggest increased territoriality during the Middle Archaic.

The Late Archaic Period (2,400 BP to 1,300 BP) is the most understood of the Archaic subperiods. Shumla, Ensor, Frio, Marco, and Montell point types are typical of the Late Archaic period. Ground stones are more frequently encountered in Late Archaic sites than in previous periods, consisting primarily of manos and metates. The increased use of ground stones likely represents an increased exploitation of mesquite, acacia beans, and other plant resources. Hester (1995) suggests this shift reflects a continued increase in population density and intensified use of local resources. Cultural deposits on Late Archaic sites also tend to be deeper than during preceding periods, suggesting that occupations were either more extended in duration or that sites were reoccupied more frequently (Black 1989).

During the Late Archaic, the exploitation of diverse ecological niches continued to intensify, becoming increasingly oriented toward the exploitation of seasonal food sources. Lithic materials, chemically traced to Central Texas, as well as the presence of a small amount of large, small-stemmed bifaces common in Central Texas, suggests that trade with neighboring areas increased during the Late Archaic.

Late Prehistoric Period (1,150 BP-350 BP)

The primary hallmarks of the Late Prehistoric Period are the introduction of the bow and arrow and the introduction of pottery in the region. The arrow points found from this period are much smaller and lighter than the dart points from earlier periods, and include Fresno, Scallorn, Starr, Zavala, and Perdiz points (Hester 1995). Two ceramic traditions are recognized in South Texas, bone-tempered and sandy paste. The bone-tempered pottery, often referred to as Leon Plain ware, is primarily recovered from inland South Texas sites and associated with the Toyah culture (Hester 1995). These wares include mostly undecorated jars and bowls. The sandy paste ceramic tradition, commonly referred to as Rockport ware, originates along the Texas Gulf Coast. These wares tend to be thin walled, sandy textured, and often decorated and waterproofed with asphaltum.

Historic Period (350 BP-50 BP)

As Europeans began to explore Mexico and South Texas in the sixteenth century, European goods were introduced to the native groups, some of which appear in contact-era artifact assemblages. The dominant regional

tribes in the area at the time of Spanish arrival included the Karankawa, Lipan Apache, and the Coahuiltecans. Records made by early European explorers, such as Alvar Nunez Cabeza da Vaca, provide the earliest ethnohistoric accounts of the Coahuiltecan-affiliated groups located in South Texas at the time. Based on these records, it appears that native groups in the region were highly nomadic hunter gatherers who moved in a seasonal pattern within distinctive territories (Hester 1989). The combined effects of diseases introduced by Europeans, as well as violent cultural conflicts, decimated local Native American populations prior to the establishment of a permanent European presence in the area.

Spain was the first European nation to explore and claim New World territory that included Texas and the Lower Rio Grande. In 1528, Cabeza de Vaca crossed South Texas after being shipwrecked along the Texas Coast near Galveston Bay. For a period of more than two centuries, Spanish excursions into South Texas were primarily military expeditions designed to bolster Spain's claim to the region and prevent other European nations from establishing claims within Spanish territory. Roads and trails used by the Spanish in this period often followed older routes used by Native American people and relied on natural springs and other water sources as waypoints. The Laredo Road of the Camino Real de los Tejas National Historic Trail is one such historic trail within the study area that linked Mexico with Texas and western Louisiana during the Spanish Colonial Period (NPS 2016b). The Camino Real is a network of trails that were created to accommodate travel in varying weather conditions, terrain, and relations with Native American groups and confront and counter French incursions into the Spanish borderlands. The trail became the initial route used by missionaries attempting to Christianize native groups in south Texas. The Laredo Road, which passes through the study area, is the southern extent of the network, and heads south from San Antonio (McGraw 1991).

After the Mexican War of Independence, the Mexican government issued land grants and empresario contracts to promote settlement in the region. In the Constitution of 1824, the Republic of Mexico formed the state of Coahuila and Texas. Catholicism was made a state religion, and liberty, security, property and equality were guaranteed to citizens (McKay 2016). From 1828 and 1834, shiploads of Irish Catholic immigrants arrived in Texas, but only few braved to travel inland. Thirty-five land grants were issued to Irish immigrants along the Frio, Nueces, and Atascosa River (Leffler 2016).

Goliad, located to the northeast of the study area, played a central role in the Texas Revolution. Increasing distrust between the Anglo-American colonists and Mexico irrupted into a full-fledged rebellion. Antonio Lopez de Santa Anna sent a military force under Martín Perfecto de Cos to combat the uprising. Cos lost the presidio at Goliad and was eventually defeated at the siege of Béxar. In 1835, the Goliad Declaration of Independence was signed. Santa Anna led his army into Texas to regain the Mission at San Antonio de Béxar, commonly known as the Alamo. General Urrea was dispatched to retake Goliad. The Alamo was taken in a costly battle, and Goliad was

taken with little resistance after Colonel James Fannin was caught at a strategic disadvantage leading his men from the fort. Fannin was forced to surrender at the Battle of Coleto Creek. The Texans, including Fannin and 342 men, were subsequently executed in what is known as the Goliad Massacre (Davenport and Roell 2016). Anger resulting from the Goliad Massacre and the valiant Texan stand at the Alamo galvanized US and European support for the cause of Texas independence. The revolution culminated with the defeat and capture of Santa Anna at the Battle of San Jacinto in 1836. The retreating Mexican Army was intercepted south of Goliad and the leader, Vicente Filisola, was forced to surrender (Barker and Pohl 2016).

Following the Texas Revolution, Mexico and the Republic of Texas both claimed land between the Rio Grande and the Nueces River. Neither government was able to firmly establish control over the region, including much of Live Oak County, and the area became a haven for fugitives, hustlers and outlaws (Leffler 2016). To lay better claim to the region, the Republic of Texas parceled out and issued an increased number of land grants, subsequently attracting more settlers to the area.

Texas was admitted to the US in 1845, and the Treaty of Guadalupe Hidalgo was signed on February 2, 1848, setting the Rio Grande as the boundary between Texas and Mexico. With the end of the hostilities, the population of the disputed area increased. In 1855, Live Oak County, originally part of San Patricio and Nueces counties, was formed at the urging of a group of frontiersman who gathered under a live oak tree and prepared the petition for the new jurisdiction (Leffler 2016). A year later, the newly formed county of Live Oak accepted a donation of 640 acres to establish the town site of Oakville, which would serve as the county seat until 1919, when it was moved to George West closer to the railroad. Bee County was formed in 1857 from San Patricio, Goliad, Refugio, Live Oak, and Karnes counties.

The mid-nineteenth century economy consisted primarily of small subsistence farmers who also traded in wild cattle, hog and mustangs (Leffler 2016). There was little commercial agriculture in Bee and Live Oak counties until shortly before the Civil War, spurred on by a booming cattle industry. Following the Civil War, cattle in the area were driven to the nearby Chisholm Trail, bound for the railroads in Matamoros, and broader American markets (Bauer 2016; Worcester 2016). After the introduction of barbed wired in the 1880s, many smaller ranchers were forced out of business, lacking access to water and forage for their herds. Fence-cutting soon became a last resort to gain access to water and forage. The State legislature passed a law making fence-cutting a felony in 1884, and within a few years the era of free-range grazing had come to an end (Leffler 2016).

During the 1880s, cotton and corn farming became an increasingly significant part of the economy. Between 1887 and 1890, the amount of acreage under the plow in Live Oak County increased from approximately 2,500 acres to 17,000 acres (Leffler 2016). Although agriculture business would never match cattle ranching in importance to

the local economy, the arrival of railroads in Bee County in the 1890s spurred a population increases and an increased reliance on farming (Bauer 2016). Railroads did not arrive in Live Oak County until 1912, aided by the ambition of wealthy rancher and businessman George W. West. West divided 75,000 acres of land, laid out a town site, arranged miles of railroad right of way leading to his town site, and established a $100,000 bonus fund to attract the railroad (Robins 2016). The railroad bypassed many older towns, shifting population centers to newly established town such as George West and Three Rivers (Leffler 2016). Towns such as Oakville became ghost towns as residents moved to towns along the rails.

During the Great Depression, tenant farming became common, and the farmers were hit by the combination of falling prices and the boll weevil (Bauer 2016; Leffler 2016). The discovery of oil in Pettus in 1929 and in neighboring Karnes County in 1930, aided in the post-Depression recovery in the area. The regional economy did not fully recover from the Great Depression until World War II, when several military installations were established, such as the Chase Field Naval Air Station (Bauer 2016), located within the study area. During the 1940s and 1950s, the regional economy began shifting towards large farms and ranches worked by a smaller number of agricultural laborers (Leffler 2016). The oil and gas industry has continued to be the most dominant part in the Bee County economy since the 1950s, whereas Live Oak County continues to rely primarily on cattle ranching as its economic base (Bauer 2016; Leffler 2016). During the mid-twentieth century, Live Oak County also became a leading producer in uranium and experienced an increase in oil and gas production.

2.6.2 Previous Investigations

Based on a review of the TASA data, multiple cultural resource investigations have been undertaken in the study area (THC 2016a). Portions of the study area have been surveyed in advance of the Choke Canyon reservoir, flood control initiatives, road improvements, oil and gas infrastructure projects, and uranium mining projects. These previous investigations are summarized in Table 2-7.

TABLE 2-7 PREVIOUS INVESTIGATIONS WITHIN THE STUDY AREA

INVESTIGATING INSTITUTION	PROJECT NAME/ REPORT TITLE	SITES INVESTIGATED WITHIN THE STUDY AREA
Texas Archeological Survey, The University of Texas at Austin	Three Rivers Flood Protection Project, Live Oak County, Texas: An Archaeological and Historical Survey of Areas Proposed for Modification (Mallouf 1975)	
Center for Archaeological Research, The University of Texas at San Antonio	Archaeological Assessment of Cultural Resources on the Felder-McLean Leases, Live Oak County, Texas (Kelly 1977)	41LK103, 41LK104, 41LK105, 41LK106, 41LK107, 41LK108, 41LK109, 41LK110, 41LK111, 41LK112

TABLE 2-7 PREVIOUS INVESTIGATIONS WITHIN THE STUDY AREA

INVESTIGATING INSTITUTION	PROJECT NAME/ REPORT TITLE	SITES INVESTIGATED WITHIN THE STUDY AREA
Texas Historical Commission	Cultural Resource Survey of Choke Canyon Reservoir, Live Oak and McMullen counties, Texas (Lynn et al. 1977)	41LK103, 41LK104, 41LK105, 41LK106, 41LK107, 41LK108, 41LK109, 41LK110, 41LK111, 41LK117
Center for Archaeological Research, University of Texas at San Antonio	Archeological Survey and Assessment of Properties for the Conquista Project in Live Oak and Karnes counties, Texas. (Smith 1978)	41LK117
Center for Archaeological Research, University of Texas at San Antonio	Phase II Archaeological Investigations at the McLean Lease (Hester 1978)	41LK105, 41LK106
State Department of Highways and Public Transportation	IH 37: From Intersection of SH 9 and SH 72 South to Sulphur Creek (SDHPT 1979)	41LK208, 41LK209, 41LK210, 41LK211, 41LK212, 41LK213, 41LK214, 41LK215, 41LK215, 41LK216, 41LK217, 41LK218, 41LK219, 41LK220, 41LK221, 41LK222, 41LK225, 41LK254
University of Texas at Austin	Archeological Assessments at the Three Rivers Flood Protection Projects (Dibble and Skelton 1979)	41LK228
Center for Archaeological Research, University of Texas at San Antonio	A Preliminary Archaeological Survey for the Conquista Project in Gonzales, Atascosa and Live Oak counties, Texas (McGraw 1979)	41LK226, 41LK227, 41LK228
Center for Archaeological Research ,University of Texas at San Antonio	An Archaeological Assessment of the Gentry-McLean Leases (Woerner 1980)	41LK109, 41LK110, 41LK111, 41LK112
Center for Archaeological Research, University of Texas at San Antonio	An Archeological Survey of the Probst and McGriff Leases in Live Oak County, Texas (Snavely 1984)	41LK270, 41LK271
TRC Mariah Associates, Inc.	Cultural Resource Investigations on the SIGMOR Crude Oil Pipeline (Tomka et al. 1994)	41LK296, 41LK297, 41LK298
SWCA Environmental Consultants	Martin-Swetlick Uranium Mine Project	41LK323
TerraXplorations, Inc., Tuscaloosa, AL	Nustar Choke Canyon Loop	41LK297, 41LK300, 41LK301, 41LK331, 41LK336, 41LK337, 41LK338, 41LK340, 41LK414, 41LK415, 41LK416
William Self Associates, Inc.	Archaeological Survey of the Koch Pipeline Company 60-mile Pipeline Project, Bee and San Patricio counties, Texas (Black and Karbula 2011)	41BE21

TABLE 2-7 PREVIOUS INVESTIGATIONS WITHIN THE STUDY AREA

INVESTIGATING INSTITUTION	PROJECT NAME/ REPORT TITLE	SITES INVESTIGATED WITHIN THE STUDY AREA
SWCA Environmental Consulting	Valero Oil Pipeline	41LK297, 41LK300, 41LK301, 41LK337, 41LK338, 41LK339, 41LK340
Cox/McLain Environmental Consulting, Inc.	Archeological Survey of High-Probability Areas along the Proposed Nustar Oakville and Pettus-Pawnee Petroleum Pipelines in Bee, Karnes, and Live Oak counties, Texas (Dayton 2013)	41LK331, 41LK338

Source: THC 2016a.

2.6.3 Records Review

The THC, working in conjunction with TARL, maintains records of previously recorded cultural resources as well as records of previous field investigations. On June 2, 2016, GIS shapefiles were acquired from TARL to identify and map the locations of previously recorded archeological sites within the study area. Information on archeological sites and surveys was obtained from the TASA (THC 2016a) in July and August, 2016. The locations of and information pertaining to State Antiquities Landmarks, NRHP properties, cemeteries, Historic Texas Cemeteries, and OTHMs within the study area were obtained from the THSA (THC 2016b) in July and August, 2016. TxDOT's historic bridges database was reviewed for bridges that are listed or determined eligible for listing on the NRHP within the study area. At the national level, NRHP databases (NPS 2016b, 2016c, and 2016d) were reviewed as well. The cultural resources recorded in the study area are summarized in Table 2-8 and discussed in more detail below.

TABLE 2-8 CULTURAL RESOURCES RECORDED WITHIN THE STUDY AREA

COUNTY	RECORDED ARCHEOLOGICAL SITES	STATE ANTIQUITIES LANDMARKS	NRHP-LISTED PROPERTIES	NATIONAL HISTORIC TRAILS	CEMETERIES	HISTORIC TEXAS CEMETERIES	OFFICIAL TEXAS HISTORICAL MARKERS
Bee	2	0	7	1	13	1	9
Live Oak	53	0	1	1	3	0	3

Source: THC 2016a, 2016b, and NPS 2016c.

The review of the TASA (THC 2016a) and TARL data indicates that 55 previously identified archeological sites have been recorded in the study area. Of these, 33 are prehistoric in age, ten are historic, and nine sites have both prehistoric and historic components. Aside from location data, no site information is available for three sites on TASA. The archeological sites are summarized in Table 2-9. None of the archeological sites are listed on or have been determined by the State Historic Preservation Office (SHPO) to be eligible for listing on the NRHP. No State Antiquities Landmarks (SAL) or NRHP-listed or determined-eligible bridges are recorded within the study area.

Prehistoric sites within the study area are typically lithic scatters that consist of debitage, cores, projectile points, bifaces, and early stage tools. Campsites, which typically include burned rock, and or/mussel shells or other evidence of food preparation or hearths, are also found in the study area. Occupation in the study area begins during the Paleoindian period at site 41BE5. This site consists of deep deposits of debitage, stone knives, scrapers, gouges, blades and projectile points associated with Pleistocene fauna (Sellards 1940). Site 41LK301 is a transitional Paleoindian to Early Archaic campsite and lithic procurement area/quarry consisting of debitage, cores, tested cobbles, pitted stones, chert bifaces, a San Patrice projectile point fragment, and mussel shell (THC 2016a). Other Early Archaic sites recorded in the study include 41LK109 and 41LK117. Site 41LK109 is a lithic scatter that consists of debitage, a core fragment, bifacial worked scraper, and biface fragments that exhibited distal square corners and roughly parallel flaking. Site 41LK117, an Archaic and Late Prehistoric campsite consists of projectile points, bifaces, scrapers gouges, cores, lithic debitage, and ceramic sherds. No sites within the study area have been determined eligible for listing on the NRHP; however sites 41BE5 and 41LK301 are recorded as having potential for listing on the NRHP.

Ten historic sites have been recorded in the study area. Only two historic sites (41LK323 and 41LK330) are attributed to specific time periods, both dating to the early to mid-20th century (THC 2016a). Site 41LK330 is a small historic house site, with a concrete pier, wooden beam, and associated scatter of artifacts including bottles, dinnerware, concrete, and brick fragments. Site 41LK323 is a historic farmstead consisting of a house site, shed, well, cistern and scatter of associated domestic artifacts. Sites within the study area that exhibit a prehistoric and historic component generally consist of prehistoric lithic scatters and historic domestic artifact scatters, house sites or farmsteads (THC 2016a). The archeological sites in the study area are summarized below (Table 2-9).

TABLE 2-9 ARCHEOLOGICAL SITES RECORDED WITHIN THE STUDY AREA

TRINOMIAL	NRHP ELIGIBILITY	DESCRIPTION	COMMENTS
41BE5	Undetermined	Paleoindian campsite: debitage, knifes, scrapers, gouges, blades and projectile points	
41BE12	Undetermined	Prehistoric lithic scatter: debitage, bifaces, knife, and projectile point fragments	
41LK103	Undetermined	Prehistoric lithic scatter: debitage and core fragments	
41LK104	Undetermined	Late Archaic campsite: debitage, cores fragments, biface preform, biface fragment, mussel and snail shell	
41LK105	Undetermined	Prehistoric lithic scatter: debitage, biface, and core fragments	
41LK106	Undetermined	Middle to Late Archaic lithic scatter: debitage, Tortugas point, and unidentified projectile point.	
41LK107	Undetermined	Prehistoric lithic scatter: debitage, biface and cores	
41LK108	Undetermined	Prehistoric campsite: scatter of debitage, two unclassifiable points, cores, bifaces, and burned bone	

TABLE 2-9 ARCHEOLOGICAL SITES RECORDED WITHIN THE STUDY AREA

TRINOMIAL	NRHP ELIGIBILITY	DESCRIPTION	COMMENTS
41LK109	Undetermined	Prehistoric lithic scatter: debitage, core fragment, bifaces and biface fragments	
41LK110	Undetermined	Prehistoric lithic scatter: unidentified projectile points, biface, biface fragment, and cores	
41LK111	Undetermined	Prehistoric lithic scatter: cores, preform and chopper	Disturbed
41LK112	Undetermined	No information on site form	
41LK117	Undetermined	Late Prehistoric campsite: projectile points bifaces, gouges, cores, debitage, and ceramic sherds	
41LK208	Undetermined	Prehistoric lithic scatter: debitage; historic farmstead: cisterns and associated artifact scatter	Destroyed/disturbed
41LK209	Undetermined	Prehistoric lithic scatter: historic cisterns, foundations	
41LK210	Undetermined	Prehistoric lithic scatter: historic artifact scatter	Mixed components
41LK211	Undetermined	Prehistoric lithic scatter: historic artifact scatter	
41LK212	Undetermined	Historic artifact scatter	
41LK213	Undetermined	Historic artifact scatter	
41LK214	Undetermined	Historic artifact scatter	
41LK215	Undetermined	Historic artifact scatter	
41LK216	Undetermined	Historic artifact scatter	
41LK217	Undetermined	Historic house site: domestic artifact scatter	
41LK218	Undetermined	Historic artifact scatter	
41LK219	Undetermined	Historic artifact scatter	
41LK220	Undetermined	Prehistoric lithic scatter: historic artifact scatter	
41LK221	Undetermined	Prehistoric lithic scatter: debitage; historic artifact scatter	Modern trash observed mixed with prehistoric and historic materials
41LK222	Undetermined	Prehistoric lithic scatter	Destroyed
41LK225	Undetermined	Prehistoric lithic scatter	Destroyed
41LK226	Undetermined	Prehistoric campsite: debitage and burned rock, exposed hearth	
41LK227	Undetermined	Prehistoric lithic scatter: debitage	
41LK228	Undetermined	No site data available on TASA	
41LK254	Undetermined	Prehistoric lithic procurement area: debitage, chert cobbles	
41LK270	Undetermined	Prehistoric campsite and lithic procurement area: debitage, biface fragments, chert cobbles, burned rock	

TABLE 2-9 ARCHEOLOGICAL SITES RECORDED WITHIN THE STUDY AREA

TRINOMIAL	NRHP ELIGIBILITY	DESCRIPTION	COMMENTS
41LK271	Undetermined	Late Prehistoric campsite and lithic procurement area: debitage, burned rock, Scallorn projectile point, biface fragments, cores	
41LK295	Undetermined	No site data available on TASA	
41LK296	Undetermined	Prehistoric campsite: debitage and mussel shell	
41LK297	Undetermined	Prehistoric campsite: debitage, informal stone tools, biface fragment, utilized flake, burned rock	
41LK298	Undetermined	Prehistoric campsite: debitage, burned rocks and bifaces; historic house site: glass, ceramics, metal fragments	
41LK300	Undetermined	Middle Archaic campsite and lithic procurement area: debitage, bifaces, Langtry projectile point, mussel shell, turtle bone, burned rock	
41LK301	Undetermined	Early Archaic campsite and lithic procurement area: debitage, cores, tested cobbles, pitted stones, bifaces, San Patrice projectile point, mussel shell	
41LK323	Undetermined	Historic house and house site, shed, well, cistern, barn and scatter of associated rusted ranch maintenance equipment	
41LK329	Undetermined	Prehistoric campsite: lithic debitage, cores and fire-cracked rock	
41LK330	Undetermined	Historic ca. 1930-1950 house site: bottles, dinnerware and brick fragments	
41LK331	Undetermined	Prehistoric campsite: debitage, cores, biface and biface fragments, informal tools, shell, burned rock	
41LK336	Undetermined	Prehistoric campsite: debitage, cores, biface fragments, hammerstone, and burned rock	
41LK337	Undetermined	Prehistoric campsite: debitage, core, biface fragment, mussel shell	
41LK338	Undetermined	Prehistoric campsite: debitage, mussel shell; historic ceramic sherd (isolated find)	
41LK339	Undetermined	Prehistoric campsite: debitage, bifaces, bivalve shells, burned rock	
41LK340	Undetermined	Prehistoric campsite: debitage, biface fragments, cores, and burned rock	Two stratigraphically distinct artifact lenses
41LK414	Undetermined	Prehistoric campsite: debitage, cores, informal tools, biface and biface fragment, mussel shell	
41LK415	Undetermined	Prehistoric campsite: debitage, tested cobbles, mussel shell fragment, informal tools; historic scatter of glass shards	
41LK416	Undetermined	Prehistoric campsite: debitage, informal tools, mussel shell, and burned rock	
41LK417	Undetermined	Prehistoric campsite and lithic procurement area: debitage, informal tools, tested cobbles, cores, and mussel shell	
41LK421	Undetermined	Prehistoric lithic scatter: debitage, cores, and bifaces	

Source: THC 2016a.

Eight NRHP-listed properties and one National Historic Trail are recorded in the study area (THC 2016a; NPS 2016c). Seven of the NRHP-listed properties are located within the Chase Field Naval Air Station (Table 2-10). Built in 1943, the Chase Air Field is one of nearly 100 naval air stations and auxiliary flying fields built immediately before and during World War II to meet the demand for trained combat pilots during the war (NRHP 1994a). At the height of the jet training program, the military and civilian personnel employed at the base reached 5,000 (NRHP 1994e). One of the NRHP-listed properties, The Women Accepted for Volunteer Emergency Service (WAVES) Barracks, constructed in 1944 to house women navel enlistees, "conveys a sense of the all-encompassing nature of the emergency that required the sacrifices of all its citizens, men and women, to the successful prosecution of the war" (NRHP 1994b). The only NRHP in the study area outside of the air field is the Oakville Jail, built from 1886 to 1887. The Oakville Jail functioned as a jail in Oakville until 1919, when the Live Oak County seat moved to George West. Today, Oakville is a ghost town (NRHP 2004).

A portion of the El Camino Real de los Tejas National Historic Trail runs through study area in Bee County, north of Beeville, and Live Oak County, south of Oakville (NPS 2016e). Known as the Laredo Road of the El Camino Real de los Tejas, this trail is the southernmost of a series of overland routes established in the 1600s, taking advantage of existing Native American trails, to connect modern day Louisiana and East Texas to government centers in Mexico (NPS 2016e).

TABLE 2-10 NRHP WITHIN THE STUDY AREA

RESOURCE ID	NAME	COUNTY
04000098	Live Oak County Jail	Live Oak
94000050	NAS Chase Air Field, Building 1001-Administration Building	Bee
94000051	NAS Chase Air Field, Building 1009-Enlisted Women Accepted for Volunteer Emergency Service (WAVES) Barracks	Bee
94000052	NAS Chase Air Field, Building 1015-Landplane Hanger	Bee
94000053	NAS Chase Air Field, Building 1040-Auditorium/Gym/Chapel	Bee
94000054	NAS Chase Air Field, Building F 1042-Brig	Bee
94000055	NAS Chase Air Field, Building Quarters R-Commanding Officer's Quarters	Bee
94000056	NAS Chase Air Field, Building Quarters S-Executive Officer's Quarters	Bee

Source: THC 2016b, NRHP 1994a, b, c, d, e, f, g, and 2004.

Information from the TASA (THC 2016a) and USGS topographic maps indicates that there are 16 cemeteries recorded in the study area (Table 2-11). The Colony Cemetery, also known as the Normanna Colony Cemetery, is the only cemetery in the study area that is a designated Historic Texas Cemeteries (HTC) (THC 2016a). The Oakville Cemetery has not been assigned an identification number by the THC; however, it is the subject of an OTHM placed at the cemetery. There are 12 OTHMS in the study area (Table 2-12), including the Colony and Oakville cemeteries that commemorate late nineteenth and early twentieth century settlement of the area by

identifying early structures, cemeteries, and communities. Two of these OTHMs are Recorded Texas Historic Landmarks (RTHLs) (THC 2016a, 2016b).

TABLE 2-11 CEMETERIES WITHIN THE STUDY AREA

THC ID NO.	NAME	COUNTY	DESIGNATION
BE-C028	Arroyo Seco	Bee	
BE-C014	Beeville Memorial Park	Bee	
BE-C042	Central	Bee	
BE-C001	Colony	Bee	HTC, OTHM
BE-C027	Corrigan	Bee	
BE-C015	Del Bosque	Bee	
BE-C038	Dial	Bee	
BE-C056	Felicidad Ranch	Bee	
	Grave	Bee	
BE-C013	Our Lady of Victory #2	Bee	
BE-C053	Ramon	Bee	
BE-C046	Robert L. Phillip	Bee	
BE-C039	Seger	Bee	
LK-C006	Lebanon	Live Oak	
	Oakville Cemetery	Live Oak	OTHM
LK-C012	Unknown Cemeteries (Ray Point)	Live Oak	

Source: THC 2016a.

TABLE 2-12 OTHMS WITHIN THE STUDY AREA

NAME	COUNTY	DESIGNATION
Cadiz Baptist Church	Bee	
Colony Cemetery	Bee	HTC
Cook Home	Bee	RTHL
Early Trails in Bee County	Bee	
Jones, Captain A.C.	Bee	
Normanna	Bee	
Park Hotel	Bee	RTHL
Tuleta	Bee	
Oakville	Live Oak	
Oakville Cemetery	Live Oak	
Oakville Post Office	Live Oak	

Source: THC 2016a, 2016b.

2.6.4 High Probability Areas

Review of the previously recorded cultural resource sites data indicates that the entire study area has not been examined during previous archeological and historical investigations. Consequently, the records review indicates that additional cultural resource sites are likely located within the study area. To further assess and avoid potential impacts to cultural resources, high probability areas (HPAs) for prehistoric archeological sites would be defined during the route analysis process. High probability areas were designated based on a review of the site and survey data within the study area, as well as soils and geologic data, and topographic variables. Native American subsistence was dependent on close proximity to natural features such as springs and streams that would provide water and attract game animals. Terraces and topographic high points near potential sources of water that would provide flats for camping and expansive landscape views affording a hunting or defensive advantage are also considered to have a high probability for containing prehistoric archeological sites, as are sources of raw materials such as chert outcroppings.

HPAs for prehistoric sites were defined by reviewing topographic maps, soils data and the Bureau of Economic Geology (BEG) Geologic Atlas of Texas Beeville-Bay City (BEG 1987) and Crystal City-Eagle Pass (BEG 1976) map sheets. The floodplains and secondary terraces of stream channels, as well as topographic high points in close proximity to water sources or sources of raw materials such as chert, were defined as having a high probability for prehistoric resources. Areas within 300 meters of recorded archeological sites are also considered HPAs.

Historic age resources are also likely to be found near water sources. However, they will also be located in proximity to primary and secondary transportation routes (e.g., trails, roads, and railroads) which provided access to the sites. Buildings and cemeteries are also more likely to be located within or near historic communities. Locations and patterns of distribution for historic-period sites are not readily predictable or quantifiable and the route analysis process discussed in Section 4.0 considers only recorded sites listed with official state and federal agencies and HPAs developed for prehistoric resources within the study area.

2.7 Aesthetic Values

Section 37.056(c)(4)(C) of the Texas Utilities Code incorporates aesthetics as a consideration when evaluating proposed electric transmission facilities. There are currently no formal guidelines provided for managing visual resources on private, state, or county owned lands. For the purposes of this study, the term aesthetics is defined by POWER to accommodate the subjective perception of natural beauty in a landscape and measure an area's scenic qualities. The visual analysis was conducted by describing the regional setting and determining a viewer's sensitivity. Related literature, aerial photograph interpretation, and field reconnaissance surveys were used to describe the regional setting and to determine the landscape character types for the area.

Consideration of the visual environment includes a determination of aesthetic values (where the major potential effect of a project on the resource is considered visual) and recreational values (where the location of a transmission line could potentially affect the scenic enjoyment of the area) that would help define a viewer's sensitivity. POWER considered the following aesthetic criteria that combine to give an area its aesthetic identity:

- Topographical variation (hills, valleys, etc.).
- Prominence of water in the landscape (rivers, lakes, etc.).
- Vegetation variety (woodland, meadows).
- Diversity of scenic elements.
- Degree of human development or alteration.
- Overall uniqueness of the scenic environment compared with the larger region.

The study area is primarily rural with residential development concentrated in the cities of Beeville and Three Rivers. The predominant land use within the study area is rangeland and cropland. The majority of the study area has been impacted by land improvements associated with agriculture, residential structures, roadways, oil and gas activities, and various utility corridors. Overall, the study area viewscape consists of open rangeland/pastureland.

No known high quality aesthetic resources, designated views, or designated scenic roads or highways were identified within the study area. The study area is located within the Texas Independence Trail Region; however, there are no sites of interest within the study area (THC 2016c). The study area is also located within the Texas Tropical Trail Region and runs along IH 37. The one site of interest along the trail within the study area is the Historic Oakville Jail Bed and Breakfast (THC 2016d).

A review of the NPS website did not indicate any Wild and Scenic Rivers, National Parks, National Monuments, National Memorials, National Historic Sites, or National Battlefields within the study area (NWSRS 2016; NPS 2016a, 2016d, and 2016f).

A National Historic Trail was identified within the study area, El Camino Real de los Tejas National Historic Trail. A branch of the El Camino Real de los Tejas National Historic Trail runs through the northern portion of the study area in a northeast to southwest direction. El Camino Real de los Tejas was an approximately 1,000-mile long corridor of changing routes established as the only primary overland route that connected a series of Spanish missions and posts from the Río Grande to the Red River Valley in Louisiana during the Spanish Colonial Period (NPS 2016e).

Based on these criteria, the study area exhibits a moderate degree of aesthetic quality for the region. The majority of the study area maintains the feel of a rural community. Although some portions of the study area might be visually appealing, the aesthetic quality of the study area overall is not distinguishable from that of other adjacent areas within the region.

2.8 Environmental Integrity

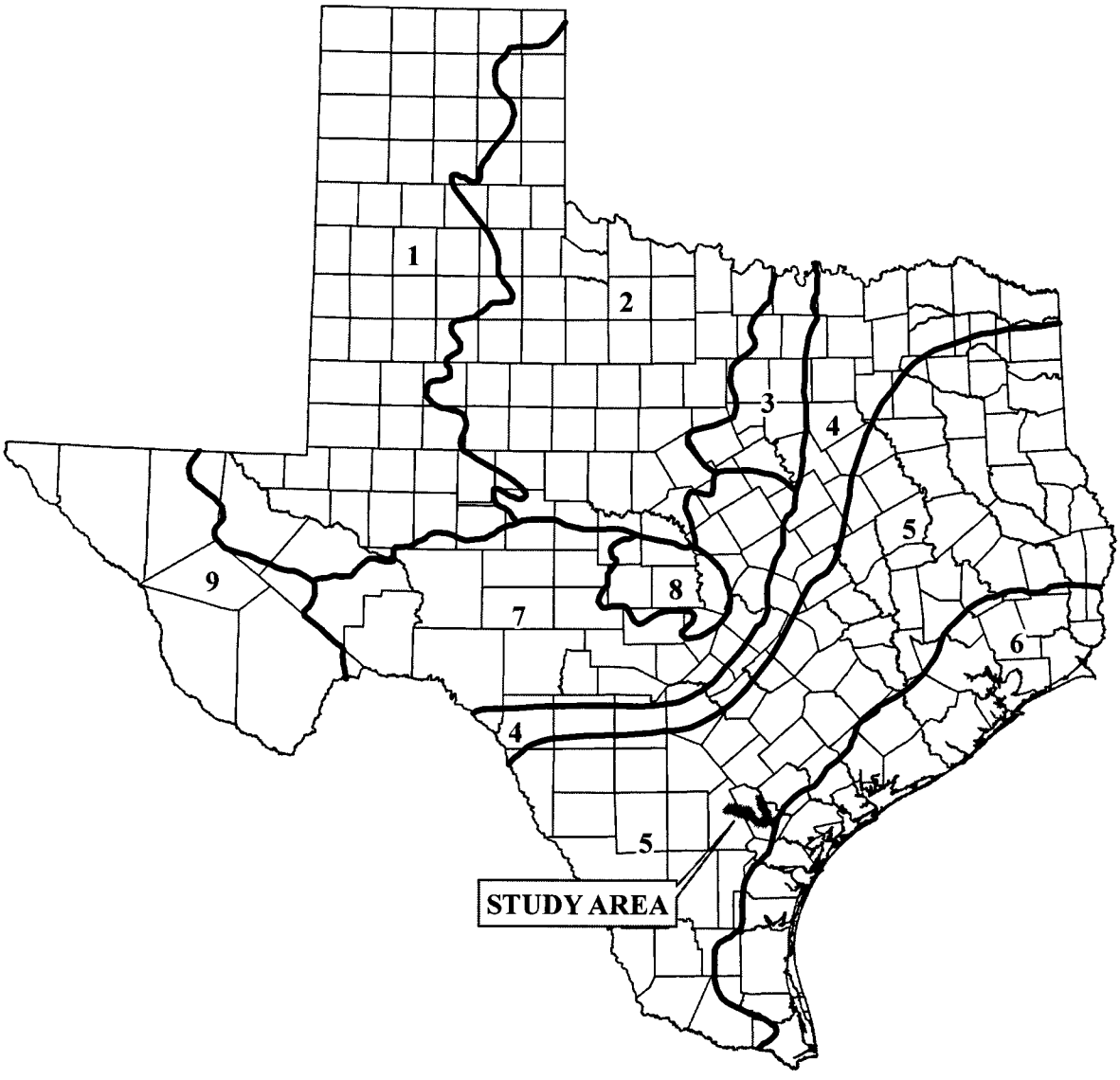
2.8.1 Physiography and Geology

As shown in Figure 2-3, the study area is located within the Interior Coastal Plains sub-province of the Gulf Coastal Prairies Physiographic Province (BEG 1996). The Interior Coastal Plains are comprised of alternating belts of resistant uncemented sands among weaker shales that erode into long, sandy ridges. Elevations within the study area range between approximately 110 feet above mean sea level (amsl) in the southern portions to approximately 470 feet amsl in the northwestern portions of the study area (BEG 1996; USGS 2016a).

Geologic formations occurring within the study area includes Quaternary and Tertiary aged formations. The Quaternary-aged formations include alluvium, terraces deposits, and the Lissie Formation. Tertiary-aged formations include the Goliad Formation, Catahoula Formation, Fleming Formation and Oakville Sandstone (BEG 1976, 1987). A brief description of these geologic formations is provided below.

Quaternary Aged Formations

Alluvium, terrace deposits, and the Lissie formation comprise the Quaternary aged formations within the study area. Alluvium and terrace deposits are sedimentary formations typically found near the Nueces River or larger creeks and streams. The sediment making up these formations is believed to have been deposited by riverine floodwaters mostly in the form of natural levees and deltas that intermixed due to the shifting locations of channels. Alluvium typically consists of clay, silt, sand, and gravel with organic material abundant locally and may include point bars, natural levees, stream channels, back swamps, coastal marshes, clay dunes, sand dunes and oyster reef deposits. Terrace deposits consist of clay, silt, sand, gravel and caliche in deposits along valley walls. The Lissie Formation occurs primarily in the south eastern portions of the study area and consists of sand, silt, clay, and minor gravel. This formation is typically flat, except for shallow depressions and pimple mounds that may be present (BEG 1976, 1987; USGS 2016b).



0 50 100 150 200 250
Miles

Source Texas Bureau of Economic Geology, 1996

Legend

Physiographic Region Boundary
1 High Plains
2 North-Central Plains
3 Grand Prairie
4 Blackland Prairies
5 Interior Coastal Plains
6 Gulf Coastal Prairies
7 Edwards Plateau
8 Central Texas Uplift
9 Trans-Pecos Basin and Range

County Boundary

THREE RIVERS - BORGLUM - TULETA
TRANSMISSION LINE PROJECT

Figure 2-3

Location of the Study Area
In Relation to the
Physiographic Regions of Texas

AEP TEXAS

POWER ENGINEERS

Tertiary Aged Formations

The Fleming Formation, Fleming Formation/Oakville Sandstone Undivided, and Goliad Formation comprise the Tertiary aged formations within the study area. The Fleming Formation is described as clay, sandstone, and is commonly calcareous forming a blackish/brown soil. The Fleming Formation is thick bedded (1,300 to 1,450 feet) with fossil wood and vertebrate fossils locally common (BEG 1987). The Oakville Sandstone is described as medium grained sandstone and clay, calcareous, thick bedded (300 to 500 feet) with some crossbedding. The Goliad Formation is the most abundant geologic formation within the study area. It is described as clay, sand, sandstone, marl, caliche, limestone, and conglomerate clay. It contains calcareous concretions; sand and sandstone with medium to very coarse grains and a thickness of 75 to 200 feet (BEG 1976, 1987).

Geological Hazards

Several potential geologic hazards affecting the construction and operation of a transmission line were evaluated within the study area. Hazardous areas reviewed included potential karst areas with known cave locations, faults, active or historical coal and uranium mining locations, gravel quarries, and potential subsurface contamination.

Review of Texas Speleological Survey (TSS) data did not indicate any known cave locations or karst regions located within the study area (TSS 1994, 2007). The study area is within the Gulf-margin normal faults region in Texas. Faults in this region are characterized as having a slip-rate category of less than 0.2 millimeter per year (USGS 2016c). No normal faults were identified within the study area (BEG 1976, 1987).

Oil and gas well operations may occur within the north-central portion of the study area (RCC 2016a). No historical or current coal mining activities are reported within the study area (RRC 2016b). No historical or currently operating uranium mines are located within the study area (RCC 2016c). Numerous caliche/gravel quarries were identified within the study area (USGS 2016a).

Subsurface contamination (soils or groundwater) from previous commercial activities or dumps/landfills may require additional considerations during routing and/or may create a potential hazard during construction activities. Review of USEPA Superfund/National Priority List Sites (USEPA 2016a) and TCEQ State Superfund Sites (TCEQ 2016) did not indicate any federal or state listed superfund sites within the study area.

2.8.2 Soils

Soil Associations

The Natural Resource Conservation Service (NRCS) Web Soil Survey (NRCS 2016) and NRCS (formerly the Soil Conservation Service [SCS]) published county soils reports was reviewed for Bee (SCS 1981) and Live Oak (NRCS 2006) counties to identify and characterize the soil associations within the study area. A soil association is

a group of soils geographically associated in a characteristic repeating pattern and defined as a single unit (NRCS 2016). Soil associations occurring within the study area are listed in Table 2-13 which summarizes each soil association within the study area and indicates if any mapped units of the soil series within the association are considered prime farmlands and/or hydric (NRCS 2016).

TABLE 2-13 MAPPED SOIL UNITS WITHIN THE STUDY AREA

SOILS ASSOCIATION	DESCRIPTION	SOIL SERIES	PERCENT OF ASSOCIATION	PRIME FARMLAND SOIL	HYDRIC SOIL
Bee County					
Parrita - Olmos - Weesatche	Nearly level to undulating, shallow, very shallow, and deep moderately well drained and well drained, loamy and gravely soils	Parrita	30	No	No
		Olmos	14	No	No
		Weesatche	10	Yes	No
		Other	46	-	-
Weesatche - Clareville	Nearly level to gently sloping, deep, well drained loamy soils	Weesatche	44	Yes	No
		Clareville	23	Yes	No
		Other	33	-	-
Orelia	Nearly level, deep, somewhat poorly drained loamy soils	Orelia	65	No	No
		Other	35	-	-
Papalote	Nearly level to gently sloping, deep, moderately well drained, sandy and loamy soils	Papalote	55	Yes	No
		Other	45	-	-
Weesatche - Pernitas	Gently sloping, deep, well drained loamy soils	Weesatche	49	Yes	No
		Pernitas	30	Yes	No
		Other	21	-	-
Live Oak County					
Weesatche - Pernitas	Very deep, very gently sloping or gently sloping, well drained, non-calcareous and calcareous, loamy soils	Weesatche	38	Yes	No
		Pernitas	28	Yes	No
		Other	34	-	-
Eloso - Rosenbrock	Moderately deep and deep, nearly level or very gently sloping, well drained, clayey soils	Eloso	49	Yes	No
		Rosenbrock	21	Yes	No
		Other	30	-	-
Sarnosa.- Weesatche	Very deep, very gently sloping to moderately sloping, well drained, loamy soils	Sarnosa	49	No	No
		Weesatche	24	Yes	No
		Other	27	-	-
Buchel - Sinton	Very deep, nearly level, moderately well drained, clayey and loamy soils	Buchel	46	Yes	No
		Sinton	33	Yes	No
		Other	21	-	-
Papalota - Weesatche - Coy	Very deep, nearly level to gently sloping, moderately well drained and well drained, loamy and clayey soils	Papalota	33	Yes	No
		Weesatche	23	Yes	No
		Coy	11	Yes	No
		Other	33	-	-

TABLE 2-13 MAPPED SOIL UNITS WITHIN THE STUDY AREA

SOILS ASSOCIATION	DESCRIPTION	SOIL SERIES	PERCENT OF ASSOCIATION	PRIME FARMLAND SOIL	HYDRIC SOIL
Monteola - Cotulla	Very deep, nearly level or very gently sloping, moderately well drained, calcareous, loamy soils	Monteola	44	Yes	No
		Cotulla	23	No	No
		Other	33	-	-

Source: NRCS 2016.

Hydric Soils

The National Technical Committee for Hydric Soils defines hydric soils as soils that were formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper horizons. These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation (NRCS 2016).

Map units that are dominantly comprised of hydric soils might have small areas, or inclusions, of non-hydric soils in the higher positions on the landform, and map units dominantly made up of non-hydric soils might have inclusions of hydric soils in the lower positions on the landform (NRCS 2016).

According to NRCS (2016) Web Soil Survey data for the study area counties, there are minor (other) soil components in multiple soil units designated as hydric soils located within the study area. Table 2-13 lists whether there are map unit components that are rated as hydric soils in the study area. Minor soils within each association were not evaluated for this criterion. Most of the soils listed as hydric are located within depressions and/or streams and floodplains.

Prime Farmland Soils

The Secretary of Agriculture, within 7 U.S.C. § 4201(c)(1)(A), defines prime farmland soils as those soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. 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, or they lack sufficient natural moisture. The USDA would consider these soils as prime farmland if such practices were installed and these soils are incorporated as Prime Farmland soils in Table 2-13.

According to NRCS (2016) Web Soil Survey data for the study area counties, there are multiple soil series designated as prime farmland soils located within the study area. The soil associations listed in Table 2-13 were compared to listed prime farmland soil map units and prime farmlands were indicated if the mapped units were listed with the soil series. This does not imply that all soil series within the mapped units are considered prime farmlands.

Transmission line projects are typically not subject to the requirements of the Farmland Protection Policy Act (FPPA) because transmission lines are not a conversion of Important Farmlands and the site can still be used as farmland after construction of the line. The NRCS responded to POWER's solicitation for information in a letter dated June 28, 2016 that stated the following: "We do not consider power lines to be a conversion of farmland because the site can still be used after construction" (see Appendix A).

2.8.3 Water Resources

Surface Water

The study area is located within the Nueces and the San Antonio – Nueces river basins (USEPA 2016b). Within the Nueces River Basin, the Nueces River is located within the western portion of the study area, near the City of Three Rivers. The Frio River meets its confluence with the Nueces River approximately one mile west of the study area. The Atascosa River meets its confluence with the Frio River approximately two miles west of the study area. The Nueces River generally flows in a southeast direction and flows into Corpus Christi Bay approximately 35 miles southeast of the study area. Named streams/creeks within the study area that drain into the Nueces River include La Para Creek, Olds Slough, Levena Hollow, Gambie Gully, Sulphur Creek, Salt Branch, and Rock Quarry Branch (USEPA 2016b; USGS 2016a).

Within the San Antonio – Nueces River Basin, the Aransas River is located along the southern boundary of the study area and the Mission River is located approximately 16 miles southeast of the study area. The Aransas River generally flows in a southeast direction and flows into Copano Bay approximately 27 miles southeast of the study area. The Mission River also flows in a southeast direction and eventually flows into Mission Bay approximately 27 miles southeast of the study area. Named streams/creeks within the study area that drain into the Aransas River include Aransas Creek, Poesta Creek, Elm Creek, Friday Hollow, Dry Creek, Little Dry Creek, Spring Creek, and Talpacate Creek. Named streams/creeks within the study area that eventually drain into the Mission River include Medio Creek, Parker Hollow Creek, Live Oak Hollow, and Boggy Creek. Many additional unnamed small lakes, ponds, quarries, creeks, and tributaries were also identified within the study area. No major reservoirs were identified within the study area (USEPA 2016b; USGS 2016a).

Under 31 TAC 357.8, the TPWD has designated Ecologically Significant Stream Segments (ESSS) based on habitat value, threatened and endangered species, species diversity, and aesthetic value criteria. Review of the TPWD information indicates there are no designated ESSS within the study area (TPWD 2016c).

In accordance with Section 303(d) and 304(a) of the CWA, the TCEQ identifies surface waters for which effluent limitations are not stringent enough to meet water quality standards and for which the associated pollutants are suitable for measurement by maximum daily load. Review of the TCEQ website and most recent TCEQ (2014), 303(d) lists indicate Aransas Creek and the Nueces River/Lower Frio River did not meet their water quality standards for designated uses. Aransas Creek did not meet their water quality standards for bacteria and the Nueces River/Lower Frio River did not meet their water quality standards for total dissolved solids (TCEQ 2014).

Ground Water

The study area overlays the Gulf Coast Aquifer (major aquifer) (TWDB 2011). No minor aquifers were identified within the study area. The Gulf Coast Aquifer parallels the Gulf of Mexico coastline from the Louisiana border to the border of Mexico within Texas. It consists of discontinuous sand, silt, clay, and gravel beds. The maximum total sand thickness of the Gulf Coast Aquifer ranges from approximately 700 feet in the south to 1,300 feet in the north. Freshwater saturated thickness averages about 1,000 feet. Water quality varies with depth and locality but it is generally of good quality within the central and northeastern portions, where the water contains less than 500 milligrams per liter of total dissolved solids. Water quality declines towards the southern portions, where it typically contains 1,000 to more than 10,000 milligrams per liter of total dissolved solids and the groundwater yield decreases. The Gulf Coast aquifer is typically used for municipal, industrial, and irrigation purposes (TWDB 2011).

The TWDB (2016a, 2016b) database was reviewed for public and private water wells within the study area. Numerous public and private wells used for stock, agricultural, residential, commercial and industrial uses were identified (TWDB 2016a). Bee and Live Oak counties historically contained several spring fed creeks and seeps, but sediment from erosion has filled in many areas with silt and sand and water tables have dramatically declined due to overgrazing and well pumps (Brune 2002). Aransas Springs along Aransas Creek, Pecan Water Hole and Rock Water Hole along Dry Creek, and Rock Pool and Oak Ville Springs along Sulfur Creek historically occurred within the study area; however, no flowing springs of significance are anticipated to occur within the study area due to historic land use practices within the region (Brune 2002).

Floodplains

The 100-year flood (one percent flood or base flood) represents a flood event that has a one percent chance of being equaled or exceeded for any given year. Review of FEMA floodplain data identified 100-year floodplains

occurring primary on low lying areas near or adjacent to the Nueces River and most named perennial creeks/streams, and their tributaries (FEMA 2016).

Future Surface Water Developments

The study area is located within TWDB Water Planning Region N (Coastal Bend). The TWDB 2017 State Water Plan and Regional Water Plans were reviewed for potential future water development projects within the study area. No planned water development projects were identified within the study area (TWDB 2016c, 2016d).

2.8.4 Ecological Resources

Data and information on ecological resources within the study area were obtained from a variety of sources, including aerial photograph interpretation, field reconnaissance surveys, correspondence with the USFWS, TPWD and published literature and technical reports. All biological resource data for the study area were mapped utilizing GIS.

Ecological Region

The study area lies within the East Central Texas Plains, Western Gulf Coastal Plains, and South Texas Plains Level III Ecoregions and Southern Post Oak Savanna, Southern Subhumid Gulf Coastal Prairies, and Texas-Tamaulipan Thornscrub Level IV Ecoregions (Griffith et al. 2007). The East Central Texas Plains includes the Southern Post Oak Savanna and these encompass a majority of the study area. Within the Western Gulf Coastal Plains lie the Southern Subhumid Gulf Coastal Prairies. The Southern Subhumid Gulf Coastal Prairies are located primarily within the southeastern portion of the study area. Within the South Texas Plains lies the Texas-Tamaulipan Thornscrub. The Texas-Tamaulipan Thornscrub are located in the far western portion of the study area (Hatch et al. 1990; Griffith et al. 2007).

The East Central Texas Plains are described as irregular plains historically covered by post oak (*Quercus stellata*) savanna vegetation. Also called the Post Oak Savanna or Claypan Area, this ecoregion is bordered to the north, south, and west by more open prairie regions and pine forests to the east. The dominant land use practices for this region are now pasture and rangeland. The Southern Post Oak Savanna contains more wooded areas than the adjacent ecoregions. Historically covered by savanna, today it is dominated by a mix of post oak woods, improved pasture and rangeland, with invasive thorn-shrub in the south. Due to suppression of wildfires and over-grazing throughout the last 150 years, thorn-shrub species have invaded many parts of this ecoregion. Land use practices have also led to the encroachment of thick understory stands of yaupon (*Ilex vomitoria*) and eastern red cedar (*Juniperus virginiana*) in some areas (Griffith et al. 2007).