AEP Texas Inc. and CPS Energy

Howard-to-Solstice 765-kV Single-circuit Transmission Line

Environmental Assessment and Alternative Route Analysis

Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties, Texas

Docket No. 59336

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Project Contact: Kathleen Cooney
Email: kathleen.cooney@wsp.com
Phone: 512-735-1823

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LIST OF ACRONYMS AND ABBREVIATIONS

Abbreviation	Term/Phrase/Name
AEP Texas	AEP Texas Inc.
amsl	above mean sea level
ANSI	American National Standards Institute
APLIC	Avian Power Line Interaction Committee
BEG	Bureau of Economic Geology
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
BP	before present
CCN	Certificate of Convenience and Necessity
CFR	Code of Federal Regulations
CLF	civilian labor force
CMP	Coastal Management Program
Companies	AEP Texas Inc. and CPS Energy
Consultant	WSP USA Inc.
CPS Energy	The City of San Antonio, acting by and through the City Public Service Board
CWA	Clean Water Act
DoD	Department of Defense
EA	Environmental Assessment and Alternative Route Analysis
EAA	Edwards Aquifer Authority
EHV	Extra-high voltage
EO	element of occurrence
ERCOT	Electric Reliability Council of Texas
ESA	Endangered Species Act
ESSS	Ecologically Significant Stream Segments
FAA	Federal Aviation Administration
FAQ	Frequently Asked Questions

Abbreviation	Term/Phrase/Name
FEMA	Federal Emergency Management Agency
FM	Farm-to-Market Road
FVZ	foreground visual zone
GCW	golden-cheeked warbler
GIS	geographic information system
GLO	Texas General Land Office
HB	House Bill
HCP	Habitat Conservation Plan
HPA	high probability area
HTC	Historic Texas Cemetery
I-	Interstate Highway
IPaC	Information for Planning and Consultation
ISD	Independent School District
kV	kilovolt
MBTA	Migratory Bird Treaty Act
MW	megawatt
NDD	TPWD's Natural Diversity Database
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NHL	National Historic Landmark
NPS	National Parks Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NWI	National Wetlands Inventory
NWP	Nationwide Permit
OHP	San Antonio Office of Historic Preservation

Abbreviation	Term/Phrase/Name
OPGW	optical ground wire
OTHM	Official Texas Historical Marker
PADUS	Protected Areas Database of the United States
Project	Howard-to-Solstice 765-kV Single-circuit Transmission Line Project
PUC	Public Utility Commission of Texas
PURA	Public Utility Regulatory Act
ROW	right-of-way
RRC	Railroad Commission of Texas
RTEST	Rare, Threatened, and Endangered Species of Texas
RTHL	Recorded Texas Historic Landmark
SAL	State Antiquities Landmark
SEP	Southern Edwards Plateau
SH	State Highway
Study	Permian Basin Reliability Plan Study
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
TDC	Texas Demographic Center
TDSP	Transmission and Distribution Service Provider
THC	Texas Historical Commission
THSA	THC’s Historic Sites Atlas
TNC	The Nature Conservancy
TPWD	Texas Parks and Wildlife Department
TSS	Texas Speleological Survey
TWDB	Texas Water Development Board

Abbreviation	Term/Phrase/Name
TxDOT	Texas Department of Transportation
US Hwy	United States Highway
USACE	United States Army Corps of Engineers
USCB	United States Census Bureau
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USPS	United States Postal Service
WOTUS	waters of the United States
WSP	WSP USA Inc.

1.0 DESCRIPTION OF THE PROPOSED PROJECT

1.1 Scope of Project

AEP Texas Inc. (AEP Texas) and the City of San Antonio, acting by and through the City Public Service Board (CPS Energy) (collectively, the Companies) are proposing to construct a new, single-circuit 765-kilovolt (kV) transmission line in Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde counties, Texas. Kimble County is within the study area; however, no routes are proposed through the county. The Howard-to-Solstice 765-kV Transmission Line Project (Project) involves approximately 335 to 393 miles of single-circuit 765-kV transmission line on self-supporting lattice structure and guyed lattice structure designs. The Project will begin at the proposed CPS Energy Howard Road 765-kV Station, to be located in the southwest portion of the City of San Antonio in Bexar County. The Project will terminate at the proposed AEP Texas Solstice 765-kV Station, to be located approximately 28 miles west-northwest of the City of Fort Stockton along Interstate Highway (I-) 10 in Pecos County. CPS Energy will own and operate the eastern half of the transmission line and AEP Texas will own and operate the western half. The new transmission line will require an approximate 200-foot-wide right-of-way (ROW). The Project vicinity is characterized by varying degrees of residential, commercial, and industrial development, infrastructure, hilly and mountainous terrain primarily in the eastern half, and some agriculture (**Figure 1-1**).

The Companies contracted with WSP USA Inc. (WSP or the Consultant) to prepare the Environmental Assessment and Alternative Route Analysis (EA). This EA supports the Companies' application to amend their Certificates of Convenience and Necessity (CCNs) to be submitted to the Public Utility Commission of Texas (PUC). This EA may also be used to support any additional local, state, or federal permitting activities that may be required prior to construction of the proposed Project.

The EA discusses the environmental and land use constraints identified within the study area as defined in Section 2.7.1, documents routing methodologies, summarizes public involvement, and provides an analysis of potential impacts of Alternative Routes from an environmental and land use perspective. The EA provides information and analyses for the Companies to use, together with other information and analyses, in identifying an Alternative Route that they believe best addresses the requirements under the Public Utility Regulatory Act (PURA) and 16 Texas Administrative Code (TAC) § 25.101. The EA also provides information and addresses the requirements of PURA § 37.056(c)(4)(A-D), 16 TAC § 25.101(b)(3)(B), the PUC's CCN application form, the PUC's policy of prudent avoidance, and the practices of the PUC regarding the consideration of CCN applications.

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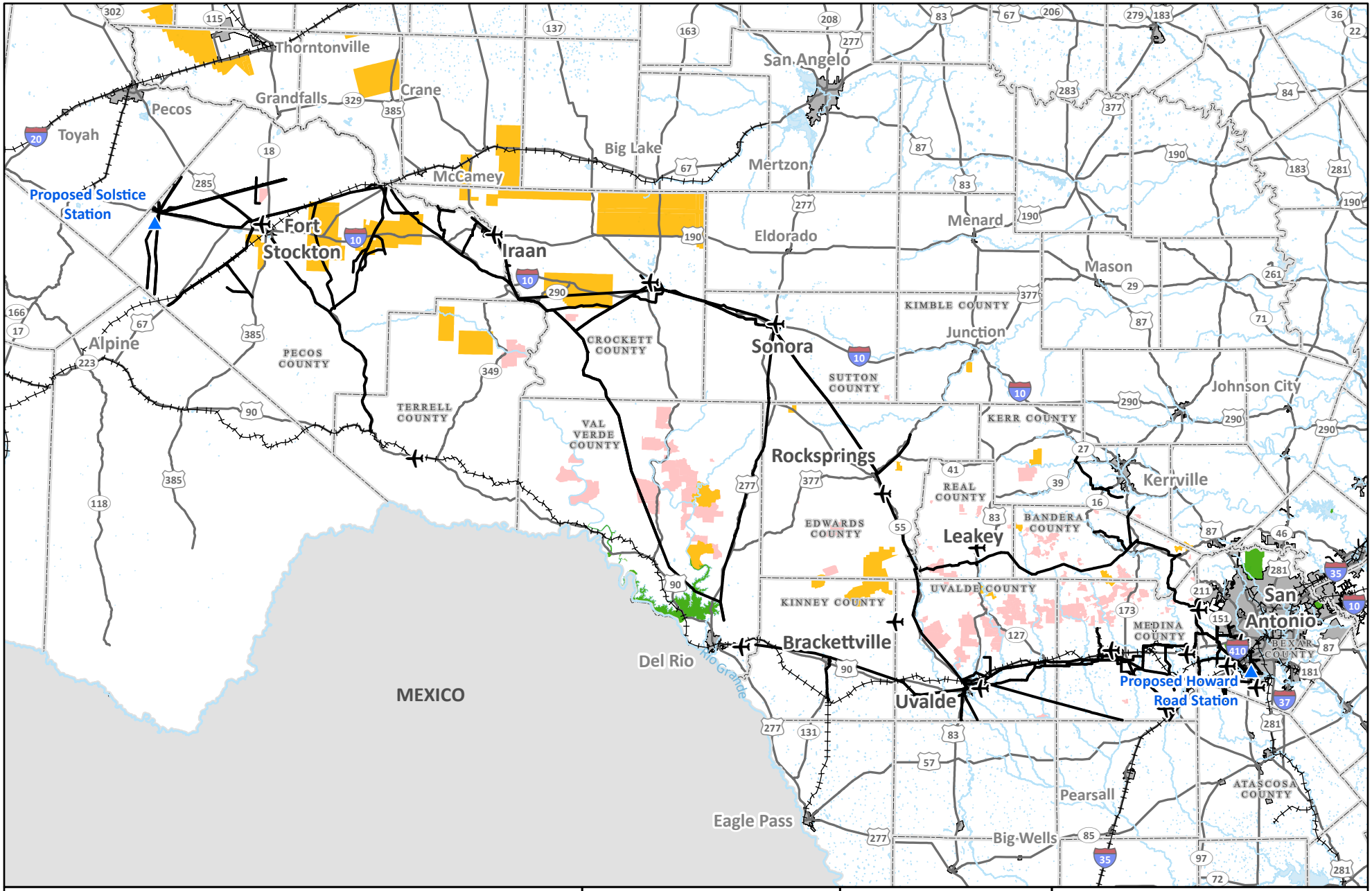

Proposed Station
Public Airport
Existing Transmission Line
Railroad
Highway
River
Waterbody
Federal Land
State Land
Local/Private Conservation Land
County Boundary
City Limit

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

December 31, 2025

Project Area

FIGURE 1-1
PROJECT VICINITY

Howard-to-Solstice 765-kV
Single-circuit Transmission Line

AEP TEXAS
CPS ENERGY

0 35
Miles

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To assist the Consultant in its development of the Alternative Routes for the proposed Project and the Project EA, the Companies provided the Consultant with the Project endpoints and information regarding the need for the Project, future construction practices, transmission line design, clearing methods, ROW requirements, and maintenance procedures for the Project.

1.2 Purpose and Need

This Project is part of the Permian Basin Reliability Plan approved by the PUC pursuant to House Bill 5066, enacted by the Texas Legislature in 2023. See Project No. 55718, *Reliability Plan for the Permian Basin under PURA § 39.167*, Order Approving the Reliability Plan for the Permian Basin Region (Oct. 7, 2024) and Second Order Approving the Reliability Plan for the Permian Basin Region (April 24, 2025).

1.3 Description of Proposed Design and Construction

1.3.1 Loading, Weather Data, and Design Criteria

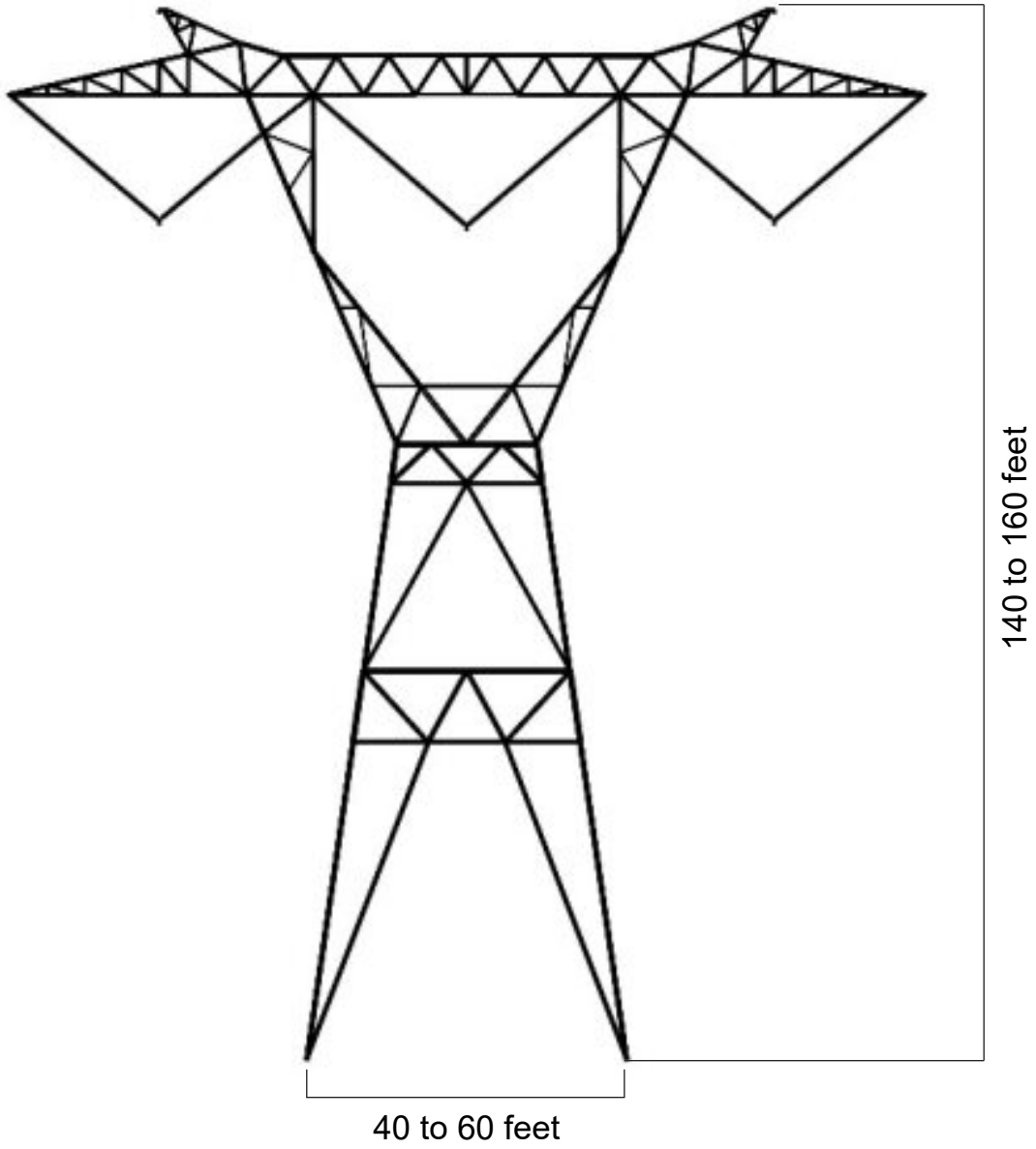
The Companies' proposed 765-kV transmission line, the Howard to Solstice line, is in the American National Standards Institute (ANSI) National Electrical Safety Code (NESC) Light Loading District and will be designed to meet or exceed NESC 2023 loading criteria (ANSI C2-2023). Depending on the type of structure used, various combinations of unbalanced vertical, transverse (wind), and longitudinal loadings (with and without ice) will be analyzed for their effects on the structures. The Project will be constructed using self-supporting lattice structures and guyed lattice structures with a typical height ranging from 140 to 160 feet, and with an estimated maximum height of 220 feet. Actual heights and ROW widths could vary depending on clearance requirements and final design. The average span length will be 1,500 feet. The new 765-kV transmission line will use six bundle 795 Kilocircular Mil Aluminum Conductor Steel Reinforced (KCM ACSR) 45/7 Tern conductors with two optical ground (shield) wires (OPGW).

1.3.2 Structural and Geotechnical Design Criteria

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 2023 and the manufacturer's recommended strength ratings for hardware. In conjunction with NESC 2023, the Companies' transmission line engineering standards will be used.

All structures will be designed to support conductors and shield wires as specified above. The configuration of the conductor and shield wires will provide lightning protection and the appropriate clearances for operation of a 765-kV transmission line. The geometry of a typical self-supporting tangent structure, typical running angle structure, typical dead-end structure, typical self-supporting delta tangent structure, typical

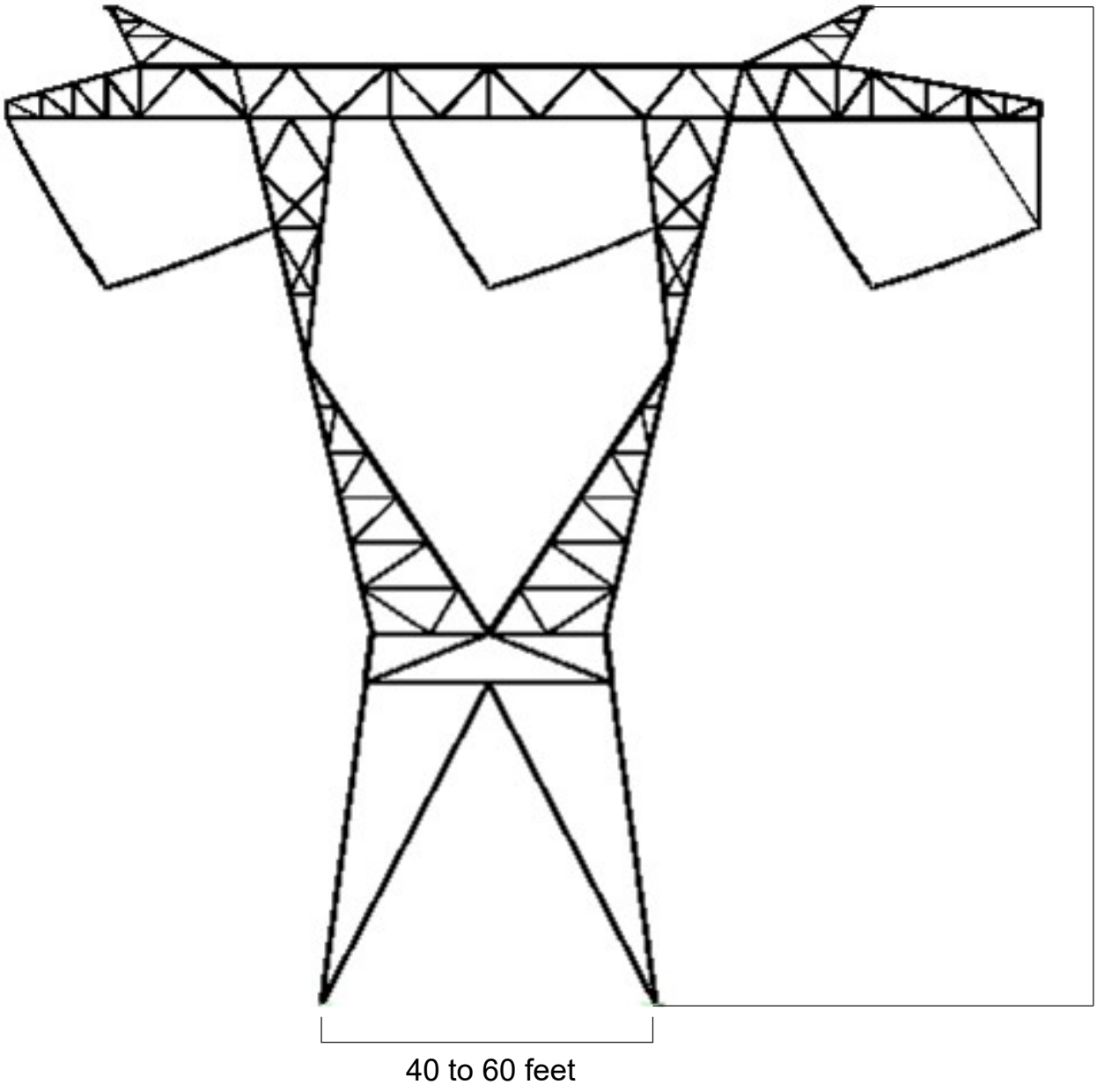
guyed-V tangent structure, and typical guyed-delta tangent structure are shown respectively on **Figures 1-2** to **1-7**. Geotechnical considerations will include soil borings and in-situ soils testing to provide the parameters for foundation design for the structures.



Howard-to-Solstice 765-kV Single-circuit Transmission Line

Figure 1-2

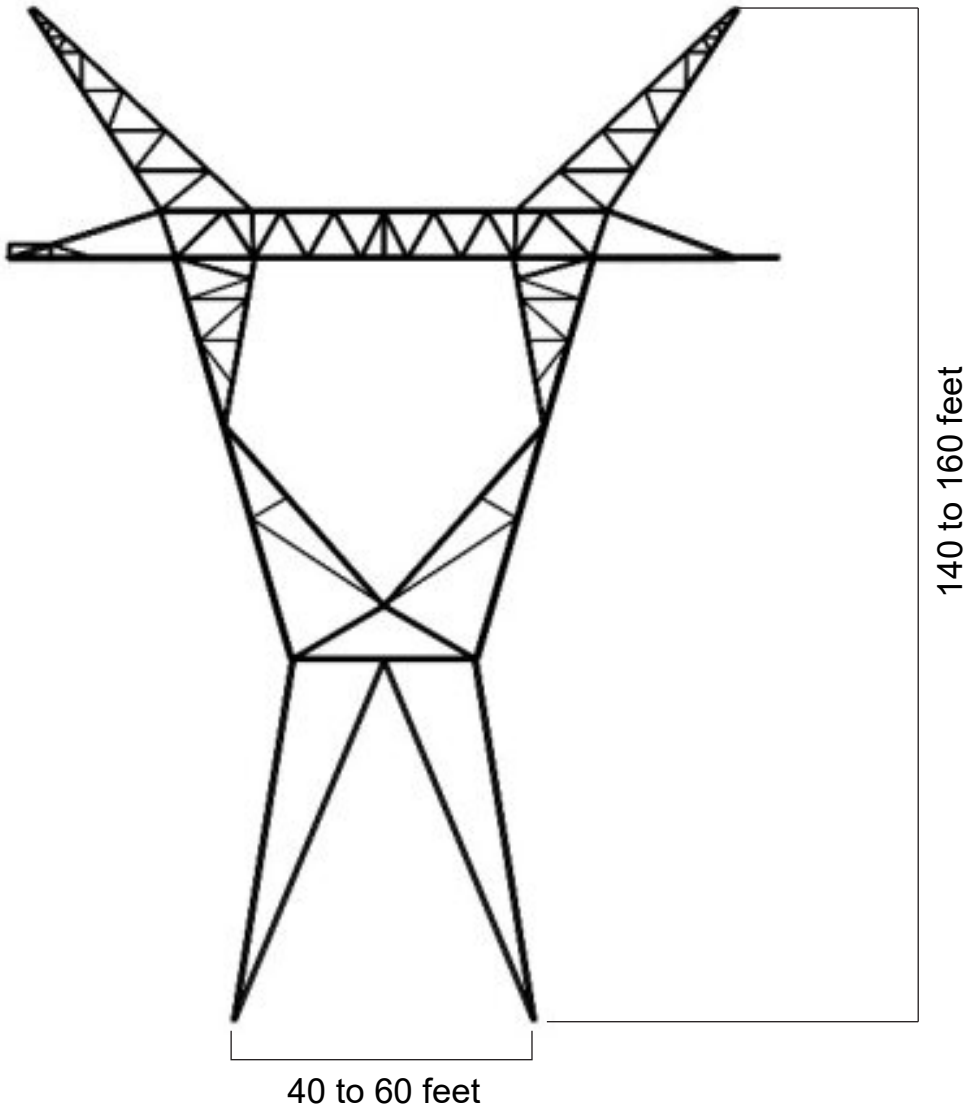
TYPICAL SELF-SUPPORTING TANGENT STRUCTURE



Howard-to-Solstice 765-kV Single-circuit Transmission Line

Figure 1-3

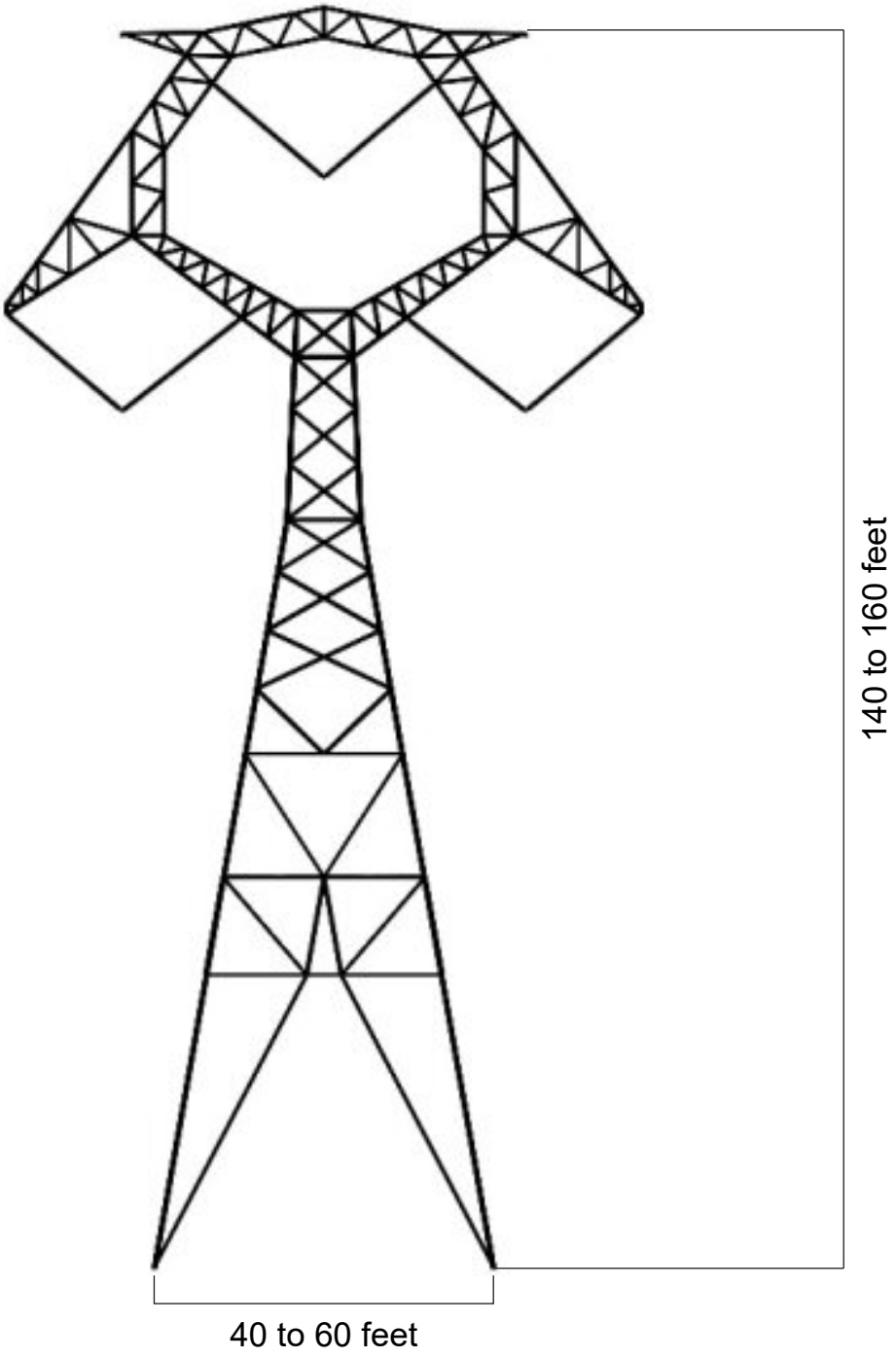
TYPICAL RUNNING ANGLE STRUCTURE



Howard-to-Solstice 765-kV Single-circuit Transmission Line

Figure 1-4

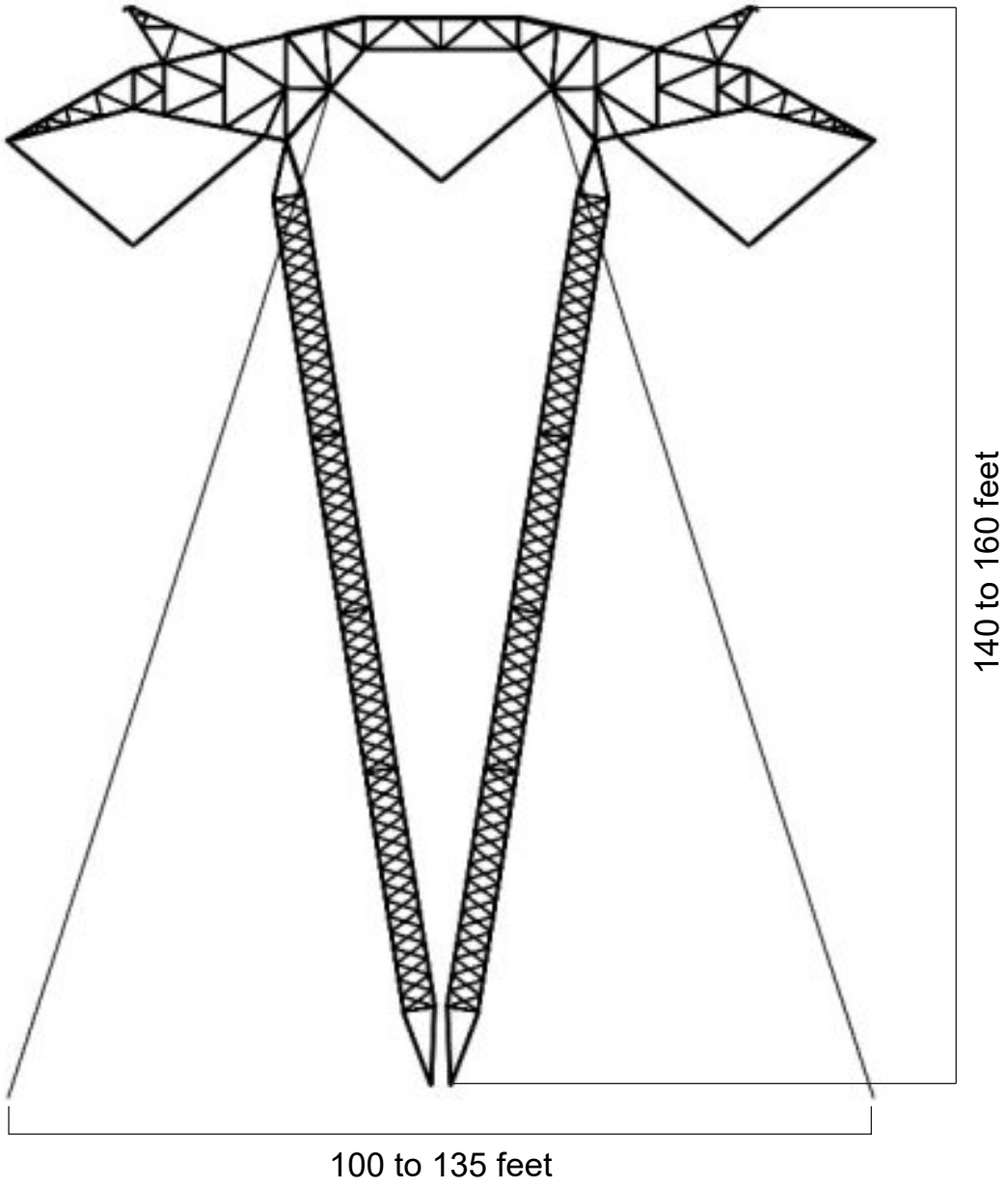
TYPICAL DEAD END STRUCTURE



Howard-to-Solstice 765-kV Single-circuit Transmission Line

Figure 1-5

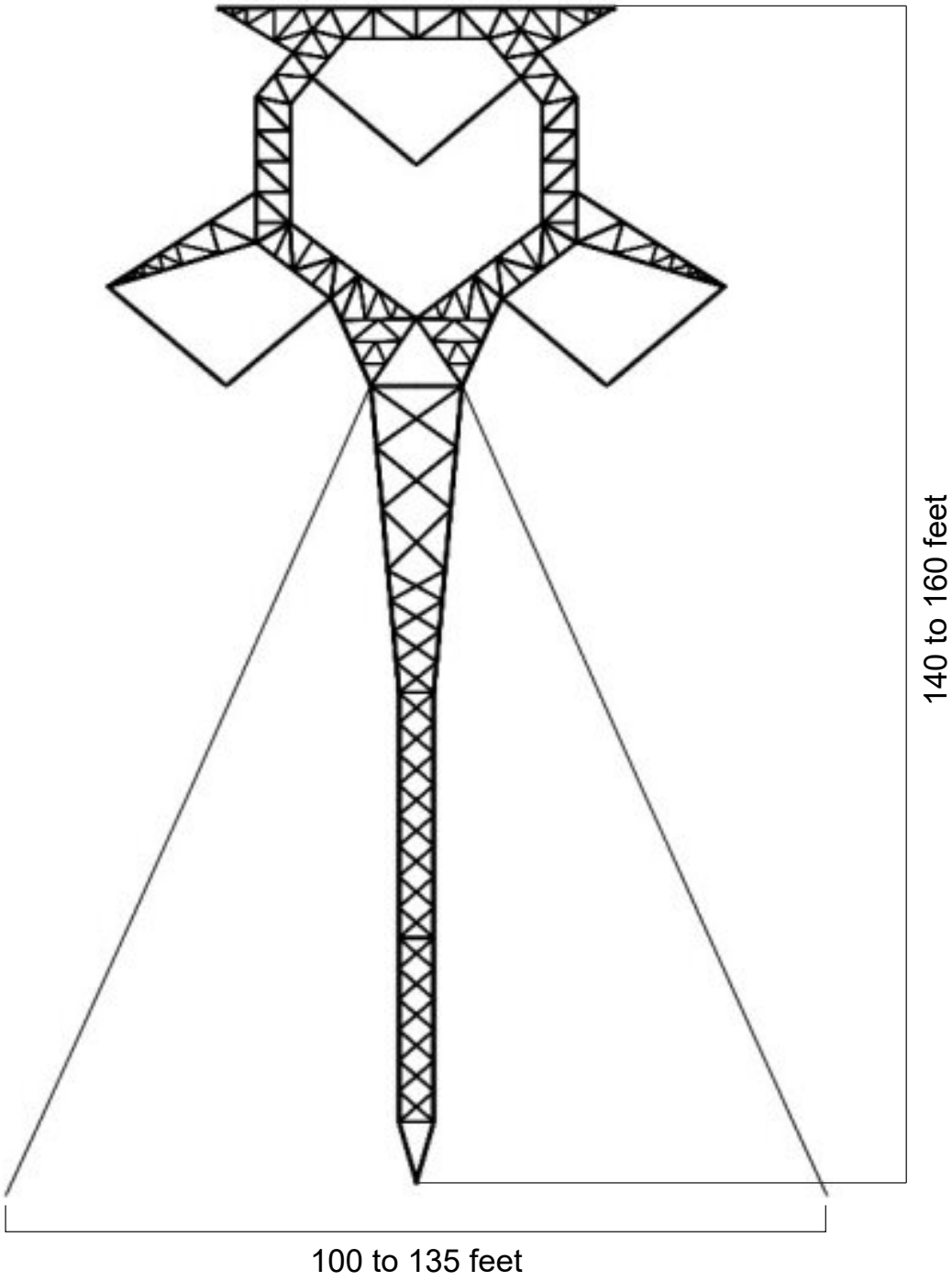
TYPICAL SELF-SUPPORTING DELTA TANGENT STRUCTURE



Howard-to-Solstice 765-kV Single-circuit Transmission Line

Figure 1-6

TYPICAL GUYED-V TANGENT STRUCTURE



Howard-to-Solstice 765-kV Single-circuit Transmission Line

Figure 1-7

TYPICAL GUYED-DELTA TANGENT STRUCTURE

1.4 Construction Considerations

Projects of this type require surveying, 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 the Consultant by the Companies.

1.4.1 Clearing

Any required clearing of the ROW will be performed by the Companies or a contractor under the direction of the Companies. Available methods of disposal are mulching, brush piling, and removal from the ROW. Woody vegetation within the ROW will be cleared as required to allow safe construction, operation, and maintenance of the line. Tree stumps will be cut to ground level and left in place. The cleared ROW will be utilized for access during construction, routine maintenance, and for required access to equipment to ensure safe and reliable service. Additional ingress and egress may be required across private property to access the ROW. In these circumstances, existing private roads will be used where possible, taking into consideration the preference of affected property owners. Temporary culverts might be installed to cross small streams and creeks, where necessary. Larger creeks are typically not crossed with equipment; rather, they are spanned by the transmission line with structures located on both sides of the creek crossing. Clearing will be accomplished to comply with the North American Electric Reliability Corporation's (NERC's) reliability standards.

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

1. Clearing will be performed in a manner that will maximize the preservation and conservation of natural resources and minimize impacts on waters in the activity area.
2. The timing and method of clearing ROW will consider 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 silt deposition in watercourses.
3. The Companies will use the most efficient and effective method to remove undesirable vegetation species. Hydro-axes and flail mowers might 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 product manufacturers' published recommendations and specifications, and as directed by appropriately qualified staff.

1.4.2 Construction

After regulatory approval and finalization of engineering design, the ROW will be surveyed, acquired, and then cleared of woody vegetation in accordance with the Companies' ROW-clearing specifications. Construction will then commence. Structure locations are surveyed and marked for construction. Structure components and associated line construction hardware are either transported to each structure location or constructed offsite and brought to the site via helicopter. Once the structures have been erected, the conductor is pulled through stringing blocks or pulleys, which are attached to the insulators on the structures. This process is repeated for all three conductor assemblies and two OPGW assemblies. Once all 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 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 regulations of any public agencies whose lands might be crossed by the proposed 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 spread evenly onto a cleared area or removed from the site. The 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. 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.
6. Efforts will be made to minimize and remediate accidental oil spills and other types of pollution, particularly while performing work near streams, lakes, and reservoirs.
7. Precautions will be taken to minimize the possibility of accidentally starting forest/range fires.
8. Precautions will be taken to protect natural and cultural resources identified along the ROW.

9. If federally protected species habitat is present, guidance from the United States Fish and Wildlife Service (USFWS) will be obtained prior to all clearing and construction activities.
10. Soil disturbance during construction will be kept to a minimum and restorative measures will be taken in a reasonable length of time.
11. Construction operations will comply with any applicable permit and required regulatory approval.

1.4.3 Cleanup

The cleanup operation involves the leveling of disturbed areas to existing contours, the removal of all construction debris, and ROW restoration. Due to topography, some work areas may be left in place for future maintenance activities and would not be leveled to pre-construction contours. The following criteria provide for the cleanup of construction debris and ROW restoration. Restoration activities will be coordinated with property owners when possible.

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 access roads are removed, the original contours will be restored to the extent practicable.
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 debris will be removed prior to completion of the Project.
7. Replacement of soil adjacent to water-crossing locations 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. Cleanup operations will comply with any applicable permitting and required regulatory approval.

1.5 Maintenance Considerations

The following information regarding maintenance of the facilities was provided to the Consultant by the Companies. Maintenance of the facilities will include periodic inspection of the line and repair of damaged structures due to component failures, accidents, vandalism, 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 necessary. While maintenance patrols will vary, aerial, vehicle, and foot patrols will be performed periodically. In cropland areas and properly managed grazing lands, little or no vegetation control will be required due to existing land-use practices. The major maintenance item will be the trimming of trees that pose a potential danger to the conductors or structures. Trimming will help to provide a safe and reliable power line.

The maintenance of the Companies' transmission ROW occurs through the implementation of a comprehensive, systematic, integrated vegetation management program designed to ensure that the vegetation along each transmission line is managed at the proper time and in the most cost-effective and environmentally sound manner. Vegetation is managed on a prescriptive basis. Ongoing evaluation of the system through ground and aerial inspections provides the basic information used by the Companies to develop an annual plan. Circuit criticality, historical data, line voltage, location, vegetative inventory information, and land use are among the factors considered in developing the annual vegetation management plan. The plans are modified as required by vegetation patrols and changed conditions.

2.0 DEVELOPMENT AND EVALUATION OF ALTERNATIVE ROUTES

2.1 Routing Study Methodology

The objective of this study was to develop and analyze an adequate number of Alternative Routes that are feasible from economic, engineering, and environmental standpoints so that the Companies may ultimately identify the route that they believe best addresses the requirements of PURA § 37.056(c)(4)(A)-(D), 16 TAC § 25.101(b)(3)(B), including the PUC's policy of prudent avoidance, and the practices and precedent of the PUC in evaluating CCN applications. The study methodology used by the Consultant 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 Project study area. The Consultant, with input from the Companies, developed Preliminary Alternative Links taking into consideration potentially affected resources and input from regulatory agencies. Following further evaluation and engineering analysis and additional input from regulatory agencies, local officials, and the public in accordance with 16 TAC § 22.52(a)(4), modifications to the Preliminary Alternative Links were completed, resulting in a set of Primary Alternative Links.

The Primary Alternative Links were used to develop Alternative Routes that were feasible, geographically diverse, and forward progressing. The Alternative Routes were comparatively analyzed using the evaluation criteria presented in Table 4-1 to determine potential impacts to existing land use and environmental resources. The Companies considered Table 4-1 in the EA, in addition to engineering and construction constraints, grid reliability and security issues, and estimated construction costs, to identify one Alternative Route that they believe best addresses the requirements of PURA, the PUC Substantive Rules, and the practices and precedent of the PUC in evaluating CCN applications. The Companies will describe this route in their joint CCN application.

2.1.1 General Routing Guidelines

At the onset of the Project, a team of the Companies' staff and external consultants with diverse expertise, including transmission line and substation siting, transmission planning, impact assessment for natural and human environments, impact mitigation, engineering, construction management, regulatory, project management, ROW, and public relations, was assembled (the Siting Team). To the extent reasonable and practical, the Siting Team used the following general siting guidelines to help develop the Preliminary Alternative Links:

- Minimize conflict with designated public conservation and protected lands such as national and state forests and parks and local conservation easements.
- Avoid or minimize new crossings of large lakes, rivers and large wetland complexes, critical and protected habitats, and other unique or distinct natural resources.
- Avoid or minimize habitat fragmentation in unfragmented areas and impacts on designated areas of biodiversity concern.
- Maximize the separation distance from and/or minimize impact on dwellings and community facilities, cemeteries, schools, daycare facilities, hospitals, historic resources, and designated landmarks.
- Avoid or minimize visibility from designated scenic resources.
- Avoid or minimize conflict with existing land uses and future development with a proposed plan, schedule, and permitting process underway.
- Minimize interference with existing and future economic activities, natural gas activities, mining operations, oil and gas exploration, and industrial facilities.
- Consider using or paralleling existing ROWs or other linear features and infrastructure when feasible. When paralleling existing facilities, however, reliability issues and mitigation requirements must be evaluated.
- Consider paralleling property lines or other natural or cultural features.
- Consider stakeholder input.
- Avoid or minimize conflicts with designated public, private, and military aviation facilities.
- Minimize environmental impact and construction/maintenance costs by developing shorter, direct routes where practicable, while avoiding or minimizing impacts on environmentally sensitive areas.
- Consider safety with respect to construction, maintenance, and operation of the facilities.
- Consider construction concerns such as access; topography; road traffic control; outages; pipelines; railroad interactions; and existing transmission line, telecommunication line, and distribution line conflicts.
- Consider locating Preliminary Alternative Links through terrain and land use where economical construction and environmental best management practices (BMPs) can be employed.
- Minimize environmental impact by considering routes that minimize the length on steep slopes and waterbody crossings.
- Consider state-specific regulatory siting guidelines.
- Consider the environmental impacts on the surrounding community and area.

2.1.2 Technical Guidelines

Technical guidelines are driven by the physical characteristics and engineering limitations of the structures and lines themselves, design criteria necessary to meet the Companies' design standards, NERC reliability standards, NESC standards, and industry best practices for construction. The technical guidelines were developed using (1) the technical expertise of engineers and other industry professionals responsible for the reliable, safe, and economical construction, operation, and maintenance of electric system facilities; (2) NERC reliability standards as implemented by ERCOT; and (3) industry best practices.

The Siting Team considered the following technical guidelines during study segment and route development to the extent practical:

- Maintain a minimum of 200 feet of centerline-to-centerline separation when paralleling transmission lines of all other voltages.
- When crossing a transmission pipeline, cross at a 60- to 90-degree angle.
- Maintain 520 feet separation from wind turbines or meteorological towers.
- Maintain 400 feet separation from oil/gas wells.
- Place the centerline at least 100 feet from edge of road ROW.
- Minimize structure angles greater than 70 degrees; structure angles less than 45 degrees preferred.
- Minimize crossing existing 345-kV transmission lines.
- Minimize electric distribution line facilities within the ROW.
- Limit crossing terrain slopes to 20 degrees (can go up to 30 if constrained) for angle structure locations and less than 45 degrees at tangent structure locations (30 degrees preferred).

2.2 Data Collection

The following sources of information were used to develop data for the EA. Data was collected and reviewed for existing and historic land uses, natural resources, cultural resources, transportation facilities, and existing utility and linear features. The Siting Team collected and reviewed the data, as described in the following sections, to support the EA. Data used by the Consultant in the analysis of the Project was drawn from a variety of sources, including:

- Published literature (documents, reports, maps, aerial photography, etc.) (see Section 6, References)
- Information from local, state, and federal agencies

- Site-specific studies or investigations performed by others
- Recent aerial imagery
    - Esri World Imagery (mosaic of Maxar Vivid satellite imagery, 2020-2025)
    - 2024 United States Department of Agriculture (USDA) National Agriculture Imagery Program
    - Google Earth (2023-2025)
    - Aerial imagery flown by CDS Muery in August and September 2025
- 7.5-minute United States Geological Survey (USGS) topographic maps
- USGS National Hydrography Dataset
- Federal Emergency Management Agency (FEMA) maps
- USFWS National Wetlands Inventory (NWI) maps
- USFWS Information for Planning and Consultation (IPaC)
- Military Aviation and Installation Assurance Siting Clearinghouse
- Texas Parks and Wildlife Department (TPWD), including the TPWD Natural Diversity Database (NDD) and Ecological Mapping Systems of Texas
- Texas Archeological Sites Atlas (TASA) through the Texas Archeological Research Laboratory (TARL) and Texas Historical Commission (THC)
- Texas Department of Transportation (TxDOT) county highway maps
- Railroad Commission of Texas (RRC)
- Texas Speleological Survey (TSS)
- The Nature Conservancy (TNC)
- Aerial and ground reconnaissance surveys

2.3 Federal, State, and Local Governing Agencies

Numerous federal, state, and local regulatory agencies and organizations have promulgated rules and regulations regarding the routing and potential impacts associated with the proposed Project. Listed below are the major regulatory agencies involved in project planning and permitting of transmission lines in Texas. Construction documents and specifications may indicate any special construction measures needed to comply with the regulatory requirements determined through the permitting process. In addition, depending upon the location of the transmission line structures, floodplain development permits and road crossing permits may be required.

2.3.1 Federal Aviation Administration

According to Federal Aviation Administration (FAA) regulations, Title 14 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 that extends 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 as described in paragraph (d) of 14 CFR § 77.9 having at least one runway longer than 3,200 feet.
- A 50:1 slope for a horizontal distance of 10,000 feet from the nearest runway of each airport as described in paragraph (d) of 14 CFR § 77.9 where no runway is longer than 3,200 feet.
- A 25:1 slope for a horizontal distance of 5,000 feet for heliports as described in paragraph (d) of 14 CFR § 77.9.

Paragraph (d) of 14 CFR § 77.9 includes public-use airports listed in the Chart Supplement (formerly the Airport/Facility Directory), public-use or military airports under construction, airports operated by a federal agency or the 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, the Companies 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 45 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.

2.3.2 United States Army Corps of Engineers

Under Section 404 of the Clean Water Act (CWA), activities in waters of the United States (WOTUS), including wetlands, are regulated by the United States Army Corps of Engineers (USACE), in conjunction with the USEPA. Certain construction activities that potentially impact WOTUS may be authorized by one of the USACE's Nationwide Permits (NWPs). Permits that may apply to placement of support structures and associated activities are NWP 25 (Structural Discharges) and NWP 57 (Electric Utility Line and Telecommunications Activities). NWP 25 generally authorizes the discharge of concrete, sand, rock, etc., into tightly sealed forms or cells where the material is used as a structural member for standard pile-supported structures (linear projects, not buildings or other structures).

NWP 57 generally authorizes discharges associated with the construction of utility lines within WOTUS and additional activities affecting WOTUS, such as those associated with the construction and maintenance of utility line substations; foundations for overhead utility line towers, poles, and anchors; and access roads for the construction and maintenance of utility lines. Construction of this transmission line Project will likely meet the criteria for NWP 57. If necessary, the Companies will coordinate with the USACE prior to clearing and construction to ensure compliance with the appropriate regulations associated with construction-related impacts to waterbodies and wetland features.

Under Section 10 of the Rivers and Harbors Act of 1899, 33 United States Code § 403, the USACE is directed by Congress to regulate all work and structures in, or affecting the course, condition, or capacity of navigable WOTUS, including tidal waters. No navigable waters occur within the study area that would require permitting under this Act.

2.3.3 United States Fish and Wildlife Service

The USFWS enforces federal wildlife laws and provides comments on proposed projects under the jurisdiction of the Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and Bald and Golden Eagle Protection Act (BGEPA). Additionally, USFWS oversight includes review of projects with a federal nexus under the National Environmental Policy Act.

The Companies and the Consultant participated in a meeting with the USFWS at the USFWS office in Austin, Texas on December 9, 2025 (see Section 2.4). Upon PUC approval of the proposed Project, a survey may be necessary to identify any potential suitable habitat for federally protected species. If suitable habitat is identified, then informal consultation with the USFWS may be conducted to determine if permitting or other requirements associated with possible impacts to protected species under the ESA, MBTA, or BGEPA

is necessary. The Companies and Consultant will consult with USFWS officials before and following the filing of the application to determine the use of existing or additional habitat conservation plans that may be prudent in association with the Project.

2.3.4 Federal Emergency Management Agency

The Consultant reviewed the Flood Insurance Rate Maps, published by FEMA, for the study area. The construction of the proposed transmission line is not anticipated to create any significant changes in the existing topographical grades and is not anticipated to significantly alter existing flow regimes within the floodplain. Coordination with local floodplain administrators will be completed after the PUC route approval to determine if any permits are necessary.

2.3.5 Military Aviation and Installation Assurance Siting Clearinghouse

The DoD Military Aviation and Installation Assurance Siting Clearinghouse works with industry to overcome risks to national security while promoting compatible domestic energy development. Energy production facilities and transmission projects involving tall structures, such as electric transmission towers, may degrade military testing and training operations. The electromagnetic interference from electric transmission lines has the potential to impact critical DoD testing activities. 16 TAC § 22.52 states that upon filing of the application, the DoD shall be notified and an affidavit attesting to the notification shall also be provided with the applicant's proof of notice. Furthermore, the utility is required to provide written notice of the public meeting or, if no public meeting is held, to provide written notice to the DoD of the planned filing of an application prior to completion of the routing study. The Consultant contacted the DoD regarding the proposed Project to provide notification and to solicit input with a letter dated March 5, 2025. In addition, in accordance with 16 TAC § 22.52 (a)(4), public meeting notice was provided via mail to the DoD Military Aviation and Installation Assurance Siting Clearinghouse by CPS Energy on July 21, 2025, and by AEP Texas on November 11, 2025. A notice of the filing of the application will be sent to the DoD Military Aviation and Assurance Siting Clearinghouse when the CCN application is filed with the PUC.

In addition, the Companies and Consultant met with military representatives of Laughlin Air Force Base on August 28, 2025, and the DoD Military Aviation and Assurance Siting Clearinghouse on November 19, 2025, regarding the Project routing.

2.3.6 The Public Utility Commission of Texas

The PUC exercises regulatory authority over CCNs for new transmission facilities under PURA § 37.056. In evaluating routing for transmission lines, the Commission applies the routing considerations in PURA § 37.056(c)(4)(A)-(D). The PUC regulatory guidelines for routing transmission lines in Texas include:

- 16 TAC § 25.101(b)(3)(B)
- Policy of prudent avoidance as defined in 16 TAC § 25.101(a)(6)
- CCN application requirements
- the practices and precedent of the PUC in evaluating CCN applications

The Project EA has been prepared by the Consultant in support of the Companies' application for the Project to be filed at the PUC for its consideration.

2.3.7 Texas Parks and Wildlife Department

The TPWD is the state agency with the primary responsibility of protecting the state's fish and wildlife resources in accordance with the Texas Parks and Wildlife Code § 12.0011(b). The Consultant solicited comments from the TPWD during the Project scoping phase and a copy of this EA will be submitted to the TPWD when the CCN application is filed with the PUC. The Companies and the Consultant participated in two meetings with the TPWD at the TPWD office in Austin, Texas on October 17 and December 19, 2025 (see Section 2.4). The Consultant also reviewed the NDD records of state-listed species occurrences and sensitive vegetation communities. The Consultant considered these during the route development process. Once the PUC approves a route, the Companies will complete a field review of the proposed ROW if it is determined to be necessary to identify potential suitable habitat for state-listed species. If suitable habitat is identified, additional coordination with the TPWD may be necessary to determine avoidance or impact minimization measures to state-listed threatened or endangered species and other state-regulated fish and wildlife resources.

2.3.8 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 Construction General Permit (TXR150000) as implemented by the TCEQ under the provisions of Section 402 of the CWA and Chapter 26 of the Texas Water Code. The TCEQ classifies construction activities based on acres of land disturbance. Small construction activities are those resulting in 1 to 5 acres of land disturbance. Large construction activities are those that disturb 5 or

more acres of land. No permit is required for land disturbances of less than 1 acre that are not part of a larger common plan of development. Small construction activities require implementation of a Stormwater Pollution Prevention Plan (SWPPP) but do not require submittal of a Notice of Intent to the TCEQ. Large construction activities require implementation of a SWPPP and the submittal of a Notice of Intent to the TCEQ prior to the start of construction and a Notice of Termination following final stabilization of disturbed land. Once a route is approved by the PUC, the Companies will determine the amount of ground disturbance and comply with the TXR150000 permit conditions.

2.3.9 Texas Department of Transportation

TxDOT has been notified of the proposed Project. If the route approved by the PUC crosses or occupies TxDOT ROW, the transmission line will be constructed in accordance with the rules, regulations, and policies of TxDOT. BMPs will be used as required to minimize erosion and sedimentation resulting from construction within TxDOT easements. Revegetation within TxDOT easements 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.

2.3.10 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). Chapter 26 of the TAC requires state agencies and political subdivisions of the state to notify the THC of ground-disturbing activity on public land. The Consultant contacted the THC to identify known cultural resource sites within the study area. The Consultant also reviewed TARL records for known locations of cultural resource sites and the THC's online, restricted-access TASA for the locations of recorded cemeteries, NRHP properties, State Antiquities Landmarks (SALs), and Official Texas Historical Markers (OTHMs).

Once a route is approved by the PUC, depending on a state or federal nexus, additional coordination with the THC might be required to determine the need for archeological surveys or additional permitting requirements. The Companies propose to implement an unanticipated discovery procedure during construction activities. If artifacts are discovered during construction, activities will cease near the discovery, and the Companies will notify the State Historic Preservation Office for additional consultation.

2.3.11 Texas General Land Office

The Texas General Land Office (GLO) requires a Miscellaneous Easement for any ROW crossing a state-owned riverbed, navigable stream, tidally influenced water, or Permanent School Fund lands.

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 wellbeing 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. As specified in the Coastal Coordination Act of 1991, the CMP of the Texas GLO must develop and implement a comprehensive plan for managing natural resources within the CMP boundary along the Texas coastline. The CMP boundary, as defined by 31 TAC § 27.1(a), delineates the coastal zone of Texas. The proposed Project is not located within the CMP boundary. Following PUC approval of a route for this Project, the Companies will coordinate with the GLO as required.

2.3.12 Edwards Aquifer Authority

The Edwards Aquifer Authority (EAA) is a regional water management agency that regulates the use of the Edwards Aquifer to ensure its sustainability. The EAA requires that any groundwater removal from the aquifer be done through a capped permitting system, which limits withdrawals to protect the aquifer and the species that rely on it. While the EAA's jurisdiction does not extend to the use of surface water, the EAA may regulate activities that affect the quality of surface water to preserve and protect the Edwards Aquifer, prevent the waste or pollution of the Edwards Aquifer, and enforce water quality standards.

The study area is located within the jurisdictional areas of Districts 4, 5, 6, 7, 12, 13, 14, and 15 (EAA 2025b). If aboveground storage tanks or underground storage tanks containing regulated substances (i.e., any liquid that is a hazardous substance or a petroleum or petroleum product) would be on site during construction, a written notification may be required to the EAA (EEA Rule § 713.610) if they do not meet the exemptions as outlined in § 713.613 of the EAA Rules. Additionally, notification to the EAA is required following any discharge or spill that is in a quantity equal to or greater than the reportable quality listed in § 713.405 in the EAA Rules in a 24-hour period. The EAA should be notified as soon as possible, but no later than 72 hours after the discovery of the spill or discharge. The notification should provide information as outlined in § 713.403(d) of the EAA Rules (EAA 2023).

2.4 Correspondence with Agencies and Officials

The Consultant contacted the following federal, state, county, and local agencies and officials by letter on March 5, 2025 to solicit comments, concerns, and information regarding potential environmental impacts, permits, or approvals for the construction of the Project within the study area. A map of the study area was included with each letter. An example of the letters and copies of the responses received are included in Appendix A (Agency Correspondence).

Federal

- DoD Military Aviation and Installation Assurance Siting Clearinghouse
- FAA
- FEMA
- Joint Base San Antonio – Lackland
- Joint Base San Antonio – Randolph
- Laughlin Air Force Base
- National Parks Service (NPS)
- National Resources Conservation Service (NRCS)
- USACE
- USEPA
- USFWS
- United States Representatives
- United States Senators for Texas

State

- GLO
- RRC
- TCEQ
- Texas Office of Public Utility Counsel
- Texas State Representatives
- Texas State Senators
- Texas Water Development Board (TWDB)
- THC
- TPWD
- TxDOT

County

- Atascosa County Judge
- Atascosa County Commissioners
- Atascosa County Historical Commission
- Bandera County Judge
- Bandera County Commissioners
- Bandera County Engineer
- Bandera County Historical Commission
- Bandera County River Authority and Groundwater District
- Alamo Soil and Water Conservation District
- Bexar County Judge

- Bexar County Commissioners
- Bexar County Economic and Community Development
- Bexar County Flood Control
- Bexar County Historical Commission
- Bexar County Manager
- Bexar County Public Works/County Engineer
- Crockett County Judge
- Crockett County Commissioners
- Crockett County Groundwater Conservation District
- Crockett County Historical Commission
- Edwards County Judge
- Edwards County Commissioners
- Edwards County Historical Commission
- Kerr County Judge
- Kerr County Commissioners
- Kerr County Engineer
- Kerr County Historical Commission
- Kimble County Judge
- Kimble County Commissioners
- Kimble County Groundwater Conservation District
- Kimble County Historical Commission
- Kinney County Judge
- Kinney County Commissioners
- Kinney County Historical Commission
- Medina County Judge
- Medina County Commissioners
- Medina County Historical Commission
- Middle Pecos Groundwater Conservation District
- Pecos County Judge
- Pecos County Commissioners
- Pecos County Historical Commission
- Real County Judge
- Real County Commissioners
- Real County Historical Commission
- Real-Edwards Conservation and Reclamation District
- Sutton County Judge
- Sutton County Commissioners
- Sutton County Underground Water Conservation District
- Terrell County Judge
- Terrell County Commissioners
- Terrell County Historical Commission
- Uvalde County Judge
- Uvalde County Commissioners
- Uvalde County Historical Commission
- Val Verde County Judge
- Val Verde County Commissioners
- Val Verde County Historical Commission

Local

- Alamo Area Council of Governments
- Bandera Independent School District (ISD)
- Brackett ISD
- Buena Vista ISD
- Center Point ISD
- City of Bandera
- City of Brackettville
- City of Camp Wood
- City of Castroville
- City of Devine
- City of Fort Stockton
- City of Hondo
- City of Lytle
- City of Natalia
- City of Sabinal
- City of San Antonio
- City of Somerset
- City of Sonora
- City of Uvalde
- Comfort ISD
- Comstock ISD
- Crockett County Consolidated Common School District
- Devine ISD
- Divide ISD
- D'Hanis ISD
- Edgewood ISD
- Edwards Aquifer Authority
- Fort Stockton Economic Development
- Fort Stockton ISD
- Hondo ISD
- Hunt ISD
- Ingram ISD
- Iraan-Sheffield Collegiate ISD
- Junction ISD
- Kerrville ISD
- Knippa ISD
- Lackland ISD
- Leakey ISD
- Lytle ISD
- Medina ISD
- Medina Valley ISD
- Natalia ISD
- Northside ISD
- Nueces Canyon Consolidated ISD
- Poteet ISD
- Rocksprings ISD
- Sabinal ISD
- San Antonio River Authority
- San Antonio Water System
- San Felipe Del Rio Consolidated ISD
- Somerset ISD
- Sonora ISD
- South San Antonio ISD
- Southside ISD
- Southwest ISD
- Terrell ISD
- Utopia ISD
- Uvalde Consolidated ISD

Non-governmental Organizations

- Greater Edwards Aquifer Alliance
- Hill Country Alliance
- Hill Country Conservancy
- Lower Colorado River Authority
- Nueces River Authority
- Texas Agricultural Land Trust
- Texas Cave Management Association
- Texas Hill Country Conservation Network
- Texas Land Conservancy
- Texas Land Trust Council
- Texas Water Trade
- The Nature Conservancy of Texas
- Watershed Association

As of December 20, 2025, replies to the letters sent on March 5, 2025 have been received from the following agencies and officials: Bandera County Convention & Visitors Bureau, Conservation Fund, Devils River Conservancy, D'Hanis ISD, DoD Military Aviation and Installation Assurance Siting Clearinghouse, FEMA, Fort Stockton ISD, GLO, NRCS, RRC, Shumla Archaeological Research & Education Center, State Senator Roland Gutierrez, TCEQ, Texas Agricultural Land Trust, THC, TNC, TPWD, TxDOT Laredo District, TxDOT Odessa District, TxDOT San Angelo District, TxDOT San Antonio District, United States Congressman Chip Roy, USACE Albuquerque District, USACE Fort Worth District, and Val Verde County. Copies of all responses are included in Appendix A.

In addition to letters sent to the agencies on March 5, 2025, the Consultant also reviewed the NDD Element of Occurrence Records from the TPWD, the IPaC from the USFWS, TARL records, and the THC restricted-access TASA to verify or update cultural and natural resource records for the study area. All agency comments, concerns, and information received were taken into consideration by the Consultant in the preparation of this EA and in the assessment of the Alternative Routes. Additionally, the information received from the agencies will be taken into consideration before and during construction of the Project. The following is a summary of the comments provided by federal, state, county, and local officials that have responded as of this writing.

- Bandera County Convention & Visitors Bureau responded on August 27, 2025, stating concerns about golden-cheeked warbler (GCW) and visual impacts along rural roadways.
- The City of San Antonio Parks and Recreation Department responded on February 11, 2026, stating concerns with routing through the Medina River Natural Area due to the Howard W. Peak Greenway Trail system, a new sanitary sewer line, and ecology.
- The Conservation Fund called WSP on October 8, 2025, with questions about the Project timeline, routing constraints, and endangered species.

- The Devils River Conservancy responded on April 4, 2025, and September 3, 2025, providing input regarding the environmental, ecological, cultural, and scenic value of Val Verde County and the Devils River region in particular. They requested that the Companies avoid routing through Val Verde County and in particular avoid routing through the Devils River and its surrounding conservation corridor.
- D'Hanis ISD called March 18, 2025, stating that the Project would have no impact on the school as long as it does not cross school property.
- The DoD Military Aviation and Installation Assurance Siting Clearinghouse responded on November 17, 2025, stating that the Project may have an impact on the United States Air Force Next Generation Weather Radar (NEXRAD) operations northeast of Laughlin Air Force Base, possibly creating radar influence. The Clearinghouse requested a meeting, which was held on December 12, 2025.
- FEMA responded on March 17, 2025, requesting that the community floodplain administrator be contacted for review and possible permit requirements for the PUC-approved route.
- Fort Stockton ISD responded on April 7, 2025, stating they have no comments.
- The GLO responded on March 18, 2025, stating that the GLO does not have environmental issues or land use constraints at this time and requesting to be contacted when a final route has been determined so they can assess the route for streambed or Permanent School Fund land crossings that would require an easement from the GLO.
- The NRCS responded on March 18, 2025, March 20, 2025, and March 25, 2025, first requesting a KMZ or shapefile of the study area and then providing an environmental assessment for the Project study area, which included a few soil limitations that should be considered, such as flood control structures and concrete corrosion potential, during Project planning.
- The RRC responded on March 15, 2025, providing links to information regarding existing oil and gas wells and pipeline locations, and oil and gas drilling permits and pipeline permitting.
- The Shumla Archaeological Research and Education Center responded on September 3, 2025, and September 18, 2025, expressing concerns relating to potential impacts on rock art and archeological sites within the Lower Pecos Canyonlands Archaeological District. The Center provided information related to rock art sites and archaeological resources.
- State Senator Roland Gutierrez sent correspondence to the Companies on November 12, 2025, expressing concerns regarding the Project. A written response from the Companies was provided to Senator Gutierrez in December 2025.
- The TCEQ responded on April 2, 2025, providing information about permits and authorizations that may be required for the Project.

- The Texas Agricultural Land Trust responded March 13, 2025, March 19, 2025, October 15, 2025, and October 23, 2025 stating that they hold conservation easements in Uvalde and Val Verde counties and providing shapefiles as requested by the Consultant. They also stated that the trust is negotiating a conservation easement near the Nueces River and voiced concern about jeopardy to the proposed conservation easement.
- The THC responded on April 7, 2025, and September 3, 2025, stating that there are many known cultural resources within the study area, but very few archeological investigations, and that mapped soil units indicate an increased likelihood of buried archeological sites. The THC also stated that several routes pass through the Lower Pecos Canyonlands Archaeological District and they have received many inquiries from concerned landowners. The THC recommended consulting with a professional archeologist early in the process to perform a comprehensive records search and to identify high-probability areas warranting an archeological survey.
- TNC responded on April 7, 2025, September 3, 2025, October 28, 2025, and October 29, 2025, stating that the Project area contains natural resources that are valuable for the public. They are particularly concerned with the Lower Pecos River, Devils River, upper Llano River watershed, and Edwards Aquifer's contributing and recharge zones. The TNC recommends siting the Project along existing pipelines, transmission lines, roadways, and other existing infrastructure. The TNC also provided digital data regarding sensitive areas and submitted a comment card.
- The TPWD responded on May 9, 2025, October 17, 2025, October 27, 2025, and December 19, 2025, providing technical guidance and recommendations. The TPWD provided the KMZs for the new Bear Creek State Park boundaries and the future Silver Lake Ranch State Park draft boundaries, and provided information performed during an in-depth review of TPWD sensitive resources that could be impacted by the Project.
- The TxDOT Laredo District responded March 18, 2025, with information about permit requirements and TxDOT Laredo special provisions.
- The TxDOT Odessa District responded on March 25, 2025, providing information about utility installation requests and driveway/access permits.
- The TxDOT San Angelo District responded March 18, 2025, stating that the Companies will be required to submit ROW, Utility, Leasing Information System (RULIS) applications for any state-maintained roadways crossed within the San Angelo District.
- The TxDOT San Antonio District responded on March 31, 2025, and July 21, 2025, providing maps detailing environmental constraints for the proposed Project.
- United States Congressman Chip Roy responded on September 22, 2025, stating that his constituents are concerned with aesthetic impacts, environmental risks, and economic

consequences of the proposed transmission line in Bandera and Real counties. The Congressman also had several questions and requested a written response to the questions from the Companies. A written response was provided by the Companies on November 7, 2025.

- The USACE Albuquerque District responded on March 5, 2025, stating they did not have the ability to provide project-specific comments and providing general recommendations.
- The USACE Fort Worth District responded March 7, 2025, and March 10, 2025, stating that an Aquatic Features Delineation Report is required before they can evaluate the Project and encouraging avoidance or minimization of aquatic features.
- The Val Verde County Judge responded on April 4, 2025, stating that there are several environmental and archeological concerns, including impacts to threatened and endangered species habitat, the Devils River State Natural Area and the Dark Sky designation, Laughlin Air Force Base, and landowners' ability to use their land.

The Companies and the Consultant also met in person and virtually with the following agencies and officials: City of Devine, TNC and Devils River Conservancy, Crockett County, City of Sabinal, Laughlin Air Force Base, Atascosa County, City of Fort Stockton, City of Hondo, City of Castroville, Sutton County, Terrell County, Bexar County, the TPWD, and the USFWS. In addition, CPS Energy representatives presented at open meetings or Special Commissioners Court meetings in Bandera, Medina, Real, and Uvalde counties. Below is a representative list of agency meetings. Due to the scope of the Project, individual representatives of the Companies may have participated in other formal or informal meetings with agencies and officials that the Consultant may not have participated in.

- A virtual meeting was held with the City of Devine on August 25, 2025.
- An in-person meeting was held with TNC and the Devils River Conservancy on August 26, 2025.
- A virtual meeting was held with Crockett County officials on August 26, 2025.
- A virtual meeting was held with the City of Sabinal Mayor on August 27, 2025.
- Virtual meetings were held with the Laughlin Air Force Base and the DoD Military Aviation and Installation Assurance Clearinghouse on August 28, 2025 and December 12, 2025.
- An in-person meeting was held with Atascosa County officials on August 28, 2025.
- The Companies presented at a Special Commissioners Court meeting in Bandera County on September 4, 2025.
- The Companies presented at an open meeting in Medina County on September 8, 2025.
- A virtual meeting was held with City of Fort Stockton City Manager on September 8, 2025.
- A virtual meeting was held with the City of Hondo Mayor on September 9, 2025.

- A virtual meeting was held with the City of Castroville Mayor on September 11, 2025.
- A virtual meeting was held with Sutton County officials on September 11, 2025.
- A virtual meeting was held with Terrell County officials on September 18, 2025.
- A virtual meeting was held with Bexar County officials on September 25, 2025.
- The Companies presented at an open meeting in Real County on September 29, 2025.
- The Companies presented at an open meeting in Uvalde County on October 14, 2025.
- In-person meetings were held with the TPWD on October 17, 2025 and December 19, 2025.
- An in-person meeting was held with CPS Energy and TNC on October 29, 2025.
- An in-person meeting was held with the USFWS on December 9, 2025.

On August 15, 2025, the Companies initiated a docket at the Commission (Docket No. 58545) for the docketing of public input filed at the PUC regarding the Project prior to the filing of the application. As of February 5, 2026, 144 filings have been made by elected officials, local agencies and groups, and individuals, including United States Congressman Chip Roy; State Senator Pete Flores; State Representatives Wes Virdell, Drew Darby, Ken King, Charlie Geren, Brad Buckly, and Stan Lambert; Edwards County; Bandera County; and the Bandera Historical Commission.

In addition, the Consultant accessed the USFWS IPaC system to request an Official Species List, which also generates an official consultation response letter and tracking number. IPaC provided a species list identifying federally threatened, endangered, and proposed to be listed species; designated and proposed critical habitat; and candidate species that may occur within the study area counties or may be affected by the proposed Project. A copy of the response letter generated by IPaC on November 14, 2025, is included in Appendix A.

Other stakeholders and individual landowners were identified and contacted as part of the public input process. Input received from the public open houses was used in the development and modification of routes and is discussed further in Section 2.7.

2.5 Field Reconnaissance

Aerial and ground reconnaissance of the study area and computer-based evaluation of digital aerial imagery were used for both refinement and evaluation of the Preliminary Alternative Links. Field inspections were conducted by helicopter within the study area during the routing process on April 1 to 4 and April 15 to 18, 2025. A field inspection was conducted by automobile on February 3 and February 5, 2026. Members of the Siting Team examined the Preliminary Alternative Links in the San Antonio area by automobile from

public roads and other points of public access and by helicopter for all of the Preliminary Alternative Links in the study area and correlated observed features to information shown on aerial photography, USGS 7.5-minute topographic maps, road maps, and geographic information systems (GIS) sources, as appropriate.

2.6 Public and Stakeholder Input

The consideration of public and stakeholder input is critical to the route development process. Landowners and stakeholders provide information and recommendations to aid the team in the development and refinement of the Preliminary Alternative Links. Typically, a project-specific outreach plan is developed and can include open houses, websites, mailings, advertising, etc. More information on how public and stakeholder input was used for the Project is presented in Section 2.7.4.

2.7 Alternative Route Identification

2.7.1 Study Area Delineation

The study area boundaries define the area in which Alternative Routes can be sited to feasibly meet the Project's functional requirements and reasonably minimize environmental impacts and Project costs. The boundaries of the study area were determined by the geographic area encompassing the Project endpoints. The purpose of delineating a study area for the Project was to establish boundaries and limits in which to identify environmental and land use constraints during the information-gathering process to properly identify and map various items included within the PUC's CCN application. Given these considerations, the Siting Team identified a study area encompassing approximately 13,049,376 acres (20,390 square miles) in Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde counties, Texas (the Study Area, see **Figure 2-1**). The Study Area is generally bound by the proposed Project stations in the east and west. The southern county line boundaries of Medina and Uvalde counties make up the southeastern Study Area boundary. The northern extent of the Study Area is generally defined by I-10 and the rest of the southern Study Area boundaries are defined by the international border between the United States and Mexico and the southwestern county line boundaries of Pecos and Terrell counties.

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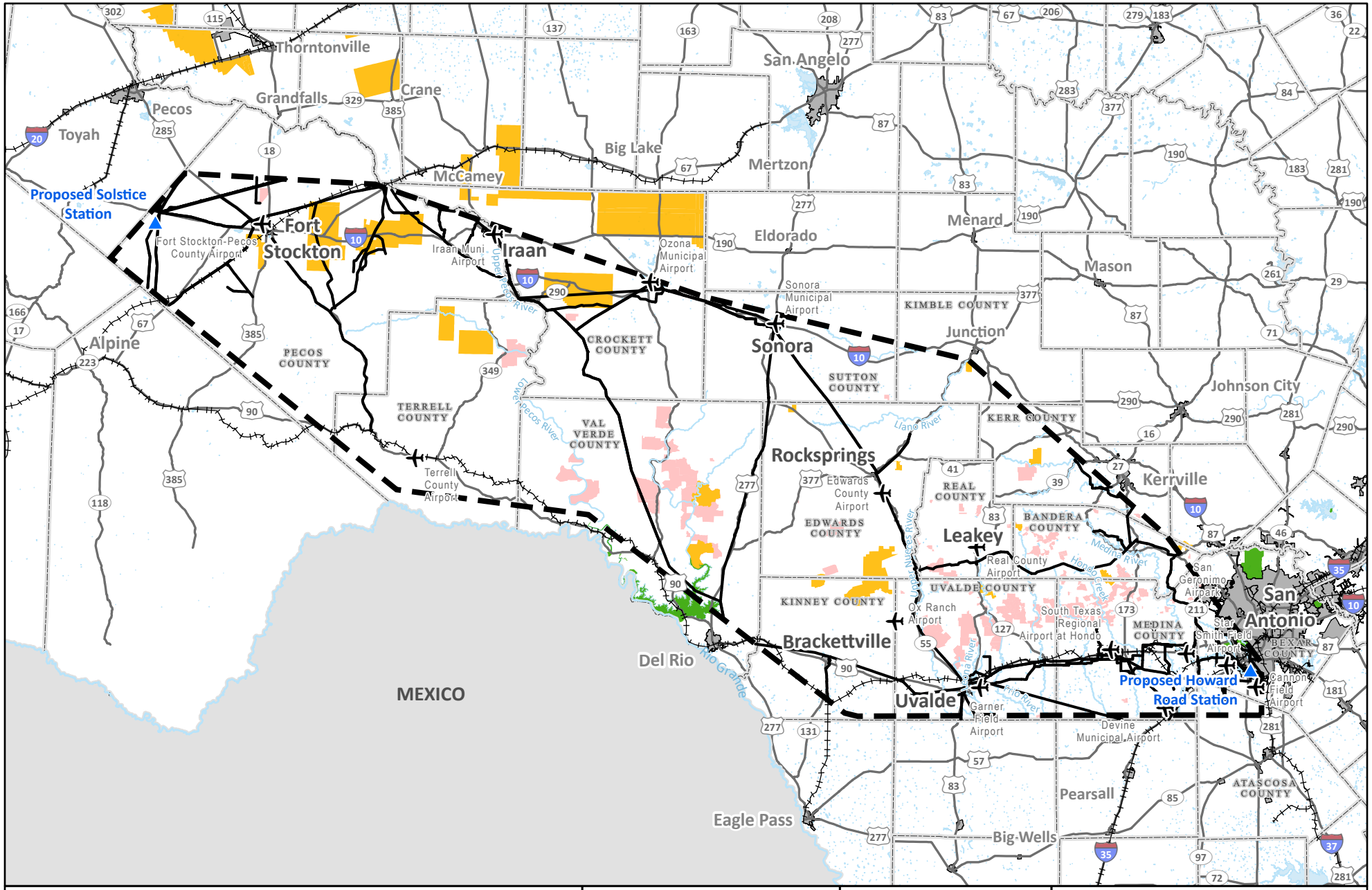

FIGURE 2-1
STUDY AREA

Howard-to-Solstice 765-kV
Single-circuit Transmission Line

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2.7.2 Constraint Mapping

To minimize impacts to sensitive environmental and land use features, a constraints mapping process was used in the development and refinement of the Preliminary Alternative Links. The geographic location of environmentally sensitive and other potentially restrictive areas within the Study Area were located and considered during development of the Preliminary Alternative Links. These constraints were mapped onto an aerial base map as well as a USGS topographic base map using Google Earth (2025) imagery. Generally, impacts from Alternative Links are reduced by avoiding, to the greatest extent practicable, constraints such as oil and gas wells and pipelines, wind farms, airports and airstrips, communities, concentrated residential and commercial development, community facilities, cemeteries, historic and archeological sites, wetland areas, parks and recreation areas, conservation easements, places of worship, and schools, and by paralleling existing compatible ROW, including transmission lines and roadways, and paralleling approximate property lines, where feasible.

Data displayed on the base map include:

- Major land jurisdictions and uses
- Major roads (including county roads, Farm-to-Market roads [FM], United States highways [US Hwys], State highways [SHs], and Interstate highways)
- Oil and gas wells
- Wind farms
- Airports, private airstrips, and communication facilities
- Conservation easements
- Lakes, reservoirs, rivers, streams, and ponds
- Floodplains
- Cemeteries
- Cities and towns
- Existing transmission lines and pipelines
- Water wells
- Solar farms
- Parks and wildlife management areas
- Major political subdivision boundaries
- Wetlands
- Parcel boundaries
- Railroads

The primary constraints in the Study Area are federally and state-owned property (including military bases and Texas State Parks and Natural Areas), residential and commercial development, topography, karst areas, GCW range, pivot irrigation facilities, public airports and private landing strips, conservation easements on the eastern side, and oil and gas infrastructure on the western side. Further details on land use and transportation are included in Sections 3.8.1 and 3.8.5, respectively.

2.7.3 Preliminary Alternative Links

The Consultant identified numerous Preliminary Alternative Links, which were presented to the Companies for review and comment. These Preliminary Alternative Links were examined in the field via helicopter by the Consultant on April 1 to 4 and April 15 to 18, 2025. Following environmental and engineering review by the Project Team, adjustments were made to the location and alignment of several Preliminary Alternative Links, resulting in a set of 230 Preliminary Alternative Links. These 230 links, shown on **Figure 2-2**, were presented to the public at four open house meetings held in the Study Area from August 4 to August 7, 2025 in the cities of Atascosa, Uvalde, Del Rio, and Fort Stockton, Texas, respectively.

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Page 2 of 11

UVALDE COUNTY
MEDINA COUNTY
BEXAR COUNTY
ATASCOSA COUNTY
FRIO COUNTY

Medina Lake
Upper Sabinal River
Frio River
Atascosa River

Government Canyon State Natural Area

ROUGH CANYON - ETT SUBSTATION
SECO STATION
BEC 138-kV Line
SOUTH TEXAS REGIONAL AIRPORT AT HONDO
Hondo
HONDO STATION
RAZORBACK STATION
D'Hanis
D'HANIS STATION
Sabinal
SABINAL STATION
SABINAL STATION
CPS Energy 138-kV Line
AEP Texas 138-kV Line
Uvalde - Castroville 138-kV Line
BEC 69-kV Line
BEC 69-kV Line
HONDO CREEK STATION
CPS Energy 138-kV Line
Biry
BEC 138-kV Line
Moore - Uvalde 138-kV Line
Yancey
DEVINE MUNICIPAL AIRPORT
Devine
DEVINE STATION
NATALIA STATION
Natalia
LYTLE STATION
Lytle
UNNAMED STATION
PEARSON STATION
Quihi
QUIHI STATION
BADER STATION
CASTROVILLE STATION
Castroville
Dunlay
Riomedina
RAFTER STATION
TEXAS RESEARCH STATION
CAGNON ROAD STATION
TALLEY ROAD STATION
Mico
SAN GERONIMO AIRPARK
ANDERSON STATION
WESTOVER HILLS STATION
VLSI STATION
POTRANCO STATION
MARBACH ROAD STATION
PINN ROAD STATION
HUNT LANE STATION
MEDINA BASE STATION
LACKLAND AIR FORCE BASE
Joint Base San Antonio
Lackland & Chapman Training Annex
LEON CREEK STATION
PEARSALL ROAD STATION
PALO ALTO STATION
Macdona
La Coste
Mangus Corner
Von Ormy
UNNAMED STATION
PROPOSED HOWARD ROAD STATION
SOMERSET STATION
Somerset
CANNON FIELD AIRPORT
PROPOSED HOWARD ROAD STATION
Helotes
Shavano Park
Castle Hills
Leon Valley
Balcones Heights
San Antonio
CPS Energy 345-kV Line
BEC 345-kV Line
Kames Electric 138-kV Line

Proposed Project Station
Existing Station
Preliminary Link, Node & ID
Existing Transmission Line
Study Area
Sheet Boundary Matchline
City Point
Railroad
Major Road
Minor Road
Public Airport
Private Airstrip
Heliport
Stream (NHD)
Waterbody (NHD)
Federal Land (PADUS)
State Land (PADUS)
Local/Private Conservation Land (PADUS)
City Limit
County Boundary

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

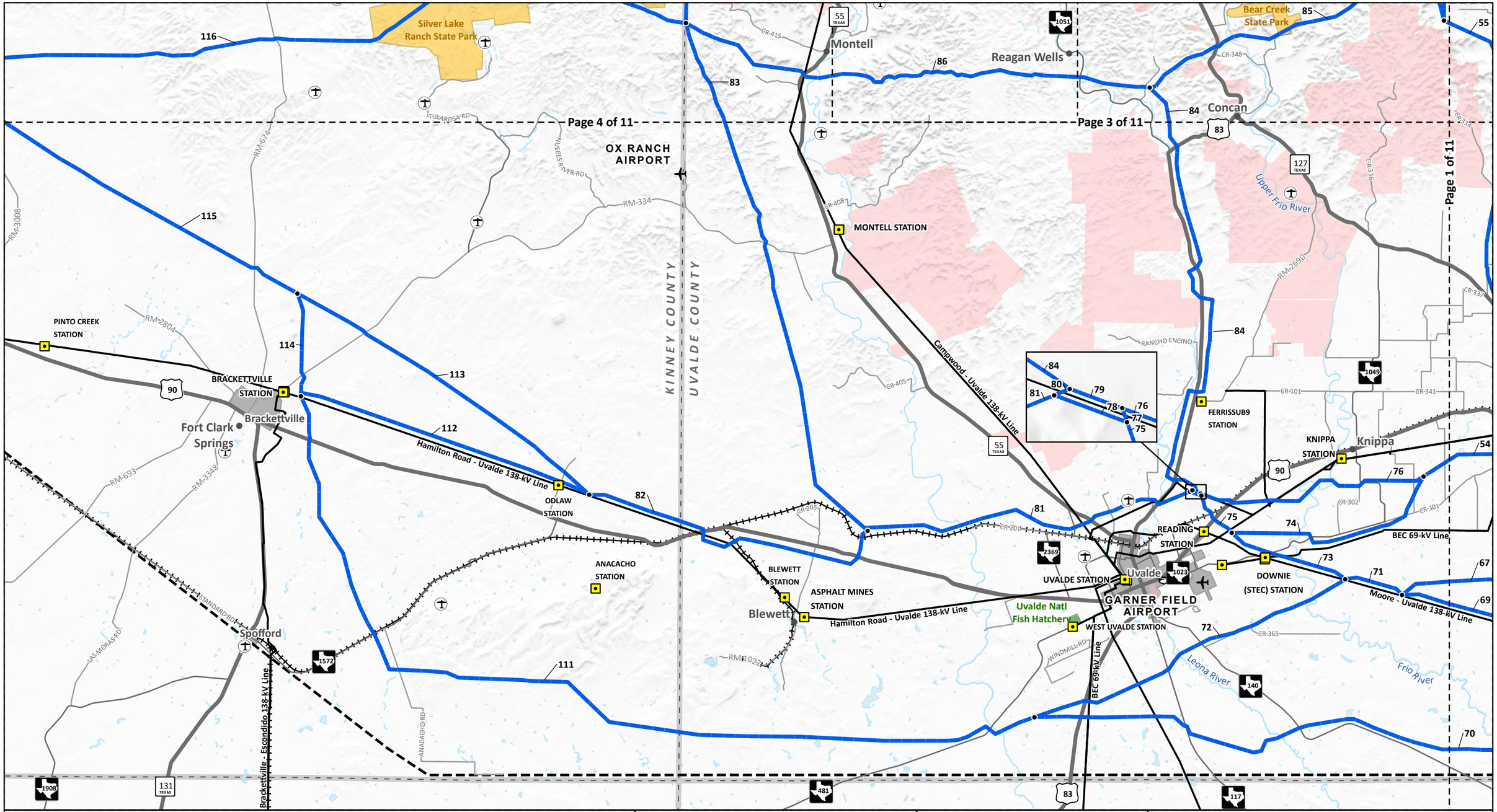
Project Area

FIGURE 2-2
PRELIMINARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV
Single-circuit Transmission Line
Page 1 of 11

AEP TEXAS
cps ENERGY

0 5
Miles



Existing Station	Major Road	Federal Land (PADUS)
Preliminary Link, Node & ID	Minor Road	State Land (PADUS)
Existing Transmission Line	Public Airport	Local/Private Conservation Land (PADUS)
Study Area	Private Airstrip	City Limit
Sheet Boundary Matchline	Heliport	County Boundary
City Point	Stream (NHD)	
Railroad	Waterbody (NHD)	

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

Project Area

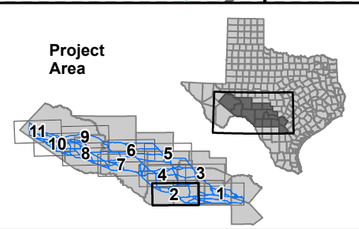


FIGURE 2-2
PRELIMINARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV
Single-circuit Transmission Line
Page 2 of 11

AEP TEXAS
cps ENERGY

0 5
Miles

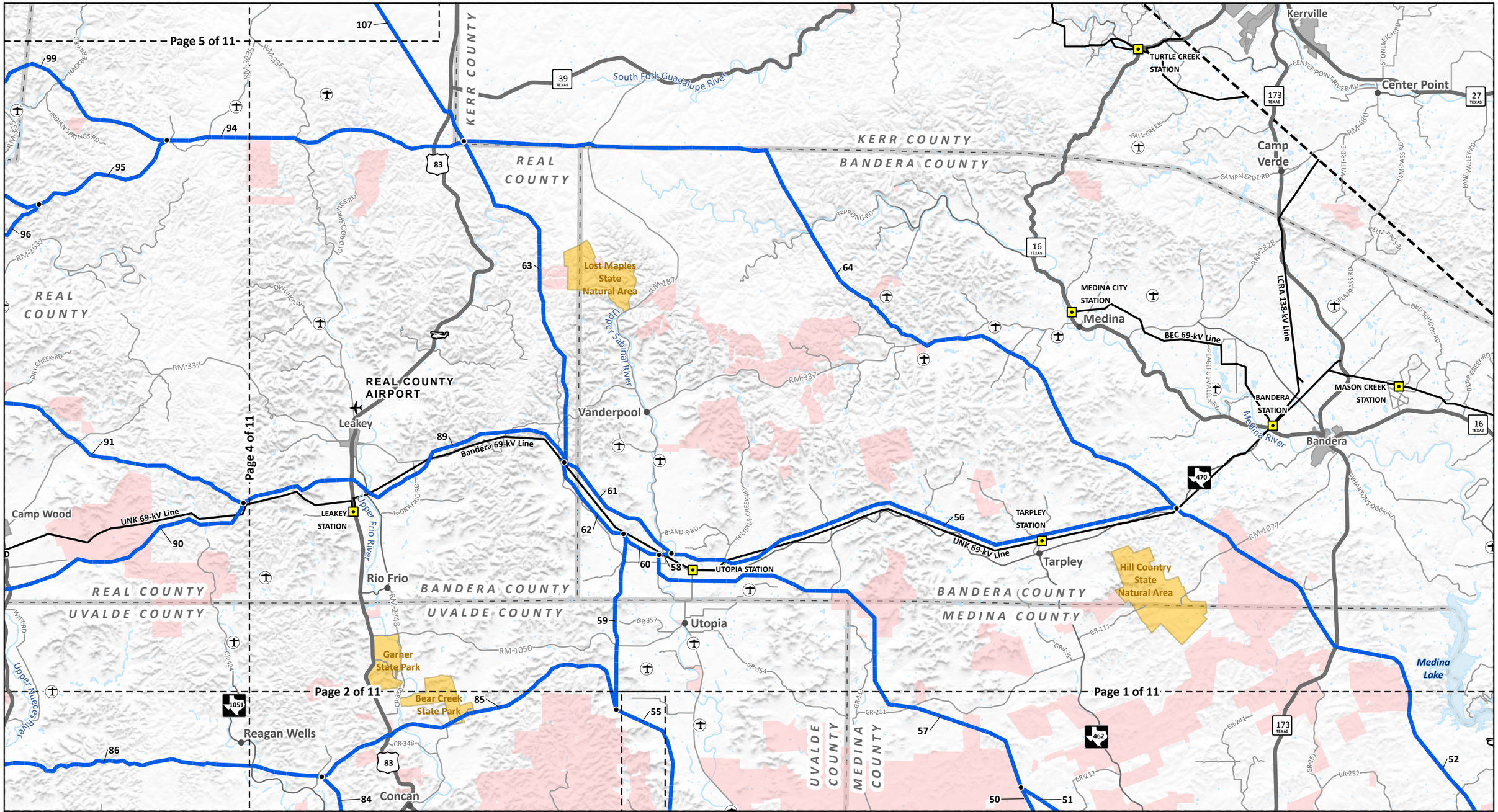
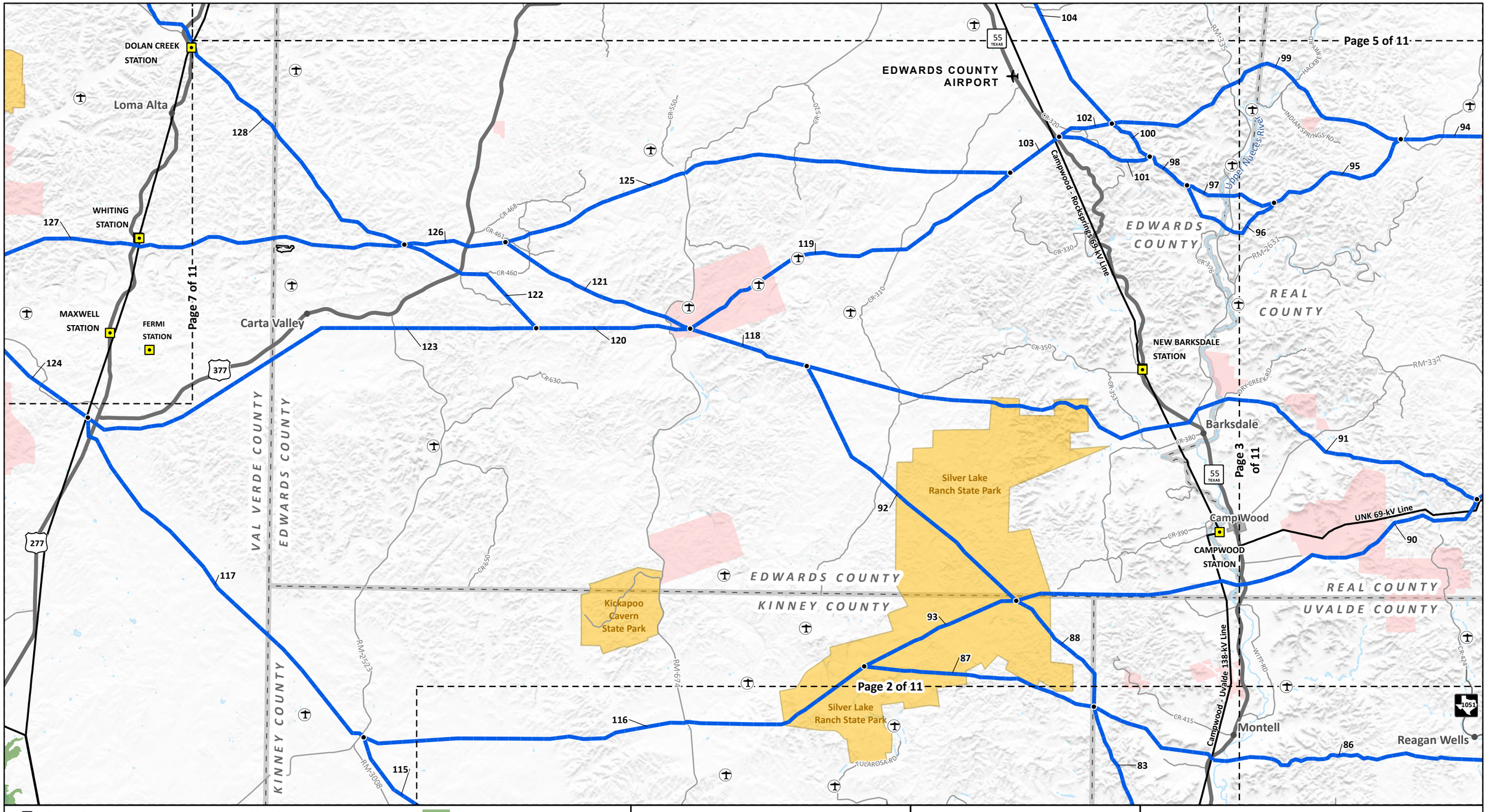


FIGURE 2-2
PRELIMINARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV
Single-circuit Transmission Line



Existing Station
Preliminary Link, Node & ID
Existing Transmission Line
Study Area
Sheet Boundary Matchline
City Point

Major Road
Minor Road
Public Airport
Private Airstrip
Heliport
Stream (NHD)
Waterbody (NHD)

Federal Land (PADUS)
State Land (PADUS)
Local/Private Conservation Land (PADUS)
City Limit
County Boundary

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

Project Area

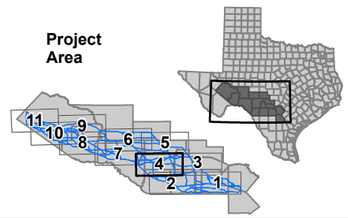
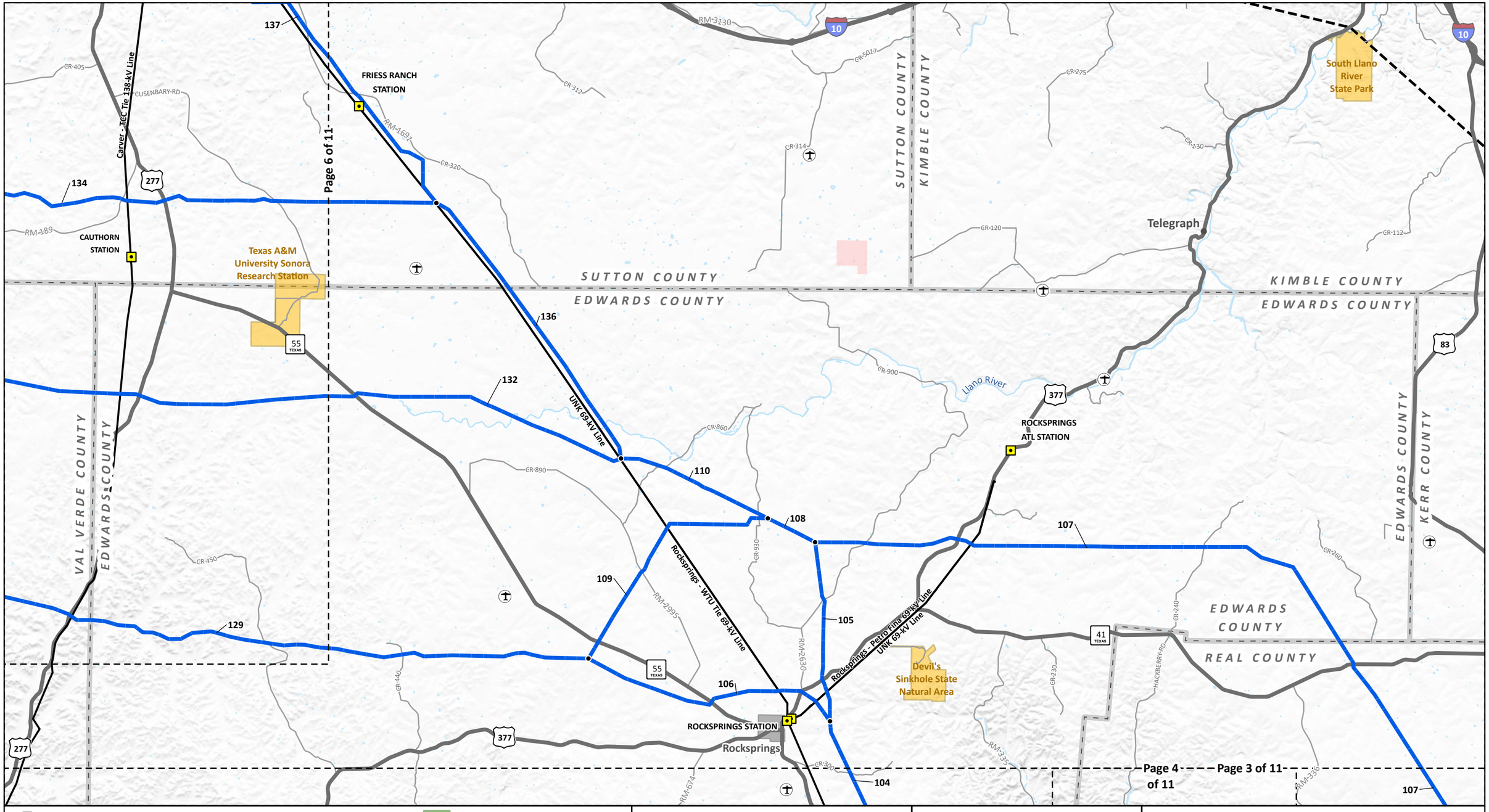


FIGURE 2-2
PRELIMINARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV
Single-circuit Transmission Line
Page 4 of 11

AEP TEXAS
cps

0 5
Miles



Existing Station
Preliminary Link, Node & ID
Existing Transmission Line
Study Area
Sheet Boundary Matchline
City Point

Major Road
Minor Road
Private Airstrip
Stream (NHD)
Waterbody (NHD)

Federal Land (PADUS)
State Land (PADUS)
Local/Private Conservation Land (PADUS)
City Limit
County Boundary

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

Project Area

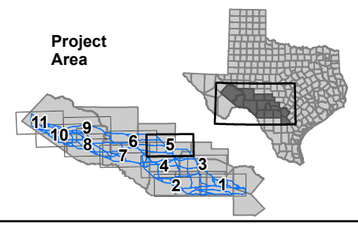
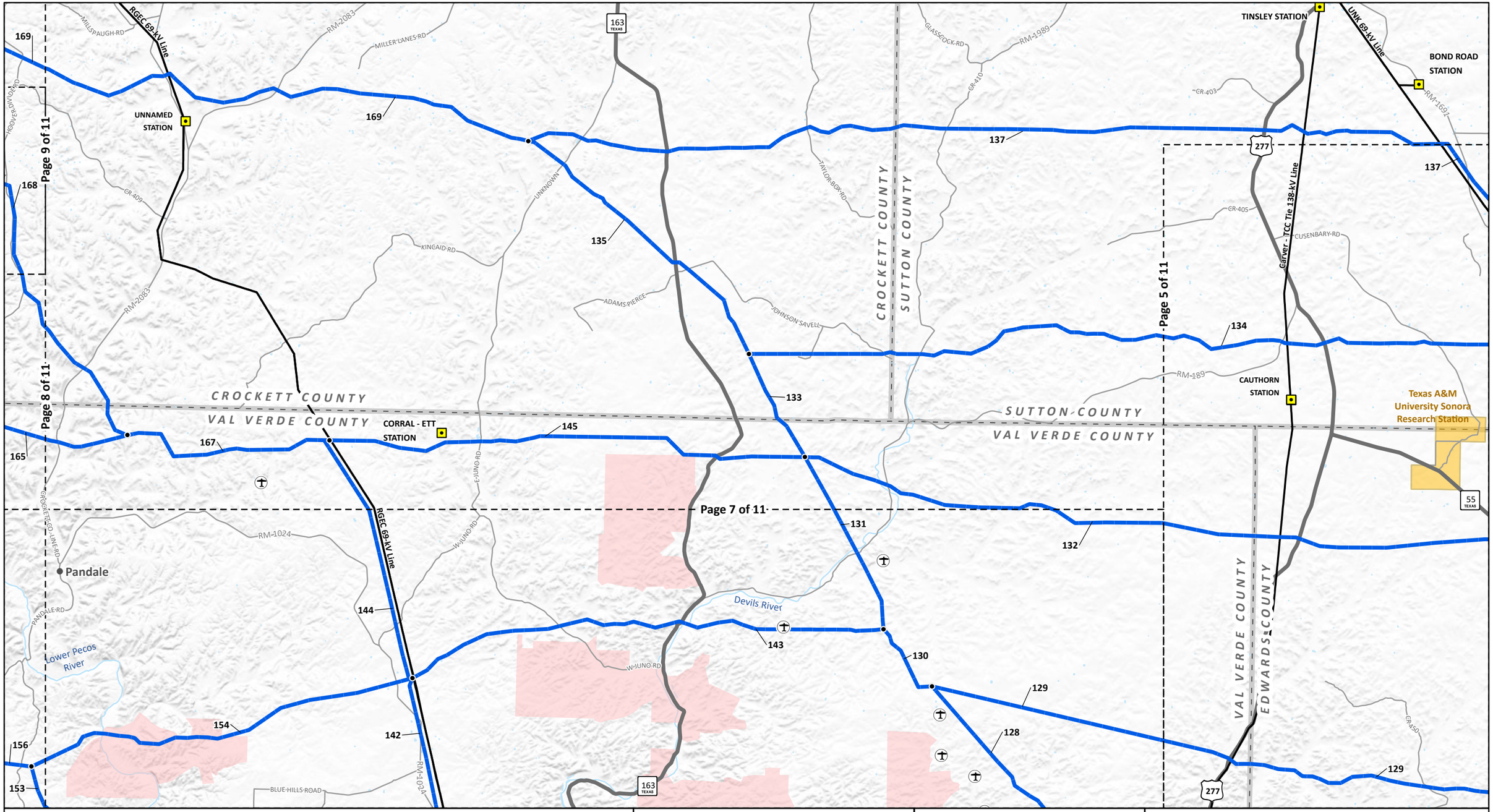


FIGURE 2-2
PRELIMINARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV
Single-circuit Transmission Line
Page 5 of 11

AEP TEXAS
cps ENERGY

0 5
Miles



Existing Station
Preliminary Link, Node & ID
Existing Transmission Line
Study Area
Sheet Boundary Matchline
City Point

Major Road
Minor Road
Private Airstrip
Stream (NHD)
Waterbody (NHD)

Federal Land (PADUS)
State Land (PADUS)
Local/Private Conservation Land (PADUS)
County Boundary

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

Project Area

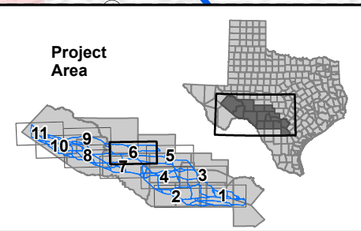
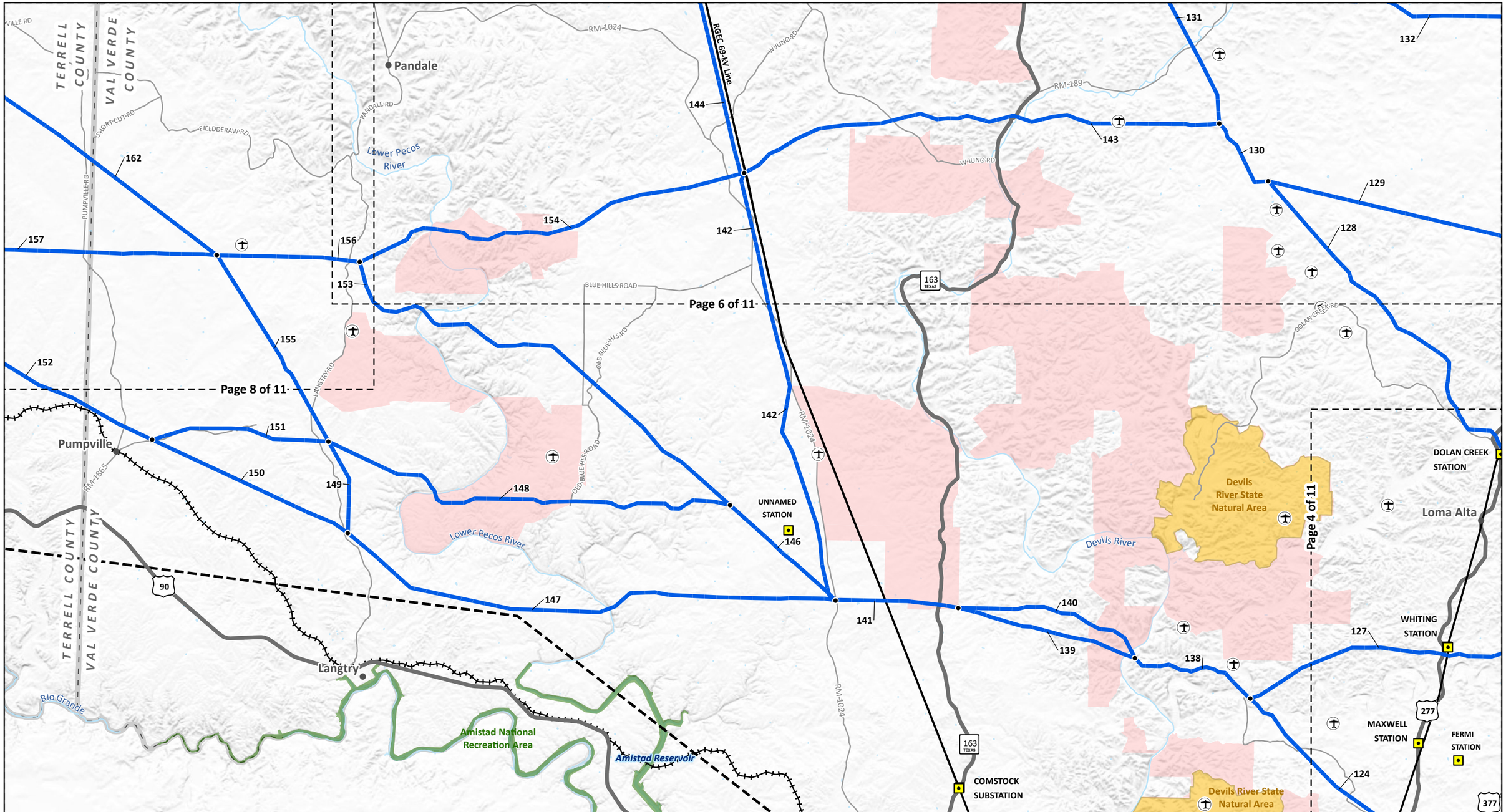


FIGURE 2-2
PRELIMINARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV
Single-circuit Transmission Line
Page 6 of 11

AEP TEXAS
An AEP Company
cps energy

0 5
Miles



- Existing Station
- Preliminary Link, Node & ID
- Existing Transmission Line
- Study Area
- Sheet Boundary Matchline
- City Point
- Railroad
- Major Road
- Minor Road
- Private Airstrip
- Stream (NHD)
- Waterbody (NHD)
- Federal Land (PADUS)
- State Land (PADUS)
- Local/Private Conservation Land (PADUS)
- County Boundary

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

Project Area

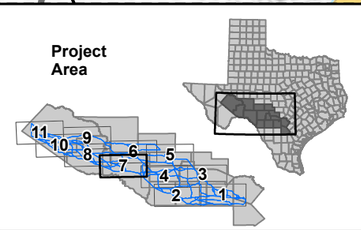
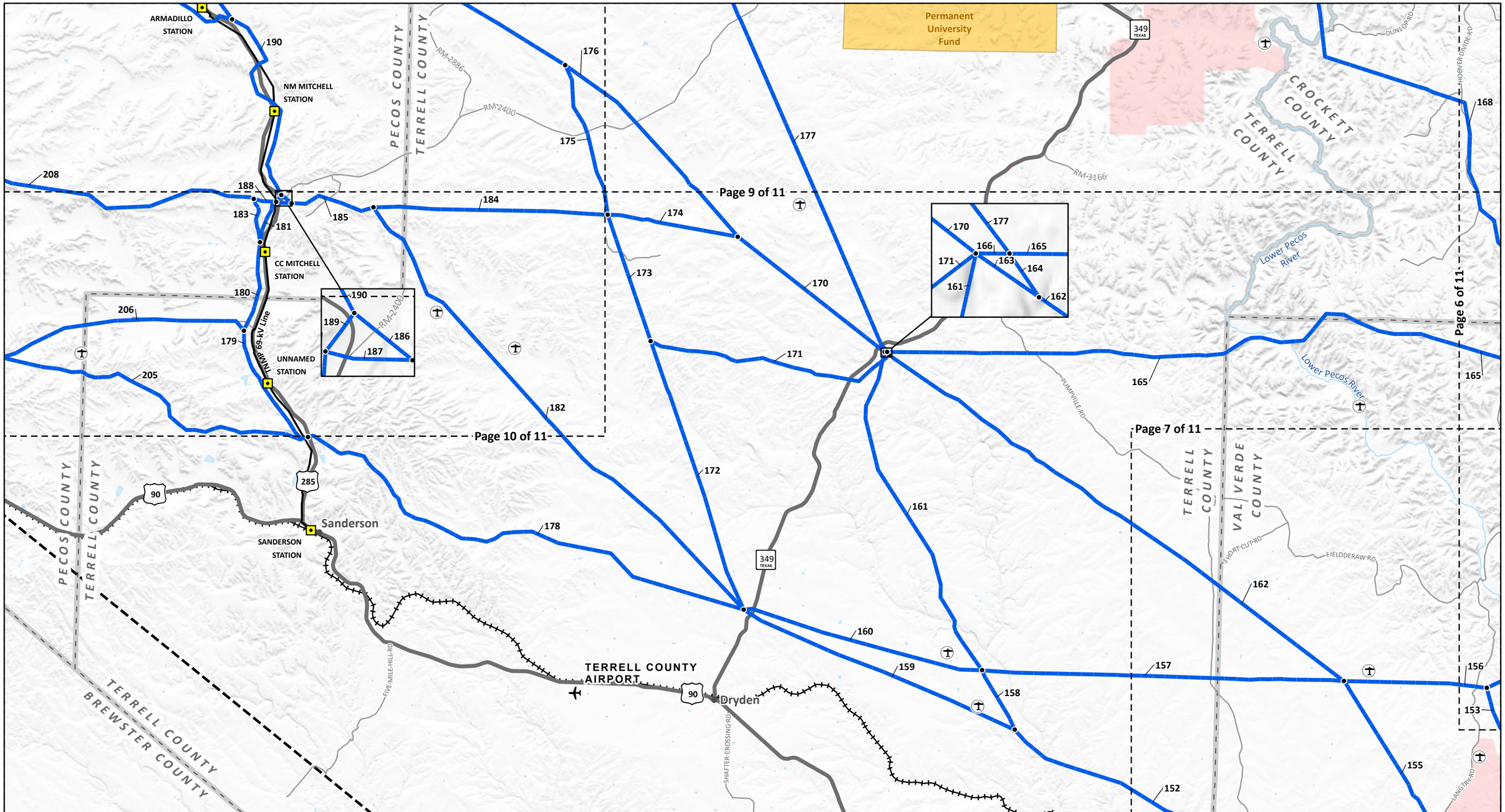


FIGURE 2-2
PRELIMINARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV
Single-circuit Transmission Line
Page 7 of 11

0 5
Miles



Existing Station
Preliminary Link, Node & ID
Existing Transmission Line
Study Area
Sheet Boundary Matchline
City Point
Railroad

Major Road
Minor Road
Public Airport
Private Airstrip
Stream (NHD)
Waterbody (NHD)

Federal Land (PADUS)
State Land (PADUS)
Local/Private Conservation Land (PADUS)
County Boundary

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

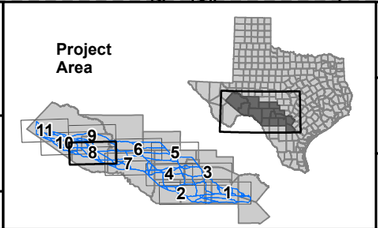
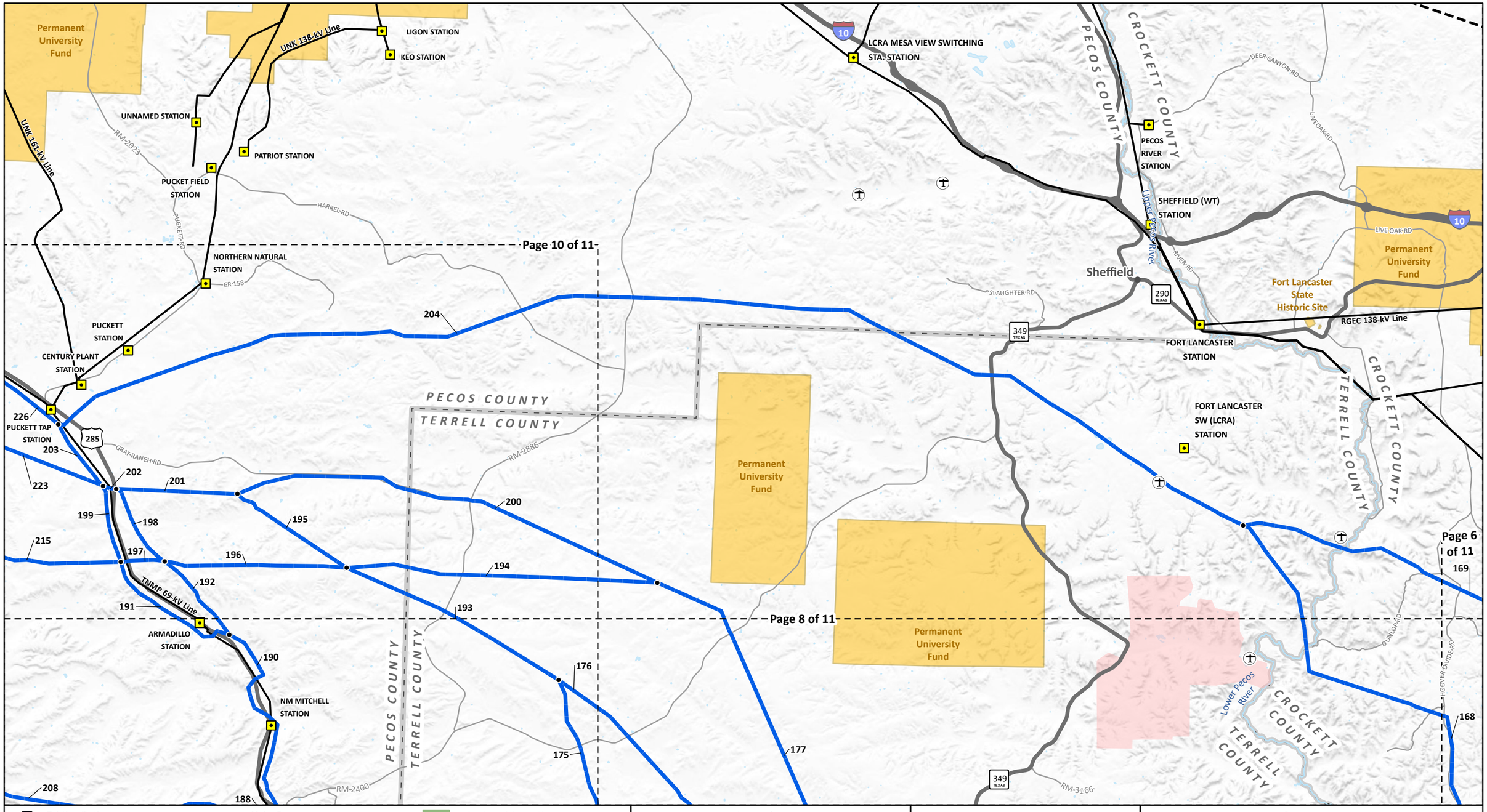


FIGURE 2-2
PRELIMINARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV
Single-circuit Transmission Line
Page 8 of 11

AEP TEXAS
cps ENERGY

0 5
Miles


Permanent University Fund
UNK 138-kV Line
LIGON STATION
KEO STATION
UNNAMED STATION
PATRIOT STATION
UNK 161-kV Line
PUCKET FIELD STATION
RM-2023
HARREL-RD
PUCKETT-RD
NORTHERN NATURAL STATION
CR-158
Page 10 of 11
204
PUCKETT STATION
CENTURY PLANT STATION
226
PUCKETT TAP STATION
285
203
223
GRAY-RANCH-RD
202
201
199
198
195
200
215
197
196
194
192
191
TNMP 69-kV Line
ARMADILLO STATION
193
190
NM MITCHELL STATION
176
175
177
208
188
RM-2400
PECOS COUNTY
TERRELL COUNTY
RM-2886
Permanent University Fund
Permanent University Fund
Permanent University Fund
10
LCRA MESA VIEW SWITCHING STATION
PECOS COUNTY
CROCKETT COUNTY
DEER CANYON RD
LAREOAK-RD
PECOS RIVER STATION
SHEFFIELD (WT) STATION
Upper Pecos River
RIVER-RD
LIVE OAK-RD
Sheffield
290
TEXAS
SLAUGHTER-RD
Fort Lancaster State Historic Site
RGEC 138-kV Line
349
TEXAS
FORT LANCASTER STATION
FORT LANCASTER SW (LCRA) STATION
Page 6 of 11
169
168
D-UNLOP-RD
HOOVER-DIVIDE-RD
Lower Pecos River
CROCKETT COUNTY
TERRELL COUNTY
RM-3166
Existing Station
Preliminary Link, Node & ID
Existing Transmission Line
Study Area
Sheet Boundary Matchline
City Point
Major Road
Minor Road
Private Airstrip
Stream (NHD)
Waterbody (NHD)
Federal Land (PADUS)
State Land (PADUS)
Local/Private Conservation Land (PADUS)
County Boundary
State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties
NAD 1983 StatePlane Texas South Central FIPS 4204 Feet
January 21, 2026
Project Area
1
2
3
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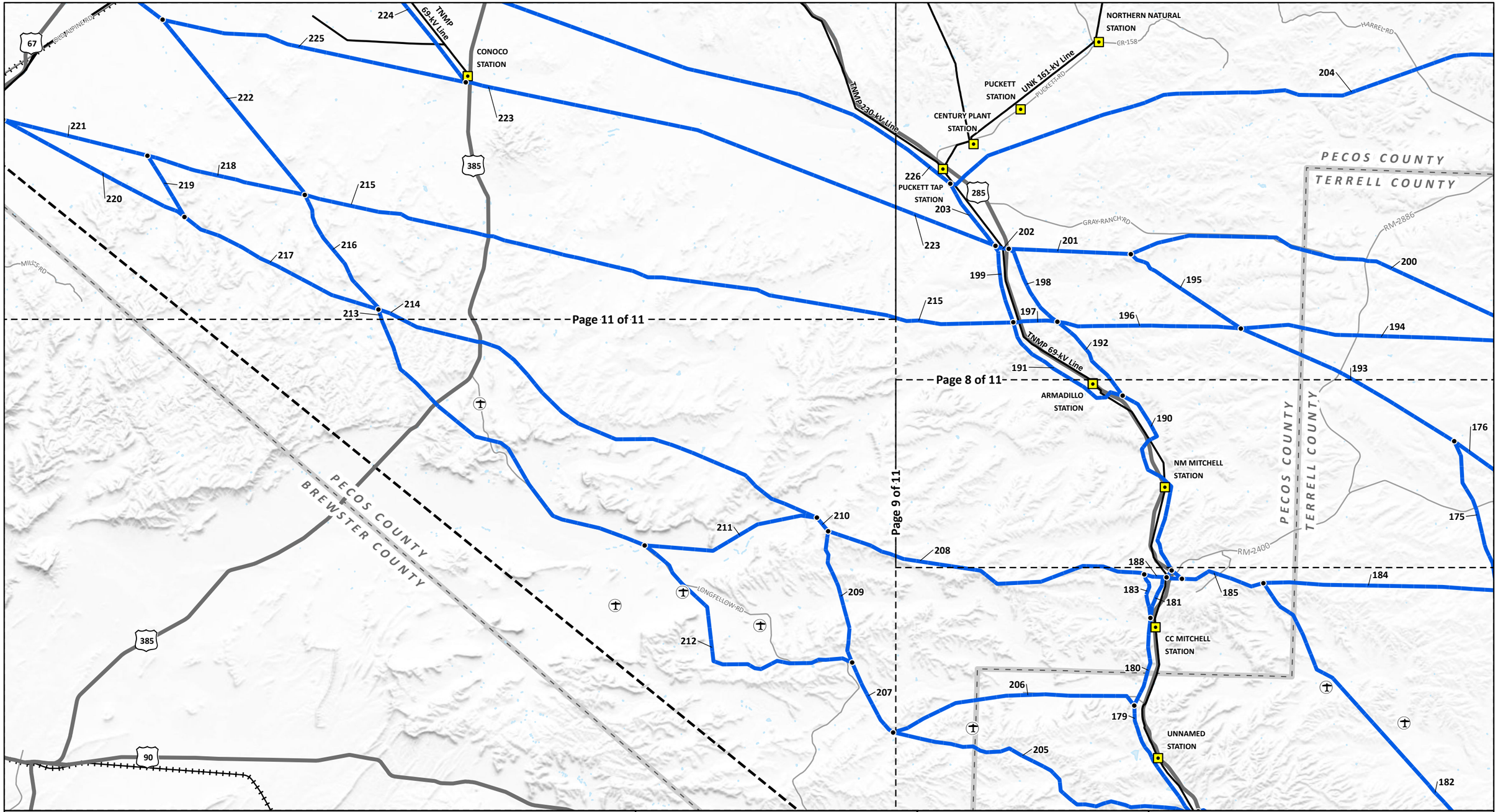
9
10
11
FIGURE 2-2
PRELIMINARY ALTERNATIVE LINKS
Howard-to-Solstice 765-kV
Single-circuit Transmission Line
Page 9 of 11
AEP TEXAS
cps ENERGY
0
5
Miles



Existing Station
Preliminary Link, Node & ID
Existing Transmission Line
Study Area
Sheet Boundary Matchline
Railroad

Major Road
Minor Road
Private Airstrip
Waterbody (NHD)

Federal Land (PADUS)
State Land (PADUS)
Local/Private Conservation Land (PADUS)
County Boundary

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

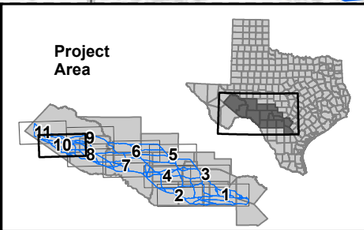


FIGURE 2-2
PRELIMINARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV
Single-circuit Transmission Line
Page 10 of 11

AEP TEXAS
cps energy
An AEP Company

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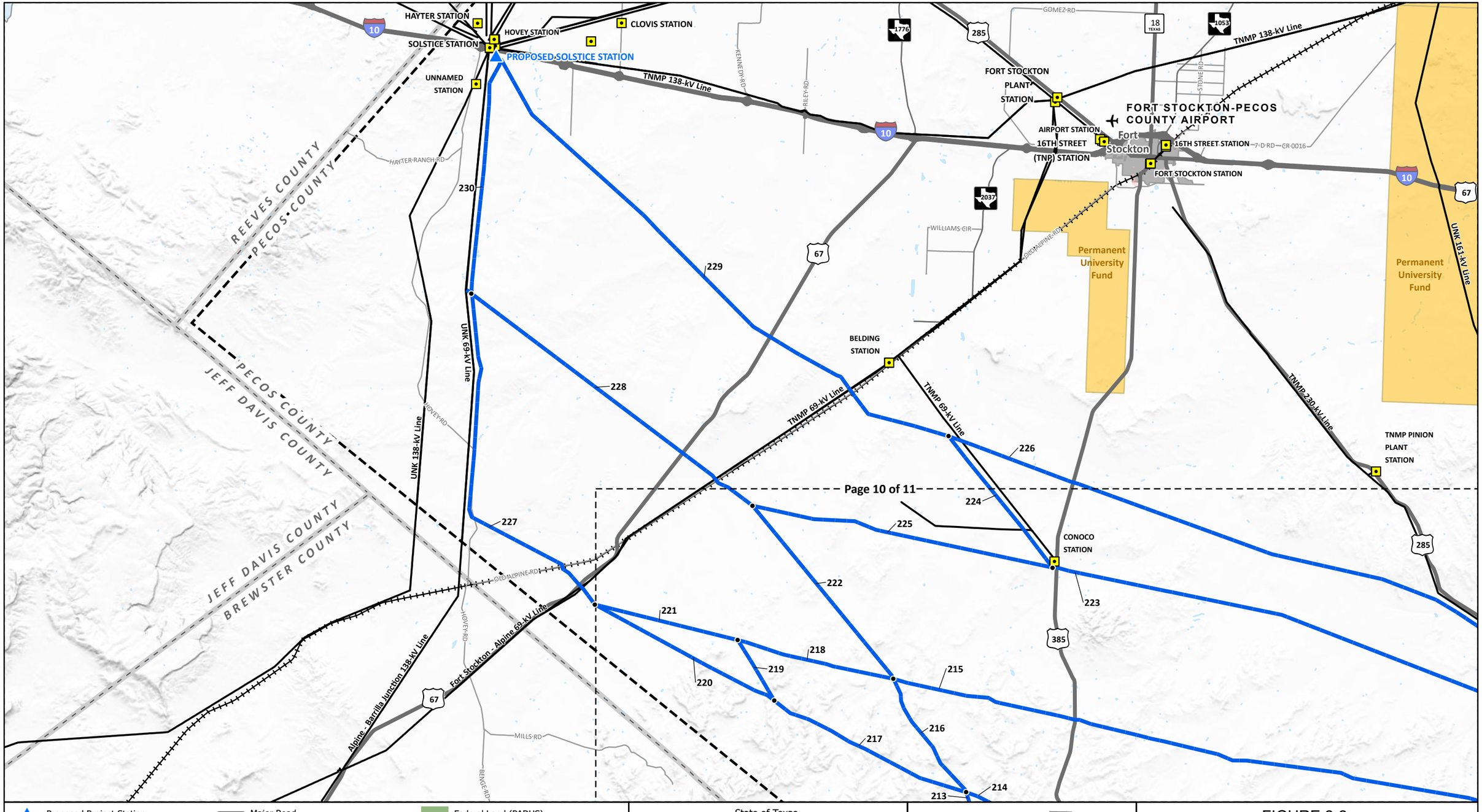
Miles



Proposed Project Station
Existing Station
Preliminary Link, Node & ID
Existing Transmission Line
Study Area
Sheet Boundary Matchline
Railroad
Major Road
Minor Road
Public Airport
Waterbody (NHD)
Federal Land (PADUS)
State Land (PADUS)
Local/Private Conservation Land (PADUS)
City Limit
County Boundary

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

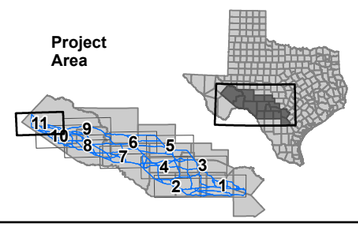


FIGURE 2-2
PRELIMINARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV
Single-circuit Transmission Line
Page 11 of 11

AEP TEXAS
cps energy

0 5
Miles

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2.7.4 Public Involvement

The Companies hosted four public open house meetings with the affected communities to solicit comments, concerns, and input from residents, landowners, public officials, and other interested parties regarding the Preliminary Alternative Links. The meetings were held on the following dates at the following locations:

- August 4, 2025, at the Silverado Event Center at 16490 I-35 S, Atascosa, Texas
- August 5, 2025, at the Uvalde County Fairplex (Event Center) at 215 Veterans Lane, Uvalde, Texas
- August 6, 2025, at the Enchanted Event Center at 4934 US Hwy 90, Del Rio, Texas
- August 7, 2025, at the Fort Stockton Convention Center at 2181 W I-10, Fort Stockton, Texas

CPS Energy primarily organized the Atascosa and Uvalde open house meetings, and AEP Texas primarily organized the Del Rio and Fort Stockton open house meetings. Representatives of both Companies and the Consultant were in attendance at all four meetings. Landowners who own property along the Preliminary Alternative Links were invited to attend. The public open houses were intended to solicit comments from landowners and other interested parties concerning the proposed Project. In addition to gathering public input, the purpose of the meetings was to:

- Promote a better understanding of the proposed Project, including the purpose and need for the Project, the benefits and potential impacts of the new transmission line, and the PUC regulatory approval process.
- Inform and educate the public about the routing procedure, schedule, and link development and route selection process.
- Ensure that the decision-making process adequately identifies and considers the values and concerns of the landowners and other interested parties in the Study Area.

Public open house invitations were sent by United States Postal Service (USPS) Priority Mail by CPS Energy on July 21, 2025. Public open house invitations from AEP Texas were scanned for USPS Priority Mail on July 23, 2025, but due to an error by the third-party printing service, were not provided to the USPS for delivery until July 30, 2025. Open house invitations were sent to landowners who own property located within 500 feet of the Preliminary Alternative Link centerlines. Approximately 4,412 landowners were notified of the open house meetings.

The CPS Energy open house invitation packet (mailed to landowners generally on the eastern half of the Project) included a letter and trifold brochure introducing the Project and open house information along with a set of three Project maps showing the Preliminary Alternative Links. Spanish versions were also included.

The AEP Texas open house invitation packet (mailed to landowners generally on the western half of the Project) included an invitation letter, a fact sheet with a Project map showing the Preliminary Alternative Links and photos of typical structures, a Frequently Asked Questions (FAQ) document, a comment card, and a postage-paid return envelope. The invitation letter, fact sheet, FAQ, and comment card were also provided in Spanish.

In addition to the mailed open house invitation packets, open house media ads within the counties containing Preliminary Alternative Links were also published through local and/or regional newspapers on the following dates:

- San Antonio Express-News (SAEN) – July 27, 2025 and August 3, 2025
- La Prensa Texas (Spanish Publication) – July 27, 2025 and August 3, 2025
- The Broadcaster News – July 31, 2025
- The Uvalde Leader-News – July 27, 2025 and August 3, 2025
- Bandera Bulletin – July 23, 2025 and July 30, 2025
- Kerrville Daily Times – July 24, 2025 and July 31, 2025
- Kinney County Post – July 24, 2025 and July 31, 2025
- Devils River News – July 24, 2025 and July 31, 2025
- The 830 Times – July 25, 2025
- The Stockton Pioneer – July 31, 2025

Each of the individuals and entities who received an invitation letter from AEP Texas generally on the western half of the Project also received a postcard in both English and Spanish inviting them again to the public open house meetings. An example of the CPS Energy and AEP Texas invitation letters and copies of the attachments are provided in Appendix B.

Rather than a formal presentation in a speaker-audience format, the public meetings were held in an open-house format. Several information stations were set up around the meeting room. Each station was devoted to a particular aspect of the routing study and was manned by the Companies' representatives and

appropriate subject matter experts. Large displays of maps, illustrations, photographs, and/or text explaining each topic were presented at the stations.

Six GIS stations were available at the public open house meetings in the cities of Atascosa and Uvalde and four GIS stations were available in the cities of Del Rio and Fort Stockton to provide additional detail on the Preliminary Alternative Links and property ownership boundaries using recent aerial photography of the Study Area. Staff at the GIS stations were available to answer questions such as the distance from a Preliminary Alternative Link centerline to the nearest portion of a habitable structure.

Attendees were encouraged to visit each station in a particular order so the entire process and general Project development sequence could be explained clearly. The open-house format is advantageous because it facilitates one-on-one discussions and encourages personalized landowner interactions. The open-house format also encourages more interaction from landowners who might be hesitant to participate in a speaker-audience format. Spanish-speaking representatives were also available.

At the first station, everyone in attendance was asked to sign their name on a sign-in sheet and was provided with a Project map, comment card, and FAQ sheet. The comment card provided information to assist the landowner in locating their property/properties on the aerial map boards and map books, solicited comments on the Project, and requested an evaluation of the information presented at the public meeting. A Spanish version of the comment card was also available.

Additional stations provided information regarding the PUC regulatory process, the purpose and need for the Project, the Project's proposed typical structure types, agencies that were contacted, and evaluation criteria. In addition, general overview maps showing the Study Area and the Preliminary Alternative Links, constraint maps, and detailed aerial photography-based maps were available for discussion and comment.

After visiting the information stations, individuals were asked to complete the comment card. Completed comment cards were returned either at the meeting or later by mail; however, not all respondents answered every question. In addition, follow-up project feedback trifolds were mailed by AEP Texas generally on the western half of the Project on August 6, 2025, with a request for feedback regarding the landowner's property.

Project Websites

There are two Project websites (https://aeptransmission.com/texas/howard-solstice/ and https://www.cpsenergy.com/content/corporate/en/about-us/new-infrastructure/howard-solstice-transmission.html). Following the open house meetings, both websites were updated to include maps of the Preliminary Alternative Links and end points and a Project fact sheet. CPS Energy's website also provides links to displays and literature from the open houses and post-open house references, including a PowerPoint overview presentation, and contact information to provide feedback. Additional FAQs, an overview presentation of the Project, and information regarding electric and magnetic fields are also available on the CPS Energy website. The AEP Texas website includes an online feedback form and a virtual open house with the following slides:

- Project Need & Benefits
- Project Map
- Project Schedule
- Proposed Structures
- How the System Works
- Right-of-Way Activities
- Field Activities
- Construction Process
- Routing Process
- Environmental
- Thank You

Both companies will update their respective websites following the filing of the Application with additional information throughout the Application proceeding to inform the public of the status of the Application at the Commission.

Open House Responses

A total of 470 individuals signed in as attendees at the four public open house meetings. AEP Texas and CPS Energy utilized slightly different comment cards; therefore, the open house responses discussion below is separated by the open houses hosted by CPS Energy in the cities of Atascosa and Uvalde, and the open houses hosted by AEP Texas in the cities of Del Rio and Fort Stockton. In addition to the comment cards discussed below, the Companies received emails, letters, and phone calls in response to the proposed Project.

CPS Energy

According to the sign-in sheets, approximately 138 individuals signed in as attending the public open house meeting in the Community of Atascosa on August 4, 2025, and approximately 193 individuals signed in as

attending the public open house meeting in the City of Uvalde on August 5, 2025. CPS Energy received a total of 1,301 comment card responses.

The comment card responses were reviewed and analyzed. Four hundred and sixty-three of the respondents (36%) agreed that the content provided was informative, while 508 (39%) said it was not.

Respondents were then asked if there are any features on their property in the Study Area. Written responses included:

- Houses
- Sheds
- Cultural resources
- Utility lines
- Irrigation
- Airstrips
- Historical structures
- Aquifer Recharge Zones
- Barns
- Streams/Rivers/Creeks
- Threatened and endangered species
- Water wells
- Cattle pens
- Livestock
- Cell towers

Comment card respondents were then presented with a list of 13 factors that are taken into consideration for a routing study (see a complete list of the criteria on the questionnaire in Appendix B). They were asked to rank each of these criteria on a scale from 1 to 5, with 1 being the least important factor and 5 being the most important factor. Of those attendees that ranked the criteria, the average rating for each factor (in descending order of importance) is as follows:

- Maximize distance from parks and recreational facilities – 4.9
- Maintain distance from residences, businesses, and schools – 4.8
- Minimize impacts on streams and rivers – 4.8
- Minimize loss of trees – 4.8
- Minimize impacts to archaeological and historic sites – 4.8
- Minimize visibility of line – 4.7
- Maximize length along existing transmission lines – 4.6
- Maximize length along highways or other roads – 4.6
- Minimize length through wetlands/floodplains – 4.6

- Minimize length through grassland or pasture – 4.5
- Maximize length along property boundary lines – 4.3
- Minimize length across cropland – 4.3
- Minimize total length of line (reduces cost of line) – 3.0

Respondents were asked if there are other factors that should be considered, and if they had any comments regarding the listed factors. Written responses included concerns about:

- Health
- Safety
- Impacts on economy and tourism
- Impacts on dark skies
- Impacts on migration patterns
- Impacts on cultural resources
- Impacts on business
- Environmental impacts
- Impacts on wildlife
- Impacts on water resources
- Close proximity to houses

Comment card respondents were asked if they had concerns with any of the Preliminary Alternative Links. The Preliminary Alternative Links with the most concerns included those in the Hill Country and generally on the eastern side of the study area.

The comment card provided a space for respondents to include any additional comments. Responders were concerned about impacts on threatened and endangered species, cultural resources, dark sky-designated areas, and environmentally sensitive areas. Respondents were also concerned about visual and tourism impacts in the Texas Hill Country. Several respondents suggested that the transmission line be parallel to I-10.

Subsequent to the open house meetings, CPS Energy has received additional emails, letters, and phone messages regarding the Project and the Preliminary Alternative Links.

AEP Texas

According to the sign-in sheets, approximately 87 individuals signed in as attending the public open house meeting in Del Rio on August 7, 2025, and approximately 52 individuals signed in as attending the public open house meeting in Fort Stockton on August 8, 2025. AEP Texas received a total of 107 comment card responses, as well as 17 comment tears (responses to the postcards). One hundred eighty individuals submitted feedback regarding the Project via the Project email address, AEPTexasOutreach@aep.com.

The comment card responses were reviewed and analyzed. Seventy-one of the respondents (66%) agreed that the content provided was informative, while 21 (20%) said it was not.

Comment card respondents were asked to provide information about features on their property in the Study Area. Written responses included, but were not limited to:

- Airstrips
- Cattle pens
- Barns, sheds, trailers, covered structures
- Caves, springs, sinkholes
- Conservation easements
- Cultural resources and cemeteries
- Gas wells
- Houses
- Hunting cabins and deer feeders
- Livestock shelters and watering facilities
- Pipelines, water lines, electric lines
- Pivot irrigation systems
- Quarries and mines
- Streams, rivers, ponds
- Threatened and endangered species
- Water wells and septic systems

The comment card provided a space for respondents to include any additional comments. Responders were concerned about aesthetics, light pollution/International Dark Sky status, electromagnetic field exposure, diminished property values, wildfire risks, and impacts to working ranches and tourism. Many responders were concerned about natural resources, such as impacts on the Devils River and other streams and rivers in the Study Area, threatened and endangered species, wildlife migration routes, as well as erosion and the Edwards Aquifer recharge zone. Several responders suggested that the route should follow existing utility corridors or highways to reduce land disturbance.

2.7.5 Modifications to Preliminary Alternative Links

Preliminary Alternative Links were evaluated and refined using public and stakeholder input and updated aerial mapping in an attempt to avoid or minimize impacts on Study Area resources. Additionally, modifications were made due to engineering constraints. As a result, some Alternative Links were added, removed, and modified. These modifications resulted in a total of 268 Primary Alternative Links, which are shown on **Figure 2-3** and are used in compiling the Alternative Routes.

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Page 2 of 11

FIGURE 2-3
PRIMARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV Single-circuit Transmission Line

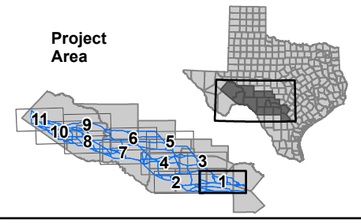
Page 1 of 11

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

Project Area



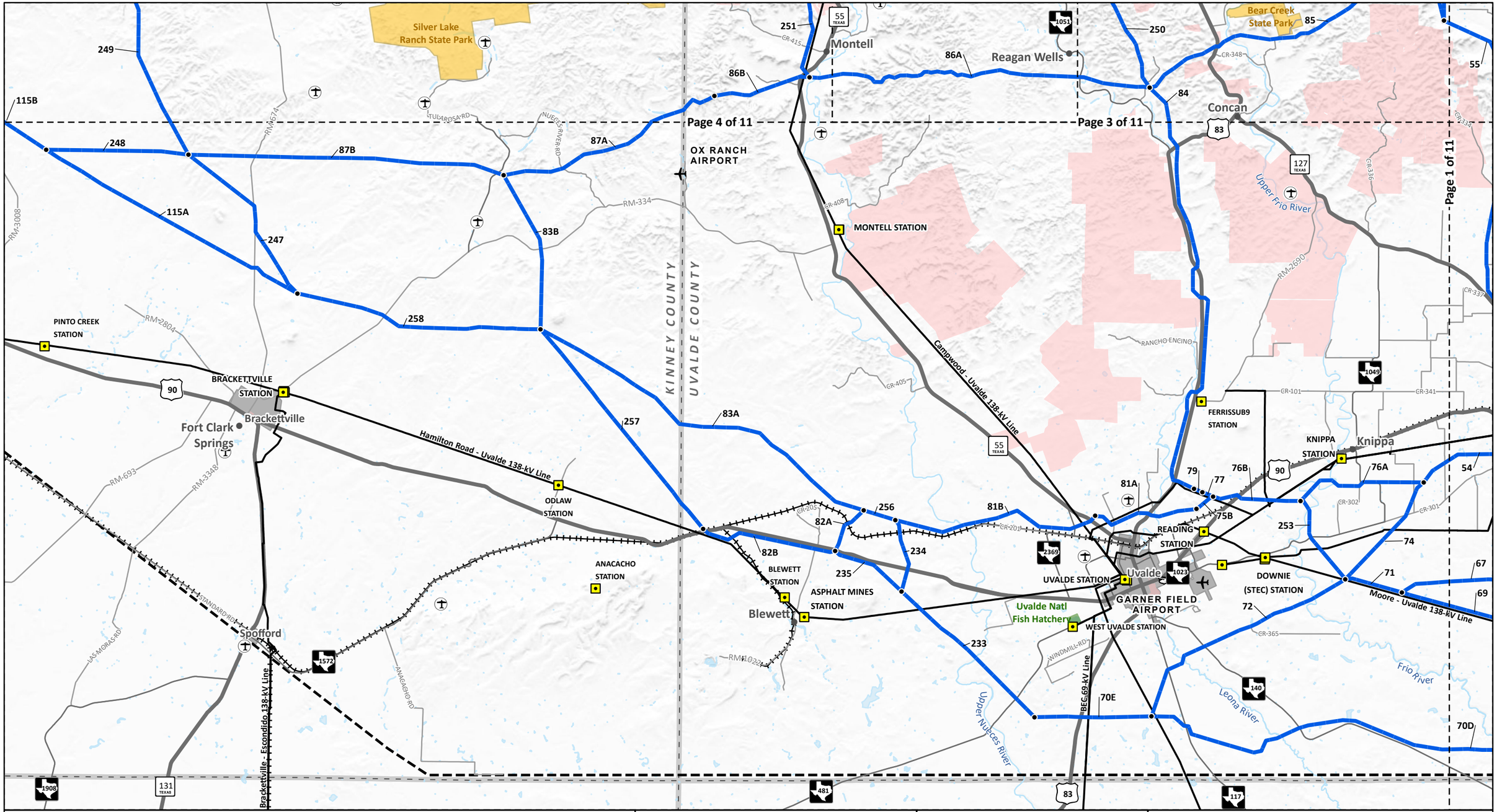
Proposed Project Station
Primary Link, Node & ID
Existing Station
Existing Transmission Line
Study Area
City Point
Railroad

Major Road
Minor Road
Public Airport
Private Airstrip
Heliport
Stream (NHD)
Waterbody (NHD)

Local/Private Conservation Land (PADUS)
Federal Land (PADUS)
State Land (PADUS)
City Limit
County Boundary
Sheet Boundary Matchline

AEP TEXAS
cps ENERGY

0 5
Miles



State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

Project Area

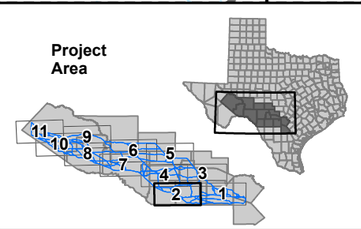
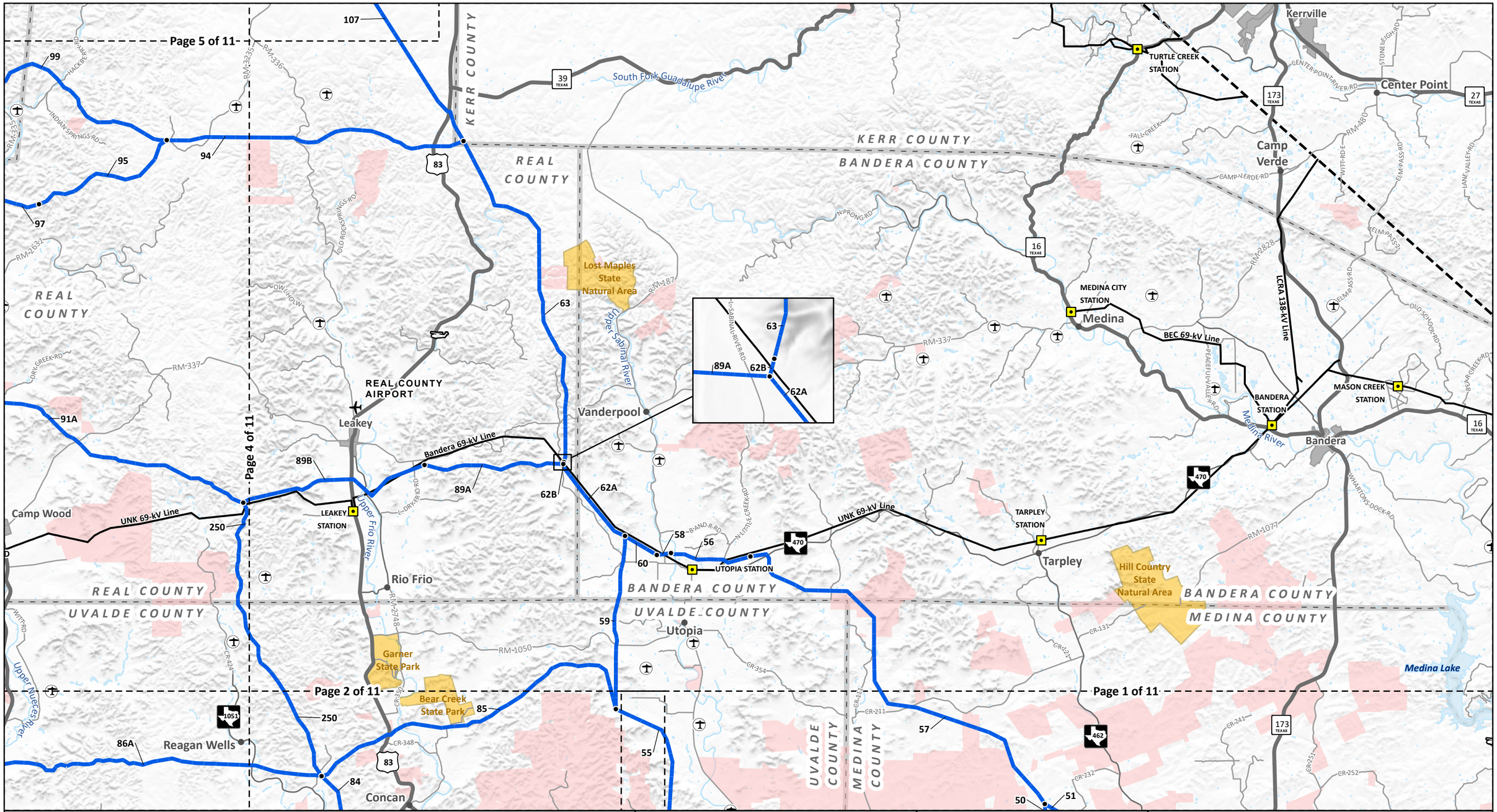


FIGURE 2-3
PRIMARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV Single-circuit Transmission Line

0 5 Miles



State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

FIGURE 2-3
PRIMARY ALTERNATIVE LINKS

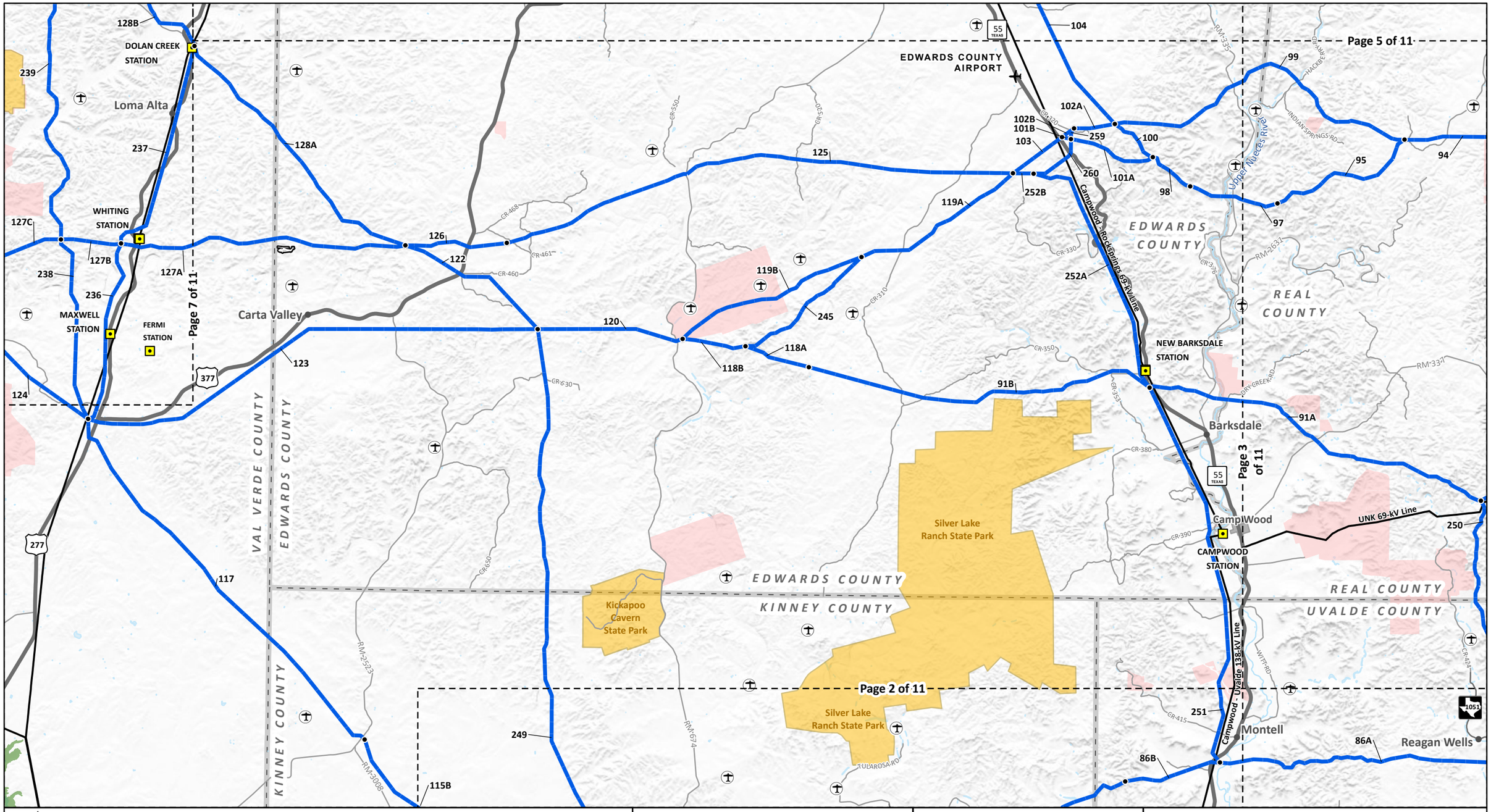
Howard-to-Solstice 765-kV Single-circuit Transmission Line

Page 3 of 11

AEP TEXAS An AEP Company

cps ENERGY

0 5 Miles



Primary Link, Node & ID
Existing Station
Existing Transmission Line
Study Area
City Point

Major Road
Minor Road
Public Airport
Private Airstrip
Heliport
Stream (NHD)
Waterbody (NHD)

Local/Private Conservation Land (PADUS)
Federal Land (PADUS)
State Land (PADUS)
City Limit
County Boundary
Sheet Boundary Matchline

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

Project Area

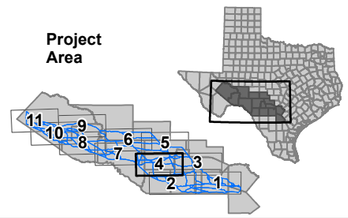


FIGURE 2-3
PRIMARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV Single-circuit Transmission Line

Page 4 of 11

AEP TEXAS
cps ENERGY

0 5
Miles

137
134
136
132
110
108
107
105
109
129
106
104
FRIESS RANCH STATION
CAUTHORN STATION
ROCKSPRINGS ATL STATION
ROCKSPRINGS STATION
Carver - TCC Tie 138-kV Line
UNK 69-kV Line
Rocksprings - WTU Tie 69-kV Line
Rocksprings - Petro Fina 69-kV Line
UNK 69-kV Line
Texas A&M University Sonora Research Station
South Llano River State Park
Devil's Sinkhole State Natural Area
Telegraph
Rocksprings
Llano River
SUTTON COUNTY
KIMBLE COUNTY
EDWARDS COUNTY
REAL COUNTY
VAL VERDE COUNTY
KERR COUNTY
CR-405
CUSENBARY-RD
RM-189
RM-3130
CR-5017
CR-312
RM-1691
CR-320
CR-314
CR-275
CR-130
CR-120
CR-112
CR-900
CR-860
CR-890
CR-930
CR-450
RM-2995
RM-2630
CR-440
CR-300
RM-674
RM-3375
RM-3336
CR-240
HACKBERRY-RD
CR-230
CR-260
277
55
377
10
83
41
Page 6 of 11
Page 4 of 11
Page 3 of 11

Primary Link, Node & ID
Existing Station
Existing Transmission Line
Study Area
City Point
Major Road
Minor Road
Private Airstrip
Stream (NHD)
Waterbody (NHD)
Local/Private Conservation Land (PADUS)
State Land (PADUS)
City Limit
County Boundary
Sheet Boundary Matchline

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

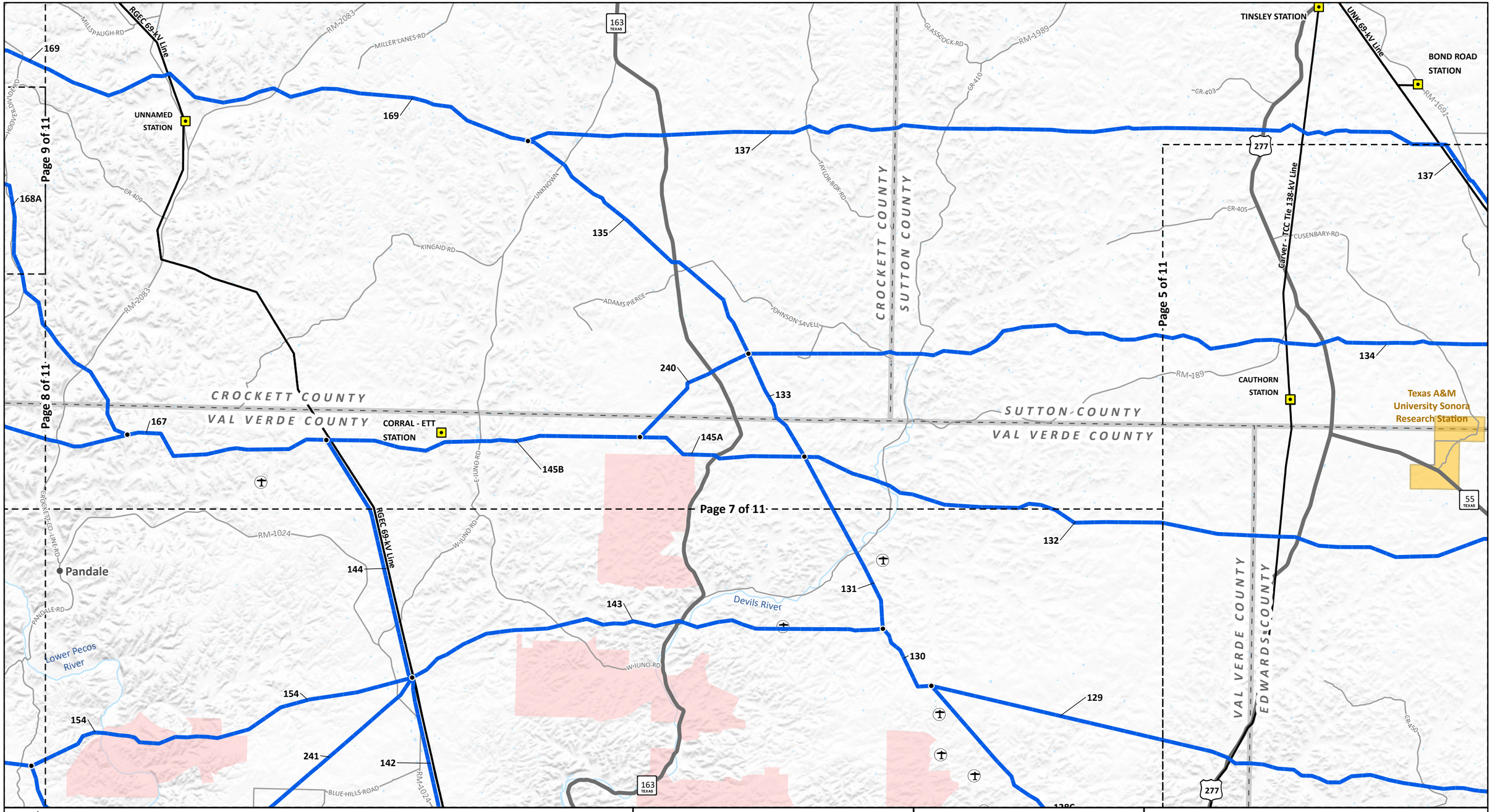
Project Area

FIGURE 2-3
PRIMARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV Single-circuit Transmission Line
Page 5 of 11

AEP TEXAS
cps ENERGY

0 5
Miles



Primary Link, Node & ID
Existing Station
Existing Transmission Line
Study Area
City Point

Major Road
Minor Road
Private Airstrip
Stream (NHD)
Waterbody (NHD)

Local/Private Conservation Land (PADUS)
State Land (PADUS)
County Boundary
Sheet Boundary Matchline

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

Project Area

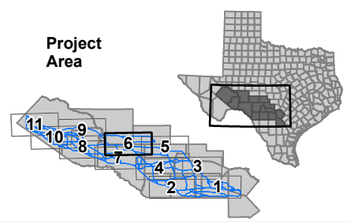
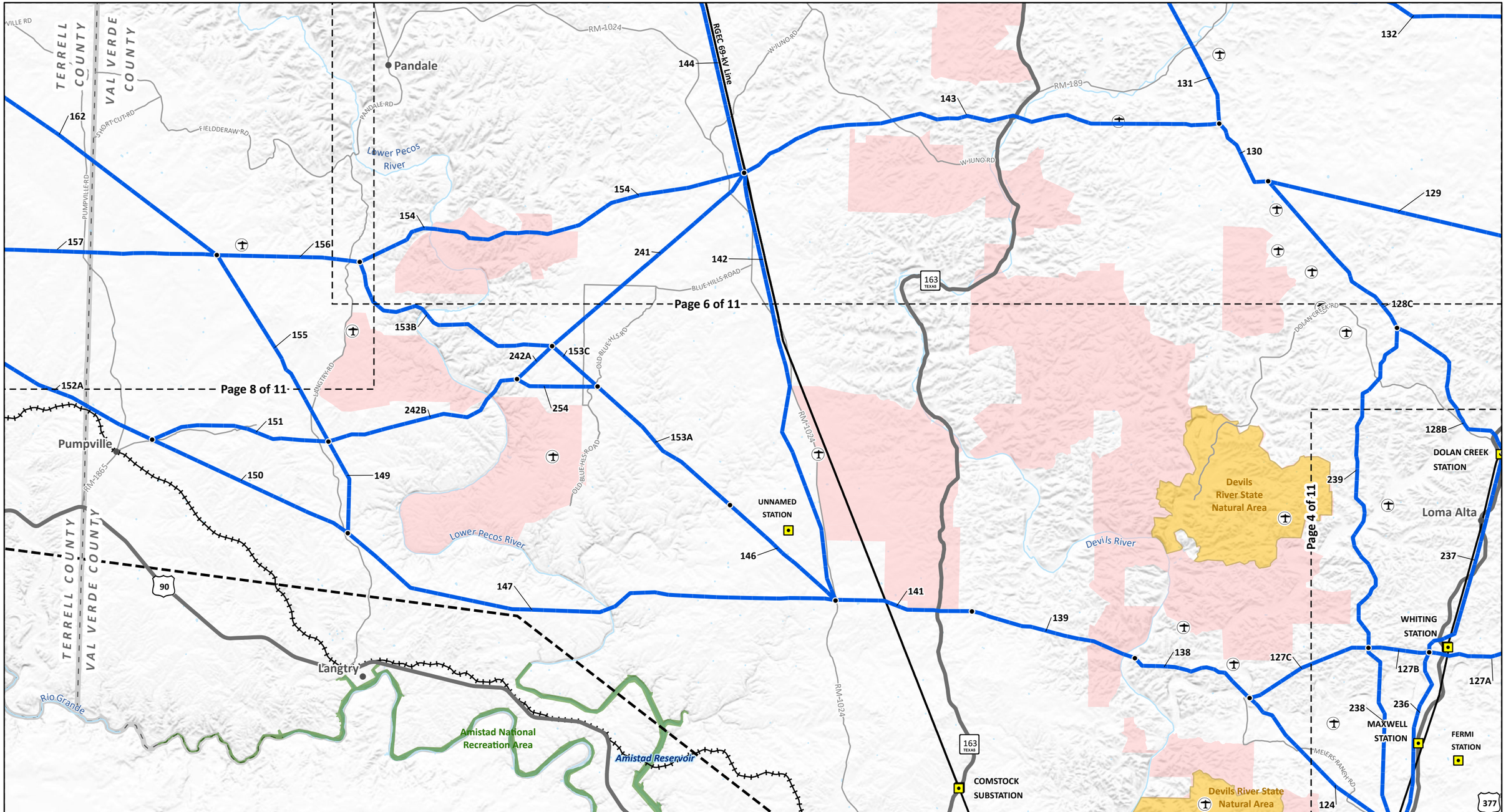


FIGURE 2-3
PRIMARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV Single-circuit Transmission Line

AEP TEXAS
An AEP Company
cps energy

0 5
Miles



Primary Link, Node & ID	Major Road	Local/Private Conservation Land (PADUS)	State of Texas Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties
Existing Station	Minor Road	Federal Land (PADUS)	NAD 1983 StatePlane Texas South Central FIPS 4204 Feet
Existing Transmission Line	Private Airstrip	State Land (PADUS)	January 21, 2026
Study Area	Stream (NHD)	County Boundary	
City Point	Waterbody (NHD)	Sheet Boundary Matchline	
Railroad			

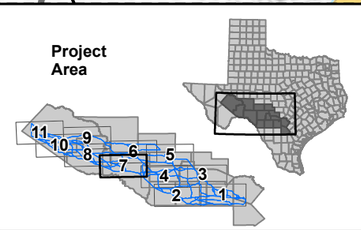


FIGURE 2-3
PRIMARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV Single-circuit Transmission Line

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AEP TEXAS
An AEP Company
cps ENERGY

0 5
Miles

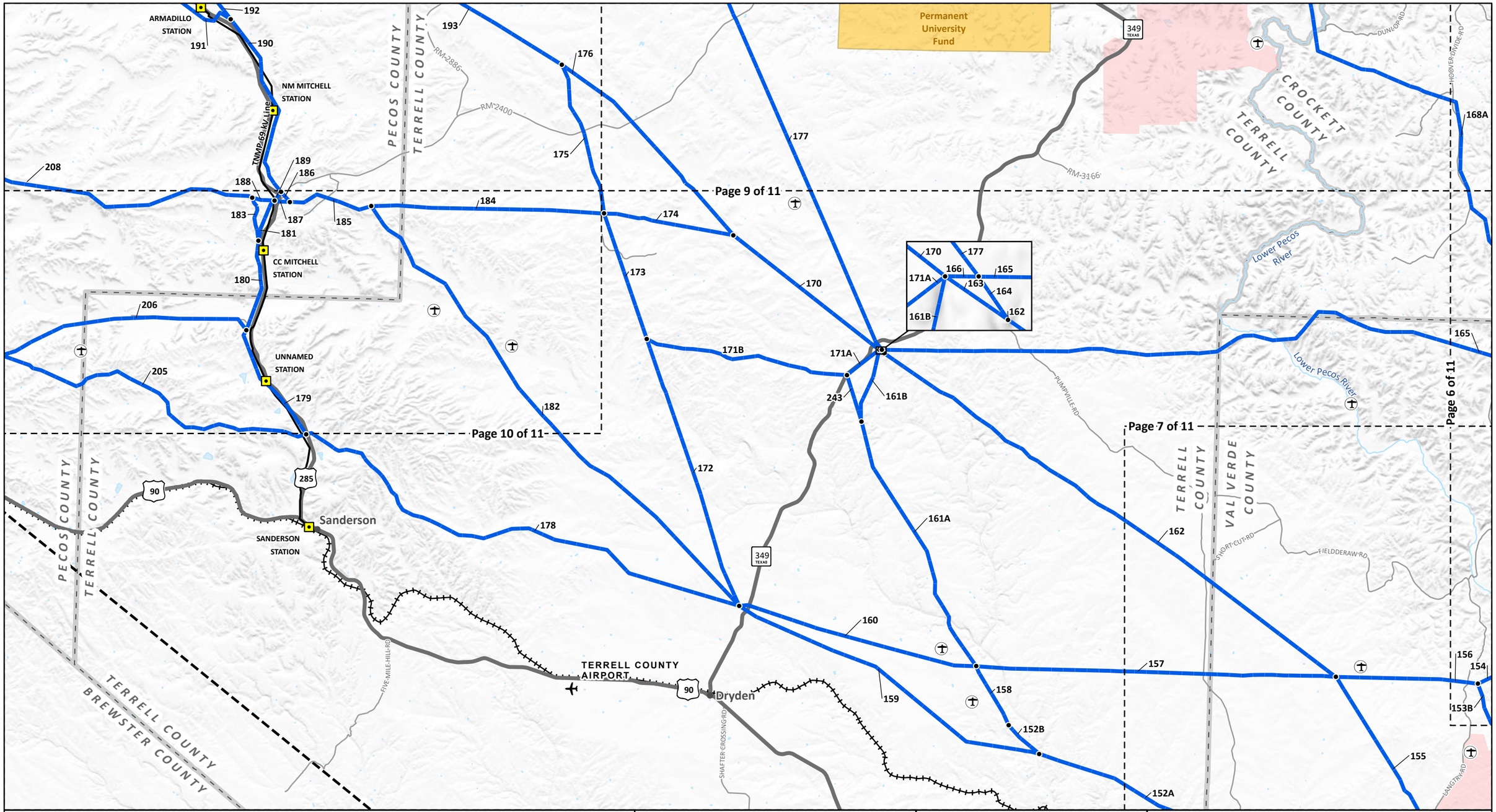
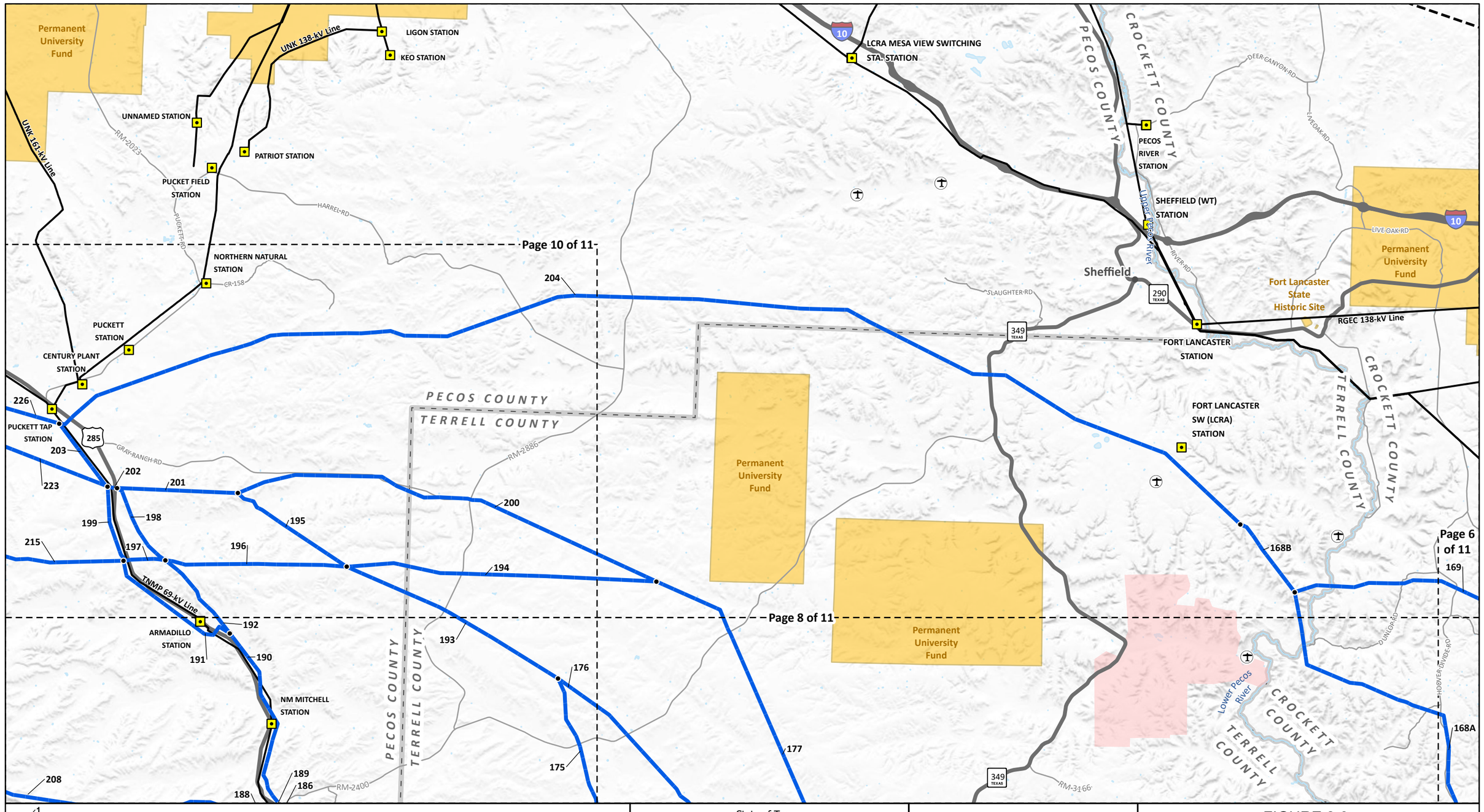


FIGURE 2-3
PRIMARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV Single-circuit Transmission Line

Page 8 of 11



Primary Link, Node & ID
Existing Station
Existing Transmission Line
Study Area
City Point
Major Road
Minor Road
Private Airstrip
Stream (NHD)
Waterbody (NHD)
Local/Private Conservation Land (PADUS)
State Land (PADUS)
County Boundary
Sheet Boundary Matchline

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

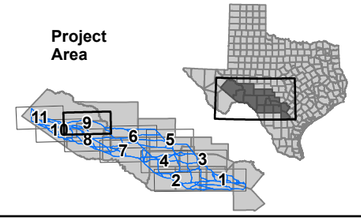
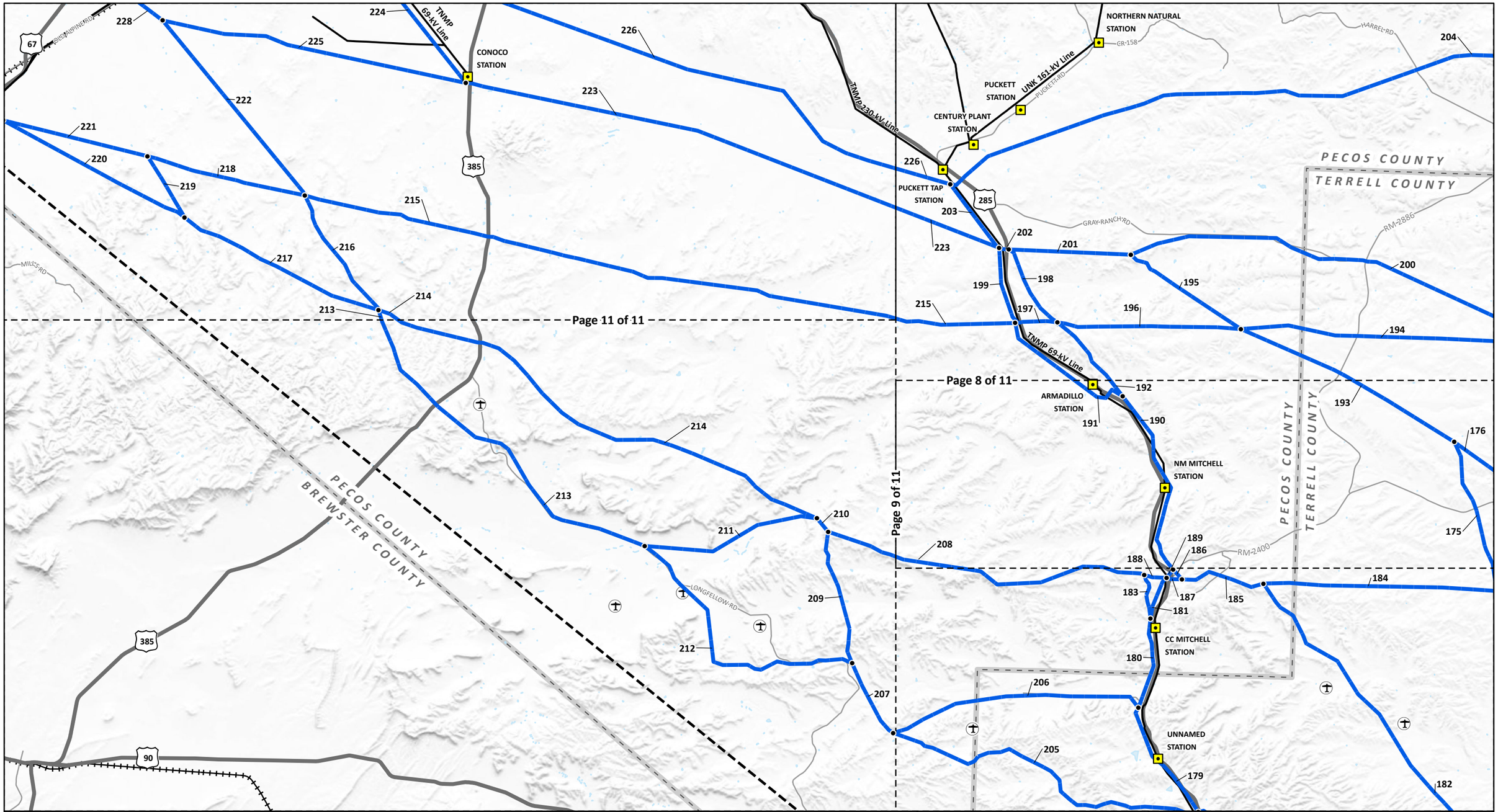


FIGURE 2-3
PRIMARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV Single-circuit Transmission Line
Page 9 of 11

AEP TEXAS
cps ENERGY

0 5
Miles



Primary Link, Node & ID
Existing Station
Existing Transmission Line
Study Area
Railroad
Major Road
Minor Road
Private Airstrip
Waterbody (NHD)
Local/Private Conservation Land (PADUS)
County Boundary
Sheet Boundary Matchline

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

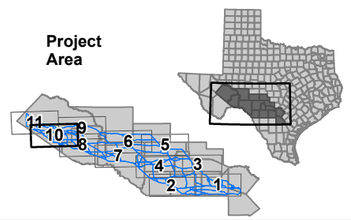


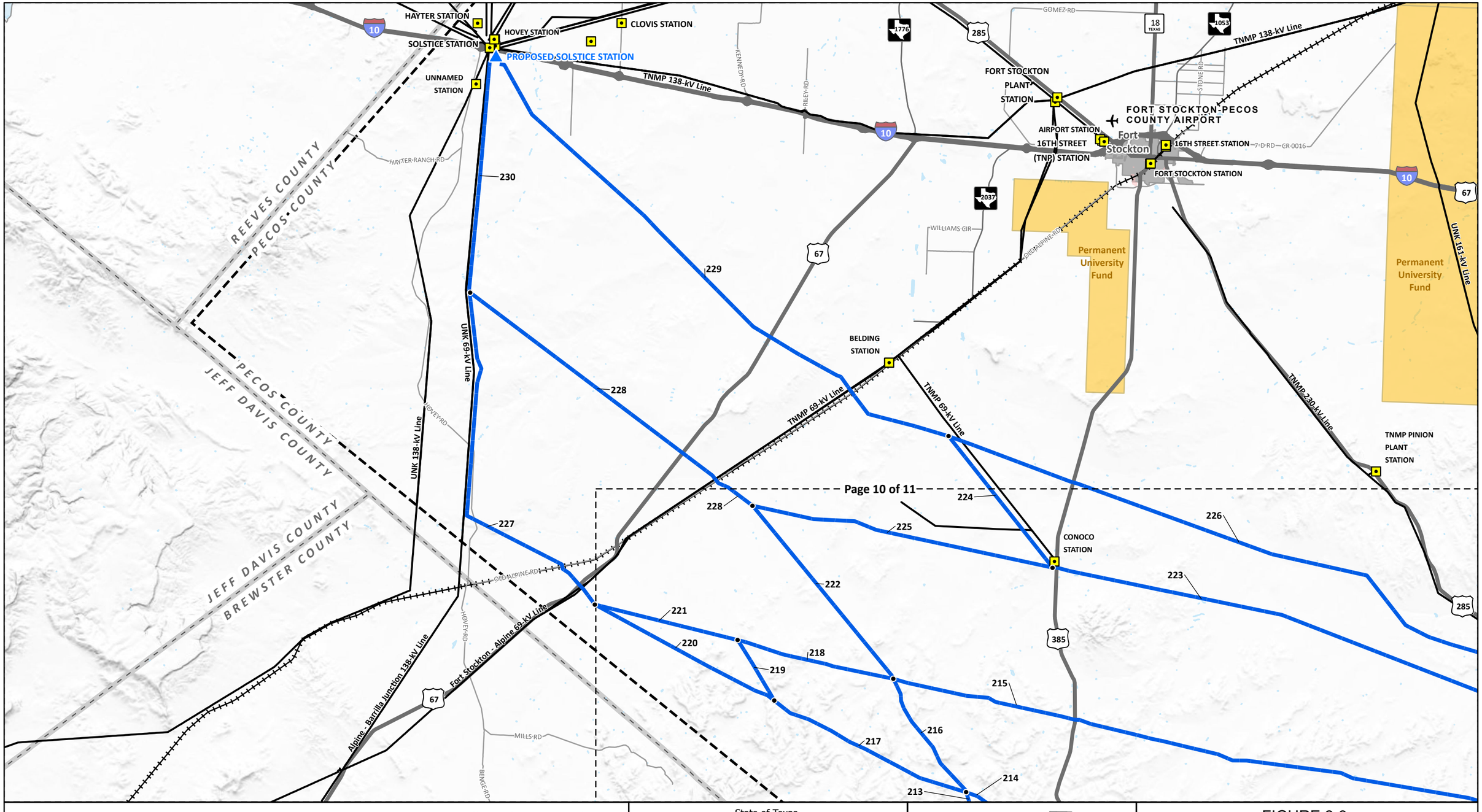
FIGURE 2-3
PRIMARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV Single-circuit Transmission Line

Page 10 of 11

AEP TEXAS
cps energy

0 5
Miles



- Proposed Project Station
- Primary Link, Node & ID
- Existing Station
- Existing Transmission Line
- Study Area
- Railroad
- Major Road
- Minor Road
- Public Airport
- Waterbody (NHD)
- Local/Private Conservation Land (PADUS)
- State Land (PADUS)
- City Limit
- County Boundary
- Sheet Boundary Matchline

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 StatePlane Texas South Central FIPS 4204 Feet

January 21, 2026

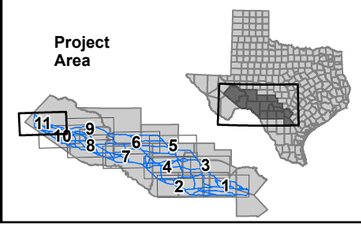


FIGURE 2-3
PRIMARY ALTERNATIVE LINKS

Howard-to-Solstice 765-kV Single-circuit Transmission Line

Page 11 of 11

AEP TEXAS
cps energy

0 5
Miles

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2.7.6 Alternative Routes

It was the Companies' and the Consultant's intent to identify Alternative Routes that would represent an adequate number of reasonable and geographically differentiated routes that reflect the previously discussed routing considerations.

Alternative Routes were developed so that each of the Primary Alternative Links appears in at least one Alternative Route. Ultimately, 77 Alternative Routes were selected for in-depth study and analysis. These Alternative Routes, their link compositions, and approximate lengths are presented in Table 2-1 and shown in Appendix C on **Figures C-1 and C-2** (map pockets) and on **Figure 2-3**.

Table 2-1: Alternative Route Composition and Length for the Howard-to-Solstice 765-kV Single-circuit Transmission Line

Route[a]	Component Alternative Links	Length (Miles)
1	6-7A-7B-11-68-70A-70C-70D-70E-233-235-82B-257-258-115A-115B-117-124-138-139-141-147-150-152A-159-178-205-207-212-213-217-220-227-230	365.08
2	6-7A-7B-11-68-70A-70C-70D-70E-233-234-256-83A-258-115A-115B-117-238-239-128C-130-143-154-156-162-163-170-176-193-196-198-202-223-224-229	370.98
3	6-7A-7B-11-68-70A-70C-70D-70E-233-234-256-83A-83B-87B-248-115B-117-238-239-128C-130-143-154-156-162-163-170-176-193-195-201-202-203-226-229	373.54
4	6-7A-7B-11-68-70A-70C-70D-70E-233-234-256-83A-258-115A-115B-117-238-239-128C-130-131-145A-145B-167-165-166-170-176-193-195-201-202-223-224-229	370.95
5	6-7A-7B-11-68-70A-70C-70D-70E-233-234-256-83A-83B-87B-248-115B-117-238-239-128C-130-131-145A-145B-167-165-166-170-176-193-195-201-202-203-226-229	374.25
6	6-7A-7B-11-68-70A-70C-70D-70E-233-234-256-83A-258-115A-115B-117-238-239-128C-130-131-133-135-169-168B-204-226-229	373.93
7	6-7A-7B-11-68-70A-70C-70D-70E-233-235-82B-257-258-115A-115B-117-238-239-128C-130-131-133-135-169-168B-204-226-229	373.44
8	6-7A-7B-11-68-70A-70C-70D-70E-233-234-256-83A-83B-87B-248-115B-117-238-239-128C-130-131-145A-145B-167-165-166-170-176-193-195-201-202-223-225-228-230	380.08
9	6-7A-7B-11-68-70A-70B-70D-70E-233-235-82B-257-258-115A-115B-117-236-237-128B-128C-130-131-133-135-169-168B-204-226-229	374.94
10	6-7A-7B-11-68-70A-70B-70D-70E-233-235-82B-257-258-115A-115B-117-124-138-139-141-146-153A-254-242B-151-152A-159-178-179-206-207-209-210-214-216-222-228-230	364.60
11	6-7A-7B-11-68-69-71-253-76B-77-79-84-86A-86B-87A-87B-249-122-128A-128B-128C-130-131-145A-145B-167-165-166-170-174-184-185-187-188-208-210-214-216-222-228-230	387.46

Table 2-1: Alternative Route Composition and Length for the Howard-to-Solstice 765-kV Single-circuit Transmission Line

Route[a]	Component Alternative Links	Length (Miles)
12	6-7A-7B-11-68-70A-70B-70D-70E-233-234-256-83A-83B-87B-249-122-128A-128B-128C-130-131-133-135-169-168B-204-226-229	373.50
13	6-7A-7B-11-68-69-71-253-76B-75B-81A-81B-256-83A-258-115A-115B-117-124-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-203-226-229	347.30
14	6-7A-7B-11-68-69-71-253-76B-75B-81A-81B-256-83A-258-115A-115B-117-124-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-223-225-228-230	353.12
15	6-7A-7B-11-68-70A-70B-70D-70E-233-235-82B-257-258-115A-115B-117-238-239-128C-130-143-154-156-162-163-170-176-193-196-197-215-222-228-230	376.75
16	6-7A-7B-11-68-70A-70B-70D-70E-233-235-82B-257-258-115A-115B-117-238-239-128C-130-143-154-156-162-163-170-176-193-195-201-202-203-226-229	369.20
17	6-7A-7B-11-68-69-71-253-76B-77-79-84-250-91A-91B-118A-118B-120-122-127A-127B-127C-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-203-226-229	362.58
18	6-7A-7B-11-65-66-45-46-47-48-50-57-56-58-60-62A-89A-89B-91A-91B-118A-118B-120-123-124-138-139-141-142-144-167-168A-168B-204-226-229	378.74
19	6-7A-7B-11-65-67-71-72-70E-233-235-82B-257-258-115A-115B-117-238-239-128C-130-143-241-242A-242B-151-152A-159-182-185-187-188-208-210-214-217-219-221-227-230	393.14
20	6-7A-7B-11-65-67-71-253-76B-75B-81A-81B-256-83A-258-115A-115B-117-124-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-203-226-229	348.03
21	6-7A-7B-11-65-67-71-253-76B-75B-81A-81B-256-83A-258-115A-115B-117-124-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-223-225-228-230	353.86
22	6-7A-255-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-74-72-70E-233-234-256-83A-258-247-249-122-128A-128B-128C-130-131-133-135-169-168B-204-226-229	366.79
23	13-14A-14B-16-20A-20B-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-258-115A-115B-117-236-237-128B-128C-130-131-145A-145B-167-165-166-170-176-193-195-201-202-223-225-228-230	364.75
24	13-14A-14B-16-20A-20B-33A-34-42-43-45-53-55-59-62A-62B-63-107-108-110-132-145A-145B-167-165-166-170-174-184-185-187-188-208-210-211-213-216-222-228-230	365.42
25	13-14A-14B-16-20A-20B-33A-34-42-43-45-46-47-49-50-57-56-58-60-62A-62B-63-94-95-97-98-100-104-106-129-130-143-241-242A-242B-151-152A-152B-158-161A-243-171B-173-184-185-186-190-192-198-202-203-226-229	371.39
26	13-14A-14B-16-20A-20B-33A-33B-35D-35E-35A-35B-37-38-51-57-56-58-60-62A-89A-89B-91A-91B-118A-118B-120-122-128A-128B-128C-130-143-154-156-162-163-170-176-193-195-201-202-203-226-229	344.41
27	13-14A-14B-16-20A-20B-33A-33B-35D-35E-35A-35C-36-38-51-57-56-58-60-62A-62B-63-94-99-102A-102B-103-125-126-127A-127B-127C-138-139-141-147-150-152A-159-178-179-180-181-189-190-191-199-203-226-229	360.63

Table 2-1: Alternative Route Composition and Length for the Howard-to-Solstice 765-kV Single-circuit Transmission Line

Route[a]	Component Alternative Links	Length (Miles)
28	13-14A-14B-16-20A-20B-33A-34-42-43-45-53-54-76A-76B-77-79-84-250-91A-91B-118A-118B-120-122-128A-128B-128C-130-131-145A-145B-167-165-166-170-174-184-185-187-188-208-210-214-216-222-228-230	366.73
29	6-7A-255-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-82A-82B-257-258-115A-115B-117-124-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-203-226-229	339.88
30	6-7A-255-14B-15-18A-246-25-26-33A-33B-35D-35E-35A-35B-37-38-51-57-56-58-60-62A-62B-63-107-108-110-132-145A-145B-167-165-166-170-176-193-195-201-202-203-226-229	347.19
31	6-7A-255-14B-15-18A-246-25-26-33A-33B-35D-35E-35A-35B-37-38-51-57-56-58-60-62A-62B-63-94-99-102A-259-260-252B-125-126-127A-127B-127C-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-203-226-229	351.47
32	6-7A-255-14B-15-18A-246-25-26-33A-33B-35D-35E-35A-35B-37-38-51-57-56-58-60-62A-89A-89B-91A-252A-252B-125-126-127A-127B-127C-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-203-226-229	344.91
33	6-7A-255-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-258-115A-115B-117-124-138-139-141-142-144-167-165-166-170-176-193-195-201-202-203-226-229	350.36
34	6-7A-255-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-258-115A-115B-117-124-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-203-226-229	336.94
35	6-7A-255-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-258-115A-115B-117-236-237-128B-128C-130-143-154-156-162-163-170-176-193-195-201-202-203-226-229	358.99
36	6-7A-255-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-258-115A-115B-117-238-239-128C-130-143-154-156-162-163-170-176-193-195-201-202-203-226-229	357.18
37	6-7A-255-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-83B-87B-248-115B-117-124-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-203-226-229	340.48
38	6-7A-255-14B-15-18A-246-25-26-33A-34-42-43-45-53-55-85-86A-251-91B-118A-118B-120-122-127A-127B-127C-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-203-226-229	353.08
39	6-7A-255-14B-16-19-23-28A-28B-29-30-40-41-51-57-56-58-60-62A-89A-89B-91A-91B-118A-118B-120-122-127A-127B-127C-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-203-226-229	341.22
40	6-7A-255-14B-15-17-27-28B-29-30-40-41-51-57-56-58-60-62A-89A-89B-91A-91B-118A-118B-120-122-127A-127B-127C-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-203-226-229	340.10
41	6-7A-255-14B-15-18A-18B-22-24-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-258-115A-115B-117-124-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-203-226-229	337.26

Table 2-1: Alternative Route Composition and Length for the Howard-to-Solstice 765-kV Single-circuit Transmission Line

Route[a]	Component Alternative Links	Length (Miles)
42	6-7A-255-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-258-115A-115B-117-124-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-223-225-228-230	342.76
43	6-7A-255-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-258-115A-115B-117-124-138-139-141-147-150-152A-159-178-179-180-183-208-210-214-216-222-228-230	349.88
44	6-7A-255-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-258-115A-115B-117-238-239-128C-130-143-154-156-162-163-170-176-193-195-201-202-223-225-228-230	363.00
45	6-7A-255-14B-15-17-27-28B-29-30-40-41-51-57-56-58-60-62A-89A-89B-91A-91B-118A-118B-120-122-127A-127B-127C-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-223-225-228-230	345.92
46	6-7A-255-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-258-247-249-122-128A-128B-128C-130-131-145A-145B-167-165-166-170-176-193-195-201-202-203-226-229	355.77
47	13-14A-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-258-115A-115B-117-236-237-128B-128C-130-143-154-156-162-163-170-176-193-195-201-202-203-226-229	357.32
48	13-14A-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-258-115A-115B-117-238-239-128C-130-143-154-156-162-163-170-176-193-195-201-202-203-226-229	355.51
49	13-14A-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-258-115A-115B-117-236-237-128B-128C-130-143-154-156-162-163-170-176-193-195-201-202-223-225-228-230	363.14
50	13-14A-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-258-115A-115B-117-238-239-128C-130-143-154-156-162-163-170-176-193-195-201-202-223-225-228-230	361.33
51	13-14A-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-83B-87B-248-115B-117-238-239-128C-130-143-154-156-162-163-170-176-193-195-201-202-223-225-228-230	364.87
52	13-14A-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-258-115A-115B-117-124-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-203-226-229	335.26
53	13-14A-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-258-115A-115B-117-124-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-223-225-228-230	341.08
54	13-14A-14B-15-18A-246-25-26-33A-34-42-43-45-53-54-76A-76B-75B-81A-81B-256-83A-258-115A-115B-117-238-239-128C-130-131-133-135-169-168B-204-226-229	359.44
55	13-14A-14B-16-19-25-231-20B-33A-34-42-43-45-46-47-49-50-57-56-58-60-62A-89A-89B-91A-91B-118A-118B-120-123-124-138-139-141-146-153A-153C-153B-156-162-163-170-176-193-195-201-202-223-224-229	346.20
56	13-14A-14B-16-19-23-28A-28B-29-30-40-41-51-57-56-58-60-62A-62B-63-107-108-110-132-145A-145B-167-165-166-171A-171B-173-184-185-187-188-208-210-214-217-220-227-230	362.61

Table 2-1: Alternative Route Composition and Length for the Howard-to-Solstice 765-kV Single-circuit Transmission Line

Route[a]	Component Alternative Links	Length (Miles)
57	13-14A-14B-16-19-25-26-33A-33B-35D-35E-35A-35C-36-38-51-57-56-58-60-62A-62B-63-94-95-97-98-100-104-106-129-130-143-154-156-157-160-178-205-207-209-210-214-216-222-228-230	364.04
58	13-14A-14B-16-19-23-28A-28B-29-30-40-41-51-57-56-58-60-62A-62B-63-94-99-104-106-129-130-143-154-156-157-160-172-173-175-193-195-201-202-223-224-229	358.81
59	13-14A-14B-15-18A-246-23-28A-28B-29-30-40-41-51-57-56-58-60-62A-62B-63-94-99-102A-102B-103-119A-245-118B-120-123-124-138-139-141-146-153A-153C-153B-156-157-160-182-185-187-188-208-210-214-217-220-227-230	368.89
60	13-14A-14B-15-17-27-28B-29-30-40-41-51-57-56-58-60-62A-62B-63-107-108-109-129-130-143-154-156-162-163-170-176-193-195-201-202-223-225-228-230	359.27
61	13-14A-14B-15-17-21-22-24-26-33A-34-42-43-45-53-55-85-86A-86B-87A-87B-248-115B-117-236-237-128B-128C-130-131-145A-145B-167-165-177-200-201-202-223-224-229	374.48
62	13-14A-14B-15-18A-18B-22-24-26-33A-33B-35D-35E-35A-35B-39-40-41-51-57-56-58-60-62A-62B-63-94-95-97-98-100-104-105-108-110-136-134-240-145B-167-165-166-171A-171B-173-175-193-195-201-202-223-225-228-230	373.23
63	13-14A-14B-15-17-21-22-24-26-33A-34-42-43-45-53-55-59-62A-62B-63-94-95-97-98-101A-101B-103-125-126-127A-127B-127C-138-139-141-147-149-155-162-164-177-194-196-197-215-218-221-227-230	376.87
64	13-14A-14B-15-18A-246-25-26-33A-33B-35D-35E-35A-35B-37-38-51-57-56-58-60-62A-62B-63-107-108-110-136-134-135-169-168B-204-226-229	350.93
65	13-14A-14B-15-18A-246-25-26-33A-33B-35D-35E-35A-35B-37-38-51-57-56-58-60-62A-62B-63-107-108-110-136-137-169-168B-204-226-229	351.67
66	13-14A-14B-15-18A-246-25-26-33A-33B-35D-35E-35A-35B-37-38-51-57-56-58-60-62A-89A-89B-91A-91B-118A-118B-120-122-128A-128B-128C-130-131-133-135-169-168B-204-226-229	347.46
67	13-14A-14B-15-18A-246-25-26-33A-33B-35D-35E-35A-35B-37-38-51-57-56-58-60-62A-89A-89B-91A-91B-118A-118B-120-122-128A-128B-128C-130-131-145A-145B-167-165-166-170-176-193-195-201-202-203-226-229	344.24
68	13-14A-14B-15-18A-246-25-26-33A-33B-35D-35E-35A-35B-37-38-51-57-56-58-60-62A-89A-89B-91A-91B-118A-118B-120-122-128A-128B-128C-130-143-154-156-162-163-170-176-193-195-201-202-203-226-229	343.52
69	13-14A-14B-15-17-27-28B-29-30-40-41-51-57-56-58-60-62A-89A-89B-91A-91B-118A-118B-120-122-128A-128B-128C-130-143-154-156-162-163-170-176-193-195-201-202-203-226-229	343.81
70	13-14A-14B-15-18A-246-25-26-33A-33B-35D-35E-35A-35B-37-38-51-57-56-58-60-62A-62B-63-107-108-110-132-145A-145B-167-165-166-170-176-193-195-201-202-223-225-228-230	351.34
71	13-14A-14B-15-18A-246-25-26-33A-33B-35D-35E-35A-35B-37-38-51-57-56-58-60-62A-89A-89B-91A-91B-118A-118B-120-122-128A-128B-128C-130-143-154-156-157-160-178-205-207-212-213-216-222-228-230	357.19

Table 2-1: Alternative Route Composition and Length for the Howard-to-Solstice 765-kV Single-circuit Transmission Line

Route[a]	Component Alternative Links	Length (Miles)
72	13-14A-14B-15-18A-246-25-26-33A-33B-35D-35E-35A-35B-37-38-51-57-56-58-60-62A-89A-89B-91A-91B-118A-118B-120-122-128A-128B-128C-130-143-241-242A-242B-151-152A-159-182-185-187-188-208-210-214-216-222-228-230	360.34
73	13-14A-14B-15-17-27-28B-29-30-40-41-51-57-56-58-60-62A-62B-63-94-99-104-105-108-110-132-145A-145B-167-165-166-170-176-193-195-201-202-203-226-229	351.71
74	13-14A-14B-15-17-27-28B-29-30-40-41-51-57-56-58-60-62A-62B-63-94-99-104-105-108-110-132-145A-145B-167-165-166-170-176-193-195-201-202-223-225-228-230	357.53
75	13-14A-14B-15-17-21-22-24-26-33A-34-42-43-45-53-55-59-62A-89A-89B-91A-91B-118A-118B-120-122-128A-128B-128C-130-131-145A-145B-167-165-177-200-201-202-223-224-229	356.97
76	13-14A-14B-15-18A-246-23-28A-28B-29-30-40-41-51-57-56-58-60-62A-62B-63-94-99-102A-102B-103-119A-119B-120-123-124-138-139-141-147-150-152A-152B-158-161A-161B-170-176-193-195-201-202-223-225-228-230	364.47
77	13-14A-14B-15-17-27-28B-29-30-40-41-51-57-56-58-60-62A-62B-63-107-108-110-136-137-169-168B-204-226-229	351.95

(a) For Alternative Route locations, see Figures C-1 and C-2 (map pockets).

2.8 Analysis of Alternative Routes

Land use and environmental criteria were developed to reflect accepted practices for routing electric transmission lines in the State of Texas. Emphasis was placed on acquiring information identified in PURA § 37.056(c)(4)(A)-(D), 16 TAC § 25.101, including the policy of prudent avoidance, the PUC CCN application requirements, and other precedent and practices commonly required by the PUC in evaluating CCN applications. The criteria were further refined based on data collection, reconnaissance surveys, and public input. The Alternative Link development process was conducted with consideration and incorporation of the criteria.

Analysis of the Alternative Routes for the Project involved reviewing a variety of environmental factors. Each of the Preliminary Alternative Links was examined in the field from April 1 to 4 and April 15 to 18, 2025. A later field inspection was conducted on February 3 and February 5, 2026. The field evaluations were conducted on the ground from publicly accessible areas and via helicopter. An analysis of the Alternative Routes was conducted utilizing 53 environmental criteria. These criteria are presented in Table 2-2.

Table 2-2: Environmental Criteria for Alternative Route Analysis for the Howard-Solstice 765-kV Transmission Line

No.	Criterion
Land Use	
1	Length of Alternative Route
2	Number of habitable structures[a] within 500 feet[b] of right-of-way (ROW) centerline
3	Length of ROW utilizing existing transmission line ROW
4	Length of ROW parallel to existing transmission line ROW
5	Length of ROW parallel to other existing compatible ROW (roads, highways, railways, etc. – excluding oil and gas pipelines)
6	Length of ROW parallel to apparent property lines (not following existing ROW)[c]
7	Sum of evaluation criteria 4, 5, and 6
8	Percent of evaluation criteria 4, 5, and 6
9	Length of ROW across parks/recreational areas[d]
10	Number of additional parks/recreational areas[d] within 1,000 feet of ROW centerline
11	Length of ROW across cropland
12	Length of ROW across pastureland/rangeland
13	Length of ROW across land irrigated by mobile irrigation systems (rolling or pivot type)
14	Length of ROW across conservation easements and/or mitigation banks (Special Management Areas)
15	Length of ROW across gravel pits, mines, or quarries
16	Length of ROW parallel to existing pipeline[e] ROW <500 feet from ROW centerline
17	Number of pipeline[e] crossings
18	Number of transmission line crossings
19	Number of Interstate, United States, and State highway crossings
20	Number of Farm-to-Market (FM)/Ranch-to-Market (RM) road crossings
21	Number of Federal Aviation Administration (FAA)-registered public/military airfields[f] within 20,000 feet of ROW centerline (with runway >3,200 feet)
22	Number of FAA-registered public/military airfields[f] within 10,000 feet of ROW centerline (with runway <3,200 feet)
23	Number of private airstrips within 10,000 feet of ROW centerline
24	Number of heliports within 5,000 feet of ROW centerline
25	Number of commercial AM radio transmitters within 10,000 feet of ROW centerline
26	Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline
27	Number of recorded water wells within 200 feet of ROW centerline
28	Number of recorded oil and gas wells within 400 feet of ROW centerline
29	Length of ROW across 20 percent or greater elevation change

Table 2-2: Environmental Criteria for Alternative Route Analysis for the Howard-Solstice 765-kV Transmission Line

No.	Criterion
Aesthetics	
30	Estimated length of ROW within foreground visual zone[g] of Interstate, United States, and State highways
31	Estimated length of ROW within foreground visual zone[g] of FM/RM roads
32	Estimated length of ROW within foreground visual zone[g] of parks/recreational areas[d]
Ecology	
33	Length of ROW across upland woodland/brushland/forest
34	Length of ROW across bottomland/riparian woodland/brushland/forest
35	Length of ROW across National Wetland Inventory-mapped wetlands
36	Length of ROW across designated critical habitat for federally endangered or threatened species
37	Length of ROW across proposed critical habitat for federally endangered or threatened species
38	Length of ROW across golden-cheeked warbler (GCW) range
39	Length of ROW across GCW potential habitat, medium to high predicted densities[h]
40	Length of ROW across GCW potential habitat, low predicted densities[h]
41	Number of stream and river crossings
42	Length of ROW parallel (within 100 feet) to streams and rivers
43	Length of ROW across open water (ponds, lakes, etc.)
44	Length of ROW across 100-year floodplains
45	Number of caves and springs within 2 kilometers of ROW centerline[i]
46	Length of ROW within 500 feet of San Antonio-area Karst Zones 1-3b[j]
Cultural Resources	
47	Number of recorded cultural resource sites crossed by ROW
48	Number of recorded cultural resource sites within 1,000 feet of ROW centerline
49	Number of vicinity cemeteries crossed by ROW
50	Number of additional cemeteries within 1,000 feet of ROW centerline
51	Number of National Register of Historic Places (NRHP)-listed or determined-eligible sites crossed by ROW
52	Number of NRHP-listed or determined-eligible sites within 1,000 feet of ROW centerline
53	Length of ROW crossing areas of high archeological/historical site potential

(a) Single-family and multifamily dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, places of worship, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis.
(b) Due to the potential inaccuracies of the aerial photography and data utilized, all habitable structures within 520 feet have been identified.
(c) Property lines created by existing road, highway, or railroad ROW are not double counted in the "Length of ROW parallel to property lines" criterion.
(d) Defined as parks and recreational areas owned by a governmental body or an organized group, club, or place of worship.
(e) Pipelines 8.0 inches diameter or greater.

(f) As listed in the Chart Supplement South Central U.S. (formerly known as the Airport/Facility Directory South Central U.S.).
(g) 0.5 mile, unobstructed.
(h) Areas with predicted densities of golden-cheeked warblers of 0.13 to 0.25 males per hectare and greater than 0.25 males per hectare as presented by Mueller et al. 2022.
(i) According to data provided by Texas Speleological Survey (2025). Data is offset by 2.0 kilometers. The data does not include feature locations on Department of Defense-owned property.
(j) The USFWS (2024a) recommends that karst feature surveys be conducted within a subject property if it is within 500 feet of the boundaries of Karst Zones 1, 2, 3a, or 3b (as described in the Section 10(a)(1)(A) Scientific Permit Requirements for Conducting Presence/Absence Surveys for Endangered Karst Invertebrates in Central Texas).

The analysis of each Alternative Route involved the inventory and tabulation of the number or quantity of each environmental criterion located along each Alternative Route (e.g., number of habitable structures within 500 feet of the centerline, the length paralleling existing compatible ROW). The number or amount of each criterion was determined by using GIS software, reviewing various maps and recent aerial imagery (CDS Muery 2025; Google Earth 2023-2025), and by field verification, where practical. Potential environmental impacts of the Alternative Routes are addressed in Section 4.0 of this EA. Comparative environmental data for the Alternative Routes are provided in Table 4-1 in Section 4.0.

After the Consultant analyzed the Alternative Routes, the Companies undertook an evaluation in which the Consultant's environmental impacts assessments were considered in conjunction with the Companies' assessment of the reliability, constructability, maintenance, operation, and cost to construct each Alternative Route.

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3.0 EXISTING ENVIRONMENT

3.1 Physiography

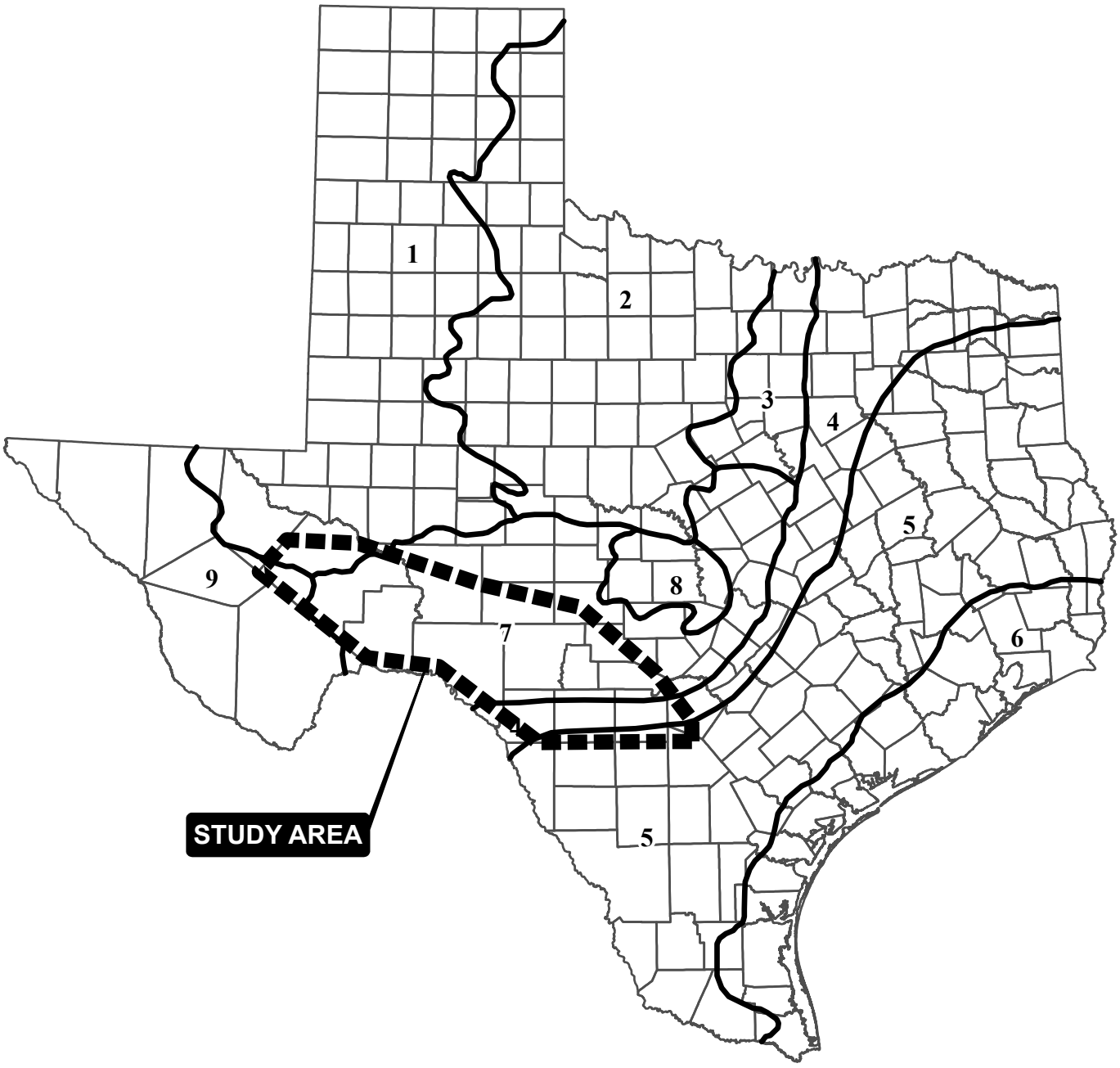
As shown on **Figure 3-1**, the Study Area is located within the following physiographic provinces: Gulf Coastal Plains (subprovinces Interior Coastal Plains and Blackland Prairies), Edwards Plateau (subprovinces Pecos Canyons and Stockton Plateau), High Plains (subprovince Southern High Plains), and Basin and Range (Bureau of Economic Geology [BEG] 1996). Elevations within the Study Area range from approximately 600 feet above mean sea level (amsl) to 5,000 feet amsl (USGS 2025a).

Located in the southeastern portion of the Study Area, the Interior Coastal Plains and Blackland Prairies subprovinces make up the Gulf Coastal Plains province. Within the Interior Coastal Plains, the landscape consists of parallel ridges and valleys with beds tilted toward the Gulf of Mexico comprised of unconsolidated sands and muds with elevations ranging from 300 to 800 feet amsl. The Blackland Prairies consist of low-rolling terrain with elevations ranging from 450 to 1,000 feet amsl. Bedrock consists of chalks and marls that have weathered into deep, black, fertile clay soils. Most of the natural vegetation has been cleared to support crop cultivation (BEG 1996).

The Stockton Plateau and the Pecos Canyons subprovinces make up the Edwards Plateau province, which is located in the center of the Study Area. The Stockton Plateau (located to the west) is a mesa-like landform with an elevation that ranges from 1,700 to 4,200 feet amsl. The Pecos Canyons (located to the east) comprise the Pecos River and its tributaries, featuring nearly vertical walls where the river has eroded the canyon to depths of up to 1,000 feet between the Edwards and Stockton plateaus (BEG 1996).

Also located in the far northwestern corner of the Study Area, the Southern High Plains subprovince of the High Plains province is characterized by flat terrain with many playas and local dune fields. Elevation ranges from 2,200 to 3,800 feet amsl (BEG 1996).

Located in the far northwestern corner of the Study Area, the Basin and Range province features basins and mountain landforms that generally trend north-south and rise sharply from barren, rocky plains. Elevation ranges from 1,700 to 8,750 feet amsl. Plateaus with rocks that are nearly horizontal commonly flank the mountains. The core of the interiors of the mountain range consists of strongly folded and faulted sedimentary and volcanic rocks or granite rocks. Volcanic rocks form many peaks, with larger flows of volcanic ash and thick deposits of volcanic debris flanking the slopes of former volcanoes (BEG 1996).



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

County Boundary

Source: Texas Bureau of Economic Geology, 1996

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 Lambert Conformal Conic

December 31, 2025

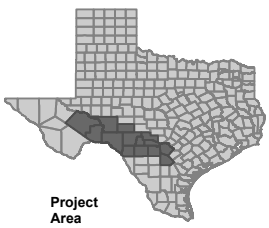


FIGURE 3-1
LOCATION OF THE STUDY AREA IN RELATION TO THE PHYSIOGRAPHIC PROVINCES OF TEXAS

AEP TEXAS
An AEP Company
CPS ENERGY

Howard-to-Solstice
765-kV Single-circuit
Transmission Line

0 50 100
Miles

3.2 Geology

There are 74 mapped geologic formations underlying the Study Area (USGS 2014). Table 3-1, Mapped Geologic Formations within the Study Area, located in Appendix D, provides rock unit names and their descriptions.

Several significant geologic features with the potential to affect the construction and operation of a transmission line were also evaluated, including fault lines and karst features such as springs and caves. No quaternary faults were identified within the Study Area (USGS 2025b).

The majority of the Study Area occurs over carbonate rocks at or near the land surface, which contain varying densities of sinkholes, caves, and other karst features (Weary and Doctor 2014). The TSS recognizes that all 15 counties within the Study Area have recorded karst features such as caves, sinks, or cavities (TSS 2026; see Table 3-2). Some of these naturally occurring features are considered sensitive and should be avoided. Karst features can provide structural concerns for development by compromising the lithologic integrity of bedrock with voids, solutioned-enlarged fractures, and internal weathering. These natural voids can also provide environmental concerns by developing conduits that could rapidly transmit pollutants to an underlying aquifer. Voids may also develop specific conditions suitable for subterranean endemic karst invertebrates that are protected under the ESA.

Within the easternmost section of the Study Area, situated in Medina and Bexar counties, mapped USFWS San Antonio karst zones 1, 2, 3a, 3b, and 4b are present (USFWS 2025a). These karst zones are delineated areas that correlate to the likelihood of the presence of rare or endangered species. Karst zone definitions are as follows (USFWS 2024a):

- Zone 1 – Areas known to contain endangered karst invertebrate species.
- Zone 2 – Areas having a high probability of suitable habitat for endangered or other endemic karst invertebrate species.
- Zone 3a – Areas suitable for endangered karst invertebrate species, but that have a low probability of containing endangered karst species because the habitat is occupied by other karst invertebrate species.
- Zone 3b – Areas that have a low probability of containing endangered karst invertebrate species because they are poorly suited for karst invertebrate species.
- Zone 4b - Areas that do not contain karst invertebrate species.

The portion of the Study Area situated within Bexar and Medina counties is mapped by the TCEQ to be within areas regulated by the Edwards Aquifer Protection Program. The Program has established three distinct zones involved in the recharge to the Edwards Aquifer:

- Recharge – Direct recharge of surface water into the surface bedrock of the Edwards Aquifer
- Transition – Indirect recharge of surface water and groundwater from lithologic strata overlying the Edwards Aquifer
- Contributing – Surface water flow from upland areas directly on to the Recharge or Transition zones for potential recharge

Table 3-2: Known Karst Features within the Study Area Counties

County	Karst Feature Type	Total[a]
Atascosa	Caves	1
Bandera	Caves, sinks/cavities, shelters, springs, other/undefined features	297
Bexar	Caves, sinks/cavities, shelters, springs, other/undefined features	1,711
Crockett	Caves, sinks/cavities, shelters, springs, other/undefined features	137
Edwards	Caves, sinks/cavities, shelters, springs	320
Kerr	Caves, sinks/cavities, springs	251
Kimble	Caves, sinks/cavities, shelters, springs, other/undefined features	201
Kinney	Caves, sinks/cavities, shelters, springs	107
Medina	Caves, sinks/cavities, shelters, springs, other/undefined features	236
Pecos	Caves, sinks/cavities, shelters, springs, other/undefined features	75
Real	Caves, sinks/cavities, shelters, springs, other/undefined features	298
Sutton	Caves, sinks/cavities, springs, other/undefined features	91
Terrell	Caves, sinks/cavities, shelters, springs, other/undefined features	85
Uvalde	Caves, sinks/cavities, shelters, springs, other/undefined features	266
Val Verde	Caves, sinks/cavities, shelters, springs, other/undefined features	796

Source: TSS (2026).
(a) Karst totals pertain to county as a whole.

3.3 Soils

The NRCS Web Soil Survey data (NRCS 2025a) were reviewed to identify and characterize mapped soils within the Study Area. Soil map units represent a collection of delineated areas that are defined and named in terms of their soil components (e.g., series). Mapped soils within the Study Area are listed in Table 3-3, Mapped Soil Associations within the Study Area, located in Appendix D, including a brief description of the soil unit, landform of occurrence, hydric status, and potential for corrosion.

3.3.1 Soil Associations

The NRCS defines a soil association as "a group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit" (NRCS 2025b). A soil association typically consists of one or more major soils, for which it is named, and some minor soils. Soils making up one unit can also occur in other units in a different pattern. According to the General Soil Map and the Soil Surveys of Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde counties, 457 general soil map units/associations occur within the Study Area. Mapped soil associations within the Study Area are provided in Table 3-3 in Appendix D.

3.3.2 Prime Farmland Soils

The Secretary of Agriculture, in United States Code § 7-4201(c)(1)(A), defines prime farmland as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion, as determined by the Secretary. Additional potential prime farmlands are those soils that meet most of the requirements of prime farmland but fail because they lack sufficient natural moisture, or they lack the installation of water management facilities. Such soils would be considered prime farmland if these practices were implemented. According to the NRCS Web Soil Survey (NRCS 2025a), there are 49 soil series designated as prime farmland soils located within the Study Area. See Table 3-3 in Appendix D.

3.4 Mineral and Energy Resources

A data review of mineral and energy resources was conducted congruently with potential geologic hazards that could affect the construction and operation of a transmission line within the Study Area. Hazardous features included active or historical coal and uranium mining locations, aggregate quarries, oil/gas wells, potential subsurface contamination, and landfills.

Ninety-nine historic and/or current sites for non-fuel mineral mines or prospects were identified within Atascosa, Bexar, Medina, Pecos, Real, Terrell, Uvalde, and Val Verde counties within the Study Area (BEG 2025). Those mapped resources include barite, bentonite, clay, lead, limestone, manganese, mercury, sand, stone, strontium, sulfur, and zinc (BEG 2025). Additionally, 44 active aggregate production operations were identified within the Study Area in the following counties: Atascosa (5); Bandera (1); Bexar (11); Edwards (1); Kinney (1); Medina (14); Pecos County (1); Sutton County (1); Uvalde (8); and Val Verde (1) (TCEQ 2025a).

Mapped locations of surface deposits of lignite and pockets of uranium, along with both active and inactive oil and gas horizons, are scattered throughout the Study Area (BEG 1976). Each location was evaluated.

No active coal or uranium mining operations regulated by the RRC were recorded within the Study Area (RRC 2025a, 2025b, and 2023). However, nine potentially reclaimed historical coal mines were recorded within the southeast corner of the Study Area in Bexar and Medina counties (RRC 2015). While a few records are missing the exact date when reclamation was complete, reclamation of all the mines occurred in the late 1980s or sooner, based on aerial imagery. Additionally, no current or historical TCEQ-regulated in-situ uranium mining operations were identified within the Study Area (TCEQ 2025b).

Numerous permitted well locations, along with dry holes and plugged oil and/or gas wells, were mapped throughout the Study Area (RRC 2025c).

Two TCEQ-regulated superfund sites are within the Study Area in Bexar County (TCEQ 2025c). One superfund site, identified as Harris Sand Pits, is located in the City of Von Ormy and was a former commercial sand and clay pit used for waste disposal. Remedial action for this site was completed in 1999, and its current status is in the operations and maintenance phase, which requires continued groundwater monitoring and waste cell maintenance (TCEQ 2025d). The second superfund site, identified as Pioneer Oil Refining Company, is located in the City of Somerset and was a former oil refinery contaminated by hydrocarbons. Remedial action for this site was completed in 2010, and its current status is in the operation and maintenance phase (TCEQ 2025e).

Five active landfills were identified within the Study Area: City of Fort Stockton Landfill (Pecos County), City of Uvalde Landfill (Uvalde County), Covel Gardens Landfill (Bexar County), Fort Clark Springs Association Inc Landfill (Kinney County), and Terrell County Landfill (TCEQ 2025f).

3.5 Water Resources

3.5.1 Surface Water

The Study Area is located within five major river basins: Colorado, Guadalupe, Nueces, Rio Grande, and San Antonio, and 32 sub-river basins: Amistad Reservoir, Atascosa, Barrilla Draw, Big Canyon, Coyanosa-Hackberry Draws, Dry Devils, Elm-Sycamore, Hondo, Howard Draw, Independence, Landreth-Monument Draws, Llano, Lower Devils, Lower Pecos, Lower Pecos-Red Bluff Reservoir, Lozier Canyon, Medina, North Llano, Nueces Headwaters, Pecos, Reagan-Sanderson, San Francisco, San Miguel, South Llano,

Toyah, Tunas, Turkey, Upper Devils, Upper Frio, Upper Guadalupe, Upper Nueces, and West Nueces (TWDB 2025a). There are numerous canals, ditches, ponds, and named surface waters along with their unnamed tributaries within the Study Area (USGS 2025a).

The Study Area occurs within the 2026 Region E, F, J, and K Regional Water Planning areas (TWDB 2025b). There are no proposed new surface water developments (reservoirs) within the Study Area (TWDB 2022).

In accordance with Section 10 of the Rivers and Harbors Act, the USACE regulates all work or structures in or affecting the course and condition of navigable WOTUS to protect their navigable capacity pertaining to interstate commerce. No Section 10 waters are located within the Study Area (USACE 2011).

The Nationwide Rivers Inventory (NRI) is a listing of more than 4,500 free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be at least regionally significant. Therefore, the NRI river segments are candidates for inclusion in the National Wild and Scenic River System. Under the Wild and Scenic Rivers Act section 5(d)(1) and related guidance, all federal agencies must seek to avoid or mitigate actions that would adversely affect NRI river sections. NRI river segments that have been identified within the Study Area include the Pecos River, Devils River, East Nueces River, Frio River, Sabinal River, Medina River, and Guadalupe River (NPS 2024).

In accordance with 31 TAC § 357.43 and 31 TAC § 358.2, the TPWD has designated Ecologically Significant Stream Segments (ESSS) based on habitat value, threatened and endangered species, species diversity, and aesthetic value criteria. There are 21 designated ESSS identified within the Study Area: Devils River, Leon Creek, Frio River, Guadalupe River, Independence Creek, Johnson Creek, Las Moras Creek, Live Oak Creek, Medina River, Mud Creek, North Fork Guadalupe River, Nueces River, Pecos River, Pinto Creek, Sabinal River, San Felipe Creek, South Fork Guadalupe River, South Llano River, Sycamore Creek, West Nueces River, and West Verde Creek (TPWD 2025a).

In accordance with Sections 303(d) and 305(b) 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 total maximum daily load. A review of the most recent TCEQ impaired waters list (TCEQ 2024) identified multiple impaired stream segments within the Study Area. These impaired waterbodies and their associated impairments are listed in Table 3-4.

Table 3-4: TCEQ Impaired Waters within the Study Area

Segment ID	Segment Name	Stream Assessment Unit	Stream Assessment Unit Impairment
Guadalupe River Basin			
1817	North Fork Guadalupe River	1817_01	Impaired fish community in water; impaired macrobenthic community in water
1818	South Fork Guadalupe River	1818_01	Impaired fish community in water; impaired macrobenthic community in water
Rio Grande River Basin			
2310	Lower Pecos River	2310_01	Total dissolved solids in water
		2310_02	Total dissolved solids in water
San Antonio River Basin			
1903	Medina River below Medina Lake	1903_01	Bacteria in water (recreation use)
		1903_03	Bacteria in water (recreation use)
1905	Medina River above Medina Lake	1905_01	Bacteria in water (recreation use)
1906	Lower Leon Creek	1906_03	Polychlorinated biphenyls (PCBs) in edible tissue; Per- and polyfluoroalkyl substances (PFAS) in edible tissue
		1906_04	PCBs in edible tissue; PFAS in edible tissue
		1906_05	Bacteria in water (recreation use); PCBs in edible tissue; PFAS in edible tissue
		1906_06	PCBs in edible tissue; PFAS in edible tissue
1912	Medio Creek	1912_01	Bacteria in water (recreation use)
Nueces River Basin			
2109	Leona River	2109_03	Bacteria in water (recreation use); Depressed dissolved oxygen in water
2110	Lower Sabinal River	2110_01	Bacteria in water (recreational use)
2113	Upper Frio River	2113_01	Impaired fish community in water
2115	Seco Creek	2115_01	Sulfate in water
		2115_02	Sulfate in water

Sources: TCEQ (2024 and 2025g).

3.5.2 Floodplains

The FEMA National Flood Hazard Layer digital data was only available for Atascosa, Bandera, Bexar, Kerr, Medina, Uvalde, and Val Verde counties within the Study Area. The digital data was not available for Crockett, Edwards, Kimble, Kinney, Pecos, Real, Sutton, and Terrell counties. Within the counties that are mapped, the FEMA 100-year floodplains are primarily mapped along named rivers and creeks and their larger, unnamed tributaries. The 100-year flood (1 percent flood or base flood) represents a flood event that has a 1 percent chance of being equaled or exceeded for any given year (FEMA 2025).

3.5.3 Groundwater

The Study Area overlies the Carrizo-Wilcox, Edwards (Balcones Fault Zone), Edwards-Trinity (Plateau), Trinity, and Pecos Valley major aquifers (TWDB 2025c).

The Carrizo-Wilcox Aquifer is located within the easternmost side of the Study Area. It comprises the Hooper, Simsboro, and Calvert Bluff formations of the Wilcox Group, along with the overlying Carrizo Formation of the Claiborne Group. This aquifer is primarily composed of sand interbedded with gravel, silt, clay, and lignite. It reaches up to 3,000 feet in thickness, with an average freshwater saturated thickness of 670 feet. The water quality varies, with some areas having slightly to moderately saline groundwater. The aquifer is used for irrigation and municipal water supply (TWDB 2025d).

The Edwards (Balcones Fault Zone) Aquifer is located west of the Carrizo-Wilcox Aquifer within the eastern third of the Study Area. It primarily consists of partially dissolved limestone, creating a highly permeable structure. The aquifer's thickness ranges from 200 to 600 feet, with an average freshwater saturated thickness of 560 feet in the southern part. It feeds several significant springs, including Comal Springs and San Marcos Springs, which are the largest and second-largest springs in Texas, respectively. The aquifer is known for its rapid response to rainfall, drought, and pumping due to its high permeability. Water from the aquifer is primarily used for municipal, irrigation, and recreational purposes (TWDB 2025e).

The Edwards-Trinity (Plateau) Aquifer underlies the majority of the central portion of the Study Area. It consists mainly of limestone and dolomite from the Edwards Group and sands from the Trinity Group. The aquifer's thickness varies from less than 100 feet in the north to over 800 feet in the south, with an average freshwater saturated thickness of 433 feet. It is primarily recharged by precipitation and features both unconfined and confined areas. The water quality is generally fresh, with total dissolved solids ranging from 400 to 1,000 milligrams per liter. This aquifer is used for irrigation, municipal, and livestock water supplies (TWDB 2025f).

The Trinity Aquifer is located west of the Edwards (Balcones Fault Zone) Aquifer on the east side of the Study Area. It consists of several smaller aquifers within the Trinity Group, which are composed of limestones, sands, clays, gravels, and conglomerates, with a combined freshwater saturated thickness averaging about 600 feet in North Texas and about 1,900 feet in Central Texas. The Trinity Aquifer is used as a water source for municipalities, irrigation, livestock, and other domestic uses (TWDB 2025g).

The Pecos Valley Aquifer underlies the extreme westernmost portion of the Study Area. It consists of alluvial and windblown deposits within the Pecos River Valley, filling structural basins like the Pecos Trough and Monument Draw Trough. The aquifer's water quality varies, with higher levels of chloride and sulfate, and naturally occurring arsenic and radionuclides. It primarily supports irrigation, with additional uses in municipal, industrial, and power generation sectors (TWDB 2025h).

Numerous private and public water wells are scattered throughout the Study Area (TWDB 2025c) and numerous natural springs were identified throughout the Study Area (Heitmuller and Reece 2003; TSS 2026).

As mentioned in Section 3.2, the Edwards Aquifer is divided into three main zones: Contributing Zone, Recharge Zone, and Artesian Zone (EAA 2025a). The Study Area is located within all three zones. The Artesian Zone of the Edwards Aquifer is situated between less permeable beds of Del Rio clay and Upper Glen Rose limestone. The Contributing Zone comprises the Edwards Plateau, where rainfall travels overland and through streams, ultimately reaching the Recharge Zone. The Recharge Zone consists of fractured limestone, which facilitates the movement of water into the aquifer.

The Study Area is located within the jurisdictional areas of Districts 4, 5, 6, 7, 12, 13, 14, and 15 (EAA 2025b). The EAA has regulatory jurisdiction in Atascosa, Bexar, Medina, and Uvalde counties within the Study Area and authorizes groundwater withdrawals for municipal, industrial, and irrigation purposes. The EAA's jurisdiction does not extend to the use of surface water; however, the EAA may regulate activities that affect the quality of surface water to preserve and protect the Edwards Aquifer, prevent the waste or pollution of the Edwards Aquifer, and enforce water quality standards. If the PUC-approved route is located within the EAA's jurisdiction, notification requirements identified within § 713.403 of the EAA Rules will be followed (EAA 2023).

Additionally, the Project is expected to be a regulated activity of the TCEQ. If the PUC-approved route is located within any of the three zones of the Edwards Aquifer, construction activities associated with the installation of electric lines are exempt from Edwards Aquifer Protection Plan application requirements under 30 TAC § 213.5(h). However, temporary BMPs as identified in 30 TAC § 213.5(h)(3) must be in place (TCEQ 2025h).

3.6 Ecological Resources

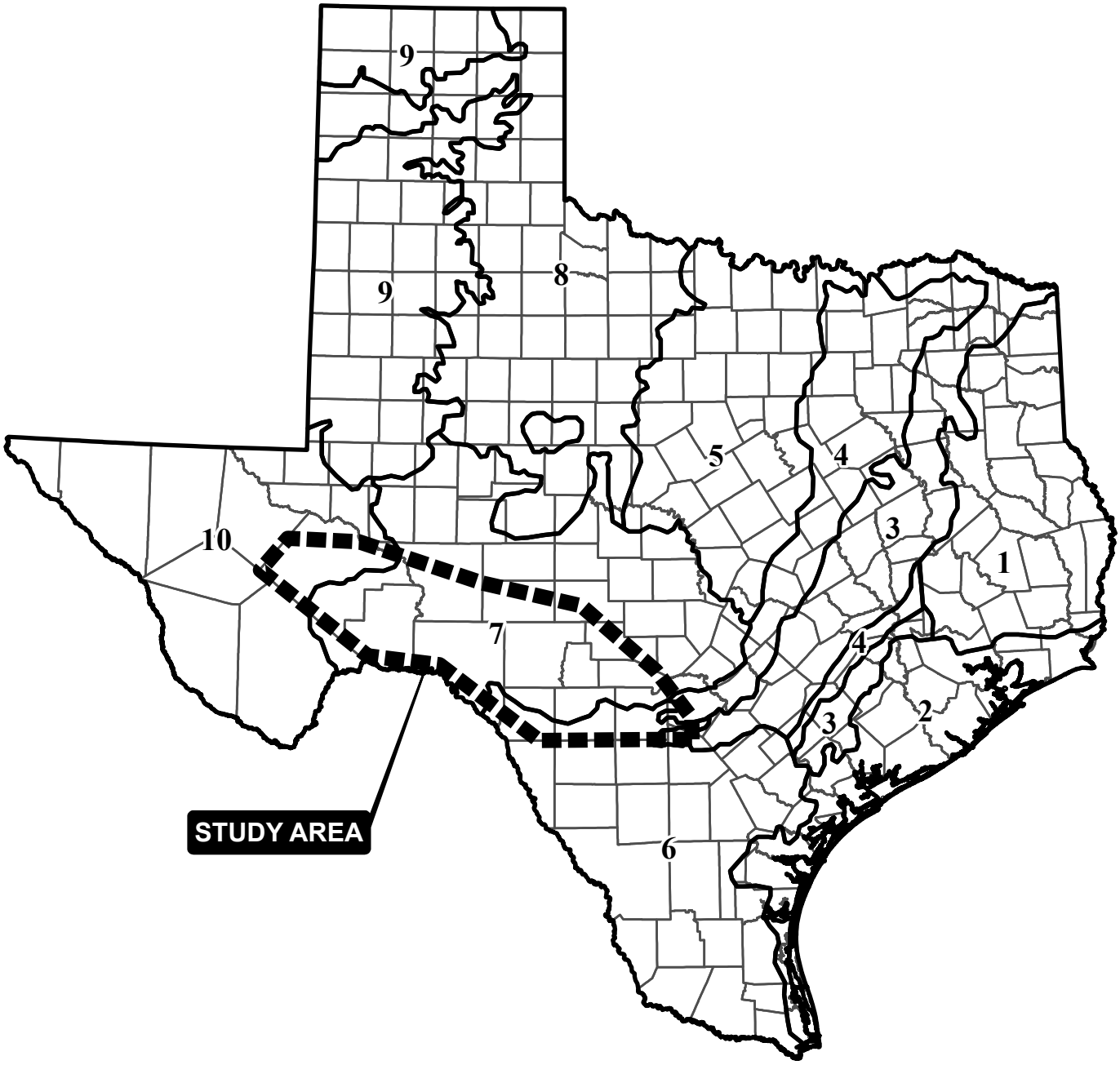
3.6.1 Vegetation

As shown on **Figure 3-2**, the study area occurs within the Blackland Prairie, Edwards Plateau, South Texas Plains, Post Oak Savanna, and Trans-Pecos Vegetational Area of Texas, as delineated by Gould et al. (1960). The Blackland Prairie vegetation area consists of black clay-loam soils, historically with prairie grass-forb vegetation. However, since this area is considered fertile, most of the vegetation community has been cultivated, with only a small fraction of acreages consisting of native tall grass vegetation. The Edwards Plateau consists of limestone outcrops and rocky but fertile soils. Dominant woody vegetation consists of honey mesquite, live oak, and juniper species, along with a mix of other grasses. The South Texas Plains consists mostly of level terrain with diverse soil types. Historically, vegetation consisted of perennial warm-season bunchgrasses in post oak, live oak, and some brush species. However, continuous grazing has impacted vegetation, where the region is now considered the "brush country," where most native grasses are typically under brush and cacti. Post Oak Savanna consists of rolling landscape with a savannah vegetation with scattered oaks and diverse soil types. However, due to intensive grazing practices, much of the area has degenerated into dense stands of oak with a thick understory of yaupon. The Trans-Pecos includes most of the regions west of the Pecos River. It consists of arid valleys, plateaus, and mountains. Mountains can range from 3,000 to 8,000 feet in elevation (Gould et al. 1960).

The dominant vegetation types (>3 percent) as mapped by the TPWD (2025b) within the Study Area include Edwards Plateau: Ashe Juniper / Live Oak Shrubland, Edwards Plateau: Deciduous Semi-arid Shrubland, Edwards Plateau: Juniper Semi-arid Shrubland, Edwards Plateau: Live Oak Motte and Woodland, Edwards Plateau: Savanna Grassland, Edwards Plateau: Semi-arid Grassland, South Texas: Shallow Shrubland, and Trans-Pecos: Creosote Bush Scrub.

3.6.1.1 Edwards Plateau: Ashe Juniper / Live Oak Shrubland

Ashe's juniper and Texas live oak are the most frequent dominants of this evergreen shrubland. Texas live oak and/or Ashe's juniper may form a sparse canopy, and sandpaper oak, Mohr oak, algerita, Texas persimmon, Texas mountain laurel [mescal bean] (*Sophora secundiflora*), honey mesquite, and prickly pear may be common in the understory.



Vegetational Areas Boundary

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

County Boundary

Source: Gould, et. al., 1960.

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 Lambert Conformal Conic

December 31, 2025

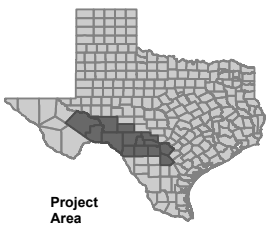


FIGURE 3-2
LOCATION OF THE STUDY AREA IN RELATION TO THE VEGETATIONAL AREAS OF TEXAS

AEP TEXAS
An AEP Company
CPS ENERGY

Howard-to-Solstice
765-kV Single-circuit
Transmission Line

0 50 100
Miles

3.6.1.2 Edwards Plateau: Deciduous Semi-arid Shrubland

Shrub and small tree species such as honey mesquite, algerita, Texas persimmon, Texas live oak, green condalia [green snakewood] (*Condalia viridis*), Texas barometer bush, Ashe's juniper, and Pinchot's juniper are common in this broadly circumscribed vegetation type. Succulents, including prickly pear, Texas sotol (*Dasylirion texanum*), Texas sacahuista (*Nolina texana*), Torrey's yucca (*Yucca torreyi*), and Lechuguilla, are common, and grasses such as side-oats grama, three-awn, slim tridens, curly-mesquite, hairy tridens [hairy woollygrass] (*Erioneuron pilosum*), and red grama may be important.

3.6.1.3 Edwards Plateau: Juniper Semi-arid Shrubland

Pinchot's juniper and Ashe's juniper may both be present in this vegetation type, together with species such as Texas live oak, honey mesquite, Texas persimmon, prickly pear, Texas sotol, and algerita. Important grasses may include side-oats grama, purple three-awn, curly-mesquite, slim tridens, hairy woollygrass, and Texas wintergrass.

3.6.1.4 Edwards Plateau: Live Oak Motte and Woodland

Texas live oak alone or with Ashe's juniper usually dominates the overstory of this type. Deciduous trees such as cedar elm, sugar-berry, sandpaper oak, and Lacey oak (*Quercus laceyi*) may be components. Shrubs such as honey mesquite, Texas persimmon, and algerita are common.

3.6.1.5 Edwards Plateau: Savanna Grassland

Grassland conditions vary for this mapped vegetation type, but many areas contain non-native King Ranch bluestem [yellow bluestem] (*Bothriochloa ischaemum* var. *songarica*) as an important species, and bermudagrass (*Cynodon dactylon*) is also frequent. Common native grasses include little bluestem, side-oats grama, silver bluestem, Texas wintergrass, purple three-awn, and common curly-mesquite. Trees and shrubs may include Texas live oak, Ashe's juniper, mesquite, algerita, and/or cedar elm.

3.6.1.6 Edwards Plateau: Semi-arid Grassland

This vegetation type often contains a mix of grasses and shrubs such as purple three-awn, red grama, side-oats grama, curly-mesquite, slim tridens, and Texas wintergrass. Shrubs may include Pinchot's juniper, honey mesquite, algerita, Texas persimmon, Ashe's juniper, catclaw mimosa (*Mimosa aculeaticarpa*), and Texas barometer bush.

3.6.1.7 South Texas: Shallow Shrubland

A more or less discontinuous canopy of shrubs and small trees characterize this vegetation type, and species such as honey mesquite, blackbrush acacia, Texas barometer bush, spiny hackberry, Texas persimmon, guayacan [Texas lignum-vitae] (*Guaiacum angustifolium*), leatherstem (*Jatropha dioica*), and Texas kidneywood (*Eysenhardtia texana*) are common components. Succulents such as yucca species, Texas sotol, prickly-pear, and tasajillo [Christmas cactus] (*Cylindropuntia leptocaulis*) are important on some sites.

3.6.1.8 Trans-Pecos: Creosote Bush Scrub

This vegetation type is mapped at low elevations within intermountain basins in the Trans-Pecos, mainly on flats or gently rolling landscapes over gravelly colluvial or alluvial soils. Creosote bush is often the primary dominant, and diversity may be low. Other woody species may include honey mesquite, mariola (*Parthenium incanum*), catclaw acacia (*Senegalia greggii*), and whitethorn acacia (*Vachellia constricta*). Common succulents include tasajillo, Torrey's yucca, prickly-pear, and lechuguilla. Bush muhly, fluffgrass [low woollygrass] (*Dasyochloa pulchella*), burrograss (*Scleropogon brevifolius*), slim tridens, three-awns, and gypsum grama are common grasses.

3.6.2 Aquatic Resources

WOTUS include, but are not limited to, territorial seas, lakes, rivers, streams, oceans, bays, ponds, and other special aquatic features, including wetlands. The USACE regulates WOTUS, including wetlands, under Section 404 of the CWA. The USACE and USEPA jointly define wetlands as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include bogs, seeps, marshes, swamps, forested bottomland wetlands, and other similar areas (40 CFR § 120.2(c)(1)). Wetlands are defined in a broad sense as transitional areas (ecotones) between terrestrial and aquatic systems where the water table is usually at or near the ground surface, or where shallow water covers the land (Cowardin et al. 1979).

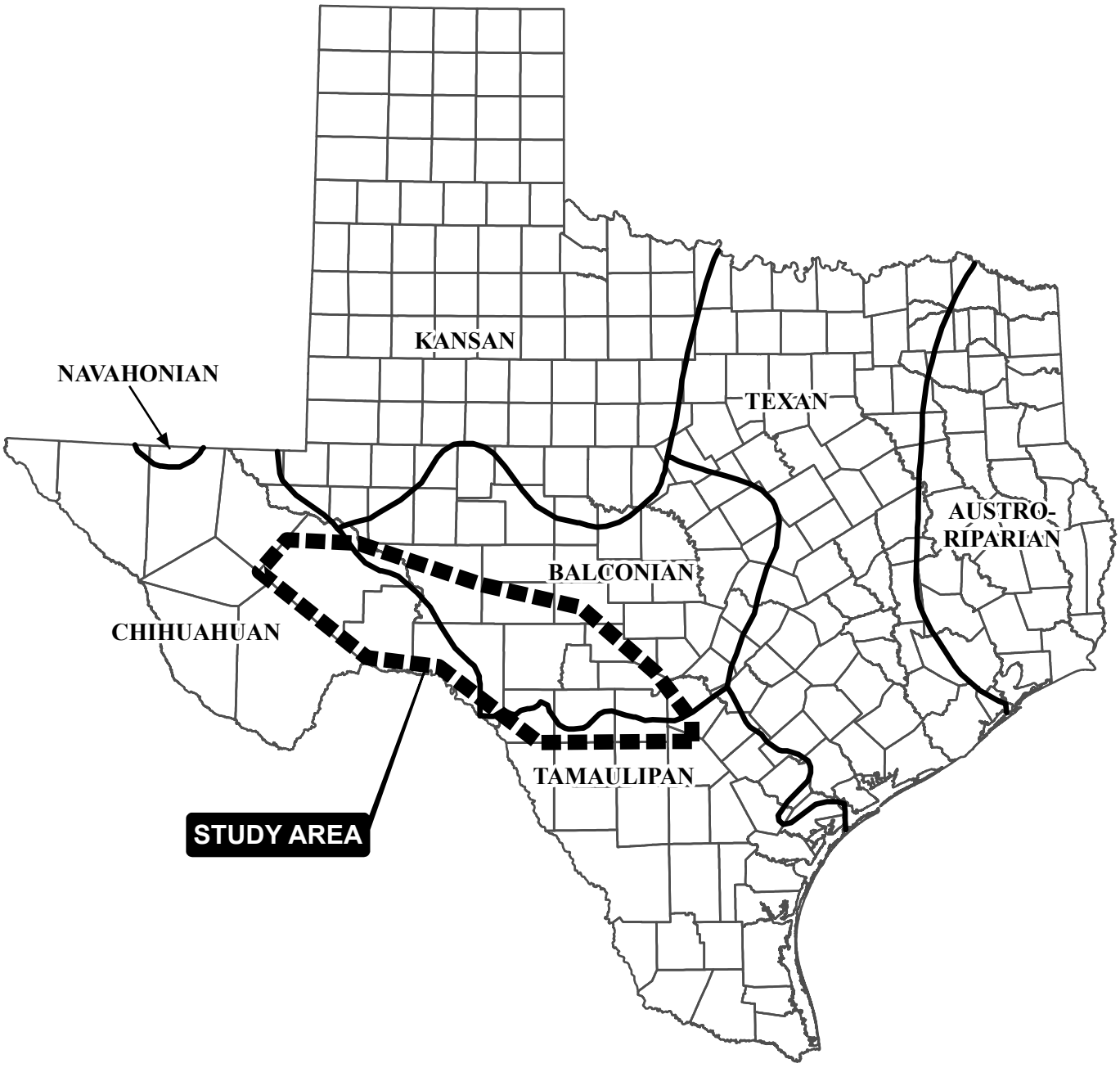
The USFWS NWI data indicate that wetland habitat features are mainly concentrated on the eastern side of the Study Area. Aquatic features in the Study Area are classified as palustrine and lacustrine (Cowardin et al. 1979). Palustrine systems include vegetated, freshwater wetlands and small (less than 20 acres), non-vegetated freshwater wetlands that are both shallow (deepest point less than 6.6 feet at low water) and lack an active wave-formed or bedrock shoreline (Cowardin et al. 1979). Lacustrine systems include wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or

a dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent mosses, or lichens with 30 percent or greater areal coverage; and (3) total area of at least 8 hectares (ha) (20 acres) (Cowardin et al. 1979). Mapped within the Study Area are numerous freshwater emergent wetlands, freshwater forested/shrub wetlands, freshwater ponds, and lakes. Unmapped wetlands may also occur in association with riparian areas near any surface drainage or pond within the Study Area.

Hydric and aquatic habitats may be considered regulatory wetlands by the USACE. Construction activities resulting in the discharge of dredged or fill materials within WOTUS are subject to the regulations and restrictions outlined in Section 404 of the CWA and may require coordination with the USACE to ensure compliance.

3.6.3 Wildlife

The Study Area is located within the Balconian, Chihuahuan, and Tamaulipan biotic provinces (**Figure 3-3**) as described by Blair (1950). The Balconian province includes the Edwards Plateau, Lampasas Cut Plain, and Central Mineral Region. This is a region of intermediate ecological conditions between the eastern forests and western deserts. Faunal composition is characterized as an intermixed representation of Austroriparian, Tamaulipan, Chihuahuan, and Kansan province species. The Chihuahuan province includes all of Trans-Pecos Texas, except the Guadalupe Mountains of northern Culberson County. With greater diversity in physiographic features than any other province in the state, this area includes features such as bolsons and mountain ranges. The Tamaulipan province includes the Gulf coastal plain south of the Balcones Escarpment and west of the boundary between pedalfer and pedocal soils. This province is characterized by an intermixture of Neotropical species, Austroriparian species, and southwest desert species (Blair 1950). The following sections list species that may occur in and represent the faunal diversity of the Study Area today.



Biotic Province Boundary

County Boundary

Source: Blair, 1950, modified

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 Lambert Conformal Conic

December 31, 2025

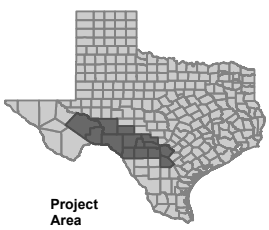


FIGURE 3-3
LOCATION OF THE STUDY AREA IN RELATION TO THE BIOTIC PROVINCES OF TEXAS

Howard-to-Solstice
765-kV Single-circuit
Transmission Line

0 50 100
Miles

3.6.3.1 Fish

In Texas, the divisions of the biotic provinces were separated on the basis of terrestrial vertebrate distributions; however, the distribution of freshwater fishes generally corresponds with the terrestrial biotic province boundaries. Areas showing the greatest deviation from this general rule include northeast Texas and the coastal zone (Hubbs 1957). A review of the USGS topographic maps indicates that the mapped surface waters within the Study Area include perennial, intermittent, and ephemeral streams, as well as lakes and ponds. Additionally, unmapped surface waters may occur within the Study Area.

Perennial streams and large ponds provide consistent aquatic habitats for all trophic levels with fish being the most prominent. The relatively stable water levels of perennial ponds facilitate stable population growth. Species adapted for deeper waters will utilize pond environments. Ponds located in the Study Area will exhibit variability in terms of their age, drainage, use by livestock, past fish stocking, and fertilization history. Typically for pond habitat, fluctuations in water levels are experienced during summer months because of high evaporation rates and repeated heavy rainfall required to fill ponds. Periods of extended drought in the region may reduce these seasonal water level fluctuations or dry ponds completely.

Intermittent and ephemeral flowing streams support aquatic species primarily adapted to ephemeral pool habitats. Because intermittent streams consist of small headwater drainages, persistent flow is unlikely to be sufficient to support any substantial lotic species assemblage. Species in ephemeral aquatic habitats are typically adapted to rapid dispersal and completion of life cycles. In streams dominated by scoured, sandy-clay bottoms, accumulations of woody debris or leaf pack provide the most important feeding and refuge areas for invertebrates and forage fish. Softer, muddy bottoms generally harbor substantial populations of burrowing invertebrates (e.g., larval diptera and oligochaetes), which can be an important food source to higher trophic levels (Thomas et al. 2007).

A representative list of freshwater fishes potentially occurring within the Study Area based on current known range, abundance, and habitat preferences is included in Table 3-5. The occurrence of each species within the Study Area is dependent upon available suitable habitat.

Table 3-5: Representative List of Fish Species of Potential Occurrence in the Study Area

Common Name	Scientific Name
ATHERINOPSIDAE: New World Silversides	
Inland silverside	*Menidia beryllina*
CATOSTOMIDAE: Suckers	
Black buffalo	*Iciobus niger*
Gray redhorse	*Moxostom congestum*
Lake chubsucker	*Erimyzon sucetta*
Longlip jumprock	*Moxostoma albidum*
Mexican redhorse	*Moxostoma austrinum*
River carpsucker	*Carpiodes carpio*
Smallmouth buffalo	*Ictiobus bubalus*
CENTRARCHIDAE: Sunfishes	
Bluegill	*Lepomis macrochirus*
Green sunfish	*Lepomis cyanellus*
Guadalupe bass	*Micropterus treculii*
Largemouth bass	*Micropterus salmoides*
Redbreast sunfish	*Lepomis auritus*
Redear sunfish	*Lepomis microlophus*
Smallmouth bass	*Micropterus dolomieu*
CICHLIDAE: Cichlids	
Blue tilapia	*Oreochromis aureus*
Mozambique tilapia	*Oreochromis mossambicus*
Rio Grande cichlid	*Herichthys cyanoguttatus*
CLUPEIDAE: Herrings	
Gizzard shad	*Dorosoma cepedianum*
CYPRINIDAE: Carps and Minnows	
Blacktail shiner	*Cyprinella venusta*
Central stoneroller	*Campostoma anomalum*
Ghost shiner	*Notropis buchanani*
Golden shiner	*Notemigonus crysoleucas*
Phantom shiner	*Notropis orca*
Plateau shiner	*Cyprinella lepida*
Proserpine shiner	*Cyprinella proserpina*
Red shiner	*Cyprinella lutrensis*
Sand shiner	*Notropis stramineus*
Silverband shiner	*Notropis shumardi*
Speckled chub	*Macrhybopsis aestivalis*
Tamaulipas shiner	*Notropis braytoni*

Table 3-5: Representative List of Fish Species of Potential Occurrence in the Study Area

Common Name	Scientific Name
Texas shiner	*Notropis amabilis*
CYNPRINIDAE: Minnows	
Bullhead minnow	*Pimephales vigilax*
Devils River minnow	*Dionda diaboli*
Fathead minnow	*Pimephales promelas*
Guadalupe roundnose minnow[a]	*Dionda nigrotaeniata*
Manantial roundnose minnow	*Dionda argentosa*
Nueces roundnose minnow[b]	*Dionda serena*
Rio Grande shiner	*Notropis jemezanus*
Roundnose minnow	*Dionda episcopa*
CYPRINODONTIDAE: Pupfishes	
Conchos pupfish	*Cyprinodon eximius*
Leon Springs pupfish	*Cyprinodon bovinus*
Sheepshead minnow	*Cyprinodon variegatus*
FUNDULIDAE: Topminnows	
Gulf killifish	*Fundulus grandis*
Plains killifish	*Fundulus zebrinus*
Rainwater killifish	*Lucania parvia*
ICTALURIDAE: North American Catfishes	
Blue catfish	*Ictalurus furcatus*
Channel catfish	*Ictalurus punctatus*
Flathead catfish	*Pylodictis olivaris*
Headwater catfish	*Ictalurus lupus*
Mexican blindcat	*Prietella phreatophila*
Toothless blindcat	*Trogloglanis pattersoni*
Widemouth blindcat	*Satan eurystomus*
Yellow bullhead	*Notropis orca*
LEPISOSTEIDAE: Gars	
Longnose gar	*Lepisosteus osseus*
Spotted gar	*Lepisosteus oculatus*
MORONIDAE: Temperate Basses	
Striped bass	*Morone saxatilis*
PERCIDAE: Perches	
Bigscale logperch	*Percina macrolepida*
Greenthroat darter	*Etheostoma lepidum*
Logperch	*Percina caprodes*
Rio Grande darter	*Etheostoma grahami*

Table 3-5: Representative List of Fish Species of Potential Occurrence in the Study Area

Common Name	Scientific Name
POECILIIDAE: Livebearers	
Blotched gambusia	*Gambusia senilis*
Largespring gambusia	*Gambusia geiseri*
Pecos gambusia	*Gambusia nobilis*
Western mosquitofish	*Gambusia affinis*

Source: Hendrickson and Cohen (2022).
Nomenclature follows: Hendrickson and Cohen (2022).
(a) Identified as Medina roundnose minnow within RTEST (TPWD 2025c).
(b) Identified as Frio roundnose minnow within RTEST (TPWD 2025c).

3.6.3.2 Amphibians and Reptiles

A representative list of amphibian species (frogs, toads, and salamanders) and reptiles (turtles, lizards, and snakes) that may occur within the Study Area is included in Table 3-6. The likelihood of occurrence of each species within the Study Area will depend on suitable habitat. Frogs and toads may occur in all vegetation types, while salamanders are typically restricted to hydric habitats. Aquatic turtles are also more commonly observed near water (Dixon 2013).

Table 3-6: Representative List of Reptile and Amphibian Species of Potential Occurrence in the Study Area

Common Name	Scientific Name
Frogs and Toads	
Blanchard's cricket frog	*Acris blanchardi*
Cope's gray treefrog	*Dryphytes chrysoscelis*
Couch's spadefoot	*Scaphiopus couchii*
Gray treefrog	*Dryophytes versicolor*
Gulf Coast toad	*Incilius nebulifer*
Hurter's spadefoot	*Scaphiopus hurterii*
North American bullfrog	*Lithobates catesbeiana*
Plains spadefoot	*Spea bombifrons*
Red-spotted toad	*Anaxyrus punctatus*
Rio Grande leopard frog	*Lithobates berlandieri*
Spotted chorus frog	*Pseudacris clarkii*
Strecker's chorus frog	*Pseudacris streckeri*
Texas toad	*Anaxyrus speciosus*
Western narrow-mouthed toad	*Gastrophryne olivacea*

Table 3-6: Representative List of Reptile and Amphibian Species of Potential Occurrence in the Study Area

Common Name	Scientific Name
Salamanders	
Cascade Caverns salamander	*Eurycea latitans*
Texas salamander	*Eurycea neotenes*
Valdina farms salamander	*Eurycea troglodytes*
Western slimy salamander	*Plethodon albagula*
Lizards	
Brown anole	*Anolis sagrei*
Common checkered whiptail	*Aspidoscelis tesselatus*
Common side-blotched lizard	*Uta stansburiana*
Common spotted whiptail	*Aspidoscelis gularis*
Crevice spiny lizard	*Sceloporus poinsettii*
Eastern collared lizard	*Crotaphytus collaris*
Eastern six-lined racerunner	*Aspidoscelis sexlineatus sexlineatus*
Great Plains skink	*Plestiodon obsoletus*
Greater earless lizard	*Cophosaurus texanus*
Little brown skink	*Scincella lateralis*
Little striped whiptail	*Aspidoscelis arizonae*
Marbled whiptail	*Aspidoscelis marmoratus*
Mediterranean gecko	*Hemidactylus turcicus*
Plateau spotted whiptail	*Aspidoscelis scalaris*
Prairie lizard	*Sceloporus consobrinus*
Round-tailed horned lizard	*Phyrnosoma modestum*
Short-lined skink	*Plestiodon tetragrammus brevilineatus*
Southwestern fence lizard	*Sceloporus cowlesi*
Texas alligator lizard	*Gerrhonotus infernalis*
Texas banded gecko	*Coleonyx brevis*
Texas horned lizard	*Phrynosoma cornutum*
Texas spiny lizard	*Sceloporus olivaceus*
Texas tree lizard	*Urosaurus ornatus ornatus*
Snakes	
Arid land ribbonsnake	*Thamnophis proximus diabolicus*
Bullsnake	*Pituophis catenifer sayi*
Black-necked gartersnake	*Thamnophis cyrtopsis*
Black-tailed rattlesnake	*Crotalus molossus*
Broad-banded copperhead	*Agkistrodon laticinctus*

Table 3-6: Representative List of Reptile and Amphibian Species of Potential Occurrence in the Study Area

Common Name	Scientific Name
Central American indigo snake	*Drymarchon melanurus*
Checkered gartersnake	*Thamnophis marcianus*
Chihuahuan nightsnake	*Hypsiglena jani*
Common glossy snake	*Arizona elegans*
Diamond-backed watersnake	*Nerodia rhombifer*
Eastern hog-nosed snake	*Heterodon platirhinos*
Eastern yellow-bellied racer	*Coluber constrictor flaviventris*
Flat-headed snake	*Tantilla gracilis*
Gray-banded kingsnake	*Lampropeltis alterna*
Great plains ratsnake	*Pantherophis emoryi*
Kansas glossy snake	*Arizona elegans elegans*
Lined snake	*Tropidoclonion lineatum*
Long-nosed snake	*Rhinocheilus lecontei*
Mexican milksnake	*Lampropeltis annulata*
Mottled rock rattlesnake	*Crotalus lepidus lepidus*
Northern cottonmouth	*Agkistrodon piscivorus*
Northern rough greensnake	*Opheodrys aestivus*
Plains black-headed snake	*Tantilla nigriceps*
Plains hog-nosed snake	*Heterodon nasicus nasicus*
Prairie rattlesnake	*Crotalus viridis*
Prairie ring-necked snake	*Diadophis punctuates arnyi*
Red-striped ribbonsnake	*Thamnophis proximus rubrilineatus*
Rough earthsnake	*Virginia striatula*
Schott’s whipsnake	*Masticophis schotti*
Smooth earthsnake	*Virginia valeriae*
Southwestern black-headed snake	*Tantilla hobartsmithi*
Striped whipsnake	*Masticophis taeniatus*
Texas coralsnake	*Micrurus tener*
Texas gartersnake	*Thamnophis sirtalis annectens*
Texas glossy snake	*Arizona elegans arenicola*
Texas patch-nosed snake	*Salvadora lineata*
Texas threadsnake	*Rena dulcis*
Trans-pecos black-headed snake	*Tantilla cucullata*
Trans-pecos ratsnake	*Bogertophis subocularis*
Trans-pecos threadsnake	*Rena segregus*

Table 3-6: Representative List of Reptile and Amphibian Species of Potential Occurrence in the Study Area

Eastern mud turtle	*Kinosternon subrubrum*
Eastern musk turtle	*Sternotherus odoratus*
Guadalupe spiny softshell	*Apalone spinifera guadalupensis*
North American snapping turtle	*Chelydra serpentina*
Ornate box turtle	*Terrapene ornata*
Pond slider	*Trachemys scripta*
Texas cooter	*Pseudemys texana*
Texas map turtle	*Graptemys versa*
Texas spiny softshell	*Apalone spinifera emoryi*
Texas tortoise	*Gopherus berlandieri*
Yellow mud turtle	*Kinosternon flavescens*

Source: Dixon (2013).
Nomenclature follows: Nicholson (2025).

3.6.3.3 Birds

A representative list of avian species that may occur within the Study Area as year-round residents, summer residents, and/or winter residents/migrants is presented in Table 3-7, Representative List of Avian Species of Potential Occurrence in the Study Area, located in Appendix D. Additional transient bird species may migrate within or through the Study Area in the spring and fall and/or use the area to nest (spring/summer) or overwinter. The likelihood for the occurrence of each species depends upon availability of suitable habitat and season.

3.6.3.4 Mammals

A representative list of common mammals that may occur in the Study Area is provided in Table 3-8 (Schmidly and Bradley 2016). The likelihood of occurrence of each species within the Study Area will depend upon suitable habitat.

Table 3-8: Representative List of Mammalian Species of Potential Occurrence in the Study Area

Common Name	Scientific Name
ARTIODACTYLA: Antilocapridae	
Pronghorn	*Antilocapra americana*
ARTIODACTYLA: Cervidae	
Mule deer	*Odocoileus hemionus*
White-tailed deer	*Odocoileus virginianus*
ARTIODACTYLA: Suidae	
Feral hog	*Sus scrofa*
ARTIODACTYLA: Tayassuidae	
Collared peccary	*Pecari tajacu*
CARNIVORA: Canidae	
Common gray fox	*Urocyon cinereoargenteus*
Coyote	*Canis latrans*
Kit fox	*Vulpes macrotis*
Red fox	*Vulpes vulpes*
CARNIVORA: Felidae	
Bobcat	*Lynx rufus*
Mountain lion	*Puma concolor*
CARNIVORA: Mephitidae	
Eastern spotted skunk	*Spilogale putorius*
Hog-nosed skunk	*Conepatus leuconotus*
Striped skunk	*Mephitis mephitis*
Western spotted skunk	*Spilogale gracilis*
CARNIVORA: Mustelidae	
American badger	*Taxidea taxus*
Long-tailed weasel	*Neogale frenata*
CARNIVORA: Procyonidae	
Northern raccoon	*Procyon lotor*
Ringtail	*Bassariscus astutus*
CARNIVORA: Ursidae	
American black bear	*Ursus americanus*
CHIROPTERA: Molossidae	
Big brown bat	*Eptesicus fuscus*
Brazilian free-tailed bat	*Tadarida brasiliensis*
Pocketed free-tailed bat	*Nyctinomops femorosaccus*
Western bonneted bat	*Eumops perotis*

Table 3-8: Representative List of Mammalian Species of Potential Occurrence in the Study Area

Common Name	Scientific Name
CHIROPTERA: Vespertilionidae	
Cave myotis	*Myotis velifer*
Eastern red bat	*Lasiurus borealis*
Hoary bat	*Lasiurus cinereus*
Pallid bat	*Antrozous pallidus*
Silver-haired bat	*Lasionycteris noctivagans*
Townsend's big-eared bat	*Corynorhinus townsendii*
Tricolored bat	*Perimyotis subflavus*
CINGULATA: Dasypodidae	
Nine-banded armadillo	*Dasypus novemcinctus*
DIDELPHIMORPHIA: Didelphidae	
Virginia opossum	*Didelphis virginiana*
EULIPOTYPHLA: Soricidae	
Crawford's desert shrew	*Notiosorex crawfordi*
Least shrew	*Cryptotis parva*
EULIPOTYPHLA: Talpidae	
Eastern mole	*Scalopus aquaticus*
LAGOMORPHA: Leporidae	
Black-tailed jackrabbit	*Lepus californicus*
Desert cottontail	*Sylvilagus audubonii*
Eastern cottontail	*Sylvilagus floridanus*
RODENTIA: Castoridae	
American beaver	*Castor canadensis*
RODENTIA: Cricetidae	
Chihuahuan grasshopper mouse	*Onychomys arenicola*
Eastern woodrat	*Neotoma floridana*
Fulvous harvest mouse	*Reithrodontomys fulvescens*
Hispid cotton rat	*Sigmodon hispidus*
North American deermouse	*Peromyscus maniculatus*
Northern grasshopper mouse	*Onychomys leucogaster*
Northern pygmy mouse	*Baiomys taylori*
Southern plains woodrat	*Neotoma micropus*
Texas deermouse	*Peromyscus attwateri*
White-footed deermouse	*Peromyscus leucopus*
White-toothed woodrat	*Neotoma leucodon*
Woodland vole	*Microtus pinetorum*

Table 3-8: Representative List of Mammalian Species of Potential Occurrence in the Study Area

Common Name	Scientific Name
RODENTIA: Geomyidae	
Attwater's pocket gopher	*Geomys attwateri*
Texas pocket gopher	*Geomys personatus*
RODENTIA: Heteromyidae	
Chihuahuan Desert pocket mouse	*Chaetodipus eremicus*
Hispid pocket mouse	*Chaetodipus hispidus*
Merriam's pocket mouse	*Perognathus merriami*
Nelson's pocket mouse	*Chaetodipus nelsoni*
RODENTIA: Sciuridae	
Black-tailed prairie dog	*Cynomys ludovicianus*
Rio Grande ground squirrel	*Ictidomys parvidens*
Spotted ground squirrel	*Xerospermophilus spilosoma*
RODENTIA: Myocastoridae	
Nutria	*Myocastor coypus*

Source: Schmidley and Bradley (2016).
Nomenclature follows: Schmidley and Bradley (2016).

3.6.4 Recreationally and Commercially Important Species

A species is considered important if one or more of the following criteria applies:

a) The species is recreationally or commercially valuable,
b) The species is endangered or threatened,
c) The species affects the well-being of some important species within criterion (a) or (b),
d) The species is critical to the structure and function of the ecological system, or
e) The species is a biological indicator.

Wildlife resources within the Study Area provide human benefits resulting from both consumptive and nonconsumptive uses. Nonconsumptive uses include observing and photographing wildlife, birdwatching, and other similar activities. These uses, although difficult to quantify, deserve consideration in the evaluation of the wildlife resources of the Study Area. Consumptive uses, such as fishing, hunting, and trapping, are more easily quantifiable. Consumptive and nonconsumptive uses of wildlife are often enjoyed contemporaneously and are generally compatible. Many species occurring in the Study Area provide consumptive uses, and all provide the potential for nonconsumptive benefits.

The Study Area falls within the TPWD's Edwards Plateau, South Texas Plains, and Trans Pecos Ecological Regions, which provide a variety of habitats to support hunting, fishing, and bird-watching opportunities. For quantifiable results for consumptive uses, a data request was submitted on April 8, 2025 to the TPWD for its 2024-2025 Big Game Harvest Survey results (Purvis 2025a) and 2024-2025 Small Game Harvest Survey results (Purvis 2025b).

During the 2024-2025 hunting season, an estimated total of 393,679 white-tailed deer and 26,129 javelina were harvested within all three ecological regions (Purvis 2025a). An estimated total of 3,970,163 doves, 374,705 quail, 17,164 turkeys (Edwards Plateau and South Texas Plains regions only), and 72,875 waterfowl were harvested within all three regions (Purvis 2025b).

Recreational fishing opportunities in the Study Area could include locations such as state parks, lakes, and rivers. Fish that are considered economically important in these ecological regions include bass, catfish, crappie, sunfish, and trout (Purvis 2025b).

3.6.5 Endangered and Threatened Species

An endangered species is one that is in danger of extinction throughout all or a significant portion of its natural range, while a threatened species is one likely to become endangered within the foreseeable future throughout all or a significant portion of its range. A candidate species is one that is currently in the assessment process to determine if listing is appropriate using the listing factors in Section 4.0 of the ESA.

A USFWS IPaC report (Project Code 2026-0016068) and a TPWD Rare, Threatened, and Endangered Species of Texas (RTEST) report were obtained on November 14, 2025. The USFWS and TPWD reports identify both federally and state-listed threatened, endangered, and proposed species and designated critical habitat potentially occurring at the Study-Area level (USFWS 2025b) and county level (TPWD 2025c). GIS data was also requested for current and historical known occurrences, also known as elements of occurrence (EO), for sensitive plant and animal communities from the TPWD Texas NDD (TPWD 2025d). For the purpose of this study, NDD information is not used as a substitute for a presence/absence survey, but as an indication of past observations of a species within suitable habitat. Only a site survey can determine whether a species or suitable habitat is present.

3.6.5.1 Plant Species

Ten federally and/or state-listed plant species were identified as potentially occurring within the Study Area (USFWS 2025b and TPWD 2025c) (see Table 3-9). Additionally, critical habitat was identified for two plant species, bracted twistflower (*Streptanthus bracteatus*) and Pecos sunflower (*Helianthus paradoxus*), within the Study Area (USFWS 2025b). There are numerous EOs for the following federally and/or state listed plant species within the Study Area: bracted twistflower, bunched cory cactus (*Coryphantha ramillosa*), South Llano (also known as Don Richards's) spring moss (*Donrichardsia macroneuron*), Leoncita false-foxglove (*Agalinis calycina*), Pecos sunflower, Texas snowbell, and Tobusch fishhook cactus (*Sclerocactus brevihamatus* ssp. *tobuschii*) (TPWD 2025d).

Table 3-9: Federally and State-listed Plant Species Potentially Occurring in the Study Area

Common Name	Scientific Name	Legal Status		Potential for Occurrence in the Study Area
		USFWS	TPWD	
Black lace cactus	*Echinocereus reichenbachii* var. *albertii*	Endangered	-[a]	May occur
Bracted twistflower	*Streptanthus bracteatus*	Threatened	-	Likely
Bunched cory cactus	*Coryphantha ramillosa*	Threatened	Threatened	May occur
Leoncita false-foxglove	*Agalinis calycina*	-	Threatened	May occur
Pecos sunflower	*Helianthus paradoxus*	Threatened	Threatened	Likely
South Llano springs moss	*Donrichardsia macroneuron*	Endangered[b]	-	May occur
Texas snowbell	*Styrax platanifolius* ssp. *texanus*	Endangered	Endangered	May occur
Texas wild-rice	*Zizania texana*	Endangered	-	Not likely
Tobusch fishhook cactus	*Sclerocactus brevihamatus* ssp. *tobuschii*	Threatened	Endangered	Likely
Wright's marsh thistle	*Cirsium wrightii*	Threatened[b]	-	Not likely

Sources: USFWS (2025b and TPWD 2025c).
(a) State listed as endangered but was not identified as occurring within the Study Area within the RTEST.
(b) Federal listing and potential to occur within the Study Area identified within the RTEST (county level), but not within the IPaC (Study-Area level).

3.6.5.1.1 Black Lace Cactus

The federally and state-listed black lace cactus is a perennial succulent that grows in clusters of 1 to 12 or more stems that are up to 20 centimeters tall. While the IPaC identified this species as potentially occurring within the Study Area, the RTEST did not. This species occurs in coastal grasslands and openings in dense scrublands and woodlands within the South Texas Coastal Bend counties but may also occupy habitats such as openings in mesquite brush occurring along streams of the coastal plain at 50 meters or less in elevation (NatureServe 2025a). The USFWS has mapped the geographic range of this species on the far southeast side of the Study Area (USFWS 2019a and USFWS 2025c). This geographic range is considered a "recovery unit." Black lace cactus populations are more likely to disperse along watercourses; therefore, the USFWS considers that to preserve the full range of this species' genetic diversity and ecological adaptation, it must be conserved throughout its geographic range. While this species' geographic range is mapped within the Study Area, the only documented occurrences of the black lace cactus are documented south of Atascosa County, outside the Study Area. However, there are very few publicly owned lands within the geographic range of black cactus (USFWS 2019a); therefore, this species may occur in undocumented areas within the Study Area where suitable habitat is present.

3.6.5.1.2 Bracted Twistflower

The federally listed bracted twistflower is an annual flower with showy, lavender-purple flowers that provide nectar and pollen for native bees. This species is endemic to the Balcones Escarpment zone of the Edwards Plateau in Central Texas and can be found in vegetation communities consisting of Ashe's juniper, Texas live oak, mescal bean, Texas red oak, and other trees and shrubs along the rocky slopes (USFWS 2023a). Seeds can remain dormant in the soil for years, and large pulses of germination occur about once every 5 to 10 years. The plant may occupy a site but remain undetectable until favorable weather allows the seeds to germinate (USFWS 2023a). Designated critical habitat and seven documented EOs were identified within the Study Area for this species. This species is likely to occur within the Study Area where suitable habitat is present.

3.6.5.1.3 Bunched Cory Cactus

The federally and state-listed bunched cory cactus is a succulent perennial, usually 3 to 9 centimeters tall and 3 to 7 centimeters wide. The stems are covered in radial and central spines, with pink to red-purple flowers. This species can be found in fractured limestone flats, hills, and mesas of the Chihuahuan Desert adjacent to scrubland vegetation and hilly terrain, and in Texas is currently only known to occur in southern Brewster and Terrell counties (TPWD 2025e). There are two documented EOs of bunched cory cactus

occurring within the Study Area in Terrell County (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.1.4 Leoncita False-foxglove

The state-listed Leoncita false-foxglove is an annual, hemiparasitic plant that grows about 50 centimeters tall, with numerous divergent, ascending branches. This species is known to occupy grasslands on perennially moist, heavy, alkaline/saline, calcareous silty clays and loams in and around cienegas (desert springs) and seeps. The currently known distribution in Texas is limited to Pecos County at Diamond Y Springs Preserve (Roth 2019). There are two documented EOs of Leoncita false-foxglove that occur within the Study Area at Diamond Y Spring (TPWD 2025d). This species may occur where suitable habitat is present.

3.6.5.1.5 Pecos Sunflower

The federally and state-listed Pecos sunflower is an annual with mostly hairless stems that reach 1 to 3 meters in height, typically found in Pecos and Reeves counties. This species occurs in permanently saturated soils at the root zone associated with cienegas, and flowers from August to November. This wetland plant grows on alkaline soils at spring seeps, wet meadows, stream courses, and pond margins, and is highly dependent on natural groundwater deposits (TPWD 2025f). In Texas, loss of habitat for the species is commonly due to groundwater withdrawals. The Diamond Y Spring Preserve within the Study Area is known for a large population of Pecos sunflower (USFWS 2005a). There are six documented EOs of the Pecos sunflower within the Study Area within Pecos County (TPWD 2025d). Additionally, designated critical habitat for this species is found within the Study Area along Leon Creek in Pecos County. This species is likely to occur within the Study Area where suitable habitat is present.

3.6.5.1.6 South Llano Springs Moss

The federally listed South Llano Springs moss is an aquatic moss that has only been documented at two sites on the upper South Llano River. This species requires a constant flow of mineral-rich spring water that flows over shallow limestone rocks. It is likely that this species must be continuously immersed in spring water for survival (USFWS 2023b). There is one documented EO of the South Llano Springs moss within the Study Area in Edwards County (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.1.7 Texas Snowbell

The federally and state-listed Texas snowbell is a deciduous woody shrub native to the drainages of the Nueces and Devils rivers in Edwards, Kinney, Real, and Val Verde counties. This species grows on limestone cliffs, slopes, and gravel streambeds along permanent or periodic waterways (TPWD 2025g). The Texas snowbell is believed to be restricted to mesic riparian habitats (Fulton 2010) surrounded by vegetation such as sycamore-little walnut (*Platanus occidentalis-Juglans microcarpa*), oak, or oak-juniper woodland (NatureServe 2025b). There are 15 documented EOs of the Texas Snowbell within the Study Area (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.1.8 Texas Wild-Rice

The federally listed Texas wild-rice is a perennial grass that roots underwater in riverbeds. This species has 1- to 2-meter-long stems with linear leaves that are narrow with a prominent vein running down the middle of the blade (TPWD 2025h). This species is endemic to the upper 2 miles of the San Marcos River in Hays County, Texas. Preferred habitat includes gravelly or coarse sandy soils in fast-flowing waters of spring-fed rivers (TPWD 2025h; USFWS 2025d). There are no documented EOs of the Texas wild-rice within the Study Area (TPWD 2025d). Because the Study Area is outside of its known range, this species is not likely to occur within the Study Area.

3.6.5.1.9 Tobusch Fishhook Cactus

The federally and state-listed tobusch fishhook cactus is a succulent perennial with solitary stems that are 3 to 15 centimeters in diameter. The low dome-shaped stems have 8 to 12, poorly defined vertical ridges that are divided into spine-tipped, cone-shaped projections. Each projection has spines arising from each tip, which turn from yellow to gray as they age. Tobusch fishhook cactus occurs in shallow, gravelly soils over limestone substrate in openings of oak-juniper woodlands or pinyon pine-oak woodlands. The species' range is found within Bandera, Edwards, Kerr, Kimble, Kinney, Real, Uvalde, and Val Verde counties (TPWD 2025i). Numerous EOs are documented within the eastern portion of the Study Area for the tobusch fishhook cactus (TPWD 2025d). This species is likely to occur within the Study Area where suitable habitat is present.

3.6.5.1.10 Wright's Marsh Thistle

The federally listed Wright's marsh thistle has a 3- to 8-foot single stalk covered with succulent leaves and typically grows in wet, alkaline soils in spring seeps and marshy edges of streams and ponds at elevations between 3,450 and 7,850 feet. Its range historically occurred in Arizona and New Mexico. Despite previous belief, this species has never been found in Texas, based on a re-examined specimen that confirmed the

actual species collected in Presidio County, Texas, was a misidentified Texas thistle (*Circium texanum*) (USFWS 2017). Known species occurrence is only documented in New Mexico. This species is not likely to occur in the Study Area because it is outside the known occupied range.

3.6.5.1.11 Sensitive Plant Communities

A review of the Texas NDD data identified EOs for 75 state-sensitive plant communities within the Study Area. Although these species are not state or federally protected, they are each considered either imperiled or vulnerable according to the status and rank key from the State Wildlife Action Plan for Texas (TPWD 2023) and are considered species of greatest conservation need. Species of greatest conservation need are species that, due to limited distributions and/or declining populations, face the threat of extirpation or extinction but lack legal protection.

3.6.5.2 Federally Listed Fish and Wildlife Species

The USFWS IPaC report and RTEST database identified 48 federally listed fish and wildlife species for the Study Area (USFWS 2025b) and the counties in which the Study Area occurs (TPWD 2025c). A brief summary of each listed species' life history and preferred habitat is provided in Table 3-10 and below.

Table 3-10: Federally Listed Threatened and Endangered Species for the Study Area Counties

Common Name	Scientific Name	Status	Potential for Occurrence in the Study Area
		USFWS	
Amphibians			
San Marcos salamander	*Eurycea nana*	Threatened	Not likely
Texas blind salamander	*Eurycea rathbuni*	Endangered	Not likely
Arachnids			
Cokendolpher Cave harvestman	*Texella cokendolpheri*	Endangered	Not likely
Government Canyon Bat Cave meshweaver	*Cicurina vespera*	Endangered	Likely
Government Canyon Bat Cave spider	*Tayshaneta microps*	Endangered	Likely
Madla Cave meshweaver	*Cicurina madla*	Endangered	Likely
Robber Baron Cave meshweaver	*Cicurina baronia*	Endangered	Not likely
Birds			
Golden-cheeked warbler	*Setophaga chrysoparia*	Endangered	Likely

Common Name	Scientific Name	Status	Potential for Occurrence in the Study Area
		USFWS	
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	Not likely
Northern aplomado falcon	*Falco femoralis septentrionalis*	Endangered	Not likely
Piping plover	*Charadrius melodus*	Threatened	May occur[a]
Rufa red knot	*Calidris canutus rufa*	Threatened	Not likely
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Not likely
Whooping crane	*Grus americana*	Endangered	Not likely[a]
Yellow-billed cuckoo	*Coccyzus americanus*	Threatened	May occur
Clams			
Balcones spike	*Fusconaia iheringi*	Endangered	Not likely
False spike	*Fusconaia mitchelli*	Endangered	Not likely
Guadalupe fatmucket	*Lampsilis bergmanni*	Endangered	Likely
Guadalupe orb	*Cyclonaias necki*	Endangered	Likely
Mexican fawnsfoot	*Truncilla cognata*	Proposed Endangered	Not likely
Salina mucket	*Potamilus metnecktayi*	Proposed Endangered	May occur
Texas fatmucket	*Lampsilis bracteata*	Endangered	Likely
Texas fawnsfoot	*Truncilla macrodon*	Threatened	Not likely
Texas hornshell	*Popenaias popeii*	Endangered	Likely
Texas pimpleback	*Cyclonaias petrina*	Endangered	Not likely
Crustaceans			
Peck's Cave amphipod	*Stygobromus pecki*	Endangered	Not likely
Pecos amphipod	*Gammarus pecos*	Endangered	May occur
Fish			
Comanche Springs pupfish	*Cyprinodon elegans*	Endangered	Not likely
Devils River minnow	*Dionda diaboli*	Threatened	May occur
Fountain darter	*Etheostoma fonticola*	Endangered	Not likely
Leon Springs pupfish	*Cyprinodon bovinus*	Endangered	May occur
Mexican blindcat	*Prietella phreatophila*	Endangered	Not likely
Pecos gambusia	*Gambusia nobilis*	Endangered	May occur
Pecos pupfish	*Cyprinodon pecosensis*	Proposed Threatened	Not likely
Toothless blindcat	*Trogloglanis pattersoni*	Proposed Endangered	May occur
Widemouth blindcat	*Satan eurystomus*	Proposed Endangered	May occur
Insects			
[no common name] Beetle	*Rhadine exilis*	Endangered	May occur
[no common name] Beetle	*Rhadine infernalis*	Endangered	May occur

Common Name	Scientific Name	Status	Potential for Occurrence in the Study Area
		USFWS	
Comal Springs dryopid beetle	*Stygoparnus comalensis*	Endangered	Not likely
Comal Springs riffle beetle	*Heterelmis comalensis*	Endangered	Not likely
Helotes mold beetle	*Batrisodes venyivi*	Endangered	May occur
Monarch butterfly	*Danaus plexippus*	Proposed Threatened	Likely
Mammals			
Ocelot	*Leopardus pardalis*	Endangered	Not likely
Tricolored bat	*Perimyotis subflavus*	Proposed Endangered	May occur
Snails			
Diamond tryonia	*Pseudotryonia adamantina*	Endangered	May occur
Gonzales tryonia	*Tryonia circumstriata*	Endangered	May occur
Pecos assiminea snail	*Assiminea pecos*	Endangered	May occur
Phantom tryonia	*Tryonia cheatumi*	Endangered	Not likely

Sources: USFWS (2025b) and TPWD (2025c).

3.6.5.2.1 San Marcos Salamander

The San Marcos salamander is a small, slender salamander that is strictly aquatic and retains its external gills throughout life. This species is found along the headwaters of the San Marcos River and in Spring Lake (USFWS 2025e). They are typically found near the surface and in subterranean aquatic habitats. This species prefers cobble, gravel, and boulder substrates and moss and algae for hiding and finding food (USFWS 2025f). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.2.2 Texas Blind Salamander

The Texas blind salamander is a smooth, unpigmented, subterranean species that is strictly aquatic. This eyeless species can be found in water-filled subterranean caverns of the Edwards Aquifer in the San Marcos area. This species is known to move through the aquifer, traveling along submerged ledges and preying on invertebrates (USFWS 2025g). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.2.3 Cokendolpher Cave Harvestman

The Cokendolpher cave harvestman is a small, eyeless, troglobitic harvestman endemic to a restricted range of karst landscape within northern Bexar County, in Robber Baron Cave (USFWS 2020a). Robber Baron Cave runs underneath a heavily urbanized area in the City of San Antonio. This species is part of the nine

federally listed karst species within Bexar County that rely on a cave's deeper zone habitat, which consists of a stable microclimate of moisture, temperature, and humidity (USFWS 2011). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.2.4 Government Canyon Bat Cave Meshweaver

The Government Canyon bat cave meshweaver is a small, eyeless, troglobitic arachnid endemic to northern Bexar County in the Government Canyon State Natural Area and the Culebra Anticline (geologic feature) within restricted karst landscapes (USFWS 2019b). This species is part of the nine federally listed karst species within Bexar County that relies on a cave's deeper zone habitat, which consists of a stable microclimate of moisture, temperature, and humidity (USFWS 2011). There is USFWS critical habitat associated with this species within the Study Area in Bexar County (USFWS 2025b). This species is likely to occur in the southeast portion of the Study Area, which encompasses the Government Canyon State Natural Area and the Culebra Anticline.

3.6.5.2.5 Government Canyon Bat Cave Spider

The Government Canyon bat cave spider is a small, eyeless, troglobitic arachnid. Its only known location is within the Government Canyon State Natural Area (USFWS 2021a). This species is part of the nine federally listed karst species within Bexar County that rely on a cave's deeper zone habitat, which consists of a stable microclimate of moisture, temperature, and humidity (USFWS 2011). There is USFWS critical habitat associated with this species within the Study Area in Bexar County (USFWS 2025b). This species is likely to occur within the southeastern portion of the Study Area, which encompasses the Government Canyon State Natural Area.

3.6.5.2.6 Madla Cave Meshweaver

The Madla Cave meshweaver is a small, eyeless, troglobitic arachnid that can be found in karst landscapes in a handful of caves within northern Bexar County (USFWS 2019c). This species is part of the nine federally listed karst species within Bexar County that rely on a cave's deeper zone habitat, which consists of a stable microclimate of moisture, temperature, and humidity (USFWS 2011). There is USFWS critical habitat associated with this species within the Study Area (USFWS 2025b). This species is likely to occur within the southeastern portion of the Study Area within Bexar County.

3.6.5.2.7 Robber Baron Cave Meshweaver

The Robber Baron Cave meshweaver is a small, eyeless, troglobitic arachnid endemic to a restricted range in the karst landscape of northern Bexar County (USFWS 2020b). This species is part of the nine federally

listed karst species within Bexar County that relies on a cave's deeper zone habitat, which consists of a stable microclimate of moisture, temperature, and humidity (USFWS 2011). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.2.8 Golden-cheeked Warbler

The GCW is a small migratory songbird. This species is 4.5 to 5 inches long with a wingspan of approximately 8 inches. Male GCWs have yellow cheeks containing a black stripe through the eye, and a black cap, throat, and back. Females are similar to males in pattern, although less colorful. Both sexes have white bellies with a black streak on their flanks (Campbell 2003). GCWs breed within a 35-county area in central Texas from March to September. GCWs generally arrive at their breeding grounds in central Texas in March and typically begin their fall migration as early as July and August or as late as September, overwintering in the highlands of southern Mexico and Central America. This species breeds exclusively in dense, mature Ashe juniper/deciduous woods within the Edwards Plateau and Cross Timbers ecoregions of Texas (USFWS 2025h). Preferred breeding habitat typically consists of dense, mature mixed Ashe Juniper-oak woodlands. High percentages of mature Ashe juniper are characteristic of the preferred breeding habitat with additional dominant trees species such as Texas red oak, plateau live oak, shin oak (*Quercus. sinuata var. beviloba*), Vasey oak, and Lacey oak (Mueller et al. 2022).

This species is known to occur within the Study Area within Bandera, Bexar, Edwards, Kerr, Kimble, Kinney, Medina, Real, and Uvalde counties. Numerous EOs are documented within the eastern portion of the Study Area (TPWD 2025d). This species is likely to occur within the Study Area where suitable habitat is present.

3.6.5.2.9 Mexican Spotted Owl

The Mexican spotted owl is considered one of the largest owls in North America. This species inhabits mixed coniferous forests and steep canyons of the southwest mountainous regions of Colorado, Arizona, Utah, New Mexico, and parts of western Texas (USFWS 2025i). Owls typically roost during the day and hunt at dusk and at night. They may occasionally leave the roost during the day to capture prey beneath it, or to drink or bathe. Their habitat is characterized as a complex structure of mature, old-growth forests on steep slopes and canyons with rocky cliffs. This species is known to occur in the Guadalupe, Davis, and Chisos mountains of west Texas (USFWS 2012). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.2.10 Northern Aplomado Falcon

The northern aplomado falcon is a large falcon with black and white facial stripes and tricolored underparts. This species' habitat once extended from Trans-Pecos, Texas, southern New Mexico, and southeastern Arizona to Chiapas and the northern Yucatan along the Gulf of Mexico, and along the Pacific slope of Central America north of Nicaragua. However, numbers have declined and are considered absent from most of its range in the United States, with only a few sightings reported. There are currently three known populations of northern aplomado falcons, one in coastal Texas, one in the Chihuahuan Desert (United States and Mexico), and one in the tropical lowlands of Mexico. Preferred breeding and nesting habitat in coastal Texas is considered treeless, yucca-studded, herbaceous-dominated communities, including irregularly flooded estuarine marsh, salty prairie, and deep-sand grasslands (USFWS 2024b). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.2.11 Piping Plover

The piping plover is a small migratory shorebird that nests within the Great Lakes, Northern Great Plains, or Atlantic Coast (USFWS 2025j). Primary fall migration to Texas is from July to early September, while spring migration occurs from March to early May. Piping plovers are common to locally uncommon winter residents along the Gulf of Mexico coastline (Lockwood and Freeman 2014). Multiple large lakes, ponds, streams, and other aquatic features occur within the Study Area that could be utilized for habitat by the piping plover during winter migration. This species may occur within the Study Area as a transient migrant wherever suitable habitat is present; however, this species only needs to be considered for wind energy or wind-related projects (USFWS 2025b).

3.6.5.2.12 Rufa Red Knot

Rufa red knots are migratory and breed in the drier arctic tundra areas, while overwintering takes place along shorelines of the Gulf of Mexico and Central and South America. Spring migration occurs in large flocks and takes place from April to June. Preferred habitat includes the shoreline of coasts and bays and sometimes inland mudflats (USFWS 2021b). Their primary prey items are small mussels, clams, snails, and other invertebrates. Due to the species' ability to travel thousands of miles without stopping, and the Study Area's distance from important migration stopover areas (USFWS 2021b), it is not likely that this species will occur within the Study Area. Furthermore, this species only needs to be considered for wind energy or wind-related projects (USFWS 2025b)

3.6.5.2.13 Southern Willow Flycatcher

The southern willow flycatcher is a small species, averaging a little less than 6 inches long, including the tail. These birds are brownish-olive to gray-green above and have whitish throats, pale olive breasts, and a yellowish belly. These birds are summer breeders within their range in the United States, and winter in Central America. For nesting, this species requires dense riparian habitats with cottonwood/willow species and tamarisk vegetation and microclimatic conditions that are dictated by the local surroundings. Saturated soils, standing water, or nearby streams, pools, or cienegas influence the microclimate and vegetation density. Habitat not suitable for nesting may be used for migration and foraging. Recurrent flooding and a natural hydrograph are important to withstand invading non-native species such as tamarisk (USFWS 2025k). Breeding habitat currently ranges from southern California through southern Nevada, southern Utah, Arizona, New Mexico, and southwestern Colorado, and historically included western Texas and extreme northwestern Mexico. While their current distribution is similar to their historic range, southwestern willow flycatcher population numbers have declined in response to the loss of suitable riparian habitat throughout the region (NPS 2016). This species is not likely to occur within the Study Area because it is outside the species' current range.

3.6.5.2.14 Whooping Crane

The whooping crane breeds at Wood Buffalo National Park in Canada and overwinters primarily in marshes at Aransas National Wildlife Refuge on the Texas coast (USFWS 2025l). Family groups of whooping cranes have also been documented overwintering further inland in Central Texas, south-central Kansas, and central Nebraska, possibly in response to record warm temperatures and extreme drought conditions in the southern and central United States (Wright et al. 2014). Winter migration primarily occurs within a 200-mile-wide migratory corridor in which 95 percent of all whooping crane sightings occur. Migration stopover sites typically include small surface waters with emergent vegetation cover, harvested grainfields, pastures, or burned upland fields (Urbanek and Lewis 2020). The majority of the whooping cranes' migration corridor is east of the Study Area. In addition, the whooping crane was not listed on the IPaC for the Study Area (USFWS 2025b). Therefore, this species is not likely to occur within the Study Area.

3.6.5.2.15 Yellow-billed Cuckoo

The yellow-billed cuckoo is a slender, long-tailed bird with bold white spots on the tail's underside. Its habitat ranges throughout much of the United States in summer. In west Texas, this species prefers dense, shrubby desert riparian woodlands of various species (Hughes 2020). This species is a locally uncommon to rare migrant and summer resident in the Trans-Pecos (Lockwood and Freeman 2014). This species may occur within the Study Area where suitable habitat is present.

3.6.5.2.16 Balcones Spike

The Balcones spike is a small- to medium-sized freshwater mussel that occurs in the Brazos and Colorado river basins. They are most commonly observed in riffles, streams, and rivers. The species prefers slow to moderate waterflows with sand, gravel, or cobble substrates. They require red shiners and blacktail shiners as their host fish. The current range includes the Little River (and some tributaries), Lower San Saba River, and Llano River (USFWS 2022a). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.2.17 False Spike

The false spike is a medium-sized freshwater mussel endemic to the Guadalupe River Basin between Gonzales and Victoria, Texas. The False spike occurs in larger creeks and rivers with moderately to slowly flowing water with mixtures of sand, gravel, or cobble substrates. The species requires flowing water with very low salinity to support shell growth (USFWS 2025m). The only known remaining population of false spike occurs in the Lower Guadalupe River. Therefore, this species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.2.18 Guadalupe Fatmucket

The Guadalupe fatmucket was recently discovered to be a separate species from the Texas fatmucket. The USFWS considers this a new species that occurs only in the Guadalupe River Basin. Because the Guadalupe fatmucket is so similar to the Texas fatmucket and little information is known about the two, it is considered that the Guadalupe fatmucket likely has the same habitat needs as the Texas fatmucket, headwater habitats in gravel or bedrock fissures, and utilizes sunfishes as host fishes. The Guadalupe fatmucket is currently restricted to one population in the Guadalupe River basin and is found in low numbers in Kerr and Kendall counties (USFWS 2022a). There is one record of the Guadalupe fatmucket in Kerr County within the Study Area (TPWD 2025d). Additionally, there is designated critical habitat for this species within Kerr County within the Study Area. This species is likely to occur within the Study Area where suitable habitat is present.

3.6.5.2.19 Guadalupe Orb

The Guadalupe orb is a small freshwater mussel found in riffles and runs of moderately sized rivers in water depths of 0.5 to 1.0 meter and substrates of mud, silt, gravel, and cobble. It is occasionally found in bedrock crevices and fissures. There are two known remaining populations, one in the upper Guadalupe River and one in the San Marcos and lower Guadalupe River (USFWS 2022a). There is designated critical habitat for this species within Kerr County within the Study Area. This species is likely to occur within the Study Area where suitable habitat is present.

3.6.5.2.20 Mexican Fawnsfoot

The Mexican fawnsfoot is a freshwater mussel that was historically known to occur in the middle to lower Rio Grande River basin in the United States and Mexico, but has since been reduced to a single population in the Rio Grande River downstream of Eagle Pass, Texas. The species occurs in medium to large rivers, in or adjacent to riffle and run habitats, and in stream bank habitats. Preferred substrates include clay, silt, sand, and crevices that provide flow refuge (USFWS 2025n). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.2.21 Salina Mucket

The Salina mucket inhabits medium to large rivers, typically in nearshore habitats within crevices and beneath large rocks and boulders. Preferred substrates include clay, silt or sand, and crevices suitable for anchoring (USFWS 2025o). This species is endemic to the lower Rio Grande system and is currently only known to occur upstream of Lake Amistad in the main stem Rio Grande River. While extreme drainage alterations have significantly affected this species' populations, they may still occur in the tributaries of the Rio Grande within the Study Area, where suitable habitat is present.

3.6.5.2.22 Texas Fatmucket

The Texas fatmucket is endemic to tributaries of the Colorado River in central Texas (USFWS 2022a). This mussel inhabits flowing streams and rivers with substrates of stable sand, firm mud, and gravel bottoms. In shallower waters, they can be found among the roots of bald cypress trees. This species requires a host fish for survival, including the Guadalupe Bass (USFWS 2025p). There is designated critical habitat for this species within Kimble and Sutton counties within the Study Area. This species is likely to occur within the Study Area where suitable habitat is present.

3.6.5.2.23 Texas Fawnsfoot

The Texas fawnsfoot is a small mussel endemic to the Colorado, Brazos, and Trinity river basins of central Texas. This species is found in flowing, medium- to large-sized streams with substrates of mud, sand, and gravel. They are often found in bank habitats or point bar habitats during high water events (USFWS 2025q). Currently, this species occurs in the lower reaches of the Colorado and Brazos rivers, as well as the main stem of the Trinity River (USFWS 2022a). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.2.24 Texas Hornshell

The Texas hornshell occurs within small streams to large rivers in slow to moderate current over bedrock and areas where small-grained materials collect, such as in crevices or around the bases of boulders. Historically, most populations were likely connected by fish migration throughout the Rio Grande River, upstream to the Pecos River, and throughout the tributaries, but due to impoundments and river reaches with unsuitable water quality, it is believed that they are isolated from one another. The species relies on host fish such as the river carpsucker, red shiner, and gray redhorse for survival (USFWS 2018a). There are seven records of the Texas hornshell in Val Verde County within the Study Area (TPWD 2025d). Additionally, there is designated critical habitat for this species within Crockett, Terrell, and Val Verde counties within the Study Area. This species is likely to occur within the Study Area where suitable habitat is present.

3.6.5.2.25 Texas Pimpleback

The Texas pimpleback is endemic to the Colorado River and its tributaries in central Texas. This species occurs in medium- to large-sized streams and rivers in riffle and run habitats of various substrates. They will occasionally inhabit gravel-filled cracks in the bedrock and are not known to tolerate impoundments (USFWS 2025r). Currently, this species is located in the Lower Concho River, Upper San Saba River, Lower San Saba and Middle Colorado River, Llano River, and Lower Colorado River, and there is one isolated population in Bluff Creek (USFWS 2022a). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.2.26 Peck's Cave Amphipod

The Peck's cave amphipod is a groundwater obligate invertebrate that inhabits subterranean areas and gravel near springs. These amphipods typically inhabit the space beneath leaf substrate or interstitial spaces between rocks, displaying a preference for shelter rather than swimming freely or being exposed at the surface (USFWS 2024c). This species is known to occur in the headwaters of the Comal Spring complex and Hueco Springs, fed by the Edwards Balcones Fault Zone Aquifer (USFWS 2025s). This species is reclusive in nature, as individuals spend most of their lives underground. Therefore, no population estimates are available. Additionally, various surveys of springs, caves, and wells in Comal, Hays, and Bexar counties did not find any Peck's Cave amphipod, aside from those found in Comal Springs and Hueco Springs. This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.2.27 Pecos Amphipod

The Pecos amphipod inhabits the Diamond Y Spring system, a complex of isolated, desert freshwater springs, seeps, and associated cienegas in the Chihuahuan Basin and Playas ecoregion of western Texas (USFWS 2019d). The species cannot survive without the presence of permanently flowing springs. Additionally, they can occur in microhabitats, including gravel and underneath rocks or vegetation (USFWS 2024d). The Diamond Y Spring system is situated within the Study Area in Pecos County and is designated as a critical habitat for the species. This species may occur within the Study Area along Diamond Y Springs where suitable habitat is present.

3.6.5.2.28 Comanche Springs Pupfish

The Comanche Springs pupfish is a small fish that is generally adapted to harsh desert conditions and is able to tolerate a range of temperatures and salinities. This species is restricted to a small series of springs and their outflows and manmade irrigation canals in the area of Balmorhea, Texas, including Phantom Springs (Jeff Davis County), San Solomon Springs, Giffin Springs, Clark Hubbs Cienega, and potentially Toyah Creek (Reeves County) (USFWS 2024e). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.2.29 Devils River Minnow

The Devils River minnow is a small fish found in channels of fast-flowing, spring-fed waters over gravel substrates. The species mostly occurs where the spring flow enters a stream, rather than in the spring outflow itself. Habitat loss and degradation (water quantity and quality) and impacts from nonnative species have been a major threat to the species (USFWS 2025t). Currently, this species occurs in the Devils River and its tributaries (Phillips Creek and Dolan Creek), and several tributaries to the Rio Grande River, including San Felipe, Pinto, Ciénegas, Sacatosa, Sycamore, Mud, and Las Moras creeks (USFWS 2025u). There are four records of the Devils River minnow in Kinney and Val Verde counties within the Study Area (TPWD 2025d). Additionally, there is designated critical habitat for this species within Kinney County along the Pinto Creek within the Study Area. This species may occur within the Study Area where suitable habitat is present.

3.6.5.2.30 Fountain Darter

The fountain darter is a species of perch that is endemic to the San Marcos and Comal river headwaters in Hays and Comal counties, Texas (USFWS 2025v). It inhabits clear waters with aquatic vegetation and constant water temperatures. Diet consists of small crustaceans and insect larvae. Fountain darters are often

associated with algae mats (Thomas et al. 2007). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.2.31 Leon Springs Pupfish

The Leon Springs pupfish is a small species of fish endemic to natural spring-fed, slow-flowing water, marshes, and pools in Pecos County. Preferred substrates include mud and aquatic plant roots. Their diet includes ingesting detritus and mud (Campbell 2003). This species is only known to occur at Diamond Y Spring and Leon Creek, north of the City of Fort Stockton (USFWS 2024f). There are three documented records of the Leon Springs pupfish in Pecos County within the Study Area (TPWD 2025d). Additionally, there is designated critical habitat for this species within Pecos County along Leon Creek within the Study Area. This species may occur within the Study Area where suitable habitat is present.

3.6.5.2.32 Mexican Blindcat

The Mexican blindcat is a catfish that inhabits subterranean freshwater cave environments in northern Mexico and Texas (Val Verde County), within portions of the Edwards-Trinity Aquifer. This species is typically found in sinkholes, caves, and underground rivers with silt substrates in temperatures of 21 degrees (°) Celsius (C) to 31.5°C (TPWD 2025c). In 2016, this species was discovered in the Amistad National Recreational Area north of Del Rio, Texas (Levihn-Coon 2022). This species is not likely to occur within the Study Area because it is outside the species' current known range.

3.6.5.2.33 Pecos Gambusia

The Pecos gambusia is a small fish that inhabits spring-fed pools, runs, downstream areas, sedge-covered marshes, and gypsum sink holes. These waterbodies must have relatively constant temperatures and abundant overhead cover. The species is an opportunistic feeder, primarily a surface feeder, including insects, small invertebrates, and some filamentous algae (Campbell 2003). Currently, this species occurs in the Diamond Y Spring system (Pecos County) and localities in the Balmorhea area within Texas (USFWS 2018b). There are three EOs within the Study Area in Pecos County (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.2.34 Pecos pupfish

The Pecos pupfish is found in a variety of habitats ranging from saline springs, wetlands, waterfowl impoundments, gypsum sinkholes, and desert streams with high salinity (USFWS 2024g). Their diet consists of detritus, macrophytes, sand, and seeds. In Texas, the species has historically been found within the Pecos River and its adjacent waters. However, this species is considered extirpated from the entirety of

the Pecos River south of Brantley Reservoir (USFWS 2024g). There are five EOs within the Study Area, three in Pecos County, one in Terrell County, and one in Crockett County (TPWD 2025d). However, these species were last observed from 1980 to 1985. This species is not likely to occur within the Study Area because it is outside the species' current known range.

3.6.5.2.35 Toothless Blindcat

The toothless blindcat is an eyeless catfish that is found in the groundwater of the Edwards Balcones Fault Zone Aquifer beneath San Antonio. This species has been captured through agricultural wells and artesian springs (USFWS 2025w). Physical spaces used by this species consist of water-filled caves, fissures, fractures, and other voids of varying diameters (USFWS 2022b). There are two EOs within the Study Area in Bexar County; however, the last documented EO of this species within the Study Area was in 1977 (TPWD 2025d). Known occupied habitat exists within the Study Area; therefore, this species may occur within the Study Area where suitable habitat is present.

3.6.5.2.36 Widemouth Blindcat

The widemouth blindcat is an eyeless catfish that is found in the groundwater of the Edwards Balcones Fault Zone Aquifer beneath San Antonio. This species has been captured through agricultural wells and artesian springs (USFWS 2025x). Physical spaces used by this species consist of water-filled caves, fissures, fractures, and other voids of varying diameters (USFWS 2022b). There is one EO within the Study Area in Bexar County, which occurred in 1985 (TPWD 2025d). Known occupied habitat exists within the Study Area; therefore, this species may occur within the Study Area where suitable habitat is present.

3.6.5.2.37 [no common name] Beetle (*Rhadine exilis*)

This beetle is a small, eyeless ground beetle with a slender body, approximately 7.4 millimeters long, which inhabits karstic formations of Bexar County. The beetle is currently known to inhabit approximately 50 caves in north and northwest Bexar County (USFWS 2021c). Habitat consists of underground honeycomb limestone that maintains high humidity and stable temperatures (USFWS 2011). There is critical habitat for this species within the Study Area in Bexar County. This species may occur within the Study Area where suitable habitat is present.

3.6.5.2.38 [no common name] Beetle (*Rhadine infernalis*)

This species is a small reddish-brown ground beetle that is known as an opportunistic feeder (Eckhardt 2025). The beetle inhabits karstic formations of Bexar County. The beetle is currently known to inhabit 12 cave clusters and 25 individual caves (USFWS 2021d) in north and northwest Bexar County. There is

critical habitat for this species within the Study Area in Bexar County. This species may occur within the Study Area where suitable habitat is present.

3.6.5.2.39 Comal Springs Dryopid Beetle

The Comal Springs dryopid beetle is a small, eyeless aquatic insect with a slender body and a length of 3 to 3.7 millimeters. The beetle is unable to swim. The larvae inhabit the ceilings of spring openings where organic soil and roots are present. This species has been identified within and around Comal Springs, Fern Bank Springs, and Sessom Springs (USFWS 2024h). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.2.40 Comal Springs Riffle Beetle

The Comal Springs riffle beetle is approximately 2 millimeters long, with a reddish-brown exoskeleton. Its diet typically consists of detritus and microorganisms (USFWS 2024i). It is restricted to springs within the Edwards Aquifer and is only known to occur near headwaters of the Comal and San Marcos rivers; it is not considered subterranean species (USFWS 2024i). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.2.41 Helotes Mold Beetle

The Helotes mold beetle is a small eyeless beetle endemic to karst features in northern Bexar County. The species requires subterranean habitats with high humidity and stable temperatures (USFWS 2019e). It has been documented in eight caves near Helotes, Texas, northwest of San Antonio. This species is a cave obligate, growing up to 2.4 millimeters long and is believed to be predatory in nature (USFWS 2019e). This species may occur within the Study Area where suitable habitat is present.

3.6.5.2.42 Monarch Butterfly

The monarch butterfly ranges from North and South America to the Caribbean, Australia, New Zealand, the Pacific islands, and Western Europe. The species has been proposed threatened for protection under the ESA due to decreasing populations and habitat loss. Eastern and western monarch populations migrate both north and south on an annual basis. Populations usually overwinter in Mexico, Florida, and California and then spend the spring and summer months migrating back north. The entire migration cycle lasts for four generations of monarchs and no individual makes the round trip. Monarchs are heavily dependent on milkweed plants for nectar and larval consumption. Preferred overwintering habitat includes appropriate roosting vegetation, dense tree cover, access to streams, and warm enough temperatures to allow for flight (USFWS 2025y). The Study Area is located along the spring and fall eastern monarch butterfly migratory

route (USFWS 2025z). This species is likely to occur within the Study Area as a migrant where suitable habitat is present.

3.6.5.2.43 Ocelot

The ocelot is a feline that avoids open areas and prefers dense (75 to 95 percent canopy coverage); thorny, low brush such as spiny hackberry, lotebush, and blackbrush acacia; and dense creosote bush thickets, mesquite-thorn scrub, and live oak motte habitats. Estimated minimum habitat patch size to sustain an ocelot is 65 acres. The ocelot was once distributed throughout South Texas, the southern Edwards Plateau, and along the Coastal Plain, but its current range is restricted to Willacy and Kenedy counties (one population on private land) and Cameron County on the Laguna Atascosa National Wildlife Refuge (USFWS 2016), which are both over 100 miles from the Study Area. There is one EO within the Study Area in Kinney County; however, this EO was documented in 1989 to 2009 (TPWD 2025d). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.2.44 Tricolored Bat

On September 13, 2022, the USFWS announced the proposal to list the tricolored bat as endangered by the ESA due to the impacts of white-nosed syndrome. The tricolored bat has an expansive range throughout eastern and central North America, occupying many types of roost sites and locations. Individuals typically forage alongside trees and forest perimeters, in forested riparian corridors, and along waterways adjacent to forested areas (USFWS 2025aa). While historically associated with forested areas, this species is an opportunistic generalist and will utilize a multitude of habitats and structures where potential roosting may be close to foraging habitat. Non-reproductive individuals have a propensity to select roost sites within mature stands of trees or near buffer zones near perennial streams. Maternity and summer roost sites utilize dead trees and live tree foliage and manmade structures or tree cavities. Caves, mines, and rock crevices may also be utilized between foraging arrays. Winter hibernation sites occur within caves, mines, cave-like tunnels, and sometimes within box culverts underneath highways adjacent to forested areas (USFWS 2025aa). Due to its opportunistic behavior, this species may occur within the Study Area where suitable habitat is present.

3.6.5.2.45 Diamond Tryonia

The diamond tryonia is a tiny freshwater snail historically found along the outflow stream margins and lateral springs of the Diamond Y Spring in Pecos County. This species occurs in mud substrates on the margins of springs and in flowing water of marshes associated with sedges and cattails. Anthropogenic disturbances to groundwater flow heavily impact this species (USFWS 2020c). There is critical habitat for

this species within the Study Area. This species may occur within the Study Area along Diamond Y Springs and Leon Creek where suitable habitat is present.

3.6.5.2.46 Gonzales Tryonia

The Gonzalez tryonia is a tiny freshwater snail historically found along the outflow stream margins and lateral springs of the Diamond Y Spring in Pecos County. Similar to the Diamond Tryonia, this species occurs in mud substrates on the margins of springs and in flowing water of marshes associated with sedges and cattails. Anthropogenic disturbances to groundwater flow heavily impact this species (USFWS 2020c). There is one EO within the Study Area in Pecos County (TPWD 2025d). Additionally, there is critical habitat for this species within the Study Area at Diamond Y Springs. This species may occur within the Study Area where suitable habitat is present.

3.6.5.2.47 Pecos Assiminea Snail

The Pecos assiminea snail is found in a few locations along the Pecos River basin. This species is associated with permanent spring run wetland habitats composed of saturated mud and plant communities. Plant communities include saltgrass (*Distichlis spicata*), common reed (*Phragmites australis*), and spike rushes (*Eleocharis* spp.). The Pecos assiminea snail is typically found near the surface of the soil beneath mats of vegetation and plant litter (USFWS 2025ab). There is one EO within the Study Area in Pecos County (TPWD 2025d). Additionally, there is critical habitat for this species within the Study Area. This species may occur within the Study Area along Diamond Y Springs where suitable habitat is present.

3.6.5.2.48 Phantom Tryonia

The Phantom tryonia is an endemic aquatic snail known from only three spring systems (Phantom Lake, San Salomon Springs, and East Sandia Spring) and associated outflows in Jeff Davis and Reeves counties (USFWS 2023c). However, loss of spring habitat due to declining levels of groundwater has been the most significant threat to this species (USFWS 2023c). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.3 State-Listed Fish and Wildlife Species

State-listed wildlife species receive protection under state laws such as Chapters 67, 68, and 88 of the TPWD Code and sections 65.171–65.184 and 59.01-69.14 of Title 31 of the TAC. Thirty-one species are protected at the state level and designated as threatened or endangered within the Study Area counties (Table 3-11). Species that were identified in the RTEST report at a county level that are federally listed are included in Table 3-10 (TPWD 2025c).

Table 3-11: State-listed Threatened and Endangered Species for the Study Area Counties

Common Name	Scientific Name	Status	Potential for Occurrence in the Study Area
		TPWD	
Amphibians			
Cascade Caverns salamander	*Eurycea latitans*	Threatened	May occur
Texas salamander	*Eurycea neotenes*	Threatened	May occur
Birds			
Common black-hawk	*Buteogallus anthracinus*	Threatened	May occur
Interior least tern	*Sternula antillarum athalassos*	Endangered	May occur
Tropical parula	*Setophaga pitiayumi*	Threatened	May occur
White-faced ibis	*Plegadis chihi*	Threatened	May occur
White-tailed hawk	*Buteo albicaudatus*	Threatened	May occur [a]
Wood stork	*Mycteria americana*	Threatened	May occur[a]
Zone-tailed hawk	*Buteo albonotatus*	Threatened	May occur
Fish			
Conchos pupfish	*Cyprinodon eximius*	Threatened	May occur
Frio roundnose minnow	*Dionda serena*	Threatened	May occur
Guadalupe darter	*Percina apristis*	Threatened	Not likely
Headwater catfish	*Ictalurus lupus*	Threatened	May occur
Medina roundnose minnow	*Dionda nigrotaeniata*	Threatened	May occur
Plateau shiner	*Cyprinella lepida*	Threatened	May occur
Proserpine shiner	*Cyprinella proserpina*	Threatened	May occur
Rio Grande darter	*Etheostoma grahami*	Threatened	May occur
Rio Grande shiner	*Notropis jemezanus*	Threatened	May occur
Roundnose minnow	*Dionda episcopa*	Threatened	May occur
Speckled chub	*Macrhybopsis aestivalis*	Threatened	May occur
Spotfin gambusia	*Gambusia krumholzi*	Threatened	Not likely
Tamaulipas shiner	*Notropis braytoni*	Threatened	May occur
Mammals			
Black bear	*Ursus americanus*	Threatened	May occur
White-nosed coati	*Nasua narica*	Threatened	May occur[a]
Reptiles			
Cagle's map turtle	*Graptemys caglei*	Threatened	May occur
Texas horned lizard	*Phrynosoma cornutum*	Threatened	May occur
Texas tortoise	*Gopherus berlandieri*	Threatened	May occur
Trans-Pecos black-headed snake	*Tantilla cucullata*	Threatened	May occur
Snails			
Caroline's springs pyrg	*Pyrgulopsis ignota*	Threatened	May occur
Carolinae tryonia	*Tryonia oasiensis*	Threatened	May occur
Crowned cavesnail	*Phreatodrobia coronae*	Threatened	May occur

Source: TPWD (2025c).
(a) Could occur within the Study Area as a migrant or on rare occasions.

3.6.5.3.1 Cascade Caverns Salamander

The Cascade Caverns salamander is a small amphibian endemic to Texas and restricted to springs and karst aquatic habitats within the Edwards-Trinity Aquifer system that underlays the Edwards Plateau in Bexar, Comal, and Kendall counties. This species requires access to surface and subsurface aquatic habitats year-round that are flowing, and chemical components should be in the normal range of natural conditions (USFWS 2025ac). There is no well-defined distribution area for this species outside of karstic systems in and around the aforementioned counties. Therefore, this species may occur within the Study Area where suitable habitat is present.

3.6.5.3.2 Texas Salamander

The Texas salamander is a small amphibian endemic to Texas and restricted to springs and karst aquatic habitats in Bexar and Kendall counties (Hillis et al. 2015). This species is a neotenic with short, moderately stout legs, with a long and slender bright red gill filament and narrow tail fins (Brown 1967). There is one EO within the Study Area in Bexar County (TPWD 2025d). This species may occur within the Study Area wherever suitable habitat is present.

3.6.5.3.3 Common Black-Hawk

The common black-hawk is a raptor that ranges in length from 16.9 to 22.1 inches and has broad wings; a wide tail; a heavy, hooked bill; and thick, long legs with large talons. They typically inhabit wooded stream corridors in canyons and deserts in the United States and northern Mexico (All about Birds 2025a). A majority of common black-hawks are usually non-migratory in most of their range, but some populations do migrate to the United States (including West Texas) to breed between March and October (Audubon 2025). Nests are set in forks in large trees, often cottonwood, American sycamore, or willow, along the edge of a river. This species may occur as a breeding migrant within the Study Area where suitable habitat is present.

3.6.5.3.4 Interior Least Tern

The interior least tern is the smallest North American tern that averages 8 to 10 inches in length, with a 20-inch wingspan. This species uses a wide array of habitat types for foraging, including large rivers, lakes, ponds, and shallow wetlands (TPWD 2025j). However, nesting habitat is more specific, where they construct nests on the ground and require open areas of sand and gravel that are largely devoid of vegetation. The interior least tern is migratory, breeding along inland river systems in the United States and wintering along the Central American coast and the northern coast of South America from Venezuela to northeastern Brazil. In Texas, interior least terns are found at three reservoirs along the Rio Grande River: on the

Canadian River in the northern Panhandle, on the Prairie Dog Town Fork of the Red River in the eastern Panhandle, and along the Red River (Texas/Oklahoma boundary) into Arkansas (TPWD 2025j). Additionally, this species has been documented since 1989 as a breeding migrant from April to August at Amistad National Wildlife Refuge along the Devils River, Rio Grande, Castle Cayon, and San Pedra Canyon/Island (NPS 2018). This species may occur within the Study Area near the Amistad Reservoir as a breeding migrant where suitable habitat is present.

3.6.5.3.5 Tropical Parula

The tropical parula is a small warbler that is found from South Texas to northern Argentina. They are typically found in riparian forests, mountain oak forests, arid thorn forests, mangroves, tropical evergreen forests, cloud forests, rainforests, second-growth areas, woodland edges, and even gardens. Most populations are considered non-migratory, except the northernmost breeding populations (those in south Texas). Nests are built in trees, often 7 to 43 feet off the ground and are typically created by hollowing out a ball of moss, other epiphytes, or lichens, resulting in a domed structure (All about Birds 2025b). Tropical Parula EOs are documented along the southern Edwards Plateau on the Devils River in Val Verde County (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.3.6 White-faced Ibis

The white-faced ibis is a medium-sized wading bird that ranges in length from 18.1 to 22.1 inches and breeds and winters along the Texas Gulf Coast. Other breeding populations occurring in the northwestern United States migrate south to overwinter along the Gulf Coast and in Central America. Preferred habitat includes swamps, ponds, rivers, sloughs, irrigated rice fields, freshwater marsh, and sometimes brackish and saltwater marsh. This species is a colonial nester and forages on insects, newts, leeches, earthworms, snails, crayfish, frogs, and fish (All about Birds 2025c). This species may occur within the Study Area as a temporary migrant where suitable habitat is present.

3.6.5.3.7 White-tailed Hawk

The white-tailed hawk is an uncommon to locally common resident in the Coastal Prairies and southeastern South Texas Brush County (Lockwood and Freeman 2014). Along the coast, this species is known to occupy prairies, cordgrass flats, and scrub-live oak. Further inland, the species may occupy prairie, mesquite and oak savanna, and mixed savanna-chaparral (All about Birds 2025d). This species may occur as a rare temporary migrant on the eastern side of the Study Area where suitable habitat is present.

3.6.5.3.8 Wood Stork

The wood stork is a colonial bird that breeds in Florida, Georgia, South Carolina, and Mexico. Nesting occurs in mangrove or cypress trees within brackish or freshwater swamp habitat. Post breeding, storks from Mexico migrate northward along the Mississippi River Valley. Migrating wood storks use prairie ponds, flooded pastures or fields, ditches, and other shallow standing water habitats to forage for fish and other small animals. This species usually roosts communally in tall snags and sometimes in association with other wading birds (Coulter et al. 1999). This species may occur as a rare temporary migrant on the eastern side of the Study Area where suitable habitat is present.

3.6.5.3.9 Zone-tailed Hawk

The zone-tailed hawk is a midsized Buteo that ranges from 17 to 22 inches in length. This species occupies a range of habitats and topographies from wet forests to dry, open scrub and deciduous forest to mountainous terrain and coastal plains in the southern half of the United States (Johnson et al. 2020). Zone-tailed hawks arrive in Texas between March and mid-May, and breeding occurs from March to July. Zone-tailed hawks are uncommon and local summer residents in their limited breeding range in Texas (Lockwood and Freeman 2014). There are three EOs within the Study Area in Bandera and Val Verde counties (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.3.10 Conchos pupfish

The conchos pupfish is a species of ray-finned fish that can grow up to 50 millimeters in length. In the United States, this species is typically found in sloughs, backwaters, marshes, and mouths of creek tributaries to larger rivers (NatureServe 2025c). Texas distribution includes the Devils River and Alamito Creek (Hendrickson and Cohen 2025a). There are five EOs within the Study Area in Val Verde County along the Devils River (TPWD 2025d). This species may occur within the Study Area along the Devils River where suitable habitat is present.

3.6.5.3.11 Frio Roundnose Minnow

The Frio roundnose minnow is a species of ray-finned fish that can grow up to 76 millimeters. This species is endemic to Texas and typically found within the headwaters of the Frio and Nueces river systems (Schönhuth et al. 2012). There are four EOs within the Study Area in Bandera, Real, and Uvalde counties (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.3.12 Guadalupe Darter

The Guadalupe darter is a species of ray-finned fish endemic to the Guadalupe River basin in Texas. This species occurs in gravelly runs in the Guadalupe River and its tributaries, and in the San Marcos and Blanco rivers (Hendrickson and Cohen 2025b). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.3.13 Headwater Catfish

The headwater catfish is likely an omnivore and bottom-feeder like other catfish. Headwater catfish are usually found in sandy and rocky riffles, runs, and pools of clear creeks, small rivers, and springs (NatureServe 2025d). This species is native to the Pecos and Rio Grande basins of Texas. Previous surveys identified headwater catfish in Independence Creek, Hinds Creek, and the Devils River (Hendrickson and Cohen 2025c). There are16 EOs within the Study Area in Crockett, Kerr, Kinney, Pecos, Real, Terrell, Uvalde, and Val Verde counties (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.3.14 Medina Roundnose Minnow

The Medina roundnose minnow is a freshwater ray-finned fish that can grow up to 90 millimeters in length. Habitat includes rocky pools of headwaters, creeks, and small rivers where filamentous algae grow (NatureServe 2025e). This species is endemic to spring-influenced headwaters in the Colorado and Guadalupe river basins (Hendrickson and Cohen 2025d). There are four EOs within the Study Area in Bandera and Kerr counties (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.3.15 Plateau Shiner

The plateau shiner is a species of freshwater ray-finned fish that can grow up to 75 millimeters in length. Habitat includes clear, cool springs and spring-fed headwater creeks, usually over gravel (NatureServe 2025f). This species is endemic to Texas, inhabiting the Frio and Sabinal rivers (Hendrickson and Cohen 2025e). There are seven EOs within the Study Area in Bandera, Kerr, Real, and Uvalde counties (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.3.16 Proserpine Shiner

The Proserpine shiner is a species of freshwater ray-finned fish that can grow up to 75 millimeters in length. This species is typically associated with spring-fed clear tributaries and spring-runs. This species is endemic to Texas within a limited range near the Devils and Lower Pecos rivers and Las Moras, Pinto, San Felipe,

and Independence creeks (Hendrickson and Cohen 2025f). There are 12 EOs within the Study Area in Crockett, Kinney, Pecos, Terrell, and Val Verde counties (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.3.17 Rio Grande Darter

The Rio Grande darter is a species of freshwater ray-finned fish that can grow up to 60 millimeters in length. This species typically inhabits clear rocky riffles and pools of creeks and small rivers, frequently in or near springs of the Edwards Plateau. They also occur in gravel or rubble areas and vegetated pools, and may hide among leaves and twigs (NatureServe 2025g). This species is believed to be restricted to the mainstream and spring-fed tributaries of the Rio Grande and Pecos rivers, and Dolan, San Felipe, and Sycamore creeks (Hendrickson and Cohen 2025g). There are 10 EOs within the Study Area in Terrell and Val Verde counties (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.3.18 Rio Grande Shiner

The roundhouse minnow is a species of freshwater ray-finned fish that can grow up to 75 millimeters in length. This species is typically found in low-gradient rivers or creeks that are large with substrates of rubble, gravel, and sand, often overlain with silt (NatureServe 2025h). This species is endemic to the Rio Grande River, occurring at the headwaters of the Rio Grande and Pecos rivers (Hendrickson and Cohen 2025h). There are three EOs within the Study Area in Terrell and Val Verde counties TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.3.19 Roundnose Minnow

The roundnose minnow is a species of freshwater ray-finned fish that can grow up to 76 millimeters in length. This species is typically found in rocky pools of headwaters, creeks, and small rivers where it often occurs among filamentous algae (NatureServe 2025i). This species is known to occur in the Pecos River and Limpia Creek in Texas (Hendrickson and Cohen 2025h). There are four EOs within the Study Area in Pecos County (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.3.20 Speckled Chub

The speckled chub is a species of freshwater ray-finned fish that can grow up to 90 millimeters in length. The speckled chub usually occurs in sand and gravel runs of small to large rivers (NatureServe 2025j). Their distribution ranges from the Rio Grande River between the confluence with the Rio Conchos and the

Pecos rivers (Hendrickson and Cohen 2025j). There are seven EOs within the Study Area in Crockett and Val Verde counties (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.3.21 Spotfin Gambusia

The spotfin gambusia is known to prefer densely vegetated stream edges or quiet water habitats in close association with areas of swift flows. This species is restricted to San Felipe Creek in Val Verde County, Texas (NatureServe 2025k). This species is not likely to occur within the Study Area because it is outside the species' known range.

3.6.5.3.22 Tamaulipas Shiner

The Tamaulipas shiner is a species of freshwater ray-finned fish that can grow up to 76 millimeters in length. This species is typically found in open weedless channels of rivers or large creeks with rubble, gravel, and sand bottoms, often overlain with silt. Water clarity may vary from clear to turbid, depending on the amount of rainfall. This species is restricted to the Rio Grande basin in Texas but also occurs in the lower Pecos River (Hendrickson and Cohen 2025k). This species may occur within the Study Area wherever suitable habitat is present.

3.6.5.3.23 Black Bear

Four subspecies of the black bear (*Ursus americanus*) can occur within Texas: the Mexican black bear (*Ursus americanus eremicus*) and New Mexico black bear (*Ursus americanus amblyceps*) in West Texas, Louisiana black bear (*Ursus americanus luteolus*) in East Texas, and Eastern black bear (*Ursus americanus americanus*), which may wander into northeastern Texas for a short time before returning to Arkansas or Oklahoma (TPWD 2025k). Suitable habitat for these species can range from bottomland hardwood forests and large tracts of inaccessible forested areas in East Texas to desert scrub along the rugged Chisos and Guadalupe mountains of the Trans Pecos region (TPWD 2025l). There are three EOs along the Crocket, Terrell, and Val Verde County lines (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.3.24 White-Nosed Coati

The white-nosed coati is a member of the raccoon family (*Procyonidae*) that inhabits cropland/hedgerows, mesquite grasslands, oak scrub, riparian corridors, and canyons of south and west Texas, but could once have been historically found throughout central Texas as well (Schmidly and Bradley 2016). Adult males are solitary, while females and young males travel in groups of 12 or more. White-nosed coatis are most

active during mornings and evenings when they forage for fruits, insects, birds, and small mammals on the ground and in tree canopies. Past sightings of this species occurred in and around Big Bend National Park, along the Devils River drainage, the Davis Mountains, and in Maverick County in South Texas (Schmidly and Bradley 2016). This species may occur along the Devils River drainage within the Study Area where suitable habitat is present.

3.6.5.3.25 Cagle's Map Turtle

The Cagle's map turtle's habitat range is limited to the Guadalupe and San Antonio river basins, inhabiting the Guadalupe, San Antonio, and San Marcos rivers. This species prefers rivers with slow to moderate flow and silt and gravel substrates. Optimal habitat includes riffles and pools (USFWS 2005b). There are two EOs within the Study Area in Kerr County (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.3.26 Texas Horned Lizard

The Texas horned lizard inhabits open, arid to semiarid regions with sparse vegetation including open desert, grasslands, and shrubland containing bunch grasses, cacti, and yucca. Preferred soils vary from pure sands and sandy loams to coarse gravels, conglomerates, and desert pavements (Henke and Fair 1998). Texas horned lizards are active from early spring to late summer and thermo-regulate by basking or burrowing into the soil. During winter inactivity periods, this species aestivates beneath the surface 6 to 12 inches deep under rocks, leaf litter, or abandoned animal burrows. Populations are thought to have decreased because of land use conversions, increased pesticide/herbicide use, collection, and increased fire ant populations. The Texas horned lizard forages primarily on the red harvester ant (*Pogonomyrmex barbatus*), but also consumes grasshoppers, beetles, and grubs (Dixon 2013; Henke and Fair 1998). There are four EOs within the Study Area: one in Bexar County, one in Terrell County, and two in Val Verde County (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.3.27 Texas Tortoise

The Texas tortoise is a long-lived species with a shell that has characteristically yellowish-orange, bluntly-horned scutes (shell plates). Habitat preferences include arid brush, scrub woods, and grass-cactus associations with grassy understories, often in areas with sandy, well-drained soils. The Texas tortoise is active from March to November, and when inactive, it occupies shallow depressions at the base of bushes or cacti, underground burrows, or under other suitable objects such as trash. The tortoise feeds on the fruits of prickly pear and other mostly succulent plants (TPWD 2025c). This species is known to occur from South-Central Texas southward into Mexico (TPWD 2025m). There is one EO within the Study Area in

Kerr County (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.3.28 Trans-Pecos Black-Headed Snake

The Trans-Pecos black-headed snake is a small, fossorial snake found in the Trans-Pecos region of Texas. It has a slender body typically measuring up to 55 centimeters in length (NatureServe 2025l). This species is found on rocky canyons or hillsides in mesquite-creosote and pinyon-juniper-oak forests, as well as grasslands (TPWD 2025c). There are five EOs occurring within the Study Area: four in Val Verde County and one in Pecos County (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.3.29 Caroline's Springs Pyrg

The Caroline's Springs Pyrg is a species of springsnail that measures approximately 1.3 to 1.5 millimeters in height and has around 3.5 whorls. The shell's color ranges from tan to orange. This species is endemic to Caroline Springs (also known as T5 Springs), which is located south of Sheffield. This species is found abundantly on cobbles in the outflow of ponds (NatureServe 2025m). Caroline's Springs Pyrg is found in Independence Creek Preserve, which has been owned and managed by The Nature Conservancy since 2000. This species may occur within the Study Area at Independence Creek Preserve, where suitable habitat is present.

3.6.5.3.30 Carolinae Tryonia

The Carolinae tryonia is a species of springsnail with a height of 3.52 millimeters that was discovered at a single site in a complex of large springs known as T5 Springs. This species was found along the edge of an outflow from one of the lower ponds. However, this species could not be found during two subsequent visits to the site in 2011. The status of this species is currently unknown (Hershler et al. 2011). This species may occur within the Study Area at Independence Creek Preserve.

3.6.5.3.31 Crowned Cavesnail

The crowned cavesnail is a small, blind, and unpigmented species of snail found in subterranean aquatic environments, specifically within the Edwards limestone and associated aquifers. Their habitat ranges from air-exposed areas to deep artesian conditions with sizes varying from interstitial pores in the limestone matrix to large solution caverns. This species has been documented in at least two spring orifices in southwestern Texas in the vicinity of the City of Del Rio in Val Verde County (Hershler and Longley 1987). Of the two known locations where this species is found, one population is documented within the Study

Area at an unnamed spring on the east side of Devils River just downflow from Slaughter Bend in Val Verde County (Hershler and Longley 1987). An EO also confirms this location within the Study Area (TPWD 2025d). This species may occur within the Study Area where suitable habitat is present.

3.6.5.4 Critical Habitat

The USFWS, in Section 3(5)(A) of the ESA, defines critical habitat as:

> *"(i) the specific areas within the geographical area occupied by the species, at the time that it is listed in accordance with the ESA, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination by the Secretary of the Interior that such areas are essential for the conservation of the species "* (USFWS 1973).

Designated critical habitat for the bracted twistflower occurs with the Study Area within approximately 345 acres within Garner State Park and within approximately 23 acres along the Medina River. Additional critical habitat has been established within Bexar and Medina counties in the eastern portion of the Study Area.

Designated critical habitat for the [no common name] beetle (*Rhadine exilis*), [no common name] beetle (*Rhadine infernalis*), Government Canyon Bat Cave spider, and Government Canyon Bat Cave meshweaver occurs in the easternmost portion of the Study Area within Government Canyon State Natural Area. Additional critical habitat is established for [no common name] beetle (*Rhadine infernalis*) in western Bexar County within the Study Area. Designated critical habitat for the Devils River minnow is established along Pinto Creek in Kinney County.

Critical habitat is proposed for the Texas hornshell within the Devils River in Val Verde County and the Pecos River in Val Verde, Crockett, and Terrell counties within the Study Area.

3.6.6 Habitat Conservation Plans

3.6.6.1 Southern Edwards Plateau Habitat Conservation Plan

The Study Area is located in the Southern Edwards Plateau (SEP) Habitat Conservation Plan (HCP) area (Bowman et al. 2015). The SEP HCP was initiated through an Interlocal Agreement between the City of San Antonio and Bexar County in 2009, and in December 2015, the HCP was approved by the USFWS. The USFWS issued a 30-year Incidental Take Permit under section 10(a)(1)(B) of the ESA in 2016 to Bexar

County and the City of San Antonio (co-permittees), which authorizes a limited amount of incidental take of seven karst invertebrate species and GCW within the City of San Antonio and Bexar County. The SEP HCP is a voluntary, alternative method that simplifies, streamlines, and shortens the process of achieving ESA compliance. The program is a regional conservation plan in which the City of San Antonio and Bexar County are the permittees; Bexar County provides financial support, and the City of San Antonio provides financial support and administers the plan.

The SEP HCP works by preserving land known to either be suitable habitat for, or occupied by, any of the eight threatened and endangered species listed in Table 3-12. Landowners, developers, Bexar County, the City of San Antonio, and other entities conducting non-federal activities within the jurisdictions of Bexar County or the City of San Antonio (excluding any portion of Comal County) may be eligible to achieve ESA compliance through the HCP. If the final route is anticipated to impact any of the listed species below, coordination with the City of San Antonio would be conducted to achieve ESA compliance. However, if additional impacts to the species listed in Table 3-12 occur outside the HCP-covered area, further coordination with the USFWS may be required.

Table 3-12: Threatened and Endangered Species in the Study Area Covered by the SEP HCP

Common Name	Scientific Name
Bird	
Golden-cheeked warbler	*Setophaga chryosparia*
Karst Species	
Braken Cave meshweaver	*Cicurina venii*
Government Canyon Bat Cave meshweaver	*Cicurina vespera*
Government Canyon Bat Cave spider	*Tayshaneta microps*
Helotes mold beetle	*Batrisodes venyivi*
Madla Cave meshweaver	*Cicurina madla*
Unnamed beetle	*Rhadine exilis*
Unnamed beetle	*Rhadine infernalis*

Source: Bowman et al. (2015).

3.6.6.2 CPS Energy System-Wide Habitat Conservation Plan

The Study Area is partially located within the CPS System-Wide HCP area (SWCA 2021). CPS Energy prepared this HCP in accordance with ESA Section 10(a)(2)(A−B) to support an application for an Incidental Take Permit from the USFWS pursuant to Section 10(a)(1)(B) of the ESA. The HCP includes CPS Energy's service area and areas outside of the service area in which CPS may expand its services in the 30 years after completion of the plan. The HCP addresses activities that CPS Energy may undertake that have the potential to impact some federally listed species in ways that may require authorization from the USFWS to stay in compliance with the ESA.

If the PUC-approved route is anticipated to impact any of the listed species in Table 3-13, coordination with the USFWS would be conducted to achieve ESA compliance. However, if additional impacts to the species listed in Table 3-13 occur outside the HCP-covered area, further coordination with the USFWS may be required.

Table 3-13: Threatened and Endangered Species in the Study Area Covered by the CPS Energy System-Wide HCP

Common Name	Scientific Name
Bird	
Golden-cheeked warbler	*Setophaga chryosparia*
Karst Species	
Government Canyon Bat Cave meshweaver	*Cicurina vespera*
Government Canyon Bat Cave spider	*Tayshaneta microps*
Helotes mold beetle	*Batrisodes venyivi*
Madla Cave meshweaver	*Cicurina madla*
Unnamed beetle	*Rhadine exilis*
Unnamed beetle	*Rhadine infernalis*
Robber Baron Cave meshweaver	*Circurina baronia*
Cokendolpher Cave harvestman	*Texella cokendolpheri*

Source: SWCA (2021).

3.7 Socioeconomics

This section presents a summary of the economic and demographic characteristics of the Study Area within Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde counties and provides a brief comparison with the socioeconomic environment of the state of Texas. Reviewed literature sources include publications of the Texas Demographic Center (TDC) and the United States Census Bureau (USCB).

3.7.1 Population Trends

Between 2010 and 2020, five counties within the Study Area experienced population increases between 2 percent and 17 percent (Atascosa, Bandera, Bexar, Kerr, and Medina), while the remaining counties (Crockett, Edwards, Kimble, Kinney, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde) experienced population declines between 2 percent and 29 percent (USCB 2010 and 2025). By comparison, population at the state level increased by 16 percent during the same decade (USCB 2010 and 2025) (Table 3-14).

Between 2020 and 2050, five counties in the Study Area are projected to experience population growth (Atascosa, Bandera, Bexar, Kerr, and Medina). The remaining counties are projected to experience population decline during the same timeframe. Pecos County is projected to experience a population decline between 2020 and 2030, growth between 2030 and 2040, and another decline between 2040 and 2050 (TDC 2025).

Between 2020 and 2030, the populations of Atascosa, Bandera, Bexar, Kerr, and Medina counties are projected to increase between 2 percent and 15 percent, while the remaining counties' populations are projected to decline between 0.1 percent and 31 percent. Between 2030 and 2040, the populations of Atascosa, Bandera, Bexar, Kerr, Medina, and Pecos counties are projected to increase between 0.9 percent and 13 percent, while the remaining counties' populations are projected to decline between 3 percent and 34 percent. Between 2040 and 2050, the populations of Atascosa, Bandera, Bexar, Kerr, and Medina counties are projected to increase between 2 percent and 10 percent, while the remaining counties' populations are projected to decline between 0.2 percent and 31 percent.

By comparison, the population of Texas is expected to experience population increases of 13 percent, 12 percent, and 10 percent over the same time periods, respectively (TDC 2025). Table 3-14 presents the past population trends and projections for the Study Area counties and for the state of Texas.

Table 3-14: Population Trends and Projections for the Study Area Counties and the State of Texas

County	Population				
	Past		Projected		
	2010	2020	2030	2040	2050
Atascosa County	44,911	48,981	53,324	57,374	61,473
Bandera County	20,485	20,851	21,272	21,701	22,139
Bexar County	1,714,773	2,009,324	2,302,829	2,599,727	2,865,834
Crockett County	3,719	3,098	2,554	2,127	1,734
Edwards County	2,002	1,422	987	652	455
Kerr County	49,625	52,598	56,295	58,870	60,685
Kimble County	4,607	4,286	4,016	3,705	3,451
Kinney County	3,598	3,129	2,736	2,465	2,266
Medina County	46,006	50,748	54,536	57,772	60,148
Pecos County	15,507	15,193	15,176	15,306	15,275
Real County	3,309	2,758	2,346	1,915	1,504
Sutton County	4,128	3,372	2,729	2,168	1,700
Terrell County	984	760	553	403	277
Uvalde County	26,405	24,564	22,571	20,698	18,741
Val Verde County	48,879	47,586	46,047	44,531	43,147
Texas	25,145,561	29,145,505	32,912,882	36,807,213	40,645,784

Sources: TDC (2025); USCB (2010 and 2025).

3.7.2 Employment

Between 2010 and 2023, the civilian labor force (CLF) in six counties (Atascosa, Bandera, Bexar, Kerr, Kinney, and Medina) counties increased between 2 percent and 31 percent. The CLF in Crockett, Edwards, Kimble, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde counties decreased between 0.3 percent and 24 percent. By comparison, the CLF at the state level grew by 25 percent over the same time period (USCB 2025).

The unemployment rate increased for Bandera and Sutton counties and did not change for Terrell County between 2010 and 2023. The unemployment rate decreased for the other 12 counties in the Study Area. By comparison, the state of Texas experienced a decrease in its unemployment rate over the same period (Table 3-15).

Table 3-15: Labor Force and Unemployment for the Study Area Counties and the State of Texas

Place	2010	2023
Atascosa County		
Civilian Labor Force	20,416	22,107
Unemployment Rate (%)	5.9%	2.6%
Bandera County		
Civilian Labor Force	9,334	9,529
Unemployment Rate (%)	2.7%	3.8%
Bexar County		
Civilian Labor Force	793,358	1,024,492
Unemployment Rate (%)	4.4%	3.5%
Crockett County		
Civilian Labor Force	1,893	1,473
Unemployment Rate (%)	6.5%	1.7%
Edwards County		
Civilian Labor Force	976	742
Unemployment Rate (%)	4.6%	0%
Kerr County		
Civilian Labor Force	22,025	24,280
Unemployment Rate (%)	3.3%	1.6%
Kimble County		
Civilian Labor Force	2,278	2,033
Unemployment Rate (%)	1.5%	0.6%
Kinney County		
Civilian Labor Force	1,134	1,483
Unemployment Rate (%)	6.2%	0.8%
Medina County		
Civilian Labor Force	20,145	22,785
Unemployment Rate (%)	5.0%	1.8%
Pecos County		
Civilian Labor Force	6,052	6,035
Unemployment Rate (%)	2.2%	0.6%
Real County		
Civilian Labor Force	1,210	732
Unemployment Rate (%)	4.2%	2.3%
Sutton County		
Civilian Labor Force	2,070	1,635
Unemployment Rate (%)	1.1%	3.0%

Table 3-15: Labor Force and Unemployment for the Study Area Counties and the State of Texas

Place	2010	2023
Terrell County		
Civilian Labor Force	386	331
Unemployment Rate (%)	0.0%	0.0%
Uvalde County		
Civilian Labor Force	11,713	10,804
Unemployment Rate (%)	4.9%	1.8%
Val Verde County		
Civilian Labor Force	20,586	20,368
Unemployment Rate (%)	5.1%	2.7%
State of Texas		
Civilian Labor Force	11,962,847	14,906,660
Unemployment Rate (%)	4.6%	3.3%

Sources: USCB (2010 and 2025).

3.7.3 Leading Economic Sectors

Education and Health Services was the major economic sector for residents of eight counties in the Study Area (Bexar, Kerr, Kimble, Medina, Real, Terrell, Uvalde, and Val Verde) in 2018. Trade, Transportation, and Utilities was the major economic sector in four Study Area counties (Atascosa, Bandera, Edwards, and Pecos) in 2018. The major economic sector in Crockett and Sutton counties was Natural Resources and Mining, and both Education and Health Service and Trade, Transportation, and Utilities were the major economic sectors in Kinney County in 2018 (USCB 2025).

In 2023, the major economic sector remained the same for 12 counties. The major economic sector in Crockett County in 2023 was Trade, Transportation, and Utilities, and in Edwards County, the major economic sector was Natural Resources & Mining. In Kinney County in 2023, the major economic sector consolidated into Education and Health Services (USCB 2025).

Similarly, the major occupations in the state of Texas in 2018 and 2023 were Education and Health Services followed by Trade, Transportation & Utilities (USCB 2025) (Table 3-16).

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Table 3-16: Covered Employment and Major Economic Sectors for the Study Area Counties and the State of Texas (5-year Period)

Employment Sector	Employment																													
	Atascosa County		Bandera County		Bexar County		Crockett County		Edwards County		Kerr County		Kimble County		Kinney County		Medina County		Pecos County		Real County		Sutton County		Terrell County		Uvalde County		Val Verde County		State of Texas	
	2018	2023	2018	2023	2018	2023	2018	2023	2018	2023	2018	2023	2018	2023	2018	2023	2018	2023	2018	2023	2018	2023	2018	2023	2018	2023	2018	2023	2018	2023
Natural Resources & Mining	1,911	1,953	679	323	10,672	8,482	583	273	153	146	715	557	189	154	53	66	1,574	1,008	1,021	918	155	18	542	326	43	64	1,351	843	793	869	407,019	344,777
Construction	2,422	2,143	1,106	1,249	70,285	79,847	258	243	105	121	2,805	2,457	243	184	121	115	2,116	2,080	652	452	110	52	142	190	15	41	1,266	906	1,456	1,242	1,088,705	1,222,119
Manufacturing	1,495	1,955	627	680	48,774	54,529	41	32	15	78	1,215	1,341	71	75	7	166	1,572	1,555	199	181	19	0	90	25	23	6	603	726	1,361	1,243	1,116,997	1,205,356
Trade, Transportation & Utilities	4,465	5,126	1,503	1,604	168,125	184,226	150	313	229	71	3,404	4,224	461	390	216	378	3,811	4,466	1,433	1,225	232	125	392	306	50	28	2,013	1,695	3,816	3,562	2,604,908	2,846,979
Information	152	120	192	40	15,650	15,439	0	0	9	90	359	342	29	20	0	0	79	368	34	58	26	0	14	0	6	4	68	61	129	231	229,841	226,893
Financial Activities	852	1,083	636	474	79,939	83,860	51	0	95	0	1,224	1,385	51	108	39	0	1,149	1,668	193	389	68	19	60	6	7	5	539	456	874	661	862,041	986,535
Professional & Business Services	1,307	1,262	592	1,405	102,101	121,574	62	61	23	55	1,648	2,340	113	176	25	0	1,876	2,164	258	218	29	75	121	65	66	50	646	873	1,051	1,031	1,480,493	1,774,719
Education & Health Services	3,794	3,613	2,209	1,484	205,129	225,663	362	406	120	121	5,227	5,709	482	403	216	459	5,261	4,871	1,024	1,068	283	179	268	300	67	111	2,405	2,497	4,164	4,803	2,805,186	3,055,393
Leisure & Hospitality	1,613	1,849	569	688	103,889	103,436	105	0	77	60	2,560	2,677	267	219	99	96	1,810	1,531	431	645	250	122	205	140	4	10	1,013	805	1,814	1,989	1,192,224	1,200,410
Other Services	922	1,001	725	516	42,108	45,386	64	104	60	0	1,788	1,857	154	182	83	37	876	1,049	293	368	97	41	65	54	29	0	714	888	730	860	673,193	695,175
Public Administration	1,104	999	405	362	40,792	45,999	65	0	16	0	925	679	64	99	354	142	1,235	1,286	558	438	23	50	39	150	34	12	690	713	2,728	2,896	525,017	582,392
Total Employment	20,037	21,104	9,243	8,825	887,464	968,411	1,741	1,432	902	742	21,870	23,568	2,124	2,010	1,213	1,459	21,359	22,046	6,096	5,960	1,292	681	1,938	1,562	344	331	11,308	10,463	18,916	19,387	12,985,624	14,140,748

Source: USCB (2025).

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3.7.4 Community Values

The term "community values" is included as a factor for consideration of transmission line certification under PURA § 37.056(c)(4), although the term has not been specifically defined for regulatory purposes by the PUC. To evaluate the effects of the proposed transmission line, the Consultant has defined community values as a "shared appreciation of an area or other natural or human resource by a national, regional, or local community."

The Consultant evaluated the proposed Project for community resources that may be important to a particular community, such as parks or recreational areas, historical and archeological sites, or scenic vistas within the Study Area. Additionally, the Consultant mailed consultation letters to federal, state, and local officials (see Section 2.4 and Appendix A) and participated in public open-house meetings in the Study Area (See Section 2.7.4 and Appendix B) to identify and collect information regarding community values and community resources, among other things. Input received was used in the evaluation of the proposed Project. Community values and community resources are discussed in the following sections.

3.8 Human Resources

3.8.1 Land Use

The primary land uses in the Study Area are pastureland/ranchland, low-density and medium-density residential and commercial development, oil and gas infrastructure, and transportation infrastructure. Land use data were obtained from interpretation of aerial photography, USGS topographical maps, and vehicular and helicopter reconnaissance surveys. Planned land use features were limited to known features obtained from public input and governmental entities. The PUC does not typically consider future development or future planned land use in selecting transmission line routes. The Commission has specifically stated that future land use development plans (post-notice construction) should not be a criterion for route selection (Docket No. 29684). More recently, in the Order on Rehearing in Docket No. 57648, the Commission reemphasized its precedent on future land use development.

There are 36 school districts located within the Study Area, 29 of which have schools located within the Study Area. See Table 3-17, School Campus Locations in the Study Area, located in Appendix D, for the school campus locations within the Study Area.

County and city websites were reviewed to identify any potential land use conflicts outlined in existing comprehensive land use plans. The cities of Bandera, Castroville, Fort Stockton, Helotes, Hondo, Kerrville,

Lytle, Natalia, and San Antonio have comprehensive land use plans online and no conflicts with the Project were identified (City of Bandera 2025; City of Castroville 2025a; City of Fort Stockton 2025a; City of Helotes 2025; City of Hondo 2025; City of Kerrville 2025; City of Lytle 2025; City of Natalia 2025; and City of San Antonio 2025a).

Twenty-four current and planned projects were identified in Bexar County within the Study Area. There are two projects with the potential to conflict with the Project if construction were to overlap. Construction of the Pearsall Road Phase II Reconstruction Project is estimated to occur between July 2026 and December 2027. The I-35 to I-37 road expansion project in Bexar County is in the planning phase (Bexar County 2025).

If available, county economic development websites were reviewed for current and planned projects within the Study Area. Kerr, Medina, and Pecos counties have economic development websites and no projects were identified that may conflict with the Project (Kerr Economic Development Corporation 2025; GoMedina 2025; and Pecos Economic Development Corporation 2025).

3.8.2 Conservation Easements

A conservation easement is a restriction that 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. Land trusts facilitate the easement and ensure compliance with the specified terms and conditions.

Conservation easements were identified based on a review of websites and databases, including the Protected Areas Database of the United States (PADUS) and the National Conservation Easement Database, as well as correspondence with stakeholders and landowners. No conservation easements were identified in Atascosa, Crockett, Kimble, Kinney, and Sutton counties. Although not identified in the reviewed sources, some properties in the Study Area may have some form of conservation easement or agreement that is not listed. Known conservation easements within the Study Area are shown in Table 3-18, Conservation Easements in the Study Area, located in Appendix D.

3.8.3 Recreation

The PUC recognizes parks and recreational areas owned by a governmental body or an organized group, club, or place of worship. Federal and state database searches and county/local maps were reviewed to identify parks and/or recreational areas within the Study Area. No national parks were identified within the Study Area (NPS 2025a).

A portion of the Amistad National Recreation Area near the City of Del Rio is located within the Study Area (NPS 2025a). One USFWS hatchery was identified within the Study Area. The Uvalde National Fish Hatchery is located within Uvalde County (USGS 2025c).

Four state parks are located within the Study Area: Kickapoo Cavern State Park in Kinney and Edwards counties, South Llano River State Park in Kimble County, and Garner State Park and the new Bear Creek State Park in Uvalde County. In addition, the TPWD is acquiring property in Kinney and Edwards counties that will become the future Silver Lake Ranch State Park (TPWD 2025n and 2025o).

Five state natural areas are located within the Study Area: Lost Maples State Natural Area in Bandera and Real counties, Hill Country State Natural Area in Bandera and Medina counties, Devils River State Natural Area in Val Verde County, Devil's Sinkhole State Natural Area in Edwards County, and Government Canyon State Natural Area in Bexar and Medina counties. In addition, the City of San Antonio manages the Medina River Natural Area in Bexar County (PADUS 2025; City of San Antonio 2025b; TPWD 2025n).

The Kerr Wildlife Management Area in Kerr County is owned and operated by the TPWD and allows public hunting. In addition, two TPWD public hunting areas, Lone Star Pass and Somerset Road hunting areas, were identified within the Study Area in Bexar County (TPWD 2025p).

Additional recreational activities such as camping, fishing, and hunting might occur on private properties throughout the Study Area but, to Consultant's knowledge, such properties are not open to the general public. A variety of recreational activities may also occur on public lakes, streams, and rivers. Several rivers in the Study Area are popular destinations for canoeing, kayaking, tubing (e.g., Devils River, Medina River, Guadalupe River, Frio River); however, rivers are mostly bound by private property and public access is limited outside of state parks, state natural areas, and leased access areas.

Several local parks were identified within the Study Area. A list is provided in Table 3-19, Local Parks within the Study Area, located in Appendix D.

3.8.4 Agriculture

Agriculture is a significant segment of the economy throughout Texas, and the Study Area counties have active agricultural sectors. According to the USDA National Agricultural Statistics Service's 2022 Census of Agriculture, the total market value for agricultural products sold for the 15 Study Area counties was $474,031,000, a 5 percent increase from the 2017 market value of $453,064,000. Between 2017 and 2022, the number of farms increased in four counties. The number of farms in Crockett County increased from 219 in 2017 to 275 in 2022 (an increase of 26 percent), and in Edwards County the number of farms increased from 380 in 2017 to 456 in 2022 (an increase of 20 percent). In Real County, the number of farms increased from 198 in 2017 to 212 in 2022 (an increase of 110 percent), and in Sutton County the number of farms increased from 261 in 2017 to 289 in 2022 (an increase of 11 percent) (USDA 2017 and 2022). Between 2017 and 2022, the number of farms decreased in the other 11 Study Area counties (USDA 2017 and 2022).

In comparison, the total market value for agricultural products sold within the state of Texas was $32,166,561,000 in 2022, a 29 percent increase from the 2017 market value of $24,924,041,000. The number of farms in Texas decreased from 248,416 in 2017 to 230,622 in 2022 (a decrease of 7 percent) (USDA 2017 and 2022). Detailed agricultural information for the Study Area counties and state of Texas are provided in Table 3-20.

Table 3-20: Percent Change of Market Value and Number of Farms for Study Area Counties and the State of Texas

County/ State	Data Type	Year		Percent Change
		2017	2022	
Atascosa County	Market Value ($)	$74,287,000	$65,106,000	-12%
	Number of Farms	1,681	1,673	0%
Bandera County	Market Value ($)	$6,940,000	$4,630,000	-33%
	Number of Farms	897	723	-19%
Bexar County	Market Value ($)	$67,877,000	$73,150,000	8%
	Number of Farms	2,520	2,107	-16%
Crockett County	Market Value ($)	$15,382,000	$30,654,000	99%
	Number of Farms	219	275	26%
Edwards County	Market Value ($)	$10,932,000	$11,392,000	4%
	Number of Farms	380	456	20%
Kerr County	Market Value ($)	$9,326,000	$11,151,000	20%
	Number of Farms	1,128	987	-13%

Table 3-20: Percent Change of Market Value and Number of Farms for Study Area Counties and the State of Texas

Kimble County	Market Value ($)	$10,852,000	$7,226,000	-33%
	Number of Farms	670	619	-8%
Kinney County	Market Value ($)	$5,044,000	$3,788,000	-25%
	Number of Farms	236	190	-19%
Medina County	Market Value ($)	$93,908,000	$82,644,000	-12%
	Number of Farms	2,281	2,204	-3%
Pecos County	Market Value ($)	$46,165,000	$48,942,000	6%
	Number of Farms	309	249	-19%
Real County	Market Value ($)	$1,263,000	$2,647,000	7%
	Number of Farms	198	212	110%
Sutton County	Market Value ($)	$10,350,000	$20,407,000	97%
	Number of Farms	261	289	11%
Terrell County	Market Value ($)	$4,191,000	$6,168,000	47%
	Number of Farms	85	60	-29%
Uvalde County	Market Value ($)	$87,101,000	$90,644,000	4%
	Number of Farms	592	580	-2%
Val Verde County	Market Value ($)	$9,446,000	$15,482,000	64%
	Number of Farms	528	333	-37%
State of Texas	Market Value ($)	$24,924,041,000	$32,166,561,000	29%
	Number of Farms	248,416	230,622	-7%

Sources: USDA (2017 and 2022).

3.8.5 Transportation/Aviation

3.8.5.1 Transportation Features

The major highway transportation corridors within the Study Area include three interstate highways, 10 US Hwys, and 32 SH: I-10, I-35, I-410, US Hwy 63, US Hwy 67, US Hwy 83, US Hwy 90, US Hwy 190, US Hwy 277, US Hwy 285, US Hwy 290, US Hwy 377, US Hwy 385, SH 13, SH 16, SH 18, SH 27, SH 29A, SH 37, SH 39, SH 41, SH 46, SH 55, SH 79, SH 98, SH 127, SH 131, SH 132, SH 137, SH 151, SH 163, SH 173, SH 211, SH 290, SH 291, SH 293, SH 349, SH 353, SH 359, SH 406, SH 421, SH 467, SH 481, SH 534, SH 1604 (TxDOT 2025a and 2025b).

Six railroads were identified within the Study Area: two Union Pacific railroads cross the southern and southwestern portions of the Study Area in east-west and northwest-southeast directions, respectively, and three Union Pacific railroad spurs are located in the southern portion of the Study Area. A Texas Pacifico

Transportation Limited railroad crosses the northwestern portion of the Study Area, in a northeast-southwest direction (United States Department of Transportation 2025).

According to TxDOT's Project Tracker (2025b), which contains detailed information by county for every transportation project that is or could be scheduled for construction, projects are planned within all 15 Study Area counties. Projects primarily include safety improvement and seal coat projects, bridge replacement, non-freeway widening projects, and other small projects. There are four counties with planned widen freeway and non-freeway construction projects within the next 10 years (Pecos, Sutton, Uvalde, and Val Verde) (TxDOT 2025b).

Larger projects scheduled to begin construction within four years include US Hwy 90 overlay, safety improvement, and conversion of non-freeway to freeway projects in Bexar, Kinney, Medina, and Uvalde counties. Construction to widen US Hwy 90 in Uvalde and Val Verde County is scheduled to begin within 10 years. In Sutton County, construction is scheduled to begin within 10 years on a US Hwy 277 non-freeway widening project, and in Pecos County, construction is scheduled to begin within 10 years to widen SH 18 (TxDOT 2025b).

As mentioned in Section 3.8.1, two road projects are planned in Bexar County in the Study Area. Construction of the Pearsall Road Phase II Reconstruction Project is estimated to be completed in December 2027, and the I-35 to I-37 road expansion project is in the planning phase.

3.8.5.2 Aviation Facilities

The Consultant reviewed the San Antonio and El Paso Sectional Aeronautical Charts (FAA 2025a and 2025b) and the Chart Supplement for the South Central United States (formerly the Airport/Facility Directory) (FAA 2025c) to identify FAA-registered facilities within the Study Area subject to notification requirements listed in 14 CFR § 77.9. Facilities subject to notification requirements listed in 14 CFR § 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. In addition, FAA Regulations require notification of the construction of any object that is greater than 200 feet above ground level and within 3 miles of an airport with a runway more than 3,200 feet in length.

Fifteen public-use or military FAA-registered airports were identified within the Study Area: Lackland Air Force Base, Laughlin AFB AUX NR 1, San Geronimo Airpark, Star Smith Field Airport, Cannon Field

Airport, South Texas Regional Airport at Hondo, Castroville Municipal Airport, Devine Municipal Airport, Garner Field Airport, Ox Ranch Airport, Real County Airport, Ozona Municipal Airport, Fort Stockton-Pecos County Airport, Terrell County Airport, and Sonora Municipal Airport (FAA 2025a, 2025b, and 2025c). No public-use heliports or heliports with an instrument approach procedure were identified in the Study Area (FAA 2025c).

The Consultant reviewed the FAA database (FAA 2025d), USGS topographic maps, and recent aerial imagery, and conducted field reconnaissance from helicopter to identify private-use airstrips and private-use heliports not subject to notification requirements listed in 14 CFR § 77.9. Within the Study Area, 115 private airstrips, 11 private heliports, and one private airport were identified (Table 3-21, Airports, Airstrips, and Heliports within the Study Area, located in Appendix D). An additional 40 private airstrips and one private heliport were identified by landowner input.

3.8.6 Utility Features and Oil and Gas Facilities

Utility features reviewed include existing electrical transmission lines, pipelines, solar farms, wind farms, water wells, and oil/gas storage wells. Data sources used to identify existing electrical transmission lines include utility company and regional system maps, aerial imagery, USGS topographic maps, and field reconnaissance surveys.

There are 13 345-kV transmission lines, 180 138-kV transmission lines, and 108 69-kV transmission lines in the Study Area (RexTag 2025). Oil/gas wells and transmission pipelines are located throughout the Study Area with high concentrations in the northwest half of the Study Area. The oil/gas wells consist of Injection/Disposal, Injection/Disposal from Gas, Injection/Disposal from Oil, Injection/Disposal from Brine Mining, Oil Well, Gas Well, Brine Mining, Observation from Oil, and Observation Well (RRC 2025c). In addition, numerous water wells are located throughout the Study Area, with the highest density in Bexar and Medina counties (TWDB 2025c). The water wells within the Study Area are either for public supply, irrigation, stock, industrial, or domestic use.

Five wind farms were identified within the Study Area, one in Kinney County, one in Val Verde County, and three in Pecos County (USGS 2025d). Solar farms were identified west of the City of Fort Stockton within the Study Area, and a planned solar farm is located near the City of Uvalde (USFWS 2025ad).

3.8.7 Communication Towers

Ten AM radio transmitters were identified within the Study Area (Federal Communications Commission 2025). There are many FM radio transmitters/microwave towers/other electronic installations scattered throughout the Study Area, with a higher concentration located in Bexar, Medina, Pecos, and Uvalde counties (Federal Communications Commission 2025). A NEXRAD (Next Generation Weather Radar) KDFX radar site was identified along US Hwy 90 in Kinney County (NOAA National Weather Service 2025).

3.8.8 Aesthetic Values

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

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

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

The eastern and southeastern portions of the Study Area surrounding the City of San Antonio within Atascosa, Bexar, Kinney, Medina, and Uvalde counties primarily consist of residential and commercial development and cropland. The Texas Hill Country is located in the northeastern and central portions of the Study Area, generally located in Bandera, northern Medina, northern Uvalde, Edwards, and Real counties, and is characterized by rolling to steep limestone hills and canyons, and springs. The western

portion of the Study Area is located in the Chihuahuan desert and Trans Pecos region and consists primarily of vast desert plains, arid valleys, plateaus, and mountains with large ranches and heavy oil and gas development. The Study Area has been impacted by land improvements associated with residential, commercial, and industrial development; oil and gas production, roadways and infrastructure; and agricultural activities and operations.

No designated views or designated scenic roads or highways were identified within the Study Area (America's Scenic Byways 2025; Federal Highway Administration 2025). The Study Area is located within the Hill Country and Pecos Trail regions. These regions are part of the THC's Texas Heritage Trails Program, which is a tourism and economic development initiative with the goal to promote Texas' historic and cultural resources (THC 2025a). As part of this program, the THC designates historic sites of interest to encourage visitors to specific cultural and historic locations. There are two sites of interest in Hill Country Trail Region within the Study Area, the Janey Slaughter Briscoe Grand Opera House and the Landmark Inn State Historic Site. There are also two sites of interest in Pecos Trail Region within the Study Area, the Fort Lancaster Scenic Overlook and the World's Tallest Roadrunner (Paisano Pete) (THC 2025a and 2025b).

While not a designated scenic highway, an approximate 100-mile loop section of Ranch-to-Market Roads 335, 336, and 337 in the Texas Hill Country, commonly referred to as the "Twisted Sisters," is famous particularly among motorcycle enthusiasts for its challenging curves and scenic views (Bandera County Convention and Visitors Bureau 2025).

A review of the NPS website did not indicate any Wild and Scenic Rivers, National Monuments, National Memorials, or National Battlefields within the Study Area (National Wild and Scenic Rivers System 2025; NPS 2025b, 2025c, and 2025d). Two National Historic Trails are located within the Study Area, the El Camino Real de los Tejas National Historic Trail and the Butterfield Overland National Historic Trail (NPS 2025e). Nineteen National Historic Sites are scattered throughout the Study Area, with a higher concentration near the City of San Antonio.

The Texas Hill Country is widely regarded as picturesque by both residents and visitors. The region features rolling terrain with limestone hills and deep canyons. This region is a popular tourist destination due in part to its scenic features.

As mentioned in Section 3.8.3, four state parks and five state natural areas, and a portion of the Amistad National Recreation Area are located within the Study Area. These parks and recreation areas are known for their natural and scenic qualities. TPWD State Parks staff conducted an in-depth review of sensitive assets that may be impacted by the Project. The information and recommendations provided by the TPWD included a sensitive assets spreadsheet, scenic viewshed map booklets (confidential and non-confidential), and a statewide TPWD GIS dataset zip file to assist the Companies with their analysis of the potential impact of the Project on TPWD properties. The information and recommendations provided by TPWD are included in Appendix A.

As mentioned in Section 3.5.1, NRI river segments identified within the Study Area include the Pecos River, Devils River, East Nueces River, Frio River, Sabinal River, Medina River, and Guadalupe River (NPS 2024). These are free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be at least regionally significant.

The Devils River, which flows perennially for 44 miles through Val Verde County, is considered to be the most untouched river in Texas and is well known for its clear blue waters and rugged canyon surroundings. In particular, the Devils River State Natural Area and the Devils River Paddling Trail are popular destinations.

The Study Area includes designated International Dark Sky locations, valued for their minimal light pollution and natural night environments. These areas offer stargazing opportunities and help preserve the nocturnal ecosystem. Two designated International Dark Sky Association sites are located within the Study Area: Devils River State Natural Area – Del Norte Unit and South Llano River State Park (DarkSky 2025).

Based on these criteria, portions of the Study Area within the Texas Hill Country and along NWI river segments, including the Devils River, exhibit a high degree of aesthetic quality for the region. The eastern portion of the Study Area around San Antonio is generally suburban with low- and medium-density residential and commercial development and agriculture to the southwest. The western half of the Study Area is sparsely populated and has a heavy density of oil and gas development in the north. Although some parts of these eastern and western portions of the Study Area might be visually appealing, the aesthetic quality of those areas overall is not distinguishable from that of other adjacent areas within the region.

3.8.9 Texas Coastal Management Program

The CMP boundary, as defined by 31 TAC § 27.1(a), delineates the coastal zone of Texas. The proposed Project is not located within the CMP boundary (GLO 2025). Refer to Section 2.3.11 for more information.

3.9 Cultural Resources

The Study Area is in the Central and Southern Planning Region and Trans-Pecos Region as delineated by the THC (Mercado-Allinger et al. 1996) (**Figure 3-4**). More specifically, the Study Area is the located near the interface of the South Texas, Central Texas, Trans-Pecos, and Lower Pecos archeological regions as mapped by Perttula (2004) and thus, shares characteristics with these regions. Although the archeological record within and near the Study Area is likely to reflect influence and shared traits from all three of the archeological regions, the following discussion focuses on the cultural chronology of South Texas, as presented by Hester (1995 and 2004) and others, and the eastern Trans-Pecos Region of West Texas, as presented by Miller and Kenmotsu (2004). The prehistory of Study Area spans at least 11,500 years, and is divided into three broad periods: Paleoindian, Archaic, and Late Prehistoric. The Post-contact period begins with the arrival of Europeans in the region. These periods are discussed below, and dates for pre-contact periods are given as years before present (BP).

Cultural Resource Planning Region Boundary

County Boundary

Source: Mercado- Allinger et. al., 1996

State of Texas
Atascosa, Bandera, Bexar, Crockett, Edwards, Kerr, Kimble, Kinney, Medina, Pecos, Real, Sutton, Terrell, Uvalde, and Val Verde Counties

NAD 1983 Lambert Conformal Conic

December 31, 2025

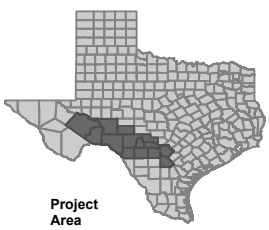

FIGURE 3-4
LOCATION OF THE STUDY AREA IN RELATION TO THE CULTURAL RESOURCE PLANNING REGIONS OF TEXAS

AEP TEXAS
An AEP Company
CPS ENERGY

Howard-to-Solstice
765-kV Single-circuit
Transmission Line

0 50 100
Miles

3.9.1 Paleoindian Period (11,500 to 8,000 years BP)

The Paleoindian period is the earliest accepted occupation of peoples in North America. During this period, small, highly mobile bands hunted now-extinct megafauna such as mammoths (*Mammuthus columbi*) and bison (*Bison antiquus*). Despite the popular misconception that these early populations were primarily hunters, evidence from the Gault site in central Texas suggests that their diet was more generalized (Collins 2002). Archeological evidence indicates that these early hunting and gathering populations subsisted on a well-diversified resource base that included smaller animals, fish, and a variety of reptiles. Paleoindian sites in the region are very rare compared to those from later periods.

In the eastern Trans-Pecos Region, the early Paleoindian period is subdivided into two complexes, the Clovis Complex and the Folsom Complex, based primarily on diagnostic lanceolate projectile points (Miller and Kenmotsu 2004). Clovis occupation in the eastern Trans-Pecos Region is almost entirely recognized from isolated finds of fluted Clovis points and from private collections. Thus, Clovis adaptations for the eastern Trans-Pecos Region are extrapolated from regions where more data exists (Miller and Kenmotsu 2004). In South Texas, the Paleoindian period is represented by the fluted projectile points and specialized blade production (Hester 1995). Diagnostic point types such as Clovis, Plainview, and Angostura are attributed to this early period. The presence of large projectile points suggests that hunting large mammals was an important component of the subsistence strategy, although the collection of readily available plant foods probably also contributed to the diet (Collins 2002). The late Paleoindian period corresponds to a greater variety of point styles, including smaller side-notched points that may reflect a hunting strategy oriented toward smaller game animals (Collins 2002).

There are dozens of recorded archeological sites in South Texas that contain Paleoindian components (Bousman et al. 2004). However, Paleoindian tools are typically isolated, and their cultural context is poorly understood. There are few well-persevered and documented Paleoindian sites in Central Texas. These sites are often deeply buried, making them difficult to locate. However, small mobile groups in this region had access to springs across the landscape and chert to manufacture tools to process edible plants and hunt (City of San Antonio Office of Historic Preservation [OHP] 2025a).

When the Pleistocene epoch came to an end around 10,900 years ago and the mammoth populations had all but disappeared, pre-contact populations began to focus their hunting efforts on the now-extinct Bison antiquus, one of the hallmarks of the transition from the early to the late Paleoindian period (Collins 2004). There appears to have been a gradual trend toward warmer and drier conditions, with woodlands slowly replaced by open grassland savannah that supported large herds of bison (Miller and Kenmotsu 2004).

Folsom occupation in the eastern Trans-Pecos Region is known from a site on Chispa Creek in Van Horn County that yielded large numbers of Folsom points, channel flakes, stone tools, and debitage. Folsom components are often mixed with artifacts from the Archaic period in the Trans-Pecos Region, making it difficult to separate non-diagnostic artifacts in the mixed assemblages (Miller and Kenmotsu 2004).

The Late Paleoindian period is recognized by stone tool traditions referred to as the Cody and Plano complexes, both of which relied heavily on bison (Hofman and Graham 1998). In the Lower Pecos, Cody and Plano components are more common than the early Paleoindian Complexes, and are identified primarily by Meserve, Golondrina, and Angostura projectile points, which are typical of the Late Paleoindian period in the Lower Pecos Region (Turpin 2004). Substance was shifting in the Lower Pecos to be less reliant on big game to a broad resource procurement strategy in response to the dryer climate (Turpin 2004). Although Late Paleoindian components are found in a wide range of topographic zones, most are found near large permanent sources of water, such as the Rio Grande Valley and large playas, the last locations with suitable habitats for large animals in an increasingly warmer and dryer Holocene environment (Hofman and Graham 1998; Turpin 2004). By the Late Paleoindian period, evidence in the Lower Pecos Region indicated that hunter-gatherer groups were moving into the area more permanently (Kenmotsu 2021).

Environmental changes that brought about the extinction of Rancholabrean megafauna and the conversion of woodlands to desert plant communities in West Texas triggered a shift away from Paleoindian adaptations toward a broad-based subsistence orientation termed Archaic (Miller and Kenmotsu 2004; Willey and Phillips 1958).

3.9.2 Archaic Period (ca. 8,000 to 1,150 BP)

The long-lasting Archaic period in South Texas is distinguished by changes in artifacts representing adaptation to the changing environment. The Archaic period spans almost 7,000 years, the bulk of the prehistory of the Trans-Pecos Region. The beginning of the Archaic period witnessed a shift to hunting smaller game and plant gathering; human population density gradually increased during this period. The Archaic period is subdivided into three sub-periods: Early, Middle, and Late.

Early Archaic (ca. 8,000 to 4,500 BP) archeological sites are rare in the South Texas and the Trans-Pecos archaeological regions, and the settlement patterns and subsistence strategies of this period are poorly understood (Collins 2004; Miller and Kenmotsu 2004). As in Central Texas, the transition from the late Paleoindian period to the Early Archaic is gradual and is generally characterized as a time when broad

territorial hunting and gathering became more localized and artifact assemblages began to show greater diversity than during the late Paleoindian period (Collins 2004).

Early Archaic people were likely organized into small hunting and gathering bands similar to their Paleoindian predecessors in their lifestyle and population density. Typical food resources probably consisted of deer, mussels, small game, fish, acorns, and roasted plant bulbs (Hester 1995; Collins 2004). Throughout the eastern Trans-Pecos Region, the use of stone or caliche as cooking stones appears, and early Archaic materials are found in burned rock features and middens. Groundstone tools appear, coincident with the use of burned rock thermal features, indicating a greater reliance on plant processing (Miller and Kenmotsu 2004). In the Lower Pecos, people preferred to occupy rock shelters, also utilized bruned rock middens, and subsisted primarily on succulents. Painted pebbles and clay figurines have been observed in the Lower Pecos beginning in the Early Archaic (Turpin 2004).

Hester (1995) divides Early Archaic archeological components in South Texas into an “early corner notched” horizon and an “early basal-notched” horizon, reflecting a distinction seen in Central Texas. Representative artifacts associated with the early corner-notched horizon include early expanding-stem (Bandy, Martindale, and Uvalde) dart points and the Guadalupe distally beveled tool (Terneny 2005). Bell and Andice varieties of dart points are associated with the early basal-notched horizon (Hester 2004; Terneny 2005). Increasing regionalization of point types is apparent; point types in the eastern Trans-Pecos Region are similar to those found in Central Texas. Increased regionalization of point types and an increased reliance on locally accessible stone raw materials suggest Early Archaic groups had a more restricted range of movement than their predecessors (Miller and Kenmotsu 2004).

The Middle Archaic has a distinct lithic technology from earlier periods. Projectile points from this period are distinguished by their triangular shape; Middle Archaic points, such as the Tortugas and Abasolo types, differ sharply from the stemmed points of the Early Archaic. This period also exhibits a large amount of distally beveled gouges, which were probably used for woodworking (Hester 1995).

The Middle Archaic is marked by growing populations and increased, but still low, population density (Collins 2004; Miller and Kenmotsu 2004). During the Middle Archaic, open campsites along waterways were the norm. Subsistence during this period continued to be dominated by hunting large and small game (Hester 1995), although in Central Texas, bison hunting is evident during the early portion of the Middle Archaic (Collins 2004). Burned rock middens were prolific in central Texas during this time and in many

instances appear to have been used for processing plants adapted to the drier climate, such as sotol, a semi-succulent plant used for both food and fiber products (Collins 2004).

Occupation in the Lower Pecos Region increased exponentially during the Middle Archaic. This increase may be tied to decreases in upland water resources and drought, as well as overexploitation of plant resources, contributing to increased movement in the area (Kenmotsu 2021). During this period, the people of the Lower Pecos began to adorn rock shelters with art that archeologists later categorized as the Pecos River Style. This style depicts polychrome pictographs of shamans with animal-like features, along with animals such as mountain lions, deer, and insects (Turpin 2004). The practices and narratives displayed likely had been in practice by the people of the Lower Pecos long before being depicted on shelter walls (Kenmotsu 2021). In addition to the Pecos River Style, Red Linear style of rock art, thought to have developed later than Pecos River Style, may have developed alongside or before Pecos River Style (Kenmotsu 2021).

During the Late Archaic (circa 3,000-1,500 BP), thermal features with burned rock become more numerous and larger (Miller and Kenmotsu 2004). Ring middens become more prominent, some of which have large quantities of lithic artifacts, ash, and charcoal. The sheer number of these features suggests widespread exploitation of desert succulents during the late Archaic. Thoms (2008 and 2009) posited that a marked increase in the use of hot-rock ovens is an expected signature of land-use intensification, which would be expected during a prolonged period of population growth and the onset of mesic conditions following a period of increasing moisture, such as seen during the Middle and Late Archaic periods.

The Late Archaic period saw a shift in projectile point types, including Shumla, Ensor, Frio, Marco, and Montell points. Ground stone tools (primarily manos and metates), are more frequently found at Late Archaic sites than at older sites. The increased use of ground stone likely represents increased exploitation of mesquite, acacia bean, and other plants. Hester suggests this shift toward plant foods resulted in a further increase in population density (Hester 1995).

Hester (2004) also suggests that the presence of large, stemmed bifaces and triangular bifaces made of Edwards chert across South Texas may indicate increased trade between South and Central Texas during the Late Archaic. Burned rock middens continued to be a common site type in the earliest years of the Late Archaic in Central Texas. As desert plants were replaced by plants adapted to a moister climate, the number of burned rock middens in east-central Texas decreased but did not entirely disappear (Collins 2004). In the Lower Pecos, Pecos River Style rock art persists through this period, and radiocarbon dating indicated

that the cosmology and rituals communicated in this form had changed little from those depicted during the Middle Archaic (Kenmotsu 2021).

3.9.3 Late Prehistoric Period (1,150 to 350 BP)

The Late Prehistoric period in the eastern Trans-Pecos Region continued patterns in mobility, subsistence, and settlement that had developed during the Late Archaic. Sites dating to this period yield even larger quantities of materials than those from earlier periods (Miller and Kenmotsu 2004) despite being smaller in general (Simmons et al. 1989). Groups in the eastern Trans-Pecos Region adopted the bow and arrow and ceramics during this period. A variety of ceramic types have been recorded in the region, indicating that although the people of the eastern Trans-Pecos interacted with neighboring agricultural groups, they continued traditional lifeways that had developed during the Archaic period (Miller and Kenmotsu 2004). Within the Study Area, site 41PC14, also called Squawteat Peak, illustrates the longevity of the foraging lifestyle in the eastern Trans-Pecos Region. Seven occupation areas and a lithic procurement/quarry area are recorded at the SAL. Burned rock middens, multiple hearths, at least 14 tipi or wiki up rings, and bedrock mortar holes are recorded at the site (Turpin 2011; Whelan 2018). Projectile points from the site date from as early as the Middle Archaic to the Late Prehistoric periods, and the largest burned rock midden was used as recently as 650 BP (Whelan 2018).

Excavations in dry shelters in and near the eastern Trans-Pecos Region revealed a rich and varied material culture associated with the Late Archaic and Late Prehistoric periods. Aside from a suite of stone tools and ceramics, pointed sticks, wooden shaft straighteners, split-yucca fireboards, fire drills, atlatls, throwing sticks, wooden scoops and tongs, pouches and blankets of rabbit fur and sewed skins, basketry, sandals, and vessels made from gourds are recorded from dry shelters (Simmons et al. 1989). Unlike their agricultural neighbors in the western Trans-Pecos and the Lower Pecos regions, Late Prehistoric groups in the eastern Trans-Pecos Region appear to have continued to rely on desert succulents and hunting for subsistence into the Post-contact period (Kenmotsu 2021 and Miller and Kenmotsu 2004). In the Lower Pecos, the Pecos River Style continued to be used until around 1,100 B.P., when it was replaced by the Red Monochrome Style. This style depicted realistic animals, and men and women in red in isolated panels. Figures are shown in what appear to be skirts, and others are shown with bows and arrows. Some figures have been pierced by these weapons. These scenes do not indicate ritual use but may have been spiritual and suggest conflict with other groups. Blue Line Geometric Style is also attributed to this period and consists of lines in a zig-zag pattern along with small human or insect-like shapes (Kenmotsu 2021).

Late Prehistoric period people in South Texas shared many cultural traits and patterns with populations in Central Texas. The primary hallmarks of this period are the use of the bow and arrow and the introduction of pottery. The projectile points from this period are much smaller and lighter than the points from earlier periods. These point types include Fresno, Scallorn, Starr, Zavala, and Perdiz (Hester 1995). The ceramics of the Late Prehistoric period, although rarely found in Rio Grande Valley sites, are typically bone-tempered. The olla, a large water jar, is the most common vessel form (Hester 1995). Late Prehistoric people of South Texas were likely extremely mobile hunters relying heavily on bison, as evidenced by the numerous bison kill sites and well-preserved faunal remains (Hester 1995). Human populations were larger and more stable in the Late Prehistoric than in earlier periods.

Late Prehistoric archeological sites are the most abundant of all three major pre-contact periods, and they exhibit evidence of increased population density and complexity. The bow and arrow might have greatly increased hunting productivity and decreased the emphasis on plant foods, although ground stone tools are still present during the Late Prehistoric period (Hester 1995).

South Texas trade connections to Central Texas and Mesoamerica are evident during the Late Prehistoric period. Two closely related Late Prehistoric cultural complexes appear to be geographically restricted to the Lower Rio Grande Valley, with sites discovered in the United States and Mexico. MacNeish (1947) identifies shell disks; pierced shell disk beads; plugs made from columellae that are round in cross-section; rectangular conch shell pendants; mollusk shell scrapers; and Starr, Fresno, and Matamoros projectile points as artifacts common to both Barril and Brownsville cultural complexes. Pottery of Huastec origin from southern Tamaulipas also appears in occupation sites and burials associated with these two cultural complexes (Anderson 1932; MacNeish 1947; Terneny 2005).

Shortly before the arrival of Europeans to Central Texas, native groups were living in small, band-sized encampments and large, diffuse camps comprised of people with multiple tribal affiliations. Hunting focused on bison but also included deer and antelope. Group mobility patterns were governed by the seasonal movements of the native animals and availability of resources and later were affected by the newly introduced horse. The presence of Caddoan ceramics at several Central Texas sites indicates a long pattern of Hasinai Caddo interaction with groups indigenous to Central Texas (Collins 2004).

3.9.4 Post-Contact Period (ca. 350 to 50 BP)

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

by early European explorers, such as Alvar Nunez Cabeza da Vaca, described the Native American people of South Texas as Coahuiltecans based on their use of a common language (Salinas 1990). Native groups in Texas first encountered Europeans during the mid- to late-1500s when several Spanish entradas passed through the Trans-Pecos Region. Efforts to settle the lands by the Spanish were slow due to the barren terrain (Simmons et al. 1989). In the Lower Pecos Region, the rock art tradition continued. Categorized as Historical Style, this style depicts subjects associated with the European contact, including horses, churches, Europeans, etc. (Texas Beyond History 2026).

During the 1600s, Spanish colonization efforts increased with establishment of missions and settlements along the Rio Grande and in the La Junta district (Miller and Kenmotsu 2004). Beginning in 1718 and continuing through the 1720s, Spanish occupation intensified as population increased following the construction of the Presidio of San Antonio de Béxar and multiple missions (Handbook of Texas Online 2025a). Olivares founded the Mission San Antonio de Valero in 1718 at its original location west of San Pedro Springs. Days later, the Presidio of San Antonio de Béxar was founded near the mission by Martín de Alcarón, governor of Coahuila y Texas (Jasinski 2025). The presidio and the mission were relocated to their latest locations in 1722 and 1724, respectively, with the presidio on the west bank of the San Antonio River directly across from the mission on the east bank. Additional missions were established as the population of the area steadily rose (Schoelwer 2025). A plan to defend the frontier of the Trans-Pecos Region was implemented in 1729 with the construction of presidios to protect settlements from Apache and Comanche bands. Defensive efforts continued through Spanish, Mexican, and American administrations (Simmons et al. 1989).

Development of South Texas continued to intensify as construction projects grew to support the population and the responsibilities of the newly established government. The San Fernando de Béxar settlement was founded in 1731, the first civil government in Texas (de la Teja 2025). Families from northern Mexico established ranches in the area by the middle of the 1700s in the area that would become Atascosa County (Peterson 2025). By 1773, San Fernando became the capital of Spanish Texas (de la Teja 2025). San Fernando de Béxar initially consisted of military personnel and civilians, including Mexican frontiersman, resident families, and Native Americans living at the mission. Later, it evolved into a castas, or an organization of social hierarchy based on racial divisions (Jasinski 2025).

During the late eighteenth and early nineteenth centuries, San Fernando de Béxar suffered a hostile period. Surrounding Native American communities such as the Apache and Comanche put pressure on communication networks and the surrounding farmland, and there were military upheavals in the city (de

la Teja 2025). In 1811, Captain Juan Bautista de las Casas assumed governorship of Texas in what was known as the Casas Revolt. The revolt was short-lived, however, and ended with the incumbent governor, Manuel María de Salcedo, re-instated, and the city was recaptured in 1813 (Cadwell 2025). This tumultuous period eventually led to the reorganization of the provinces of Texas and Coahuila into one state governed out of Saltillo (de la Teja 2025). During the initial stages of the Texas Revolution, San Fernando de Béxar was besieged and occupied by rebel forces. By 1837, it had been renamed San Antonio and was the county seat of Bexar County (de la Teja 2025).

The impetus for the Texas Revolution began when several Mexican states rebelled against President Antonio Lopez de Santa Anna's reformation that replaced the constitution of 1824 with a new government. Coahuila y Tejas were among the rebelling states, and on February 23, 1836, the Mexican army under Santa Anna retaliated against the Texian rebels by laying siege to San Antonio. The resulting battle became known as the Battle of the Alamo. This rebellion ultimately ended on April 21, 1836 with the independence of Texas and the subsequent removal of Mexican forces from San Antonio (Barker and Pohl 2025).

Following the war for independence, San Antonio became the seat of Bexar County within the Republic of Texas. Hostilities with Comanches persisted, such as the Council House Fight in 1840 (Schilz 2025), and San Antonio was seized twice by Mexico in 1842 (Jasinski 2025). To counter increased hostilities with Native Americans, the United States Army established a post at Camp Verde in the southern part of present-day Kerr County in 1855 (Odintz 2025). Camp Verde is known for its experimental use of camels as transport (Handbook of Texas Online 2025b).

Kerr County was formed in 1856 and Kerrville (formerly Brownsborough) was established as the county seat (Odintz 2025). Due to continued attacks, Kerr County decided to move the county seat to the more established community of Comfort, where it remained for two years. Comfort became part of the newly established Kendall County, and the Kerr County seat was moved back to Kerrville. Mountain Home was settled around 1856 (Odintz 2025). Uvalde County was organized in 1856 and Uvalde made the county seat (Ochoa 2025). The first permanent Anglo settlement in the area that would be Pecos County was the United States Army outpost Fort Stockton, established near Comanche Springs in 1859 (Justice and Leffler 2025). Several counties within the Study Area were formed out of parts of Bexar County in the latter half of the 1800s, including Atascosa, Kerr, and Edwards counties. Atascosa and Kerr counties were established in 1856, with Navatasco becoming the county seat of Atascosa County (Odintz 2025; Peterson 2025). Edwards County was formed in 1858 and officially organized in 1883 (McCrain 2025).

Within the Study Area, counties that voted in favor of succession prior to the Civil War included Atascosa, Bandera, Bexar, and Kerr counties by slim majorities. Medina and Uvalde counties voted against succession (Huff 2025). Those opposed to succession, like the German population in Kerr County, would join the Union League during the Civil War (Odintz 2025).

During the Civil War, Kerr County was put under the charge of James Duff after martial law was imposed on Central Texas in 1862 (Kohout 2025). The Union League formed companies by 1862 to protect families from Indian attack and confrontations with local Confederate forces. Increased tensions led to the Unionist Kerr and neighboring counties to be deemed in rebellion to the state of Texas. Confederate forces began to take measures to quell this "rebellion" (Odintz 2025). Rather than swear allegiance to the Confederacy, Union loyalists attempted to flee to Mexico. Duff and his men caught up with the Union loyalists in Kinney County, and the cruelty of Duff's men in the ensuing battle shocked the local population (Shook 2025).

Fort Stockton, in present-day Pecos County, was abandoned by federal troops after news came of Texas' secession from the Union and was reoccupied by Confederate Captain Charles L. Pyron and a regiment of Texas Mounted Rifles. In 1862, the fort was abandoned by the Confederates, and its ruins were reoccupied after the Civil War by General Edward Hatch and made the headquarters for the Ninth United States Calvary, a regiment of black troops (Wallace 2025).

Following the Civil War, Anglo-Americans moved into the frontier region (Smith 2025). San Antonio became a prosperous hub supporting multiple industries. Cattle trail drives were an integral part of the San Antonio economy, as well as the wool from the nearby Hill Country (Jasinski 2025). After the Civil War, bitterness in Kerr County continued due to the wartime divisions. The economy, however, recovered quickly with the number of farms and ranches doubling by 1870, dominated by wheat, corn, cattle, and sheep. Raids by Indigenous groups abated (Oehler 2025).

Pecos County, originally a part of Bexar Territory and, later, Presidio County, was established in 1871, and formally organized in 1875 (Justice and Leffler 2025). On January 12, 1875, Crockett County was formed from Bexar County and attached to Kinney County for judicial purposes. Crockett County included the future Sutton and Schleicher counties and parts of the future Val Verde, Kinney, and Edwards counties. From the earliest Anglo settlement, the Crockett County economy was dependent on sheep and cattle ranching (Smith 2025).

Val Verde County was organized in 1885, under which Crockett County became a subsidiary (Smith 2025 and 2025b). Two years later, on March 15, 1887, Crockett County was reduced to its present size when Sutton and Schleicher counties were formed (Smith 2025). Sheep and cattle ranchers were enticed to Crockett County by cheap grassland available for lease from both the railroad and the state (Smith 2025).

The railroads fueled local industries, and five additional railroads connected San Antonio to distant markets by 1900 (Jasinski 2025). For instance, Kerr County's economy boomed, fed by the growing demand in San Antonio for lumber, produce, and craftsmen, and the San Antonio and Aransas Pass Railway, which was built into Kerrville in 1887 (Odintz 2025).

In 1913, the construction of the Kansas, Mexico, and Orient Railway Company of Texas across Pecos County stimulated the economy, resulting in population growth and increased land speculation. To attract land buyers, irrigation projects along the Pecos River were begun (Justice and Leffler 2025). Similarly, in Atascosa County, irrigation, first used effectively in 1911, allowed for growing cash crops such as strawberries, peas, and watermelons. Cotton and cattle continued to drive the economy into the 1930s, when crashing prices and boll weevil infestations devastated the industry (Peterson 2025).

The early twentieth century saw a growth in Kerr County's tourist industry. The area's weather was a draw for religious camp meetings, the first being the Presbyterian Westminster Encampment, established in 1906. By 1989, over 30 camps in Kerr County served more than 23,000 children.

Oil was discovered in 1925 in north-central Crockett County. Though many ranchers sold mineral leases to oil companies for large sums of cash, oil companies exerted no other overt influence on the economy or politics of the county in the 1920s; no oil boom occurred, and no oil companies opened offices in the county (Smith 2025). In 1927, the Yates oil field, one of the largest in the nation at the time, was discovered in Pecos County. The economic boom caused by the oil field discovery led to the creation of the towns of Bakersfield, Red Barn, and Iraan to accommodate the influx of people (Justice and Leffler 2025).

Exploration in Crockett County in the 1930s and 1940s resulted in good oil and gas production in several fields, including the prolific Todd Ellenburger field, which opened in 1945. Although oil money eased the lives of ranchers, the raising of livestock continues to dominate the economy (Smith 2025). By 1940, the number of farms was rising again, and in 1945, the rural parts of Kimble Country received electricity for the first time. By the mid-1940s, a small amount of oil was being produced as well as gas, gravel, and sand

(Thompson 2025). By the 1950s, Kerr County had become a manufacturing center, including the manufacture of small aircraft by the Mooney Air Corporation (Odintz 2025).

During the Great Depression, oil production helped stabilize the Pecos County's economy, although farmers were hit hard: the number of tenant farmers decreased from 198 in 1939 to 145 in 1940, and the number of farms decreased to 326 in 1940 (Justice and Leffler 2025). By 1931, US Hwy 290 and SH 82 reached Fort Stockton. In 1956, US Hwy 290 connected Fort Stockton to Big Bend National Park, boosting tourism in the area. Oil and gas production continues to play an important role in the economy (Justice and Leffler 2025).

3.9.5 Previous Investigations

Over 779 archeological investigations are mapped in the Study Area (THC 2025c). The bulk of these surveys are located in the southeastern portion of the Study Area within and near Bexar County and in the northwestern portions of the Study Area associated with University Lands. Many of these surveys were sponsored by the NPS, TxDOT, TPWD, Rural Electrification Administration, USACE, and the Texas State Historical Association, among others (THC 2025c).

3.9.6 Records Review

The Consultant conducted an examination of the TASA (THC 2025c), THC's Historic Sites Atlas (THSA) (THC 2025d), NPS' NRHP databases (NPS 2025b, 2025c, and 2025d), and TxDOT's Historic Resources Aggregator (TxDOT 2025c) to identify previously recorded archeological sites, NRHP-listed properties and districts, National Historic Landmarks, historic-age cemeteries, and OTHMs, including Recorded Texas Historical Landmarks (RTHLs), within the Study Area.

In addition to the review of TASA, THSA, and NPS databases, the Consultant sent letters to the counties' historical commissions within the Study Area. Information was provided to the Consultant from the Shumla Archaeological Research and Education Center and was reviewed.

On February 18, 2025, GIS shapefiles were acquired from TARL to identify and map the locations of recorded archeological resources within the Study Area. Descriptive data pertaining to archeological sites and surveys were obtained from the TASA in February 2025. The locations of, and information pertaining to, SALs, NRHP properties, Historic Texas Cemeteries (HTCs), and OTHMs within the Study Area were obtained from the TASA (THC 2025c) and the THSA (THC 2025d). The TASA, THSA, and USGS topographic maps were reviewed to identify cemeteries within the Study Area. TxDOT's Historic

Resources Aggregator database was reviewed to identify historic resources that are listed or determined eligible for listing on the NRHP within the Study Area (TxDOT 2025c). At the national level, the NRHP database (NPS 2025f) and NPS websites for National Historic Landmarks (NPS 2025c) and National Historic Trails (NPS 2025e) were reviewed. At the local level, the City of San Antonio OHP was reviewed to identify historic resources that are listed or determined eligible for listing on the NRHP and other local designations (OHP 2025b).

The records search indicated that 47 NRHP-listed properties, 6,622 archeological sites, 225 cemeteries, 367 OTHMs, six OHP properties, and eight historic highways are documented within the Study Area. A total of 538 of the cultural resources within the Study Area have been determined eligible for listing on the NRHP, and 115 are designated SALs. The cultural resources within the Study Area are summarized in Table 3-22. Due to the large number of resources within the Study Area, NRHP-listed resources, Historic Texas Cemeteries (HTCs), and Registered Texas Historic Landmarks (RTHLs) within the Study Area are summarized below. Resources within 1,000 feet of the Alternative Routes are discussed in more detail in Section 4.4.4.

Table 3-22: Recorded Cultural Resources within the Study Area

County	Archeological Sites	SALs	NRHP-Listed Resources	NRHP-Eligible Properties	OTHMs	RTHLs	Cemeteries	HTCs
Atascosa	10	0	0	0	7	1	7	1
Bandera	248	8	4	19	40	18	24	2
Bexar	562	9	4	76	9	1	35	5
Crockett	1,224	2	4	23	26	7	5	1
Edwards	366	20	1	26	26	5	12	1
Kerr	358	5	1	9	15	4	11	0
Kimble	70	10	0	26	8	1	3	0
Kinney	185	0	2	3	35	27	12	1
Medina	260	2	8	33	70	23	52	6
Pecos	855	10	3	60	26	13	10	2
Real	166	1	1	10	19	1	20	1
Sutton	90	0	3	4	12	4	1	1
Terrell	492	37	4	133	7	2	4	1

Table 3-22: Recorded Cultural Resources within the Study Area

County	Archeological Sites	SALs	NRHP-Listed Resources	NRHP-Eligible Properties	OTHMs	RTHLs	Cemeteries	HTCs
Uvalde	463	9	11	32	61	16	25	1
Val Verde	1,273	2	1	84	6	0	4	1

Sources: NPS (2025c, 2025d, and 2025f); THC (2025c and 2025d); and TxDOT (2025c).

Forty-seven NRHP-listed properties are mapped within the Study Area (Table 3-23). These properties include, but are not limited to, archeological districts, individual archeological sites, as well as courthouses, schools, homes, military fortifications, ranches and farmsteads, and economic districts (NPS 2025c, 2025e, and 2025f). These properties reflect the extensive human settlement and activities in the Study Area.

Table 3-23: Recorded NRHP-listed Resources within the Study Area

NRIS Reference Number	Additional State Designation	Resource Name	Address	County
02001062	-	Carson, Ira and Wilma, House	1103 Avenue C	Crockett
04000229	-	Langford, B.F., Jr. and Mary Hay, House	415 Fourteenth Street	Bandera
04000230	-	1911 Kinney County Courthouse	501 S. Ann Street	Kinney
10000737	-	Herrera Ranch	Old Somerset Road at the Medina River	Bexar
10000963	-	Nicolas Street School	332 Nicolas Street	Uvalde
11000134	-	deBerry Ranch	Private Road 1105, approximately 1.5 mile east of County Road 108	Sutton
14000106	-	First National Bank	100 S. East Street	Uvalde
70000758	-	Castroville Historic District	Roughly bounded by Medina River, SR 471, Gime, Houston, and Constantinople	Medina
71000928	-	Fort Lancaster	10 miles east of Sheffield on US Hwy 290	Crockett
71000958	SAL	Mission San Lorenzo de la Santa Cruz (41RE1)	Address Restricted	Real
72001368	SAL	Landmark Inn Complex	Florella and Florence Streets	Medina
72001373	-	Meyers Springs Pictograph Site	Address Restricted	Terrell
73001968	-	Old Camp Verde	Address Restricted	Kerr
73001971	-	Fort Stockton Historic District	East edge of town	Pecos

Table 3-23: Recorded NRHP-listed Resources within the Study Area

NRIS Reference Number	Additional State Designation	Resource Name	Address	County
74002066	-	Crockett County Courthouse	907 Avenue D	Crockett
75001999	-	Devine Opera House	Transportation Boulevard	Medina
76002018	-	Live Oak Creek Archeological District	Address Restricted	Crockett
76002050	-	Medina Dam	North of Castroville on the Medina River	Medina
76002051	-	D'Hanis Historic District	7 miles west of Hondo	Medina
76002074	-	Garner, John Nance, House	333 N. Park Street	Uvalde
76002075	-	Leona River Archeological Site (41UV49)	Address Restricted	Uvalde
76002076	-	Taylor Slough Archeological Site (41UV51)	Address Restricted	Uvalde
76002077	-	Uvalde Flint Quarry (41UV43)	Address Restricted	Uvalde
76002078	-	Willingham Site (41UV47)	Address Restricted	Uvalde
77001465	-	Canon Ranch Railroad Eclipse Windmill (X)	West of Sheffield on Canon Ranch	Pecos
77001476	-	Sutton County Courthouse	Public Square	Sutton
78002979	-	Old Mercantile Building	222 Main Street	Sutton
78002985	-	Bullis' Camp Site	Address Restricted	Terrell
78002986	-	Geddis Canyon Rock Art Site	Address Restricted	Terrell
78002996	-	Grand Opera House	E. North and N. Getty Streets	Uvalde
79002911	SAL	Bandera County Courthouse and Jail	Public Square, 12th and Maple Streets	Bandera
79002932	-	Edwards County Courthouse and Jail	Public Square	Edwards
79002990	-	Fort Clark Historic District	Off US Hwy 90	Kinney
80004075	-	Jureczki House	607 Cypress Street	Bandera
80004142	-	de Montel, Charles, House	Northwest of Castroville	Medina
82004515	-	Saathoff House	Quihi-Stormhill Road	Medina
82004519	-	Canon Ranch Archeological District	Address Restricted	Pecos
85002298	-	Fort Inge Archeological Site (41UV75)	Address Restricted	Uvalde
89002279	-	Wroe Ranch Shelter No. 1 (41TE307)	Address Restricted	Terrell
90000299	-	Meyer Pottery Archeological Complex (41BX128)	Address Restricted	Bexar
90001733	-	Seven Mile Ranch Archeological District	Address Restricted	Val Verde

Table 3-23: Recorded NRHP-listed Resources within the Study Area

NRIS Reference Number	Additional State Designation	Resource Name	Address	County
96001108	-	State Highway 3 Bridge at the Nueces River	US Hwy 90, 13 miles east of junction with Kinney County	Uvalde
100002696	-	Ball, Joseph, Jr. and Salome, Homestead (41BX2175)	Address Restricted	Bexar
100003354	-	River Oaks Courts	14349 TX 16	Bandera
100004009	-	Uvalde Downtown Historic District	Centered around junction of US Hwy 90 & US Hwy 83, roughly bounded by School Lane, Hornby Place, 2nd Alley, and High Street	Uvalde
100008551	-	Heermann Store	4738 West Loop 1604	Bexar
100010210	-	Dan's Meat Market and Saloon	1303 Lorenzo Street	Medina

Sources: NPS (2025c, 2025e, and 2025f); THC (2025b).

According to the THC (2025c), there are 5,478 pre-contact archeological sites, 324 post-contact period sites, and 216 sites with both pre-contact and post-contact components recorded in the Study Area. No descriptive data is available for 604 of the sites. Of the 6,622 archeological sites recorded within the Study Area, nine are listed on the NRHP, portions of two sites are within address-restricted NRHP District boundaries, and 431 sites have been determined eligible for listing. A total of 454 sites and portions of 183 sites have been determined ineligible for listing on the NRHP. A total of 4,950 sites have not been formally evaluated for inclusion on the NRHP, and the remaining 595 sites have no site form available on the TASA. A total of 111 of the archeological sites are also designated SALs. Due to the sheer number of archeological sites within the Study Area, sites crossed or within 1,000 feet of the Alternative Routes are discussed in detail in Section 4.4.4.

A total of 225 cemeteries is recorded in the Study Area, including 24 designated HTCs, 17 that are also recorded archeological sites, and 48 vicinity cemeteries (THC 2025c and 2025d). Vicinity cemeteries are general areas where a cemetery location has been reported (THC 2025e). The exact location of these cemeteries is unknown and can be due to various factors, including the removal of aboveground indicators (i.e., headstones) and graves have been reportedly moved, but some remains may still be present (THC 2025e). The HTCs and the cemeteries that are also recorded archeological sites are listed in Table 3-24. In addition, 367 OTHMs are mapped in the Study Area. Forty-two of the markers are 1936 Centennial Markers and of these, 24 are eligible for listing on the NRHP (Table 3-25), and 123 are RTHLs (THC 2025d).
A total of six OHP properties (Table 3-26) and eight historic highways are located within the study area (Table 3-27) (THC 2025c and OHP 2025b).

Table 3-24: Historic Texas Cemeteries and Recorded Archeological Sites with Burials Identified within the Study Area

THC Cemetery Number/Trinomial	Name	Time Period	Designations	County
AT-C023	Brite	post-contact	HTC	Atascosa
BN-C087	Colored Burial Ground	post-contact	HTC	Bandera
BN-C020	Polly's	post-contact	HTC	Bandera
BX-C004	Oak Island Cemetery	post-contact	HTC	Bexar
BX-C050	Arnold	post-contact	HTC	Bexar
BN-C002	Bandera	post-contact	HTC	Bexar
BX-C167	Hermann Sons	post-contact	HTC	Bexar
BX-C001	McCulloch Cemetery	post-contact	HTC	Bexar
CX-C001	Cedar Hill-Lima	post-contact	HTC	Crockett
ED-C003	Hackberry	post-contact	HTC	Edwards
KY-C005	Seminole Scout	post-contact	HTC	Kinney
ME-C001	Ihnken Family	post-contact	HTC	Medina
ME-C050	Lytle Masonic	post-contact	HTC	Medina
ME-C092	Renken	post-contact	HTC	Medina
ME-C003	St. Louis	post-contact	HTC	Medina
ME-C004	Tomerlin	post-contact	HTC	Medina
ME-C005	Trimble	post-contact	HTC	Medina
PC-C003	Memory Garden	post-contact	HTC	Pecos
PC-C015	Ira G. Yates Ranch Gravesite	post-contact	HTC	Pecos
RE-C001	Clark	post-contact	HTC	Real
SU-C001	Sutton County Burial Park	post-contact	HTC	Sutton
TE-C001	Cedar Grove	post-contact	HTC	Terrell
UV-C033	Marine Gararez Gravesite	post-contact	HTC	Uvalde
VV-C003	Comstock	post-contact	HTC	Val Verde
-	41BN100	post-contact	-	Bandera
-	41BN104	pre-contact	-	Bandera
-	41BX1659	post-contact	-	Bexar
-	41BX1768	post-contact	-	Bexar
-	41CX1770	pre-contact	-	Crockett
-	41ED235	pre-contact	-	Edwards
-	41ED250	pre-contact	-	Edwards
-	41KM66	post-contact	Eligible/SAL	Kimble
-	41KY133	post-contact	-	Kinney

Table 3-24: Historic Texas Cemeteries and Recorded Archeological Sites with Burials Identified within the Study Area

THC Cemetery Number/Trinomial	Name	Time Period	Designations	County
-	41ME156	pre-contact	-	Medina
-	41PC822	pre- and post-contact	-	Pecos
-	41RE68	post-contact	-	Pecos
-	41TE103	pre-contact	-	Terrell
-	41UV126	pre- and post-contact	-	Uvalde
-	41UV253	post-contact	-	Uvalde
-	41VV1519	pre-contact	-	Val Verde
-	41VV850	pre- and post-contact	-	Val Verde

Sources: THC (2025c and 2025d).

Table 3-25: Centennial and NRHP-Eligible OTHMs Identified in the Study Area

THC Marker No.	Name	Designation	County
293	Bandera Pass	Eligible/Centennial Marker	Bandera
18414	Bandera Pass	Centennial Marker	Bandera
23365	Bandera Water Works Complex	RTHL/Centennial Marker	Bandera
17596	Bandera, “Cowboy Capital of the World”	Centennial Marker	Bandera
294	Bandera’s First Bank	RTHL/Centennial Marker	Bandera
13310	Battle of Medina	Centennial Marker	Atascosa
16553	Baxter’s Curve Train Robbery	Centennial Marker	Terrell
2134	Baylor, John R.	Centennial Marker	Uvalde
12931	Benjamin Franklin and Mary Hay Langford, Jr. Home	RTHL/Centennial Marker	Bandera
727	Benson, William	Centennial Marker	Uvalde
397	Bethlehem Lutheran Church	Centennial Marker	Medina
18540	Biry-Ahr Property	RTHL/Centennial Marker	Medina
662	Camp Fawcett	Centennial Marker	Edwards
4744	Camp Hudson, Site of	Centennial Marker	Val Verde
668	Camp Montel, C.S.A.	Centennial Marker	Bandera
4746	Camp Sabinal	Centennial Marker	Uvalde
4748	Camp Verde	Centennial Marker	Kerr
680	Camp Verde Barracks	RTHL/Centennial Marker	Kerr
681	Camp Verde General Store and Post Office	RTHL/Centennial Marker	Kerr
1401	Edwards County	Eligible/Centennial Marker	Edwards
13330	Hendrick Arnold	Eligible/Centennial Marker	Bexar
370	Highsmith, Benjamin F.	Eligible/Centennial Marker	Bandera

Table 3-25: Centennial and NRHP-Eligible OTHMs Identified in the Study Area

THC Marker No.	Name	Designation	County
721	In This Vicinity June 24, 1841, John Coffee Hays	Eligible/Centennial Marker	Uvalde
16070	Medina County	Eligible/Centennial Marker	Medina
3973	Pecos County	Eligible/Centennial Marker	Pecos
17266	Real County	Eligible/Centennial Marker	Real
4383	Ruins of Fort Lancaster	Eligible/Centennial Marker	Crockett
4744	Site of Camp Hudson	Eligible/Centennial Marker	Val Verde
4746	Site of Camp Sabinal	Eligible/Centennial Marker	Uvalde
4748	Site of Camp Verde	Eligible/Centennial Marker	Kerr
4749	Site of Camp Wood	Eligible/Centennial Marker	Real
11373	Site of Fort Inge	Eligible/Centennial Marker	Uvalde
4794	Site of Fort Lincoln	Eligible/Centennial Marker	Medina
4798	Site of Fort Stockton	Eligible/Centennial Marker	Pecos
2024	Site of Fort Terrett	Eligible/Centennial Marker	Sutton
4934	Site of the Mission Nuestra Senora de la Candelaria	Eligible/Centennial Marker	Uvalde
5156	Sutton County	Eligible/Centennial Marker	Sutton
5232	Terrell County	Eligible/Centennial Marker	Terrell
5526	Town of D'Hanis	Eligible/Centennial Marker	Medina
5537	Town of Quihi	Eligible/Centennial Marker	Medina
5619	Uvalde County	Eligible/Centennial Marker	Uvalde
12893	William Ware	Eligible/Centennial Marker	Uvalde

Sources: THC (2025d); TxDOT (2025c).

Table 3-26: OHP Properties Recorded within the Study Area

Property Address	OHP Status	Property Owner
Old Applewhite Road San Antonio	Individual Landmark	City of San Antonio
19441 S Jett Road	Individual Landmark	Privately owned
8551 Pearsall Road	Individual Landmark	Southwest ISD
8455 Pearsall Road	Individual Landmark	McCullock Cemetery
Medina ISD Rural US HWY 90 West	Individual Landmark	San Antonio River Authority
12861 Galm Road	Individual Landmark	Texas Parks and Wildlife Department

Source: OHP (2025b).

Table 3-27: Historic Highways Recorded within the Study Area

Historic Highway	Highway Name	Year Constructed	Location Confidence
Meridian	1916 The Meridian Road in Texas	1916	Medium
Meridian	1916 The Meridian Road in Texas	1916	Low
Meridian	1924 Automobile Red Book - Meridian	1924	-
Meridian	1940 Texas Highway Department - Meridian	1940	-
Meridian	1960 Texas Highway Department - Meridian	1960	-
Old Spanish Highway	1920s OST Highway	1920s	-
Old Spanish Highway	1930s OST Highway	1930s	-
Old Spanish Highway	1950-1960s OST Highway	1950 - 1960	-

Source: THC (2025d).

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 were defined during the route analysis process. HPAs were designated based on a review of the site and survey data within the Study Area, as well as soils and geologic data, topographic variables, and landowner input. Native American subsistence was dependent on proximity to natural sources of water, such as rivers, creeks, and smaller streams, and sources of raw resources, such as chert outcroppings.

Historic resources are also likely to be found near water sources. However, they will also be in close proximity to primary and secondary transportation routes (e.g., trails, roads, and railroads), which provided access to the sites. Buildings and cemeteries are 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 Alternative Route analysis 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. Review of the historic topographical USGS maps show numerous structures along roads within the Study Area.

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4.0 ENVIRONMENTAL IMPACTS OF THE ALTERNATIVE ROUTES

The analysis of potential impacts for each of the 77 Alternative Routes was based upon the consideration of the requirements of PURA § 37.056(c)(4)(A)-(D); the PUC's Substantive Rule 25.101; the precedent and practices of the PUC in evaluating CCN applications, including the PUC's policy of prudent avoidance; public comments received from the open house meetings; field reconnaissance; and the information received from federal and state agencies and local officials. Measurements of the environmental criteria were taken from recent aerial photography (CDS Muery 2025; Google Earth 2023-2025) and from available digital resource layers using GIS software.

The Consultant professionals with proficiency in different environmental disciplines (terrestrial and aquatic ecology, land use and planning, cultural resources, and GIS) analyzed the Alternative Routes based upon environmental conditions present along each Alternative Route and the general routing criteria developed by the Companies and the Consultant. Each Consultant discipline lead independently analyzed the Alternative Routes and the environmental and land use data presented in Table 4-1 for their technical discipline. The potential impacts to natural, human, and cultural resources resulting from the proposed Project are discussed below by discipline.

4.1 Impact on Natural Resources

4.1.1 Impact on Physiography and Geology

Construction of the proposed transmission line is not anticipated to have adverse effects on the physiographic or geologic features or resources of the area. Erection of the structures will require the excavation and/or minor disturbance of small quantities of materials but should have no measurable impacts on the geologic resources or features along any of the Alternative Routes. No geologic hazards are anticipated by the proposed Project.

The number of caves and springs within 2 kilometers (1.2 miles) of the ROW centerline ranges from 7 for Alternative Routes 23 and 33 to 97 each for Alternative Routes 39, 40, and 45. The length of ROW within 500 feet of San Antonio-area Karst Zones 1 to 3b ranges from zero miles for 65 of the Alternative Routes to 4.77 miles for Alternative Routes 39, 40, 45, 56, 58, 59, 60, 69, 73, 74, 76, and 77 (Table 4-1).

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Table 4-1 ENVIRONMENTAL DATA FOR ROUTE EVALUATION

Evaluation Criteria																											
Land Use	**Route 1**	**Route 2**	**Route 3**	**Route 4**	**Route 5**	**Route 6**	**Route 7**	**Route 8**	**Route 9**	**Route 10**	**Route 11**	**Route 12**	**Route 13**	**Route 14**	**Route 15**	**Route 16**	**Route 17**	**Route 18**	**Route 19**	**Route 20**	**Route 21**	**Route 22**	**Route 23**	**Route 24**	**Route 25**	**Route 26**	**Route 27**
Length of Alternative Route	365.08	370.98	373.54	370.95	374.25	373.93	373.44	380.08	374.94	364.60	387.46	373.50	347.30	353.12	376.75	369.20	362.58	378.74	393.14	348.03	353.86	366.79	364.75	365.42	371.39	344.41	360.63
Number of habitable structures[a] within 500 feet[b] of right-of-way (ROW) centerline	89	70	69	67	66	74	76	66	91	97	98	81	95	95	73	73	99	184	120	128	128	185	172	155	155	167	160
Length of ROW utilizing existing transmission line ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Length of ROW parallel to existing transmission line ROW	17.50	3.85	3.13	3.85	3.13	0	0.92	8.09	8.50	9.70	31.50	0	26.68	31.65	9.02	4.05	26.54	26.07	20.01	6.90	11.87	10.28	26.31	21.45	19.89	11.90	17.43
Length of ROW parallel to other existing compatible ROW (roads, highways, railways, etc. – excluding oil and gas pipelines)	15.43	3.73	3.73	3.73	3.73	3.73	7.73	3.73	8.03	11.08	9.29	5.63	3.94	3.94	7.73	7.73	10.56	10.18	7.88	3.91	3.91	7.66	3.99	13.44	6.69	3.49	7.49
Length of ROW parallel to apparent property lines (not following existing ROW)[c]	26.95	27.33	35.78	32.21	41.51	31.87	27.01	41.51	26.44	23.89	37.25	40.16	26.35	26.35	22.47	21.62	19.74	29.16	24.95	30.47	30.47	31.44	31.66	43.25	20.16	15.20	29.44
Sum of evaluation criteria 4, 5, and 6	59.88	34.90	42.63	39.79	48.36	35.60	35.66	53.33	42.96	44.67	78.05	45.79	56.98	61.94	39.21	33.40	56.83	65.40	52.84	41.28	46.25	49.38	61.97	78.14	46.75	30.60	54.35
Percent of evaluation criteria 4, 5, and 6	16	9	11	11	13	10	10	14	11	12	20	12	16	18	10	9	16	17	13	12	13	13	17	21	13	9	15
Length of ROW across parks/recreational areas[d]	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0	0	0	0	0
Number of additional parks/recreational areas[d] within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
Length of ROW across cropland	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	5.61	5.61	6.83	5.61	6.07	6.07	5.61	5.61	6.30	8.88	5.25	6.89	6.89	22.16	24.40	23.40	17.06	15.82	16.54
Length of ROW across pastureland/rangeland	256.23	260.15	273.76	269.90	276.44	277.76	276.48	275.34	262.74	260.10	244.90	243.55	261.00	259.91	268.19	272.27	250.21	262.18	279.55	266.00	264.90	243.35	257.25	272.39	262.49	234.53	248.58
Length of ROW across land irrigated by mobile irrigation systems (rolling or pivot type)	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.70	0.86	0.96	0.96	0.86	0.86	0.70	1.22	1.03	1.14	1.14	1.98	2.76	2.30	1.84	0.43	0.43
Length of ROW across conservation easements and/or mitigation banks (Special Management Areas)	1.54	5.32	5.32	0	0	0	0	0	2.84	4.38	0	2.84	1.54	1.54	8.16	8.16	1.54	5.69	0	1.54	1.54	0	0.51	0.51	4.66	9.98	6.20
Length of ROW across gravel pits, mines, or quarries	0.46	0.47	0.47	0.47	0.47	0.46	0.46	0.47	0.46	0.46	0.46	0.46	0.47	0.47	0.47	0.47	0.47	0.46	0.46	0.47	0.47	0	0.01	0.02	0	0.01	0.01
Length of ROW parallel to existing pipeline[e] ROW <500 feet from ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.07	0	0	0	0	0	0.96	0	0	0
Number of pipeline[e] crossings	16	42	41	52	50	58	58	51	56	27	36	44	27	28	41	41	27	39	40	27	28	45	49	35	26	25	23
Number of transmission line crossings	14	15	15	15	15	15	15	14	17	14	15	15	18	17	14	15	17	22	12	16	15	23	27	25	31	20	22
Number of Interstate, United States, and State highway crossings	11	11	11	11	11	11	11	11	17	11	17	12	12	12	11	11	17	13	12	13	13	12	18	14	13	13	15
Number of Farm-to-Market (FM)/Ranch-to-Market (RM) road crossings	6	6	7	6	7	6	6	7	6	6	6	7	5	5	6	6	4	5	7	6	6	9	8	7	6	8	7
Number of Federal Aviation Administration (FAA)-registered public/military airfields within 20,000 feet of ROW centerline (with runway >3,200 feet)	4	3	6	2	5	2	2	5	2	4	10	5	6	6	3	3	7	9	5	7	7	3	4	4	5	6	7
Number of FAA-registered public/military airfields within 10,000 feet of ROW centerline (with runway <3,200 feet)	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4
Number of private airstrips within 10,000 feet of ROW centerline	6	9	9	9	9	9	9	9	8	4	8	8	4	4	9	9	6	4	10	3	3	9	10	4	8	10	6
Number of heliports within 5,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Number of commercial AM radio transmitters within 10,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	0	0	1	1	1	2	1	0	0	0
Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline	4	6	3	6	3	5	5	6	6	5	4	5	5	8	3	3	4	11	4	6	9	7	10	1	4	4	7
Number of recorded water wells within 200 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	1	3	3	3	2	2	4	1	4	5
Number of recorded oil and gas wells within 400 feet of ROW centerline	1	1	1	4	4	8	8	4	8	2	5	8	1	1	1	1	1	3	8	7	7	45	33	35	30	23	24
Length of ROW across 20 percent or greater elevation change	4.31	4.48	4.56	6.39	6.46	4.71	4.65	6.48	3.79	4.38	10.29	3.93	2.53	2.54	4.52	4.45	13.74	14.66	5.87	2.60	2.61	3.85	5.54	8.57	8.70	12.96	11.78
Aesthetics																											
Estimated length of ROW within foreground visual zone of Interstate, United States, and State highways	19.76	12.85	13.43	13.80	14.72	12.49	20.08	13.52	36.98	24.91	32.83	14.23	15.74	14.54	19.85	21.02	31.40	28.03	21.38	17.25	16.06	16.68	33.90	18.62	27.11	17.82	44.82
Estimated length of ROW within foreground visual zone of FM/RM roads	13.61	13.61	14.40	13.61	14.40	13.61	13.61	14.40	13.61	13.61	9.71	14.40	8.61	8.61	13.61	13.61	7.16	9.39	7.85	8.65	8.65	10.74	14.84	11.06	15.74	16.37	15.07
Estimated length of ROW within foreground visual zone of parks/recreational areasd	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.87	1.87	1.29	1.29	1.29	1.29	1.29	2.15	2.15	1.87	1.29	1.29	1.29	1.75	1.75	1.75	2.60	1.75
Ecology																											
Length of ROW across upland woodland/brushland/forest	96.53	99.38	88.24	89.73	86.49	84.88	85.50	93.25	102.08	90.68	159.79	121.88	75.81	82.58	95.31	83.79	137.68	131.97	100.66	70.45	77.21	96.92	79.74	79.64	101.73	123.13	101.21
Length of ROW across bottomland/riparian woodland/brushland/forest	4.85	4.27	4.47	4.32	4.44	4.66	4.67	4.81	5.09	5.41	3.59	3.98	3.84	4.21	5.02	4.71	2.68	2.79	4.44	4.09	4.45	4.21	4.24	2.43	3.42	2.18	3.19
Length of ROW across National Wetland Inventory-mapped wetlands	0.01	0.03	0.03	0.01	0.01	0.01	0.01	0.01	0.03	0.03	0	0.02	0	0	0.04	0.04	0	0.07	0.02	0.01	0.01	0.16	0.15	0.07	0.09	0.14	0.09
Length of ROW across designated critical habitat for federally endangered or threatened species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Length of ROW across proposed critical habitat for federally endangered or threatened species	0.26	0.13	0.13	0.19	0.19	0	0	0.19	0	0.26	0.19	0	0.26	0.26	0.13	0.13	0.26	0.14	0.12	0.26	0.26	0	0.19	0.19	0.12	0.13	0.26
Length of ROW across golden-cheeked warbler (GCW) range	0	0	0	0	0	0	0	0	0	0	64.20	25.19	0	0	0	0	75.90	95.24	0	0	0	25.19	0	103.44	110.55	96.02	107.10
Length of ROW across GCW potential habitat, medium to high predicted densities	0	0	0	0	0	0	0	0	0	0	25.18	9.57	0	0	0	0	40.99	49.27	0	0	0	9.57	0	17.13	32.89	46.33	35.93
Length of ROW across GCW potential habitat, low predicted densities	0	0	0	0	0	0	0	0	0	0	18.52	10.65	0	0	0	0	17.82	18.39	0	0	0	10.65	0	8.62	14.36	21.63	25.70
Number of stream and river crossings	430	375	390	383	394	362	362	402	374	423	464	378	345	353	413	384	358	367	462	353	361	390	405	411	471	393	420
Length of ROW parallel (within 100 feet) to streams and rivers	1.97	1.50	1.37	1.45	1.32	1.39	1.39	1.32	1.97	2.21	1.79	1.38	1.88	1.88	1.72	1.72	1.42	0.55	3.03	2.32	2.32	2.40	2.38	2.46	2.22	1.78	1.81
Length of ROW across open water (ponds, lakes, etc.)	0.10	0.09	0.08	0.10	0.09	0.07	0.07	0.10	0.08	0.12	0.07	0.07	0.07	0.08	0.08	0.08	0.07	0.05	0.10	0.03	0.04	0.07	0.10	0.08	0.09	0.10	0.12
Length of ROW across 100-year floodplains	15.50	19.29	19.29	19.76	19.76	17.73	17.13	19.76	17.68	16.02	22.66	16.49	19.07	19.07	18.74	18.74	17.63	12.23	18.70	18.20	18.20	18.73	22.21	14.60	15.92	15.66	12.44
Number of caves and springs within 2 kilometers of ROW centerline	14	10	13	9	12	11	11	12	10	10	51	35	15	15	10	10	71	88	14	15	15	35	7	37	74	83	72
Length of ROW within 500 feet of San Antonio-area Karst Zones 1-3b[j]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cultural Resources																											
Number of recorded cultural resource sites crossed by ROW	6	6	6	6	6	6	6	5	6	5	3	4	7	6	5	6	5	5	5	7	6	6	11	8	8	7	10
Number of additional recorded cultural resource sites within 1,000 feet of ROW centerline	24	19	20	25	26	21	21	25	23	20	21	11	19	18	17	18	24	20	18	19	18	15	26	15	15	13	23
Number of vicinity cemeteries crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	1	0	0	1	1	2	1
Number of additional cemeteries within 1,000 feet of ROW centerline	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	3	1	1	1	1	1	1	3	1	1	0
Number of National Register of Historic Places (NRHP)-listed or determined-eligible sites crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of additional NRHP-listed or determined-eligible sites within 1,000 feet of ROW centerline	5	5	5	5	5	5	5	5	5	5	6	5	5	5	5	5	6	5	5	5	5	6	1	1	1	1	1
Length of ROW crossing areas of high archeological/historical site potential	263.81	263.81	261.64	264.44	263.31	254.04	254.82	273.11	255.00	266.73	293.76	254.96	231.38	241.19	274.93	259.05	254.05	274.68	288.02	231.57	241.37	252.35	260.20	269.17	285.42	262.11	273.28

(a) Single-family and multifamily dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, places of worship, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis.

(b) Due to the potential inaccuracies of the aerial photography and data utilized, all habitable structures within 520 feet have been identified.

(c) Property lines created by existing road, highway, or railroad ROW are not double counted in the "Length of ROW parallel to property lines" criterion.

(d) Defined as parks and recreational areas owned by a governmental body or an organized group, club, or place of worship.

(e) Pipelines 8.0 inches diameter or greater.

(f) As listed in the Chart Supplement South Central U.S. (formerly known as the Airport/Facility Directory South Central U.S.).

(g) 0.5 mile, unobstructed.

(h) Areas with predicted densities of golden-cheeked warblers of 0.13 to 0.25 males per hectare and greater than 0.25 males per hectare as presented by Mueller et al. (2022).

(i) According to data provided by Texas Speleological Survey (2025). Data is offset by 2 kilometers. The data does not include feature locations on Department of Defense-owned property.

(j) The USFWS (2024a) recommends that karst feature surveys be conducted within a subject property if it is within 500 feet of the boundaries of Karst Zones 1, 2, 3a, or 3b (as described in the Section 10(a)(1)(A) Scientific Permit Requirements for Conducting Presence/Absence Surveys for Endangered Karst Invertebrates in Central Texas).

Table 4-1 ENVIRONMENTAL DATA FOR ROUTE EVALUATION

Evaluation Criteria																											
Land Use	**Route 28**	**Route 29**	**Route 30**	**Route 31**	**Route 32**	**Route 33**	**Route 34**	**Route 35**	**Route 36**	**Route 37**	**Route 38**	**Route 39**	**Route 40**	**Route 41**	**Route 42**	**Route 43**	**Route 44**	**Route 45**	**Route 46**	**Route 47**	**Route 48**	**Route 49**	**Route 50**	**Route 51**	**Route 52**	**Route 53**	**Route 54**
Length of Alternative Route	366.73	339.88	347.19	351.47	344.91	350.36	336.94	358.99	357.18	340.48	353.08	341.22	340.10	337.26	342.76	349.88	363.00	345.92	355.77	357.32	355.51	363.14	361.33	364.87	335.26	341.08	359.44
Number of habitable structures[a] within 500 feet[b] of right-of-way (ROW) centerline	178	195	162	177	204	193	193	196	182	192	198	155	109	191	193	202	182	109	186	203	189	203	189	188	200	200	193
Length of ROW utilizing existing transmission line ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Length of ROW parallel to existing transmission line ROW	18.58	15.60	10.72	10.72	15.78	31.97	14.67	22.25	14.67	14.67	22.96	12.81	12.81	14.67	19.64	20.33	19.64	17.77	14.67	21.34	13.77	26.31	18.73	18.73	13.77	18.73	10.64
Length of ROW parallel to other existing compatible ROW (roads, highways, railways, etc. – excluding oil and gas pipelines)	11.18	8.81	1.03	4.68	4.68	7.94	5.27	3.99	3.69	5.27	11.60	4.71	5.60	6.07	5.27	4.99	3.69	5.60	6.70	3.99	3.69	3.99	3.69	3.69	5.27	5.27	3.69
Length of ROW parallel to apparent property lines (not following existing ROW)[c]	26.55	23.80	39.66	25.18	22.59	29.59	27.59	25.44	26.01	36.89	14.91	19.56	20.27	27.25	27.59	32.24	26.01	20.27	35.64	25.25	25.82	25.25	25.82	35.12	27.40	27.40	31.21
Sum of evaluation criteria 4, 5, and 6	56.31	48.20	51.41	40.58	43.06	69.50	47.53	51.68	44.38	56.83	49.47	37.08	38.67	48.00	52.49	57.55	49.34	43.64	57.01	50.58	43.28	55.55	48.24	57.54	46.43	51.40	45.54
Percent of evaluation criteria 4, 5, and 6	15	14	15	12	12	20	14	14	12	17	14	11	11	14	15	16	14	13	16	14	12	15	13	16	14	15	13
Length of ROW across parks/recreational areas[d]	0	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0	0	0	0	0	0	0	0
Number of additional parks/recreational areas[d] within 1,000 feet of ROW centerline	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Length of ROW across cropland	24.63	23.20	14.62	14.62	14.72	23.20	23.20	23.20	23.20	23.20	23.02	14.63	15.58	23.90	23.20	23.20	23.20	15.58	23.20	23.34	23.34	23.34	23.34	23.34	23.34	23.34	23.34
Length of ROW across pastureland/rangeland	230.18	258.75	279.34	258.00	265.94	268.27	256.73	257.09	271.29	257.40	250.47	243.33	242.01	256.55	255.63	252.04	270.19	240.92	241.34	256.27	270.48	255.17	269.38	270.05	255.91	254.81	275.15
Length of ROW across land irrigated by mobile irrigation systems (rolling or pivot type)	2.50	2.76	0.43	0.43	0.43	2.76	2.76	2.76	2.76	2.76	2.30	0.49	0.77	2.76	2.76	2.76	2.76	0.77	2.76	2.76	2.76	2.76	2.76	2.76	2.76	2.76	2.76
Length of ROW across conservation easements and/or mitigation banks (Special Management Areas)	0.51	1.54	4.15	5.69	5.69	1.54	1.54	5.32	5.32	1.54	1.96	5.69	5.69	1.54	1.54	1.54	5.36	5.69	0	5.83	5.83	5.83	5.83	5.83	2.05	2.05	0.51
Length of ROW across gravel pits, mines, or quarries	0	0.01	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.09	0.09	0.01	0.01	0	0.01	0.09	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0
Length of ROW parallel to existing pipeline[e] ROW <500 feet from ROW centerline	0	0	0.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of pipeline[e] crossings	36	27	42	25	25	30	27	39	41	27	27	26	26	27	28	27	42	27	36	39	41	40	42	42	27	28	58
Number of transmission line crossings	24	24	19	16	18	24	24	26	24	24	20	15	15	24	23	23	23	14	24	26	24	25	23	23	24	23	24
Number of Interstate, United States, and State highway crossings	17	14	14	13	15	12	12	18	12	12	13	13	13	12	12	12	12	13	13	18	12	18	12	12	12	12	12
Number of Farm-to-Market (FM)/Ranch-to-Market (RM) road crossings	7	8	7	7	8	8	8	8	8	9	8	6	6	8	8	8	8	6	8	8	8	8	8	9	8	8	8
Number of Federal Aviation Administration (FAA)-registered public/military airfields within 20,000 feet of ROW centerline (with runway >3,200 feet)	5	6	2	8	8	6	6	5	5	9	8	8	8	6	6	6	5	8	4	5	5	5	5	8	6	6	4
Number of FAA-registered public/military airfields within 10,000 feet of ROW centerline (with runway <3,200 feet)	2	3	3	5	4	3	3	3	3	3	3	4	5	3	3	3	3	5	2	2	2	2	2	2	2	2	2
Number of private airstrips within 10,000 feet of ROW centerline	11	5	3	6	5	5	5	10	11	5	6	5	5	5	5	5	11	5	10	10	11	10	11	11	5	5	11
Number of heliports within 5,000 feet of ROW centerline	0	0	0	1	1	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Number of commercial AM radio transmitters within 10,000 feet of ROW centerline	2	2	0	0	0	2	2	2	2	2	1	0	0	2	2	2	2	0	2	2	2	2	2	2	2	2	2
Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline	5	10	4	4	6	8	8	9	8	8	4	3	4	6	11	10	11	7	8	9	8	12	11	11	8	11	10
Number of recorded water wells within 200 feet of ROW centerline	2	2	6	5	4	2	2	2	2	2	3	3	3	2	2	2	2	3	2	2	2	2	2	2	2	2	2
Number of recorded oil and gas wells within 400 feet of ROW centerline	34	38	36	31	31	39	38	38	38	38	38	19	12	38	38	39	38	12	41	32	32	32	32	32	32	32	39
Length of ROW across 20 percent or greater elevation change	15.05	2.54	7.22	11.34	14.04	5.06	2.59	3.63	4.52	2.67	11.62	14.81	14.80	2.59	2.60	4.19	4.54	14.82	5.54	3.63	4.52	3.64	4.54	4.62	2.59	2.60	4.75
Aesthetics																											
Estimated length of ROW within foreground visual zone of Interstate, United States, and State highways	33.80	24.89	21.50	17.61	25.29	19.09	18.19	35.37	18.48	18.19	21.19	15.66	15.68	16.79	16.99	26.81	17.28	14.48	21.50	35.97	19.07	34.77	17.87	17.87	18.78	17.59	18.13
Estimated length of ROW within foreground visual zone of FM/RM roads	13.39	11.91	12.03	12.03	13.44	11.91	11.91	11.91	11.91	12.70	9.90	12.18	11.40	11.91	11.91	11.91	11.91	11.40	11.91	11.91	11.91	11.91	11.91	12.70	11.91	11.91	11.91
Estimated length of ROW within foreground visual zone of parks/recreational areasd	3.18	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	4.17	2.15	2.15	1.29	1.29	1.87	1.29	2.15	1.29	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
Ecology																											
Length of ROW across upland woodland/brushland/forest	145.31	50.81	64.02	84.69	89.71	51.86	50.14	74.25	55.45	52.97	107.88	107.84	106.62	50.21	56.90	66.47	62.21	113.38	88.82	73.43	54.62	80.19	61.39	64.22	49.32	56.08	54.10
Length of ROW across bottomland/riparian woodland/brushland/forest	2.68	4.73	3.73	3.68	4.12	4.93	4.72	5.10	5.05	4.86	2.74	3.29	3.04	4.33	5.09	5.70	5.41	3.41	4.05	4.76	4.71	5.12	5.08	5.21	4.38	4.75	5.04
Length of ROW across National Wetland Inventory-mapped wetlands	0.15	0.15	0.09	0.09	0.12	0.15	0.15	0.16	0.16	0.15	0.12	0.07	0.10	0.15	0.15	0.15	0.16	0.10	0.14	0.16	0.16	0.16	0.16	0.16	0.15	0.15	0.15
Length of ROW across designated critical habitat for federally endangered or threatened species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Length of ROW across proposed critical habitat for federally endangered or threatened species	0.19	0.26	0.19	0.26	0.26	0.33	0.26	0.13	0.13	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.13	0.26	0.19	0.13	0.13	0.13	0.13	0.13	0.26	0.26	0
Length of ROW across golden-cheeked warbler (GCW) range	75.84	0	113.16	107.74	101.18	0	0	0	0	0	92.33	96.08	96.08	0	0	0	0	96.08	25.19	0	0	0	0	0	0	0	0
Length of ROW across GCW potential habitat, medium to high predicted densities	40.99	0	20.25	35.93	35.72	0	0	0	0	0	40.57	46.33	46.33	0	0	0	0	46.33	9.57	0	0	0	0	0	0	0	0
Length of ROW across GCW potential habitat, low predicted densities	17.82	0	10.47	25.92	26.32	0	0	0	0	0	23.80	21.63	21.63	0	0	0	0	21.63	10.65	0	0	0	0	0	0	0	0
Number of stream and river crossings	447	366	397	385	381	380	359	404	395	368	373	364	357	358	367	425	403	365	403	401	392	409	400	409	356	364	373
Length of ROW parallel (within 100 feet) to streams and rivers	2.45	2.50	1.84	1.52	1.81	1.86	2.50	2.48	2.12	2.38	1.94	3.00	2.90	2.50	2.50	3.26	2.12	2.90	1.84	2.48	2.12	2.48	2.12	1.99	2.50	2.50	2.01
Length of ROW across open water (ponds, lakes, etc.)	0.07	0.04	0.09	0.08	0.08	0.06	0.04	0.04	0.03	0.04	0.03	0.08	0.08	0.04	0.05	0.05	0.04	0.09	0.04	0.07	0.06	0.09	0.07	0.07	0.07	0.09	0.05
Length of ROW across 100-year floodplains	20.39	20.83	18.33	15.66	15.66	22.10	21.36	24.91	24.42	21.36	18.13	16.83	16.08	21.16	21.36	21.24	24.42	16.08	23.59	23.82	23.33	23.82	23.33	23.33	20.27	20.27	21.78
Number of caves and springs within 2 kilometers of ROW centerline	59	15	38	75	90	7	15	8	9	18	66	97	97	15	15	13	9	97	30	8	9	8	9	12	15	15	10
Length of ROW within 500 feet of San Antonio-area Karst Zones 1-3b[i]	0	0	0	0	0	0	0	0	0	0	0	4.77	4.77	0	0	0	0	4.77	0	0	0	0	0	0	0	0	0
Cultural Resources																											
Number of recorded cultural resource sites crossed by ROW	8	9	4	7	6	9	9	9	9	9	8	6	5	9	8	8	8	4	7	11	11	10	10	10	11	10	11
Number of additional recorded cultural resource sites within 1,000 feet of ROW centerline	23	22	17	22	25	24	22	25	21	22	29	25	25	22	21	24	20	24	19	21	17	20	16	16	18	17	18
Number of vicinity cemeteries crossed by ROW	1	0	1	1	2	0	0	0	0	0	2	2	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Number of additional cemeteries within 1,000 feet of ROW centerline	3	1	0	0	1	1	1	1	1	1	3	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1
Number of National Register of Historic Places (NRHP)-listed or determined-eligible sites crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of additional NRHP-listed or determined-eligible sites within 1,000 feet of ROW centerline	2	6	6	6	6	6	6	6	6	6	6	6	5	6	6	6	6	5	6	1	1	1	1	1	1	1	1
Length of ROW crossing areas of high archeological/historical site potential	284.69	231.73	256.49	261.72	255.54	244.22	228.10	250.78	250.29	231.15	253.88	251.66	250.29	228.26	237.91	253.03	260.10	260.10	251.17	249.60	249.11	259.41	258.92	261.97	226.92	236.73	244.57

(a) Single-family and multifamily dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, places of worship, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis.

(b) Due to the potential inaccuracies of the aerial photography and data utilized, all habitable structures within 520 feet have been identified.

(c) Property lines created by existing road, highway, or railroad ROW are not double counted in the "Length of ROW parallel to property lines" criterion.

(d) Defined as parks and recreational areas owned by a governmental body or an organized group, club, or place of worship.

(e) Pipelines 8.0 inches diameter or greater.

(f) As listed in the Chart Supplement South Central U.S. (formerly known as the Airport/Facility Directory South Central U.S.).

(g) 0.5 mile, unobstructed.

(h) Areas with predicted densities of golden-cheeked warblers of 0.13 to 0.25 males per hectare and greater than 0.25 males per hectare as presented by Mueller et al. (2022).

(i) According to data provided by Texas Speleological Survey (2025). Data is offset by 2 kilometers. The data does not include feature locations on Department of Defense-owned property.

(j) The USFWS (2024a) recommends that karst feature surveys be conducted within a subject property if it is within 500 feet of the boundaries of Karst Zones 1, 2, 3a, or 3b (as described in the Section 10(a)(1)(A) Scientific Permit Requirements for Conducting Presence/Absence Surveys for Endangered Karst Invertebrates in Central Texas).

Table 4-1 ENVIRONMENTAL DATA FOR ROUTE EVALUATION

Evaluation Criteria																								
Land Use	**Route 55**	**Route 56**	**Route 57**	**Route 58**	**Route 59**	**Route 60**	**Route 61**	**Route 62**	**Route 63**	**Route 64**	**Route 65**	**Route 66**	**Route 67**	**Route 68**	**Route 69**	**Route 70**	**Route 71**	**Route 72**	**Route 73**	**Route 74**	**Route 75**	**Route 76**	**Route 77**
Length of Alternative Route	346.20	362.61	364.04	358.81	368.89	359.27	374.48	373.23	376.87	350.93	351.67	347.46	344.24	343.52	343.81	351.34	357.19	360.34	351.71	357.53	356.97	364.47	351.95
Number of habitable structures[a] within 500 feet[b] of right-of-way (ROW) centerline	243	141	177	136	167	99	182	173	192	178	179	199	192	195	118	169	203	202	75	75	197	156	102
Length of ROW utilizing existing transmission line ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Length of ROW parallel to existing transmission line ROW	19.38	23.27	14.78	10.54	23.27	14.78	20.80	29.03	29.94	19.48	25.32	8.77	11.90	11.90	11.90	14.78	16.87	16.87	9.82	14.78	19.29	14.78	25.32
Length of ROW parallel to other existing compatible ROW (roads, highways, railways, etc. – excluding oil and gas pipelines)	8.20	2.51	3.49	2.50	5.36	2.43	9.66	3.64	11.43	1.60	1.03	3.49	3.49	3.49	4.89	1.03	12.16	3.49	2.67	2.67	11.82	2.82	2.43
Length of ROW parallel to apparent property lines (not following existing ROW)[c]	18.04	43.68	20.11	21.76	24.52	30.77	30.59	39.42	33.05	40.58	39.20	19.90	20.24	14.51	17.08	39.46	16.10	16.85	39.30	39.30	20.65	24.95	41.77
Sum of evaluation criteria 4, 5, and 6	45.62	69.46	38.38	34.79	53.15	47.98	61.05	72.09	74.41	61.66	65.55	32.17	35.64	29.91	33.87	55.28	45.13	37.21	51.79	56.75	51.77	42.56	69.51
Percent of evaluation criteria 4, 5, and 6	13	19	11	10	14	13	16	19	20	18	19	9	10	9	10	16	13	10	15	16	15	12	20
Length of ROW across parks/recreational areas[d]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of additional parks/recreational areas[d] within 1,000 feet of ROW centerline	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Length of ROW across cropland	17.10	14.77	16.26	14.77	13.98	15.72	25.52	15.25	25.13	14.94	14.76	14.76	14.76	14.76	15.72	14.76	14.76	14.76	15.72	15.72	25.13	13.98	15.72
Length of ROW across pastureland/rangeland	232.05	272.94	264.63	264.54	231.40	284.50	265.74	274.44	262.49	284.69	279.10	239.81	237.81	235.14	233.06	277.42	233.76	232.83	266.29	265.19	233.51	240.79	277.02
Length of ROW across land irrigated by mobile irrigation systems (rolling or pivot type)	1.84	0.49	0.43	0.49	0.49	0.77	2.47	0.43	2.47	0.43	0.43	0.43	0.43	0.43	0.77	0.43	0.43	0.43	0.77	0.77	2.47	0.49	0.77
Length of ROW across conservation easements and/or mitigation banks (Special Management Areas)	6.20	4.66	9.98	9.98	6.20	9.98	0.51	4.66	2.05	4.66	4.66	4.66	4.66	9.98	9.98	4.66	9.98	4.66	4.66	4.66	0.51	10.94	4.66
Length of ROW across gravel pits, mines, or quarries	0.01	0.09	0	0.09	0.07	0.09	0	0.06	0.01	0.05	0	0	0.01	0.01	0.09	0.03	0	0	0.11	0.11	0	0.09	0.07
Length of ROW parallel to existing pipeline[e] ROW <500 feet from ROW centerline	0	0.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0.96	0	0	0.96	0.96	0	0	0
Number of pipeline[e] crossings	29	41	26	29	24	35	50	45	25	48	47	42	34	25	26	43	16	25	41	42	38	27	48
Number of transmission line crossings	26	15	18	16	12	15	22	18	20	19	19	18	18	18	15	18	17	17	16	15	23	12	16
Number of Interstate, United States, and State highway crossings	14	14	13	13	12	14	18	12	13	13	13	13	13	13	13	14	13	13	13	13	13	12	13
Number of Farm-to-Market (FM)/Ranch-to-Market (RM) road crossings	7	5	7	5	5	5	9	7	7	7	7	8	8	8	6	7	8	8	5	5	8	5	5
Number of Federal Aviation Administration (FAA)-registered public/military airfields within 20,000 feet of ROW centerline (with runway >3,200 feet)	8	3	7	6	9	4	9	5	9	3	3	5	5	6	6	2	7	6	4	4	6	7	3
Number of FAA-registered public/military airfields within 10,000 feet of ROW centerline (with runway <3,200 feet)	2	3	2	4	5	4	4	2	4	2	2	2	2	2	4	2	2	2	5	5	3	4	4
Number of private airstrips within 10,000 feet of ROW centerline	5	2	10	7	10	4	10	6	8	3	3	10	10	10	9	3	15	12	3	3	11	8	2
Number of heliports within 5,000 feet of ROW centerline	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of commercial AM radio transmitters within 10,000 feet of ROW centerline	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline	14	1	7	5	5	5	6	6	1	7	5	8	6	6	4	7	7	7	2	5	7	8	3
Number of recorded water wells within 200 feet of ROW centerline	1	5	5	5	5	5	3	5	2	9	7	4	4	4	3	6	5	4	4	4	2	4	6
Number of recorded oil and gas wells within 400 feet of ROW centerline	32	19	26	13	14	7	35	30	32	34	35	32	28	25	6	30	25	26	11	11	35	13	16
Length of ROW across 20 percent or greater elevation change	12.71	8.82	10.73	8.85	12.17	5.88	11.18	9.99	11.67	5.49	5.67	13.19	14.87	12.96	12.97	7.23	14.39	14.16	10.23	10.24	15.26	9.61	5.69
Aesthetics																							
Estimated length of ROW within foreground visual zone of Interstate, United States, and State highways	25.81	20.10	16.97	15.33	21.17	16.83	33.61	16.27	15.12	18.37	17.83	19.02	21.25	19.97	17.64	20.89	19.03	18.81	17.48	16.28	18.53	21.55	15.51
Estimated length of ROW within foreground visual zone of FM/RM roads	15.01	10.76	12.93	10.76	9.98	9.98	10.68	12.65	8.13	12.03	12.03	13.44	13.44	13.44	11.40	12.03	13.44	13.44	9.98	9.98	9.55	9.98	9.98
Estimated length of ROW within foreground visual zone of parks/recreational areasd	2.60	2.33	2.33	1.75	2.33	1.75	3.77	2.83	1.75	1.75	1.75	2.60	2.60	2.60	2.60	1.75	2.60	3.18	1.75	1.75	2.60	1.75	1.75
Ecology																							
Length of ROW across upland woodland/brushland/forest	120.06	90.43	87.85	89.05	127.88	65.45	104.06	94.39	93.65	59.43	65.44	121.31	120.08	121.83	122.33	69.97	135.90	140.28	77.57	84.33	125.39	114.54	65.94
Length of ROW across bottomland/riparian woodland/brushland/forest	2.95	3.34	5.32	4.58	3.79	3.95	3.80	3.78	2.42	3.68	3.90	3.37	3.02	3.05	2.72	3.76	4.13	3.52	3.53	3.90	2.07	4.59	3.57
Length of ROW across National Wetland Inventory-mapped wetlands	0.15	0.04	0.10	0.05	0.04	0.09	0.12	0.07	0.06	0.09	0.09	0.12	0.12	0.14	0.12	0.09	0.14	0.12	0.07	0.07	0.09	0.04	0.07
Length of ROW across designated critical habitat for federally endangered or threatened species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Length of ROW across proposed critical habitat for federally endangered or threatened species	0.26	0.19	0.13	0.13	0.26	0.13	0.19	0.19	0.26	0	0	0	0.19	0.13	0.13	0.19	0.13	0.12	0.19	0.19	0.19	0.26	0
Length of ROW across golden-cheeked warbler (GCW) range	95.24	113.16	111.56	111.19	110.56	115.10	51.92	105.44	97.25	99.16	99.16	96.02	96.02	96.02	96.02	113.16	96.02	96.02	119.06	119.06	86.30	109.92	99.16
Length of ROW across GCW potential habitat, medium to high predicted densities	49.27	20.25	32.89	34.16	46.93	20.53	27.00	32.60	31.25	20.25	20.25	46.33	46.33	46.33	46.33	20.25	46.33	46.33	33.88	33.88	43.21	42.11	20.25
Length of ROW across GCW potential habitat, low predicted densities	18.39	10.47	14.36	13.73	20.24	11.61	10.29	13.22	24.81	10.47	10.47	21.63	21.63	21.63	21.63	10.47	21.63	21.63	12.59	12.59	19.78	21.02	10.47
Number of stream and river crossings	370	458	512	434	441	424	458	431	446	373	378	382	405	401	390	402	462	453	393	401	428	439	367
Length of ROW parallel (within 100 feet) to streams and rivers	1.46	3.74	2.72	3.89	3.51	4.23	2.88	2.42	1.27	1.91	1.66	1.73	1.78	1.83	2.84	1.84	1.77	2.31	2.58	2.58	2.58	2.48	2.66
Length of ROW across open water (ponds, lakes, etc.)	0.09	0.13	0.10	0.12	0.12	0.11	0.09	0.12	0.08	0.09	0.12	0.09	0.11	0.10	0.10	0.14	0.10	0.13	0.13	0.14	0.08	0.14	0.12
Length of ROW across 100-year floodplains	14.15	18.40	15.88	17.93	16.73	17.18	19.54	13.67	12.28	13.05	13.05	16.18	18.21	17.74	18.15	17.24	17.74	18.20	17.66	17.66	16.13	16.62	13.47
Number of caves and springs within 2 kilometers of ROW centerline	96	41	75	69	92	40	35	70	79	38	37	84	82	83	86	38	89	85	62	62	81	86	40
Length of ROW within 500 feet of San Antonio-area Karst Zones 1-3b[j]	0	4.77	0	4.77	4.77	4.77	0	0	0	0	0	0	0	0	4.77	0	0	0	4.77	4.77	0	4.77	4.77
Cultural Resources																							
Number of recorded cultural resource sites crossed by ROW	9	7	7	8	7	5	10	6	9	6	6	6	6	6	6	5	6	5	7	6	8	7	6
Number of additional recorded cultural resource sites within 1,000 feet of ROW centerline	16	15	14	15	20	10	34	14	24	8	9	14	19	13	16	12	14	13	21	20	22	22	12
Number of vicinity cemeteries crossed by ROW	2	1	1	1	1	2	2	1	2	1	1	2	2	2	3	1	2	2	2	2	3	1	2
Number of additional cemeteries within 1,000 feet of ROW centerline	2	0	0	0	0	1	3	0	3	0	0	1	1	1	2	0	1	1	1	1	4	0	1
Number of National Register of Historic Places (NRHP)-listed or determined-eligible sites crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of additional NRHP-listed or determined-eligible sites within 1,000 feet of ROW centerline	2	1	2	1	0	0	1	1	1	1	1	1	1	1	0	1	1	1	0	0	1	0	0
Length of ROW crossing areas of high archeological/historical site potential	258.96	284.13	293.80	275.20	289.14	272.78	282.13	287.46	287.98	253.27	253.00	258.43	264.65	262.98	261.24	265.12	282.05	287.93	261.36	271.17	272.55	284.18	251.26

(a) Single-family and multifamily dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, places of worship, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis.

(b) Due to the potential inaccuracies of the aerial photography and data utilized, all habitable structures within 520 feet have been identified.

(c) Property lines created by existing road, highway, or railroad ROW are not double counted in the "Length of ROW parallel to property lines" criterion.

(d) Defined as parks and recreational areas owned by a governmental body or an organized group, club, or place of worship.

(e) Pipelines 8.0 inches diameter or greater.

(f) As listed in the Chart Supplement South Central U.S. (formerly known as the Airport/Facility Directory South Central U.S.).

(g) 0.5 mile, unobstructed.

(h) Areas with predicted densities of golden-cheeked warblers of 0.13 to 0.25 males per hectare and greater than 0.25 males per hectare as presented by Mueller et al. (2022).

(i) According to data provided by Texas Speleological Survey (2025). Data is offset by 2 kilometers. The data does not include feature locations on Department of Defense-owned property.

(j) The USFWS (2024a) recommends that karst feature surveys be conducted within a subject property if it is within 500 feet of the boundaries of Karst Zones 1, 2, 3a, or 3b (as described in the Section 10(a)(1)(A) Scientific Permit Requirements for Conducting Presence/Absence Surveys for Endangered Karst Invertebrates in Central Texas).

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4.1.2 Impact on Soils

The construction and operation of transmission lines normally create very few long-term adverse impacts on soils. Transmission lines do not normally cause a conversion of farmland/pastureland because the site can still be used in this capacity after construction. The major potential impact upon soils from transmission line construction would be erosion and soil compaction. The potential for soil erosion is generally greatest during the initial clearing of the ROW; however, the Companies employ erosion control measures during the clearing and construction process. Where existing land cover includes woody vegetation within the ROW, much of this vegetation will be removed to provide adequate space for construction activities and to minimize corridor maintenance and operational problems.

Construction of the transmission line would require minimal amounts of clearing in desert scrub, grasslands, and areas that have already been cleared for crops, pastures, and existing road, transmission line, and pipeline ROW. The most important factor in controlling soil erosion associated with construction activity is to revegetate areas of disturbance immediately following construction. Natural succession would revegetate most of the ROW. Impacts from soil erosion caused by construction activities would be minimized due to the implementation of BMPs designed in the SWPPP and matting.

Prime farmland soils, as defined by the NRCS, are soils that are best suited for producing food, feed, forage, or fiber crops. The USDA recognizes the importance and vulnerability of prime farmlands throughout the nation and encourages the wise use and conservation of these soils where practical. The Project would cross prime farmland soils and would cross some cropland. In addition to construction-related impacts described above, the major impact of the Project on soils would be the physical occupation of small areas by the actual support structures. However, most of the ROW would be available for agricultural use once construction of the transmission line is completed.

Anthrax, a bacterial disease caused by *Bacillus anthracias*, which is a naturally occurring organism found in soil, is known to occur in the following counties within the Study Area: Edwards, Crockett, Kinney, Sutton, Uvalde, and Val Verde. If it is determined that anthrax is prevalent within construction areas within the PUC-approved route, proper construction procedures will be followed.

4.1.3 Impact on Mineral and Energy Resources

Activities associated with the construction, operation, and maintenance of electrical transmission lines typically do not impact mineral and energy resources when appropriate measures are implemented during

the routing and construction phases. There are many known oil or gas wells and transmission pipelines identified within the Study Area that were taken into consideration during the routing process. Although unidentified gravel/caliche pits and quarries occur within the Study Area, no significant adverse impacts are anticipated to gravel/caliche pits and quarries.

4.1.4 Impact on Water Resources

4.1.4.1 Surface Water

All surface waters will be spanned, including identified NRI river segments and ESSS, and a SWPPP will be implemented during construction; therefore, no significant impacts to surface waters are anticipated for any of the Alternative Routes. Potential impacts include short-term disturbances resulting from construction activities, which could result primarily from increased siltation from erosion and decreased water quality from accidental spillage of petroleum and other chemical products. Additionally, activities such as clearing of vegetation may temporarily increase local stormwater runoff volumes and sediment loading. However, potential impacts would be avoided when possible by spanning surface waters, diverting construction traffic around water resources via existing roads, and eliminating unnecessary clearing of vegetation. This may eliminate the necessity of constructing temporary low-water crossings that may result in erosion, siltation, and disturbance of the stream and its biota. In construction areas, BMPs outlined in the SWPPP will help prevent on-site silt and erosion from occurring and leaving the workspace and prevent accidental spillage of petroleum and other chemical products. BMPs may include, but are not limited to, silt fencing, organic filter tubes, hay-bale dikes, rock filter dams, temporary stabilization materials, and secondary containment for petroleum and other chemical products. If a spanned stream is dry at the time of construction, some bank and streambed alterations may be necessary to facilitate crossing. Such activities will be conducted in accordance with USACE regulations and the SWPPP.

Alternative Route 13 has the fewest stream crossings at 345, while Alternative Route 57 has the most stream crossings at 512. The length of ROW parallel (within 100 feet) to streams ranges from 0.55 mile for Alternative Route 18 to 4.23 miles for Alternative Route 60 (Table 4-1).

4.1.4.2 Floodplains

FEMA digital floodplain data was available for seven of the 15 counties in the Study Area, including Atascosa, Bandera, Bexar, Kerr, Medina, Uvalde, and Val Verde counties. Proposed construction could result in locating some transmission line structures within floodplains, particularly in the vicinity of named streams. These structures would be designed and constructed so as not to impede the flow of any waterway or create any hazard during flooding. Construction activities within floodplains would be limited to the Project

ROW, and significant efforts should be made to keep structures from being in obvious flood channels. Some scour could occur around structures if flood-flow depths and velocities become great enough. Careful siting of structures should eliminate the possibility of significant scour. The Project should have no significant impact on the function of the floodplain, nor adversely affect adjacent property or downstream properties. Prior to construction, the Companies will coordinate with the appropriate floodplain administrator, as necessary, to acquire any floodplain construction permits.

All of the Alternative Routes have some length of ROW across 100-year floodplains. The length of ROW across floodplains ranges from 12.23 miles for Alternative Route 18 to 24.91 miles for Alternative Route 35 (Table 4-1).

4.1.4.3 Groundwater

No adverse impacts to groundwater are expected to occur from the construction and operation of the proposed transmission line. The amount of recharge area that would be disturbed by construction is minimal when compared with the total amount of recharge area available for the aquifer systems in the region. A SWPPP will be developed to identify avoidance measures for potential contamination of water resources. Standard operating procedures and spill response specifications relating to petroleum product storage, refueling, and maintenance activities of equipment are provided as a component of the SWPPP. Any accidental spills would be promptly responded to in accordance with state and federal regulations. The Companies will take all necessary and available precautions to avoid and minimize the occurrence of such spills.

4.1.5 Impact on the Ecosystem

4.1.5.1 Vegetation

Impacts to vegetation resulting from the construction and operation of transmission lines are primarily associated with the removal of existing woody vegetation within the ROW. The amount of vegetation cleared from the transmission line ROW would be dependent upon the type of vegetation present. For example, the greatest amount of vegetation clearing would occur in wooded areas, whereas cropland, desert scrub, and grassland would require little to no removal of vegetation.

Vegetation type data was interpolated from aerial photography and route lengths across these areas were digitally measured for tabulation. All of the Alternative Routes cross upland woodland/brushland/forest vegetation, ranging from 49.32 miles for Alternative Route 52 to 159.79 miles for Alternative Route 11. The length of the Alternative Routes across bottomland/riparian woodland/brushland/forest that would

require removal ranges from 2.07 miles for Alternative Route 75 to 5.70 miles for Alternative Route 43 (Table 4-1).

Construction of the transmission line within the ROW would be performed in such a way as to minimize adverse impacts to vegetation and to retain existing ground cover when practicable. Where necessary, soil conservation practices will be undertaken to protect local vegetation and ensure successful revegetation for areas disturbed during construction.

4.1.5.2 Aquatic Resources

Removal of vegetation in wetlands increases the potential for erosion and sedimentation, which can be detrimental to downstream aquatic life and plant communities. Any placement of fill material within WOTUS would represent a permit action that may require notification to the USACE. Detailed field studies would be required to verify the location and amount of jurisdictional wetlands that may be within the ROW of an Alternative Route. Precautions would be taken throughout the construction process to avoid and minimize impacts to wetlands. Depending on the size and vegetation type (shrub/scrub or herbaceous), these areas can be spanned in many instances, although they cannot always be avoided by construction equipment. Impact minimization measures (e.g., timber matting, hand-clearing woody vegetation, spanning wetlands) will be implemented during construction to reduce wetland impacts. Placement of approved BMPs for construction and minimization of erosion in disturbed areas would help dissipate the flow of runoff. Placement of silt fences or hay-bale dikes between streams and disturbed areas would also help prevent siltation into the waterway.

Alternative Routes that cross NWI-mapped wetlands range from zero for Alternative Routes 11, 13, 14, and 17 to 0.16 mile (~844.8 feet) each for Alternative Routes 22, 35, 36, 44, 47, 48, 49, 50, and 51 (Table 4-1).

Physical habitat loss or modification could result whenever access road crossings intercept a drainage system through sedimentation due to erosion; increased suspended solids loading; or accidental petroleum spills directly into a creek, lake, or other aquatic features. Erosion results in siltation and increased suspended solids entering streams, creeks, or lakes, which in turn may negatively affect many aquatic organisms at many trophic levels. Since aquatic features of the area typically exhibit relatively high turbidities during and following runoff events, small increases in suspended solids during the construction phase are unlikely to have any discernible adverse impact. Additionally, BMPs outlined in the SWPPP will help prevent on-site silt and erosion from occurring and leaving the workspace. BMPs may include, but are

not limited to, silt fencing, organic filter tubes, hay-bale dikes, rock filter dams, and temporary stabilization materials.

The length of ROW across open water ranges from 0.03 mile (~158.4 feet) each for Alternative Routes 20, 36, and 38 to 0.14 mile (~739.2 feet) each for Alternative Routes 70, 74, and 76 (Table 4-1).

4.1.5.3 Wildlife

The impacts of transmission lines on wildlife could include short-term effects resulting from physical disturbance during construction, as well as long-term effects resulting from habitat modification, fragmentation, or loss. The net effect from transmission line construction on local wildlife is typically minor. The following section provides a general discussion of the effects of transmission line construction and operation on terrestrial wildlife, followed by a discussion of the possible impacts of the Alternative Routes.

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

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

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

Transmission line structures will be designed in compliance with the Avian Power Line Interaction Committee (APLIC) standards, as defined in *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC 2012). As such, the danger of electrocution to birds from this Project is anticipated to be insignificant because the distance between conductors or conductor and structure or ground wire on 765-kV transmission lines is greater than the wingspan of any bird in the area (i.e., greater than 8 feet). Some avian species may use transmission line structures or wires for perching and roosting; however, this is not the designed intent of those facilities. Additionally, edge-adapted species (e.g., some flycatchers, northern cardinal, northern bobwhite, Cooper's hawk, brown-headed cowbird, and northern mockingbird) may select the edge habitat created along the changed vegetation areas adjacent to the transmission line ROW (Rochelle et al. 1999).

The transmission line (both structures and wires) could present a hazard to flying birds, particularly when flying through a migratory pathway or stopover site (National Audubon Society 2023). Mortality is directly related to an increase in structure height; number of guy wires, conductors, and ground wires; and use of solid or pulsating red lights (an FAA requirement on some structures or structures over 200 feet in height) (Erickson et al. 2005). Collision hazards are greatest near habitat "magnets" (e.g., wetlands, open water, edges, and riparian zones) and during the fall when flight altitudes of dense migrating flocks are lower in association with cold air masses, fog, and inclement weather. The greatest danger of mortality exists during periods of low ceiling, poor visibility, and drizzle when birds are flying low, perhaps commencing, or terminating a flight, and when they may have difficulty seeing obstructions (Electric Power Research Institute 1993). Most migrant species known to occur in the Study Area, including passerines, should be minimally affected during migration since their normal flying altitudes are much greater than the heights of the proposed transmission structures (Willard 1978; Gauthreaux 1978).

The species most prone to collision are often the largest and most common for resident birds or for birds during periods of non-migration (Rusz et al. 1986; APLIC 1994); however, over time, these birds learn the location of transmission lines and become less susceptible to wire strikes (Avery 1978). Raptors, typically, are uncommon victims of transmission line collisions because of their great visual acuity (Thompson 1978). In addition, many raptors only become active after sufficient thermal currents develop, which is usually late in the morning when poor light is not a factor (Avery 1978).

Waterfowl species are particularly vulnerable to collisions with power lines because of their low-altitude flight and high speed. Additionally, species that travel in large flocks, such as blackbirds and many

shorebirds, are also vulnerable because dense flocking makes movement around obstacles more difficult for individuals in the flock (APLIC 1994).

Utility companies can employ several means to minimize transmission line impacts on birds in flight. The initial placement of a transmission line is the most important consideration (Avery 1978; APLIC 1994 and 2006). The proximity of a transmission line to areas of frequent bird use (e.g., communal foraging or roosting areas, rookeries, wetlands) is crucial. This is especially true for daily use areas, such as feeding areas or other areas where birds may be taking off or landing regularly (APLIC 1994 and 2006). The position of the individual structures can also help reduce collisions. Faanes (1987), in an in-depth study in North Dakota, found that birds in flight tend to avoid the transmission line structures, presumably because such structures are visible from a distance. Instead, most appear to fly over the lines in the mid-span region. In areas where the transmission line passes between roosting and foraging areas, the structures can be placed in the center of the flyway (i.e., where the birds are more likely to fly) to increase their visibility, in addition to marking the wires.

Faanes (1987) reported that 97 percent of birds observed colliding with a power line did so with the ground (static) wire, largely because of attempts to avoid the conductors. Beaulaurier (1981) found that removal of the ground wire at two study sites in Oregon resulted in a reduction in collisions of 35 percent and 69 percent. However, since overhead static wires are installed on transmission lines for safety and reliability reasons, increasing the visibility of the static wire would be a better alternative, when necessary. Increasing the visibility of the wires by using markers such as orange aviation balls, black-and-white ribbons, or spiral vibration dampers, particularly at mid-span, can reduce the number of collisions. Beaulaurier (1981) reviewed 17 studies involving marking ground wires or conductors and found an average reduction in collisions of 45 percent when compared to unmarked lines.

Negative edge effects can be reduced through native revegetation of disturbed construction areas where necessary and appropriate for safe and reliable operation. Additionally, nest management through platform design (if required), equipment protection, and other physical disincentives to bird use and nesting can avoid negative impacts on birds and power reliability (APLIC 2006).

In general, the greatest potential impact to wildlife typically results from the loss and fragmentation of woodland and wetland habitats. Woodlands, particularly, are relatively static environments that require greater regenerative time compared to pastureland, cropland, grassland, desert scrub, rangeland, or emergent wetlands. In most cases, wetlands and small waterbodies can be spanned with little or no resulting

impact on wildlife. However, as previously noted, the amount of aquatic habitat being crossed is minimal due to the ephemeral nature of many of the streams. Therefore, the greatest potential to impact wildlife would be the length requiring woodland clearing, followed by the length of the Alternative Routes, which would present the potential for wire strikes to both migrant and resident birds.

Most of the Alternative Routes cross some length of NWI-mapped wetlands. All of the Alternative Routes cross some length of bottomland/riparian woodland/brushland/forest and upland woodland/brushland/ forest, resulting in clearing and subsequent habitat fragmentation.

4.1.5.4 Recreationally and Commercially Important Species

Increased noise and equipment movement during construction may temporarily displace mobile wildlife species from the immediate workspace area. These impacts are considered short-term and normal wildlife movements would be expected to resume after construction is completed. All of the 77 Alternative Routes cross areas of upland woodland/brushland/forest and bottomland/riparian woodland/brushland/forest habitat, which can represent the highest degree of habitat fragmentation by converting the area within the ROW to an herbaceous habitat. Although all of the Alternative Routes cross bottomland/riparian woodland/brushland/forest habitat, it is not anticipated that significant impacts will occur to large game, small game, or trapping species from construction activities and with the removal of vegetation (habitat modification/fragmentation). The proposed Project is not anticipated to have a significant impact on game fish, waterfowl hunting, recreational fishing, and commercial fishing.

4.1.5.5 Endangered and Threatened Species

An assessment of potential impacts for listed threatened or endangered species within the Study Area was conducted by reviewing readily available desktop data from the USFWS IPaC, TPWD RTEST, and TPWD NDD. Current USFWS IPaC listings (USFWS 2025b) included data based on the Study Area, while the TPWD RTEST (TPWD 2025c) data is only available at the county level. The NDD data (TPWD 2025d) provides historical records of species and other rare resources that could occur in the Study Area. Potential USFWS-designated critical habitat locations (USFWS 2025b) were also included in the review.

Following PUC approval of a route and prior to construction, field habitat assessments will be conducted to identify protected plant and wildlife species and their potential habitat along the PUC-approved route. Following these assessments, necessary coordination and correspondence will be conducted with the USFWS and TPWD.

4.1.5.5.1 Plant Species

Review of the IPaC report, TPWD RTEST tool, and NDD identified previously documented occurrences of Federally and state-listed threatened or endangered plant species within the Study Area. The TPWD's NDD data identified EO data for seven federally or state-listed species: bracted twistflower, bunched cory cactus, South Llano (also known as Don Richards') spring moss, Leoncita false-foxglove, Pecos sunflower, Texas snowbell, and Tobusch fishhook cactus. Additionally, the TPWD's NDD data identified EO data for 75 state-listed sensitive plant species. However, these species are not state or federally protected. If any of the threatened or endangered plant species occur in the PUC-approved route ROW, they may be affected during initial vegetation clearing during construction. Prior to construction, a habitat assessment would be necessary to verify whether habitat for threatened or endangered species is present along the PUC-approved route.

4.1.5.5.2 Federally Listed Wildlife Species

Federally listed avian species may occur throughout the Study Area and occupy habitats seasonally or temporarily but are unlikely to reside within the Study Area for an extended period. Species such as the piping plover and rufa red knot only need to be considered for wind energy or wind-related projects (USFWS 2025b). The transmission line is unlikely to result in adverse impacts to these species.

The GCW is known to occur throughout the Study Area within Bandera, Bexar, Edwards, Kerr, Kimble, Kinney, Medina, Real, and Uvalde counties, and numerous EOs are documented within the Study Area (TPWD 2025d). Alternative Routes 1 to 10, 13 to 16, 19 to 21, 23, 29, 33 to 37, 41 to 44, and 47 to 54 do not cross GCW range (USFWS 2025h). Alternative Routes 18, 26, 39, 40, 45, 55, 66 to 69, 71, and 72 cross the highest amount of medium to high predicted densities of male GCWs as presented by Mueller et al. (2022). Length of ROW across GCW potential habitat and low predicted densities were also tabulated in Table 4-1.

For the Alternative Routes crossing GCW range, the total combined lengths of ROW across GCW medium to high and low predicted densities range from 20.22 miles each for Alternative Routes 12, 22, and 46 to 67.95 miles each for Alternative Routes 26, 39, 40, 45, 66 to 69, 71, and 72. Because many of the canyons where potential GCW habitat is located can be spanned, habitat impacts may be reduced. Any Alternative Routes or portions of Alternative Routes that parallel or utilize existing cleared ROW or span potential habitat for the GCW through GCW range should have less of an impact than Alternative Routes that do not. Routes that do not cross GCW range are not expected to impact GCW habitat. Once a final route is

approved by the PUC, a habitat assessment would be necessary to identify potential GCW habitat where the PUC-approved route crosses GCW range.

The Companies are currently working with the USFWS to develop timely permitting and mitigation strategies if the Commission were to approve a route that crosses through GCW habitat. Based on recent discussions with the USFWS, all routes are assumed permissible through an Incidental Take Permit under Section 10 of the ESA if needed, and impacts can be minimized, mitigated, and monitored through an HCP.

Federally listed aquatic and karst species, including the San Marcos salamander, Texas blind salamander, Cokendolpher cave harvestman, Robber Baron Cave meshweaver, Peck's cave amphipod, comal springs dryopid beetle, and comal springs riffle beetle, do not occur within the Study Area because the Study Area is outside of its known range. Therefore, no impacts to these species are anticipated.

Arachnid and crustacean species that may occur within the Study Area where available habitat is present include the Government Canyon Bat Cave meshweaver, Government Canyon Bat Cave spider, Madla Cave meshweaver, and Pecos amphipod. The length of ROW within 500 feet of San Antonio-area Karst Zones 1 to 3b ranges from zero miles for 65 of the Alternative Routes to 4.77 miles for Alternative Routes 39, 40, 45, 56, 58, 59, 60, 69, 73, 74, 76, and 77 (Table 4-1). The USFWS (2024a) recommends that karst feature surveys be conducted within a subject property if it is within 500 feet of the boundaries of Karst Zones 1, 2, 3a, or 3b (as described in the Section 10(a)(1)(A) Scientific Permit Requirements for Conducting Presence/Absence Surveys for Endangered Karst Invertebrates in Central Texas.

Federally listed aquatic species such as clams, fish, and freshwater snails that may occur within permanent waterbodies in the Study Area include the Guadalupe fatmucket, Guadalupe orb, Salina mucket, Texas fatmucket, Texas hornshell, Devils River minnow, Leon Springs pupfish, Mexican blindcat, Pecos gambusia, Toothless blindcat, Widemouth blindcat, diamond tryonia, Gonzales tryonia, and Pecos assiminea snail. These species are dependent on aquatic habitats and, therefore, impacts are not anticipated since surface waters will be spanned by transmission line structures. Additionally, a SWPPP will be implemented during construction to minimize sedimentation from disturbed soils in areas adjacent to surface waters.

4.1.5.5.3 Federally Proposed, Candidate, and Other Protected Species

The tricolored bat, which has been proposed by the USFWS to be listed as endangered, is opportunistic when it comes to habitat preferences. Due to the amount of woodland and forested habitat within the Study Area and the species' opportunistic behavior, this species may occur within the Study Area. However, impacts to this species are considered temporary due to their ability to relocate to suitable habitat.

The monarch butterfly is a federal candidate species for listing. The Study Area could provide suitable migratory habitat for the monarch butterfly at specific times of the year. Although the monarch butterfly may occur as a temporary migrant within the Study Area, no significant impacts to this species are anticipated to occur.

Although not federally listed as threatened or endangered, bald eagles are protected under the MBTA and BGEPA. Breeding bald eagles are not expected to occur in the Study Area. Non-breeding bald eagles may winter within the Study Area near open waters or abundant, readily available food sources. If, during biological surveys and/or construction activities, any bald eagle roost or nest trees are identified within the vicinity of the Project, the Companies will refer to the National Bald Eagle Management Guidelines to avoid and minimize harm and disturbance of bald eagles as recommended by the USFWS.

4.1.5.5.4 State-Protected Species

State-listed aquatic species such as the Cascade Caverns salamander, Texas salamander, Caroline's springs pyrg, Carolinae tryonia, Crowned cavesnail, Conchos pupfish, Frio roundnose minnow, Headwater catfish, Medina roundnose minnow, Plateau shiner, Proserpine shiner, Rio Grande darter, Rio Grande shiner, Roundnose minnow, Speckled chub, and Tamaulipas shiner, may occur within the Study Area if suitable habitat is present. However, impacts on their preferred habitat, such as surface waters and specific wetlands, are not anticipated because the Project spans all surface waters and most wetlands. Additionally, a SWPPP will be implemented during construction to minimize sedimentation from disturbed soils in areas adjacent to surface waters.

State-listed avian species such as the common black-hawk, interior least tern, tropical parula, white-faced ibis, white-tailed hawk, wood stork, and zone-tailed hawk may occur within the Study Area and occupy habitats temporarily or seasonally. Impacts on these species are considered temporary due to their ability to relocate to similar unaffected habitats. With the implementation of mitigation measures for avian species discussed previously, adverse impacts on birds are not anticipated to occur from the construction of any of the Alternative Routes.

The state-listed mammal, white-nosed coati, is extremely rare in the general area and unlikely to occur along the PUC-approved route. Furthermore, this species is highly mobile and, if they do occur on a rare occasion, they may temporarily avoid the construction area. Additionally, black bears may occur within the Study Area. However, they are highly mobile and may temporarily avoid construction areas. The proposed transmission line is unlikely to result in adverse impacts to these species.

Cagle's map turtle, Texas horned lizard, Texas tortoise, and Trans-Pecos black-headed snake are state-listed reptile species that may occur within the Study Area and these species could experience minor temporary disturbance during construction. However, these species are not expected to experience significant impacts due to their ability to relocate to similar unaffected habitats.

4.1.5.5.5 Critical Habitat

While USFWS-designated critical habitat does occur within the Study Area, none of the 77 Alternative Routes cross USFWS-designated critical habitat. Most of the 77 Alternative Routes cross proposed critical habitat for the Texas hornshell along the Devils River and the Pecos River. However, impacts to proposed Texas hornshell critical habitat are not anticipated because surface waters such as the Devils River and Pecos River would be spanned. Alternative Routes 6, 7, 9, 12, 22, 54, 64, 65, 66, and 77 do not cross any designated or proposed critical habitat (Table 4-1).

4.2 Socioeconomic Impact

4.2.1 Impact on Social and Economic Factors

Construction and operation of the proposed transmission line is not anticipated to result in a significant change in the population or employment rate within the Study Area. The Companies typically use contract labor supervised by Companies' employees during the clearing and construction phases of transmission line projects. Construction workers for the Project would likely commute to the work site on a daily or weekly basis instead of permanently relocating to the area or temporary worker camps would be installed. The temporary workforce increase would likely result in an increase in local retail sales due to purchases of lodging, food, fuel, and other merchandise for the duration of construction activities. No additional staff would be required for line operations and maintenance. AEP Texas is also required to pay sales tax on purchases and is subject to paying local property tax on land or improvements as applicable.

4.2.2 Impact on Community Values

Adverse effects upon community values are defined as aspects of the proposed Project that would significantly and negatively alter the use, enjoyment, or intrinsic value attached to an important area or resource by a community. This definition assumes that community concerns are identified regarding the location and specific characteristics of the proposed transmission line and do not include possible objections to electric transmission lines in general.

Impacts on community values can be classified into two areas: (1) direct effects, or those effects that would occur if the location and construction of a transmission line results in the removal or loss of public access to a valued resource; and (2) indirect effects, or those effects that would result from a loss in the enjoyment or use of a resource due to the characteristics (primarily aesthetic) of the proposed lines, structures, or ROW. Impacts on community values, whether direct or indirect, can be more accurately gauged as they affect recreational areas or resources and the visual environment of an area (aesthetics). Impacts in these areas are discussed in detail in Sections 4.3.2 and 4.3.7 of this report, respectively.

4.3 Impact on Human Resources

4.3.1 Impact on Land Use

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

4.3.1.1 Habitable Structures

One of the most important measures of potential land use impact is the number of habitable structures located within a specified distance of an Alternative Route centerline. Habitable structures are defined by 16 TAC § 25.101(a)(3) 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 multifamily dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, and schools.*

The Consultant determined the number and distance of habitable structures located within approximately 500 feet of the centerline of each Alternative Route using GIS software, interpretation of aerial imagery, and verification during field reconnaissance where practical. To account for the margin of error in horizontal accuracy of aerial imagery, the Consultant identified habitable structures located within 520 feet of the centerline of each Alternative Route. Tables 4-2 to 4-78, located in Appendix D, present detailed information on the habitable structures. All known habitable structure locations are shown in relation to the Alternative Routes on **Figures C-1 and C-2** (map pockets).

The number of known habitable structures located within 520 feet of the Alternative Routes ranges from 66 each for Alternative Routes 5 and 8 to 243 for Alternative Route 55 (Table 4-1).

4.3.1.2 Using and Paralleling Existing Transmission Line ROW

The least impact to land use generally results from building within existing transmission line ROW, followed by building parallel to existing transmission line ROW. Using existing transmission line ROW of sufficient width usually eliminates the need for additional clearing. Additionally, building parallel to existing transmission line ROW, when compared to establishing a new ROW corridor, can also minimize the amount of ROW to be cleared, which generally results in the least amount of impact to landowners, the environment, and the overall aesthetic quality of that area. In fact, the factors listed by 16 TAC § 25.101(b)(3)(B) to be considered in the selection of Alternative Routes include:

- Whether the Alternative Routes utilize existing compatible ROW, including the use of vacant positions on existing multiple-circuit transmission lines;
- Whether the Alternative Routes parallel existing compatible ROW; and
- Whether the Alternative Routes parallel property lines or other natural or cultural features.

None of the Alternative Routes utilize existing transmission line ROW.

Alternative Routes parallel existing transmission line ROW for a portion of their lengths range from zero for Alternative Routes 6 and 12 to 31.97 miles for Alternative Route 33 (Table 4-1).

4.3.1.3 Paralleling Other Existing Compatible ROW

Paralleling other existing compatible ROW (roads, highways, etc. – excluding oil and gas pipelines) is also considered to be a positive routing criterion, one that usually results in fewer impacts than establishing a new ROW corridor within an area and is included in the PUC's transmission line certification criteria. In accordance with PUC Substantive Rule § 25.101(b)(3)(B), the Consultant identified existing compatible ROW for potential paralleling opportunities.

All of the Alternative Routes have some length of ROW parallel to other existing compatible ROW. Alternative Routes 30, 65, and 70 have the shortest length of ROW parallel to other existing compatible ROW at 1.03 mile each, and Alternative Route 1 has the longest length at 15.43 mile (Table 4-1).

4.3.1.4 Paralleling Property Lines

Another important land use and favorable routing criterion under PUC Substantive Rule § 25.101(b)(3)(B) is the length of property lines paralleled. In the absence of existing ROW to follow, paralleling property or fence lines minimizes disruption to agricultural activities and creates less of a constraint to the future development of a tract of land. Each Alternative Route was developed to parallel property lines where feasible, while avoiding other known constraints. Property lines created by existing compatible ROW (e.g., roadways, highways, railroads, etc.) are not double counted in the "Length of ROW parallel to property lines" criterion.

All of the Alternative Routes have some length of ROW parallel to apparent property lines. Alternative Route 68 has the shortest length parallel at 14.51 miles and Alternative Route 56 has the longest length parallel at 43.68 miles (Table 4-1).

4.3.1.5 Combined Total Length Paralleling ROW and Property Lines

The combined total length that each Alternative Route parallels existing transmission lines, other compatible ROW, and property lines was calculated for comparison. The sum of each criterion was then considered in relation to the total length of the Alternative Route.

The combined total length of ROW paralleling existing transmission lines, other compatible ROW, and property lines ranges from 29.91 miles for Alternative Route 68 to 78.14 miles for Alternative Route 24 (Table 4-1).

4.3.1.6 Overall Length of Routes

The length of an alternative route can be an indicator of the relative magnitude of land use impacts. Generally, all other things being equal, the shorter the route, the less land is crossed, which usually results in the least amount of potential impacts. The total lengths of the Alternative Routes range from 335.26 miles for Alternative Route 52 to 393.14 miles for Alternative Route 19 (Table 4-1). The differences in route lengths reflect the direct or indirect pathway of each Alternative Route between the Project endpoints. The lengths of the Alternative Routes may also reflect the effort to parallel existing transmission lines and other existing linear features and apparent property boundaries, and the geographic diversity of the Alternative Routes.

4.3.1.7 Impact on Lands with Conservation Easements

As described in Section 3.8.2, there are numerous conservation easements within the Study Area. While 68 of the 77 Alternative Routes have some length of ROW crossing conservation easements, no significant impacts are anticipated. Of those 68 Alternative Routes, the length of ROW crossing conservation easements ranges from 0.51 mile for Alternative Routes 23, 24, 28, 47 to 51, 54, 61, and 75 to 10.94 miles for Alternative Route 76 (Table 4-1).

4.3.2 Impact on Recreation

Potential impacts on parks or recreation areas through the disruption or preemption of recreational activities are not anticipated by any of the Alternative Routes. Several parks were identified within the Study Area as described in Section 3.8.3. No significant impacts on the use of the parks and recreation areas located within the Study Area are anticipated from any of the Alternative Routes. The Alternative Routes will span surface waters and will not inhibit recreational activities that may occur on public waters. Also, no adverse impacts are anticipated for any public fishing or hunting areas from any of the Alternative Routes.

Of the 77 Alternative Routes, 37 do not cross parks or recreation areas and each of the remaining 40 Alternative Routes crosses 0.71 mile of the Medina River Natural Area, which is managed by the City of San Antonio. There are no additional parks within 1,000 feet of the Alternative Route ROW centerlines for 39 of the 77 Alternative Routes. Of the remaining 38 Alternative Routes, 36 have one additional park within 1,000 feet of the Alternative Route ROW centerlines, and Alternative Routes 61 and 62 each have two additional parks within 1,000 feet of the Alternative Route ROW centerlines (Table 4-1).

4.3.3 Impact on Agriculture

Impacts on agricultural land uses can generally be ranked by degree of potential impact, with the least potential impact occurring in areas where grazing is the primary use (pasture or rangeland), followed by cultivated cropland, with forested/wooded land (orchards, commercial timber, etc.) having the highest degree of impact.

All of the Alternative Routes cross some length of pasture/rangeland and cropland; however, because the ROW for the Project will not be fenced or otherwise separated from adjacent lands, there will be no significant long-term displacement of farming or grazing activities.

The length of Alternative Routes across pasture/rangeland ranges from 230.18 miles for Alternative Route 28 to 284.69 miles for Alternative Route 64. The length of Alternative Routes across cropland ranges from 4.62 miles each for Alternative Routes 1 to 8 to 25.52 miles for Alternative Route 61 (Table 4-1).

All of the Alternative Routes cross lands with known mobile irrigation systems (rolling or pivot); however, the Alternative Routes were developed to span the arc of pivot systems with minimal impact to the systems and land use. Therefore, no significant impacts on mobile systems are anticipated. The Alternative Routes with the shortest length across lands with known mobile irrigation systems range from 0.43 mile each for Alternative Routes 26, 27, 30 to 32, 57, 62, 64 to 68, and 70 to 72 to 2.76 miles each for Alternative Routes 23, 29, 33 to 37, 41 to 44, and 46 to 54.

4.3.4 Impact on Utility Features and Oil and Gas Facilities

Oil and gas wells and pipelines are located throughout the Study Area, with more significant facilities concentrated in the northwestern portion. During the route development process, the Companies and Consultant applied a setback distance of 400 feet from the Alternative Route centerlines to identified well heads using RRC data layers (RRC 2025c), aerial imagery interpretation, and GIS software-generated measurements. In some instances, the setback distance was reduced due to the need to traverse a particular area to connect the Project endpoints while also considering other existing constraints in the area.

The Companies and Consultant applied a setback distance of 500 feet from the centerline when an Alternative Route would need to parallel existing transmission pipelines and, when feasible, existing gathering pipelines as identified using RRC data layers (RRC 2025c), aerial photo interpretation, and GIS software-generated measurements. The Companies and Consultant also applied routing criteria to cross existing transmission pipelines and, when feasible, existing gathering pipelines at 90 degrees, if possible,

but no less than 60 degrees. These routing criteria are to address potential delays in construction schedules and additional cost in addressing the PUC final order language directing the electric utility to work with pipeline owners or operators to assess if mitigation may be necessary. Pipelines that are crossed by the PUC-approved Alternative Route will be indicated on engineering drawings and flagged prior to construction. The Companies will notify and coordinate with pipeline companies as necessary during transmission line construction and operation.

Seven of the Alternative Routes parallel existing pipeline ROW less than 500 feet from the ROW centerline. Alternative Routes 24, 30, 56, 70, 73, and 74 each parallel existing pipelines for 0.96 mile, while Alternative Route 18 parallels existing pipelines for 4.07 miles. In addition, the number of pipelines crossed by the Alternative Routes ranges from 16 each for Alternative Routes 1 and 71 to 58 each for Alternative Routes 6, 7, and 54 (Table 4-1).

Alternative Routes 1 to 3 and 13 to 17 each have one recorded oil and gas well less than 400 feet from the ROW centerlines, while Alternative Route 22 has 45 recorded oil and gas wells less than 400 feet from the ROW centerlines (Table 4-1).

All of the Alternative Routes cross existing transmission lines. Alternative Routes 19, 59, and 76 each cross the fewest existing transmission lines at 12 crossings each and Alternative Route 25 crosses the most existing transmission lines at 31 (Table 4-1). The number of recorded water wells within 200 feet of the ROW centerlines range from zero for Alternative Routes 1 to 10, 12, 15, and 16 to nine for Alternative Route 64 (Table 4-1).

4.3.5 Impact on Transportation/Aviation

4.3.5.1 Transportation Features

Potential impacts to transportation include the temporary disruption of traffic and potential conflicts with proposed roadway or utility improvements. Increased traffic and congestion may also occur during the construction of the proposed Project. However, the Project would generate only minor construction traffic at any given time or location. This traffic would consist of construction employees' personal vehicles and trucks and equipment for material deliveries and construction. Such impacts, however, are usually temporary and short-term. The Companies will coordinate with the agencies in control of the affected roadways to address these traffic-flow impacts. The Companies would also be required to obtain road-crossing permits from TxDOT for any crossing of state-maintained roadways.

The number of Interstate highways, US Hwys, or SHs crossed by the Alternative Routes ranges from 11 crossings each for 11 of the Alternative Routes, to 18 crossings each for Alternative Routes 23, 35, 47, 49, and 61. The number of FM/Ranch-to-Market (RM) roads crossed by the Alternative Routes range from four crossings for Alternative Route 17, to nine crossings for Alternative Routes 22, 37, 51, and 61 (Table 4-1).

4.3.5.2 Aviation Facilities

According to FAA Part 77 regulations, Title 14 CFR Part 77.9, 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. The FAA also requires notification if structure heights exceed a slope of 50 to 1 for a horizontal distance of 10,000 feet from the nearest runway of a public or military airport with no runway longer than 3,200 feet, and if structure heights exceed a 25 to 1 slope for a horizontal distance of 5,000 feet from landing and takeoff areas for heliports (FAA 2025a and 2025b).

FAA-registered public airports where the runway is longer than 3,200 feet located within 20,000 feet of the centerline of the Alternative Routes range from two each for Alternative Routes 4, 6, 7, 9, 30, and 70 to 10 for Alternative Route 11. FAA-registered public airports where the runway is no longer than 3,200 feet located within 10,000 feet of the Alternative Routes range from one each for Alternative Routes 11 and 12, to five each for Alternative Routes 31, 40, 45, 59, 73, and 74 (Table 4-1).

Alternative Routes 17, 27, 31, 32, 38 to 40, 45, and 63 each have one heliport located within 5,000 feet of the ROW centerline (Table 4-1).

FAA-registered private airstrips located within 10,000 feet of the Alternative Route centerlines range from two each for Alternative Routes 56 and 77 to 15 for Alternative Route 71 (Table 4-1). Table 4-79, Airport, Airstrip, and Heliport Locations near the Alternative Routes, located in Appendix D, shows each airport's distance from the Alternative Route centerlines.

4.3.6 Impact on Communication Towers

The Alternative Routes would not have a significant impact on electronic communication facilities or operations in the Study Area. AM radio towers were identified within 10,000 feet of 33 of the Alternative Route centerlines. One AM radio tower each was identified within 10,000 feet of Alternative Routes 11, 13, 14, 17, 20 to 22, 24, 38, 61, 63, and 75, while Alternative Routes 23, 28, 29, 33 to 37, 41 to 44, and 46

to 54 each have two. The number of FM radio transmitters or other electronic communication facilities identified within 2,000 feet of the Alternative Route centerlines ranges from one each for Alternative Routes 24, 56, and 63 to 14 for Alternative Route 55 (Table 4-1).

4.3.7 Impact on Aesthetics

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

It is virtually impossible for a new transmission line to have no visual impacts, and construction of the proposed transmission line could have both temporary and permanent aesthetic effects. Temporary impacts would include views of the actual construction, including assembly and erection of the structures, and any clearing of the ROW. Where limited clearing is required, the brush and wood debris could have a temporary negative impact on the local visual environment. Permanent impacts from the Project would include the views of the structures and lines themselves, as well as views of cleared ROW from public viewpoints, including roadways, recreational areas, and scenic overlooks.

As mentioned in Section 3.8.3, four state parks and five state natural areas are located within the Study Area. As mentioned in Section 2.4, the Companies participated in two in-person meetings with the TPWD. The TPWD provided general recommendations to avoid all TPWD properties with a minimum 0.25-mile setback buffer from the property boundary, including the Devils River Paddling Trail and associated campsites and river access points. They also requested to coordinate with the Companies to expand the setback buffer to up to 5.0 miles surrounding TPWD properties known for their natural and scenic qualities and provided maps and GIS data depicting the portions of the Preliminary Alternative Links where visual impacts could be a concern. The Companies are taking the information provided by the TPWD into consideration and have implemented modifications to the Preliminary Alternative Links where reasonable and practical.

The addition of lighting to transmission line structures could affect the region’s designated International Dark Sky areas and alter the visual character of the landscape, which are important considerations for scenic and environmental preservation. Lighting on the structures is not anticipated unless required by the FAA in specific areas.

To evaluate aesthetic impacts, field surveys were conducted to determine the general aesthetic character of the area and the degree to which the proposed transmission line would be visible from selected areas. These areas generally include those of potential community value, parks and recreational areas, and the major highways and FM roads that traverse the Study Area. Measurements were made to estimate the length of each Alternative Route that would fall within the foreground visual zone (FVZ) of recreational areas or major highways. A transmission line (structures and wires) is within the FVZ if it is visible (e.g., not obstructed by terrain, trees, buildings) within 0.5 mile of an observer. The determination of the visibility of the transmission line from various points was calculated using USGS maps, GIS software, and aerial imagery interpretation.

All of the Alternative Routes have some portion of their lengths located within the FVZ of Interstate highways, US Hwys, and SHs. Alternative Route 6 has the shortest length with 12.49 miles and Alternative Route 27 has the longest length with 44.82 miles. All of the Alternative Routes have some portion of their lengths located within the FVZ of FM/RM roads. Alternative Route 17 has the shortest length with 7.16 miles and Alternative Route 26 has the longest length with 16.37 miles (Table 4-1).

All of the Alternative Routes have some portion of their lengths located within the FVZ of parks or recreational areas. Alternative Routes 1 to 9, 12 to 16, 20 to 22, 29 to 37, 41, 42, 44, and 46 each have the shortest length of ROW within the FVZ of parks or recreational areas with 1.29 miles, while Alternative Route 38 has the longest length with 4.17 miles.

4.3.8 Impact on Texas Coastal Management Program

The Study Area is not located within the CMP boundary; therefore, there will be no impact on the CMP.

4.4 Impact on Cultural Resources

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

or archeological significance. Permitting, surveys, and coordination with the THC may be required along CPS Energy easements under the Antiquities Code of Texas.

4.4.1 Direct Impacts

Direct impacts include actions that physically damage or alter an archeological site, historically significant building, structure, object, district, or other cultural resource. Typically, these impacts occur during the construction phase of a transmission line project and can result from actual placement of tower locations and lines as well as from activities associated with construction, including clearing vegetation and vehicular and heavy machinery traffic. Archeological sites, which can be surficial or shallowly buried, are particularly sensitive to these impacts.

Historically significant buildings, structures, objects, districts, and other landscape-related resources within or adjacent to the Study Area can be directly affected by construction activities. These effects can include direct impacts to the resources themselves via physical destruction or damage, or impacts to their character-defining features, including changes to the overall character of the property's use or alteration of physical features within the property's setting that contribute to its historical significance.

Direct impacts to cemeteries require compliance with the Texas Health and Safety Code, as amended. These rules and regulations are available in Title 13, Part 2, Chapter 22, Rule § 22.5 of the TAC. The marked boundaries of historic-age cemeteries are notorious for shifting over time as a result of several factors, including abandonment, the removal or disintegration of headstones or other markers, and the encroachment of new developments. This boundary ambiguity can result in unmarked burials being unintentionally or intentionally excluded from current cemetery boundaries. To limit the potential for a project to impact unmarked burials, the THC recommends all construction projects, including ground disturbance within 25 feet of a known cemetery boundary, be surveyed in advance by an archeologist for evidence of possible burials within proposed construction areas.

4.4.2 Indirect Impacts

Indirect impacts can include the introduction of visual, atmospheric, or audible elements that diminish the integrity of a property's significant historic features. Often, indirect impacts affect cultural resources located outside of the immediate Study Area and frequently relate to a resource's overall integrity of setting, feeling, or association. Such impacts may include landscape alteration or changes in land use patterns, the introduction of air pollution, increased traffic, or changes in population density. Historic landscapes, buildings, structures, objects, and districts are common resources affected by indirect impacts.

4.4.3 Mitigation

The preferred form of mitigation for impacts to cultural resources is avoidance. Alternative forms of mitigation for direct impacts can be developed for archeological and historical sites and properties through the implementation of an appropriate data recovery program. Indirect impacts to historically significant properties and landscapes can be lessened through careful design choices and landscaping considerations. In some situations, the relocation of historic structures may be another possible form of mitigation.

4.4.4 Summary of Impact on Cultural Resources

The distance of each recorded site located within 1,000 feet from the nearest Alternative Route was measured using GIS software and aerial photography interpretation. A review of the THSA and TASA (THC 2025c and 2025d) records, the TxDOT Historic Resources Aggregator (TxDOT 2025c) and NPS data (NPS 2025e and 2025f) described in Section 3.9, indicated that two NRHP-listed archeological sites; seven resources that have been determined eligible for the NRHP, including four archeological sites; an additional 116 archeological sites; two National Historic Trails; and 15 cemeteries, including three of the archeological sites, are recorded within 1,000 feet of the Alternative Routes. A total of 20 archeological sites and six vicinity cemeteries are crossed by the Alternative Route centerlines or the Alternative Route ROWs. The distances of the archeological sites recorded within 1,000 feet from the Alternative Routes are provided in Table 4-80, Archeological Sites Records within 1,000 Feet of the Alternative Routes, in Appendix D. The remaining resources are discussed below.

Two NRHP-listed archeological sites and seven additional resources that have been determined eligible for the NRHP, including four archeological sites, are within 1,000 feet of the Alternative Route centerlines or ROWs (Table 4-81). No direct impacts are anticipated for resources within 1,000 feet.

Two NRHP-listed resources are recorded within 1,000 feet of the Alternative Routes. Archeological site 41BX128, the Meyer Pottery Archeological Complex, is the remains of a family-owned and operated pottery kiln from between 1887 and 1964 (NRHP 1990). Features include kiln rims and stack; posts indicating the location of the work area; plaster molds; and a scatter of glazed and unglazed ceramics, flower pots, bricks, and salt used for salt glazes (THC 2025b). The NRHP district is significant for its potential to yield information about the manufacture of pottery throughout a 77-year time period and as the supplier for much of the pottery from San Antonio to the Rio Grande during that time (NRHP 1990). The 41BX128 archeological site boundary does not match the NRHP listing boundary for the Meyer Pottery Archeological Complex (41BX128) available on the TASA and appears to be a mapping error (THC 2025b). The NRHP boundary for the resource is 528 feet from Alternative Routes 22, 29, 30, 31, 32, 33,

34, 35, 36, 37, 38, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 57, 61, 62, 63, 64, 65, 66, 67, 68, 70, 71, 72, and 75, and 631 feet from Alternative Route 55.

The Taylor Slough Archeological Site (41UV51) is a Late Archaic campsite that, at the time of its NRHP nomination, was considered undisturbed aside from brush clearing. The site consists of a burned rock midden and hearths dating to the Late Archaic Edwards Plateau Aspect (NRHP 1976). The NRHP-listed restricted district boundary does not match the archeological site boundary provided for 41UV51 on the TASA. According to the site form, site 41UV51 is a campsite with a burned rock midden, stone tools, and debitage (THC 2025b). The NRHP-listed resource is mapped 433 feet from Alternative Routes 11, 17, and 28.

A total of seven cultural resources within 1,000 feet of the Alternative Routes have been determined eligible for listing on the NRHP, including five archeological sites (Table 4-81). The Frederick (Fritz) Munk House and Kurz-Stumberg House are two of many properties included under the Historic Farms and Ranches of Bexar County, Texas, Multiple Property Listing, and both have been determined eligible for listing on the NRHP. The Frederick (Fritz) Munk House is an 1880 home associated with German immigrants, and the Kurz-Stumberg House is a late nineteenth century home (TxDOT 2025c). These properties, as well as many of the others described in the Historic Farms and Ranches of Bexar County, Texas, Multiple Property Listing, are significant as examples of the importance of agriculture to rural Bexar County and the contributions of immigrants to that industry (Dase et al. 2010). The Frederick (Fritz) Munk House is 674 feet from Alternative Routes 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46; and the Kurz-Stumberg House is 786 feet from Alternative Routes 23, 24, 25, 26, 27, 28, 39, 55, 56, 57, 58.

Site 41BX274 is a designated SAL, and a portion of the site has been determined eligible for listing on the NRHP. Sites 41BX346, 41BX350, 41BX1578, and 41BX1580 have been determined eligible for listing on the NRHP. Site 41BX274 is an Early Archaic to Late Prehistoric campsite with burned rock, stone tools, and debitage, and the remains of the post-contact Ignacio Perez Spanish Colonial homestead with ceramics, glass, and metal. Site 41BX274 is approximately 519 feet from Alternative Routes 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, and 46.

Table 4-81: NRHP-Listed and Determined Eligible Resources within 1,000 feet of the Alternative Routes

NRIS ID	Resource Name	Determination	Distance (feet)	Alternative Route
-	Frederick (Fritz) Munk House	Eligible	674	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46
-	Kurz-Stumberg House	Eligible	786	23, 24, 25, 26, 27, 28, 39, 55, 56, 57, 58
90000299	Meyer Pottery Archeological Complex (41BX128)	Listed	528	22, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 57, 61, 62, 63, 64, 65, 66, 67, 68, 70, 71, 72, 75
			631	55
76002076	Taylor Slough Archeological Site (41UV51)	Listed	433	11, 17, 28
-	41BX274	Eligible/SAL*	519	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46
-	41BX346	Eligible	331	23, 24, 25, 26, 27, 28, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77
-	41BX350	Eligible	192	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46
-	41BX1578	Eligible	468	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41
-	41BX1580	Eligible	201	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41

Sources: THC (2025c); TxDOT (2025c).

Site 41BX346 is a campsite with burned rock, a stone tool, and debitage, and a post-contact artifact scatter that is approximately 331 feet from Alternative Routes 23, 24, 25, 26, 27, 28, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, and 77.

Site 41BX350 is a pre-contact lithic scatter approximately 192 feet from Alternative Routes 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, and 46.

Site 41BX1578 is a pre-contact campsite with burned rock, ceramics, stone tools, and debitage, and post-contact artifact scatter of ceramic and glass that is approximately 468 feet from Alternative Routes 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, and 41.

Site 41BX1580 is a pre-contact campsite with burned rock, stone tools, and debitage approximately 201 feet from Alternative Routes 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, and 41.

In addition to the NRHP-listed and -eligible sites within 1,000 feet of the Alternative Routes, the Shumla Archaeological Research and Education Center provided the National Historic Landmark (NHL) nomination form for the Lower Pecos Canyonlands Archeological District. According to the nomination form provided, the Lower Pecos Canyonlands Archeological District was accepted as an NHL on January 1, 2021 (Kenmotsu 2021).

None of the archeological sites listed as either contributing or non-contributing elements of the Lower Pecos Canyonlands Archeological District NHL are located within 1,000 feet of the Alternative Routes (THC 2025c; Kenmotsu 2021). The nomination form indicates that there is no polygon for the for the NHL; instead, the district consists of multiple non-continuous sites that make up the NHL. On January 21, 2026, the Consultant was provided location data of the sites that are part of the non-continuous district by the Shumla Archaeological Research and Education Center. These sites range from approximately 7,920 feet to 67,584 feet from the Alternative Route centerlines; therefore, no direct impacts are anticipated on these sites. However, the Shumla Archaeological Research and Education Center has recommended that Alternative Routes that extend through Val Verde County be avoided to protect sensitive archeological resources.

Including the sites discussed above, 122 archeological sites are recorded within 1,000 feet of the Alternative Routes. Of these, 83 are pre-contact sites, 11 are post-contact sites, and 14 have both pre- and post-contact components. No descriptive information is available for the remaining 14 sites (THC 2025c). The seven listed and determined-eligible archeological sites are discussed above, and of the remaining sites, 10 sites and portions of 18 sites have been determined ineligible for listing on the NRHP. The remaining 87 sites have not been formally evaluated for inclusion on the NRHP.

Twenty archeological sites are crossed by the Alternative Route centerlines or ROWs. Of the sites crossed, 12 are pre-contact sites, three are post-contact sites, four sites have both a pre- and post-contact component, and one has no description information on the TASA (THC 2025c).

Site 41BX858 is a pre-contact campsite with burned rock, stone tools, and debitage, mapped approximately 51 feet from Alternative Routes 23, 24, 25, 26, 27, 28, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, and 77. Site 41KY174 is a pre-contact campsite with burned rock and debitage crossed by Alternative Routes 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 15, 16, 19, 20, 21, 23, 29, 33, 34, 35, 36, 37, 41, 42, 43, 44, 47, 48, 49, 50, 51, 52, 53, 54, and 61. Site 41BX858 has not been formally evaluated for inclusion on the NRHP, and site 41KY174 has been determined ineligible for inclusion on the NRHP.

Site 41PC393 is a pre-contact campsite with burned rock and debitage crossed by Alternative Routes 2, 4, 55, 58, 61, and 75, and is approximately 516 feet from Alternative Routes 3, 5, 6, 7, 9, 12, 13, 16, 17, 18, 20, 22, 25, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 46, 47, 48, 52, 54, 64, 65, 66, 67, 68, 69, 73, and 77. Site 41TE120 is a pre-contact campsite with a ring midden, burned rock, and debitage, approximately 78 feet from Alternative Routes 56 and 62. Sites 41PC393 and 41TE120 have not been formally evaluated for inclusion on the NRHP.

Site 41VV803 is a pre-contact campsite with burned rock, stone tools, and debitage crossed by Alternative Routes 9, 23, 35, 47, 49, and 61. Site 41VV940 is a campsite with burned rock middens and hearths, mussel shells, cores, a Langtry projectile point, stone tools, and debitage, mapped approximately 55 feet from Alternative Routes 1, 10, 13, 14, 17, 18, 20, 21, 27, 29, 31, 32, 33, 34, 37, 38, 39, 40, 41, 42, 43, 45, 52, 53, 55, 59, 63, and 76. Site 41VV940 has not been formally evaluated for inclusion on the NRHP and portions of site 41VV803 have been determined ineligible for inclusion on the NRHP.

Site 41ED312 is a pre-contact lithic scatter with stone tools and debitage crossed by Alternative Routes 27, 31, 32, and 63. Site 41RE119 is a pre-contact lithic procurement site with stone tools and debitage approximately 20 feet from Alternative Routes 27, 31, 58, 59, 73, 74, and 76, and approximately 792 feet from Alternative Routes 25, 57, 62, and 63. Site 41UV353 is a pre-contact lithic procurement area with cores, bifaces, Fairland and Langtry projectile points, and debitage that is crossed by Alternative Routes 13, 14, 20, 21, 23, 29, 33, 34, 35, 36, 37, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, and 54, and is approximately 659 feet from Alternative Routes 13, 14, 20, 21, 23, 29, 33, 34, 35, 36, 37, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54. Sites 41ED312 and 41RE119 have not been formally evaluated for inclusion on the NRHP, and portions of site 41UV353 have been determined ineligible for listing on the NRHP.

Site 41ME203 is redeposited Early Archaic to Late Prehistoric cultural materials from 41ME202 and is crossed by Alternative Routes 22, 23, 24, 25, 28, 29, 33, 34, 35, 36, 37, 38, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 61, 63, and 75. Site 41TE69 is a pre-contact rock shelter with burned rock, a pictograph, scratches, mortar, grinding basin, a polished boulder, stone tools, and debitage approximately 24 feet from Alternative Routes 1, 57, and 71. Site 41UV137 is a pre-contact Toyah Phase site crossed by Alternative Routes 24, 38, 61, 63, and 75. Sites 41ME203, 41TE69, and 41UV137 have not been officially evaluated for inclusion on the NRHP.

Three sites crossed by the Alternative Routes are post-contact in age. Site 41BX523 is a scatter of brick, glass, and metal fragments approximately 53 feet from Alternative Routes 23, 24, 25, 26, 27, 28, 39, 55, 56, 57, and 58. Site 41BX860 is a homestead with a commercial component likely associated with a sulfur spring on the property and is crossed by Alternative Routes 23, 24, 25, 26, 27, 28, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, and 77. Site 41BX987 is a farmstead with four structures and trash scatter of glass, ceramics, and plastic crossed by Alternative Routes 23, 24, 25, 26, 27, 28, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, and 77. Sites 41BX523 and 41BX987 have not been formally evaluated for inclusion on the NRHP, and portions of site 41BX860 have been determined ineligible for inclusion on the NRHP.

Four sites crossed by the Alternative Routes have both pre- and post-contact components. Site 41BX544 is a Late Prehistoric campsite with bone and mussel shell, a ceramic fragment, a dart point, stone tools, and debitage, and a post-contact component. The site is crossed by Alternative Routes 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43,

44, 45, and 46. Site 41PC691 is a pre-contact quarry/procurement area with debitage, and a scatter of electrical telephone/telegraph materials crossed by Alternative Routes 3, 5, 6, 7, 9, 12, 13, 16, 17, 18, 20, 22, 25, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 46, 47, 48, 52, 54, 64, 65, 66, 67, 68, 69, 73, and 77. Site 41UV457 is a pre-contact campsite with burned rock midden, burned rock, and debitage, and a post-contact glass bottle approximately 82 feet from Alternative Route 38 and approximately 347 feet from Alternative Routes 11 and 61. Site 41VV2081 is a Middle to Late Archaic campsite with burned rock, stone tools, and debitage, and post-contact farmstead with a hand-forged horseshoe, an aluminum numbered tag, and a tin can with a church key opening crossed by Alternative Routes 2, 3, 4, 5, 6, 7, 8, 15, 16, 19, 36, 44, 48, 50, 51, and 54. Sites 41PC691 and 41UV457 have not been formally evaluated for inclusion on the NRHP, and sites 41BX544 and 41VV2081 have been determined ineligible for listing on the NRHP.

No descriptive information is available for site 41UV406, which is crossed by Alternative Routes 22, 23, 28, 29, 33, 34, 35, 36, 37, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, and 54. The site has not been formally evaluated for inclusion on the NRHP.

The sites crossed that have associated polygons range in length from approximately 78 feet to 1,676 feet where they are crossed by Alternative Route centerlines or ROWs. The average span length for the proposed 765-kV transmission line is 1,500 feet. Except for site 41PC691, the sites that are crossed with associated polygons can be spanned, avoiding deep impacts from the construction of transmission line structure within the site boundaries, and it is anticipated that impacts to these sites can be mitigated through Project planning. Site 41PC691 is approximately 1,676 feet where it is crossed by the ROW and thus, will likely be impacted by the construction of a transmission line structure within the site boundary.

An additional 102 archeological sites are located within 1,000 feet of the Alternative Route centerlines (Table 4-80 in Appendix D). No direct impacts are anticipated for these additional archeological sites within 1,000 feet of the Alternative Routes.

Additional cultural resources recorded crossed by the Alternative Routes include two National Historic Trails, the El Camino Real De Los Tejas National Historic Trail and the Butterfield Overland National Historic Trail. The trail locations have not been ground-truthed and are mapped by the NPS based on research (NPS 2025e).

The Butterfield Overland National Historic Trail was an overland mail route established by John Butterfield (NPS 2025e and 2025g). In 1857, Butterfield was awarded a contract by Congress, and beginning in 1858,

the stagecoach route through Texas, Missouri, Oklahoma, and other states would carry mail, freight, and passengers from the eastern to the western United States. The route was used for three years before service was interrupted by the Civil War, and the trail was eventually replaced by the use of telegraph and other more direct routes (NPS 2025e and 2025g). The Butterfield Overland National Historic Trail is crossed by all of the Alternative Routes except Alternative Route 75. The portion of the Butterfield Overland National Historic Trail crossed by the Alternative Routes can be spanned and direct impacts can be avoided through Project planning.

The El Camino Real De Los Tejas National Historic Trail was one of the roads connecting regions of the Spanish territories to Mexico City (NPS 2025e and 2025h). This road provided an overland route to the Red River Valley in Louisiana. Consisting of established Indian trails and trade routes, El Camino Real de Los Tejas continued to be utilized by the Spanish during their conquests, by Mexico, the Republic of Texas, and eventually the United States (NPS 2025e and 2025h). The El Camino Real de los Tejas National Historic Trail is crossed by all of the Alternative Routes. The portion of El Camino Real de los Tejas National Historic Trail crossed by the Alternative Routes can be spanned and direct impacts can be avoided through project planning.

The Shumla Archaeological Research and Education Center provided a list of sites that may be affected by the construction of the Project. One of these, site 41VV1630, is located within 1,000 feet of Alternative Routes. The remaining sites on the list are not accounted for in this analysis because they are located outside of the 1,000-foot buffer used in the analysis. Site 41VV1630 is an Archaic campsite in a rock shelter with a pictograph panel (Pecos River Style figures and other unidentified images), burned rock midden, three ground stone bedrock features, and debitage (Stove Canyon Shelter/Shumla Rock Art Site). Site 41VV1630 is approximately 353 feet from Alternative Routes 1, 10, 13, 14, 17, 18, 20, 21, 27, 29, 31, 32, 33, 34, 37, 38, 39, 40, 41, 42, 43, 45, 52, 53, 55, 59, 63, and 76. The site has not been formally evaluated for inclusion on the NRHP; however, the Shumla Archaeological Research and Education Center recommends that the site is eligible for listing on the NRHP.

Fifteen cemeteries are recorded within 1,000 feet of the Alternative Routes, including three archeological sites (THC 2025c and 2025d) (Table 4-82). The Texas Health and Safety Code states that a “property is considered to be dedicated cemetery property if: (1) one or more human burials are present on the property,” [Sec. 711.035(g)(1)], thus, archeological sites where human remains or burials have been observed are discussed below. Four vicinity cemeteries are crossed by the Alternative Routes.

Vicinity cemeteries are general areas where a cemetery location has been reported (THC 2025e). The exact location of these cemeteries is unknown and can be due to various factors, including the removal of above-ground indicators (i.e., headstones) and graves have been reportedly moved, but some remains may still be present (THC 2025e).

In the event that a cemetery or burial is observed during pre-construction survey or during construction, all work should cease immediately, and the appropriate authorities be notified. As stated above, if a burial is present, the Health and Safety Code considers that area a dedicated cemetery. A dedicated cemetery cannot be crossed by an electrical line or other public utility without the consent of two-thirds of the owners of the plots Sec. 711.035(d)(2). For those who have passed, their decedents would need to give consent Sec. 711.010(a). If an abandoned, unknown, or unverified cemetery is discovered during construction, activities would need to cease to avoid damage to the cemetery until the human remains could be moved Sec. 711.010(a). Removal would involve notification and consent of the living descendants Sec. 711.004(a)(5), and the THC would need to be notified, Sec. 711.010(c).

The de Montes de Oca headstone Vicinity Cemetery is crossed by Alternative Routes 40, 45, 60, 61, 63, 69, 73, 74, 75, and 77. The Deadmans Hollow Grave Vicinity Cemetery is crossed by Alternative Routes 18, 25, 26, 27, 30, 31, 32, 39, 40, 45, 55, 56, 57, 58, 59, 60, 62, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 76, and 77. The Graveyard Flat Vicinity Cemetery is crossed by Alternative Routes 17, 18, 26, 28, 32, 39, 40, 45, 55, 66, 67, 68, 69, 71, 72, and 75. The Old Sabinal Station Vicinity Cemetery is crossed by Alternative Routes 24, 38, 61, 63, and 75, and the Sutherland Grave Vicinity Cemetery is crossed by Alternative Route 38. The Unnamed near Butts Cemetery Vicinity Cemetery is crossed by Alternative Routes 19, 20, and 21. The Binnion-Binman Vicinity Cemetery is approximately 401 feet from Alternative Routes 24, 38, 61, 63, and 75, and the Weber Family Vicinity Cemetery is 742 feet from Alternative Routes 22, 23, 24, 25, 28, 29, 33, 34, 35, 36, 37, 38, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 61, 63, and 75. Within the Study Area, the vicinity cemetery areas crossed by the Alternative Routes range in acreage from approximately 313 acres (Old Sabinal Station Vicinity Cemetery) to 1,512 acres (Deadmans Hollow Grave Vicinity Cemetery) (THC 2025b). Thus, it is likely that the Alternative Routes do not cross the exact location of the cemetery; however, field verification would be required.

Site 41ME156 is a pre-contact burial and campsite with a fragmentary burial, as well as burned rock and debitage approximately 898 feet from Alternative Routes 22, 23, 24, 25, 28, 29, 33, 34, 35, 36, 37, 38, 41, 42, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 61, 63, and 75 (THC 2025b). Site 41UV131 is a pre-contact or possible post-contact isolated burial with red ochre, three large stones, and mussel shell. Approximately

90 percent of the burial remains were excavated and removed from the site and then analyzed at Southwest Texas State University in San Marcos. Site 41UV131 is approximately 539 feet from Alternative Routes 1, 2, 3, 4, 5, 6, 7, and 8. Site 41RE68 is Father Maloney's Grave with a grave stone, cabin foundation, and debris, and clay figurines have been reported. The site is approximately 983 feet from Alternative Routes 25, 27, 31, 57, 58, 59, 62, 63, 73, 74, and 76. Sites 41ME156, 41RE68, and 41UV131 have not been formally evaluated for inclusion on the NRHP (THC 2025c).

The Butts Cemetery is approximately 263 feet from Alternative Routes 19, 20, and 21. The Clark Family Cemetery is approximately 926 feet from Alternative Routes 17 and 28. The Davenport Cemetery #1 is approximately 618 feet from Alternative Routes 11, 17, and 28, and the Davenport Cemetery #2 is approximately 521 feet from Alternative Routes 24, 38, 61, 63, and 75. The Little Dry Frio Family Cemetery is approximately 331 feet from Alternative Routes 18, 26, 32, 39, 40, 45, 55, 66, 67, 68, 69, 71, 72, and 75. The San Isidro Cemetery is approximately 410 feet from Alternative Routes 40, 45, 60, 69, 73, 74, and 77. The Tomerlin Cemetery is approximately 296 feet from Alternative Routes 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, and 17.

No systematic cultural resource surveys have been conducted along the Alternative Routes. Thus, the potential for undiscovered cultural resources does exist along all of the Alternative Routes. To assess this potential, a professional archeologist reviewed geological, soils, and topographical maps to identify areas along the Alternative Routes where unrecorded pre-contact archeological resources have a higher probability to occur. These HPAs for pre-contact archeological sites were identified near unnamed streams in the Study Area and adjacent to closed depressions that may have held fresh water. To facilitate the data analysis, each HPA was mapped using GIS and the length of each Alternative Route crossing these areas was tabulated. HPAs were mapped near previously recorded post-contact sites and NRHP properties, and near structures depicted on historic topographic maps.

All of the Alternative Routes cross HPAs for cultural resources. Alternative Route 52 has the shortest length across HPAs with 226.92 miles, and Alternative Route 57 has the longest length across HPAs with 293.80 miles (Table 4-1).

Table 4-82: Cemeteries recorded within 1,000 feet of the Alternative Routes

Cemetery Name/Trinomial	Determination of Eligibility	Distance (feet)	Description	Route
Butts Cemetery	Undetermined	263	post-contact cemetery	19, 20, 21
Clark Family Cemetery	Undetermined	926	post-contact cemetery	17, 28
Davenport Cemetery #1	Undetermined	618	post-contact cemetery	11, 17, 28
Davenport Cemetery #2	Undetermined	521	post-contact cemetery	24, 38, 61, 63, 75
Little Dry Frio Family Cemetery	Undetermined	331	post-contact cemetery	18, 26, 32, 39, 40, 45, 55, 66, 67, 68, 69, 71, 72, 75
San Isidro Cemetery	Undetermined	410	post-contact cemetery	40, 45, 60, 69, 73, 74, 77
Tomerlin Cemetery	Undetermined	296	post-contact cemetery	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17
Binnion-Binman Vicinity Cemetery	Undetermined	401	post-contact cemetery	24, 38, 61, 63, 75
de Montes de Oca headstone Vicinity Cemetery	**Undetermined**	**14**	**post-contact cemetery**	**40, 45, 60, 61, 63, 69, 73, 74, 75, 77**
Deadmans Hollow Grave Vicinity Cemetery	**Undetermined**	**0**	**post-contact cemetery**	**18, 25, 26, 27, 30, 31, 32, 39, 40, 45, 55, 56, 57, 58, 59, 60, 62, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 76, 77**
Graveyard Flat Vicinity Cemetery	**Undetermined**	**0**	**post-contact cemetery**	**17, 18, 26, 28, 32, 39, 40, 45, 55, 66, 67, 68, 69, 71, 72, 75**
Old Sabinal Station Vicinity Cemetery	**Undetermined**	**0**	**post-contact cemetery**	**24, 38, 61, 63, 75**
Sutherland Grave Vicinity Cemetery	**Undetermined**	**88**	**post-contact cemetery**	**38**
Unnamed near Butts Cemetery Vicinity Cemetery	**Undetermined**	**0**	**post-contact cemetery**	**19, 20, 21**

Table 4-82: Cemeteries recorded within 1,000 feet of the Alternative Routes

Cemetery Name/Trinomial	Determination of Eligibility	Distance (feet)	Description	Route
Weber Family Vicinity Cemetery	Undetermined	742	post-contact cemetery	22, 23, 24, 25, 28, 29, 33, 34, 35, 36, 37, 38, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 61, 63, 75
41ME156	Undetermined	898	pre-contact burial and campsite with a fragmentary burial, as well as burned rock and debitage.	22, 23, 24, 25, 28, 29, 33, 34, 35, 36, 37, 38, 41, 42, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 61, 63, 75
41RE68	Undetermined	983	Father Maloney's Grave with a grave stone, cabin foundation and debris, and clay figurines have been reported.	25, 27, 31, 57, 58, 59, 62, 63, 73, 74, 76
41UV131	Undetermined	539	pre-contact or post-contact isolated burial with red ochre, three large stones, and mussel shell. Approximately 90 percent of the burial remains were excavated and analyzed at Southwest Texas State University.	1, 2, 3, 4, 5, 6, 7, 8

Sources: THC (2025a and 2025b).
Note: Bold entries are crossed by the Alternative Route centerlines or ROWs.

5.0 LIST OF PREPARERS

This Environmental Assessment was prepared for the Companies by WSP. The Companies provided information in Section 1.0. Below is a list of the Consultant's employees with primary responsibilities for the preparation of this EA.

Responsibility	Name	Title
Project Directors	Gary McClanahan Lisa Barko Meaux	Project Manager III Senior Project Manager
Project Manager	Kathleen Cooney	Project Manager II
Principal Siting Specialist	Ashley Brewer	Environmental Planner II
Natural Resources	Daniel Ray Bethany Reyes	Environmental Specialist IV Environmental Specialist II
Land Use/Aesthetics	Ashley Brewer Briana Henriques	Environmental Planner II Environmental Planner I
Cultural Resources	Darren Schubert Emily Duke	Project Manager II Cultural Resource Specialist II
GIS/Mapping	Gray Rackley Jennifer Knowles Kevin Garcia	Senior GIS Analyst II GIS Analyst III GIS Analyst II
Quality Control/Assurance	Heidi Horner	Senior Technical Writer

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6.0 REFERENCES

All About Birds. 2025a. Common Black Hawk. Cornell University. https://www.allaboutbirds.org/guide/Common_Black_Hawk/overview. Accessed October 2025.

_____. 2025b. Tropical Parula. Cornell University. https://www.allaboutbirds.org/guide/Tropical_Parula/lifehistory#habitat. Accessed October 2025.

_____. 2025c. White-faced Ibis. Cornell University. https://www.allaboutbirds.org/guide/White-faced_Ibis/lifehistory#nesting. Accessed October 2025.

_____. 2025d. White-tailed Hawk. Cornell University. https://www.allaboutbirds.org/guide/White-tailed_Hawk/lifehistory. Accessed October 2025.

America's Scenic Byways. 2025. Texas. https://scenicbyways.info/. Accessed September 2025.

American Birding Association (ABA). 2024. The ABA Checklist. Version 8.18 – September 2025. https://www.aba.org/aba-checklist/. Accessed September 2025.

Anderson, A.E. 1932. Artifacts of the Rio Grande Delta Region. *Bulletin of the Texas Archeological and Paleontological Society* 4:29-31.

Audubon. 2025. Common Black Hawk. https://www.audubon.org/field-guide/bird/common-black-hawk. Accessed June 2025.

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

Avian Power Line Interaction Committee (APLIC). 1994. *Mitigating bird collisions with power lines: the state of the art in 1994.* 77pp + apps. Washington, D.C.: Edison Electric Institute. 40-570-76 between U.S. Department of the Interior and U.S. Department of Energy. FWS/OBS-78/48. 151pp.

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

_____. 2012. *Reducing avian collisions with power lines: the state-of-the-art in 2012*. 184 pp. + apps. Washington, D.C.: Edison Electric Institute (EEI)/Raptor Research Foundation.

Bandera County. 2025. Parks. https://www.banderacounty.org/page/parks.medina.lake.map. Accessed April 2025.

Bandera County Convention & Visitors Bureau. 2025. The three sisters or the twisted sisters and more. https://www.banderacowboycapital.com/business/the-three-sisters-or-the-twisted-sisters-and-more. Accessed December 2025.

Barker, E.C. and J.W. Pohl. 2025. Texas Revolution. *Handbook of Texas Online.* The Texas Revolution: Key Events and Impact. Revised by Mary L. Scheer May 2025. Published by the Texas State Historical Association.

Beaulaurier, D.L. 1981. *Mitigation of Bird Collisions with Transmission Lines*. Portland, Oregon: Bonneville Power Administration.

Bell, W. and E. Prewitt. 1971. Lower Pecos Canyonlands Archeological District. Val Verde County, Texas. National Register of Historic Places Form.

Bexar County. 2025. Capital Improvement Projects. https://bexar.maps.arcgis.com/apps/instant/nearby/index.html?appid=47f9a4b28bec47438bcb63e78c2ca6eb. Accessed June 2025.

Blair, W.F. 1950. The Biotic Provinces of Texas. *Texas Journal of Science* 2:93-117.

Bousman, C. Britt, B.W. Baker, and A.C. Kerr. 2004. "Paleoindian Archeology in Texas." In *Prehistory of Texas*. Ed. Timothy Perttula. Texas A&M University Press. College Station.

Bowman Consulting Group, Ltd., Jackson Walker LLP, Zara Environmental, LLC, Wendell Davis and Associates, & M.E. Allison & Associates. 2015. *Southern Edwards Plateau Habitat Conservation Plan*. County of Bexar Infrastructure Services Department. https://docsonline.sanantonio.gov/FileUploads/dsd/SEPHCPConservationPlan.pdf. Accessed June 2025.

Brown, B.C. 1967. *Eurycea neotenes*. Catalogue of American Amphibians and Reptiles, P. 36. https://repositories.lib.utexas.edu/server/api/core/bitstreams/677a8281-6022-4631-8065-1a6d1b9e99c7/content. Accessed June 2025.

Bryan, K.B. 2002. Birds of the Trans-Pecos: A Field Checklist. Natural Resources Program, Texas Parks and Wildlife. PWD BK P4000-809 (3/02).

Bureau of Economic Geology (BEG). 2025. Texas Mineral Resources Map. https://www.beg.utexas.edu/research/areas/mineral-resources. Accessed April 2025.

_____. 1996. Physiographic Map of Texas. Bureau of Economic Geology, University of Texas. Austin, Texas.

_____. 1976. Energy Resources of Texas. Bureau of Economic Geology, University of Texas at Austin. Austin, Texas.

Cadwell, L. 2025. The Casas Revolt of 1811: A Challenge to Imperial Authority in New Spain. *Handbook of Texas Online*. https://www.tshaonline.org/handbook/entries/casas-revolt. Accessed July 2025

Campbell, L. 2003. *Endangered and Threatened Animals of Texas*. Endangered Resource Branch. Austin: Texas Parks and Wildlife Department.

CDS Muery. 2025. Flyover aerial imagery dated August and September 2025.

City of Bandera. 2025. Comprehensive Master Plan. https://www.banderatx.gov/community/page/comprehensive-master-plan. Accessed June 2025.

City of Camp Wood. 2025. https://cityofcampwood.com/. Accessed June 2025.

City of Castroville. 2025a. Comprehensive Plan. https://www.castrovilletx.gov/2475/Comprehensive-Plan. Accessed June 2025.

_____. 2025b. Parks & Recreation. https://castrovilletx.gov/2343/Other-City-Parks. Accessed May 2025.

City of Fort Stockton. 2025a. Comprehensive Summary. https://cms9files.revize.com/fortstocktontx/2023%20Comprehensive%20Summary%20Revised%203-18-2025.pdf. Accessed June 2025.

_____. 2025b. City of Fort Stockton Parks. https://www.cityoffortstockton.com/departments/public_works/parks.php. Accessed October 2025.

City of Helotes. 2025. Master Plan. https://helotes-tx.gov/departments/development-services/master-plan/. Accessed June 2025.

City of Hondo. 2025. Master Plan. https://www.dropbox.com/scl/fi/aas8atyyvjc5nwnvcjjlw/HondoMP22017withSTWP.pdf?rlkey=y2u0bbg2628hb8m4m7nhr3azc&e=2&dl=0. Accessed June 2025.

City of Kerrville. 2025. Comprehensive Plan. https://www.kerrvilletx.gov/1617/Kerrville-2050-Comprehensive-Plan. Accessed June 2025.

City of Lytle. 2025. Comprehensive Plan. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.lytletx.org/DocumentCenter/View/2967/LYTLE-COMPREHENSIVE-PLAN---FINAL?bidId=. Accessed June 2025.

City of Natalia. 2025. 2017 Comprehensive Master Plan. http://cityofnatalia.com/improvement-projects. Accessed June 2025.

City of San Antonio. 2025a. SA Tomorrow Comprehensive Plan. https://sacompplan.com/. Accessed June 2025.

_____. 2025b. Medina River Natural Area. https://www.sa.gov/Directory/Departments/Parks/Parks-Facilities/Parks/Directory/Medina-River-Natural-Area. Accessed December 2025.

City of San Antonio Office of Historic Preservation [OHP] . 2025a. Paleoindian Period. https://www.sanantonio.gov/Mission-Trails/Prehistory-History/Prehistory-of-SA/Paleoindian-Period. Accessed December 2025.

_____. 2025b. OHP Explorer. https://gis.sanantonio.gov/OHP/explorer/index.html. Accessed July 2025.

Collins, M.B. 2004. Archaeology in Central Texas. In *The Prehistory of Texas*. Ed. Timothy Perttula. College Station: Texas A & M University Press.

_____. 2002. The Gault Site, Texas and Clovis Research. *Athena Review* 3(2):24-36.

Coulter, M.C., J.A. Rodgers Jr., J.C. Ogden, and F.C. Depkin. 1999. Wood Stork (*Mycteria americana*), version 2.0. Cornell Lab of Ornithology. *The Birds of North America* (A.F. Poole and F.B. Gill, Editors). https://doi.org/10.2173/bna.409. Accessed June 2025.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service, Office of Biological Services, Washington, D.C.

Dase, A.E., S. Chandler, S. Katauskas, and C. Finney. 2010. Historic Farms and Ranches of Bexar County, Texas. Prewitt and Associates, Inc. Austin.

DarkSky. 2025. Find a Dark Sky Place. https://darksky.org/what-we-do/international-dark-sky-places/all-places/. Accessed November 2025.

de la Teja, J.F. 2025. History of San Fernando de Bexar: From Settlement to City. *Handbook of Texas Online*. https://www.tshaonline.org/handbook/entries/san-fernando-de-bexar. Accessed July 2025.

Dixon, J.R. 2013. Amphibians and Reptiles of Texas, 3rd ed. Texas A&M University Press. College Station, Texas. 447pp.

Eckhardt, G. 2025. The Edwards Aquifer Website. https://www.edwardsaquifer.net/species.html#Rhadine%20infernalis. Accessed April 2025.

Edwards Aquifer Authority (EAA). 2025a. EAA Subchapter 713 Regulated Zones. https://www.arcgis.com/home/webmap/viewer.html?webmap=aed0e4eddc794ec49d740a267d42560a&extent=-101.1491,28.3085,-96.6364,30.6845. Accessed April 2025.

_____. 2025b. EAA Shapefiles. Director Districts. https://www.edwardsaquifer.org/aquifer-science/maps-gis/shapefiles/. Accessed April 2025.

_____. 2023. Edwards Aquifer Authority Rules. https://www.edwardsaquifer.org/wp-content/uploads/2024/07/EAA-Rules.pdf. Accessed April 2025.

Electric Power Research Institute. 1993. *Proceedings: Avian Interactions with Utility Structures.* International Workshop, Miami, Florida, September 13-16, 1992. EPRI TR-103268, Palo Alto, California. https://www.nrc.gov/docs/ML0405/ML040570489.pdf. Accessed December 2025.

Erickson, W.P., G.D. Johnson, and D.P. Young Jr. 2005. *A Summary and Comparison of Bird Mortality from Anthropogenic Causes with an Emphasis on Collisions*. In: Ralph, C. John; Rich, Terrell D., editors 2005. *Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference.* 2002 March 20-24; Asilomar, California, Volume 2 Gen. Tech. Rep. PSW-GTR-191. Albany, CA: U.S. Dept. of Agriculture, Forest Service, Pacific Southwest Research Station: p. 1029-1042.

Faanes, C.A. 1987. *Bird Behavior and Mortality in Relation to Power Lines in Prairie Habitats.* Fish and Wildlife Technical Report 7, 22 pp. Washington, D.C.: U.S. Fish and Wildlife Service.

Federal Airways & Airspace (FA&A). 2025. Airspace GridSearch Report. October 10, 2025.

Federal Aviation Administration (FAA). 2025a. National Aeronautical Charting Office. San Antonio Sectional Aeronautical Chart, Effective June 12, 2025.

_____. 2025b. National Aeronautical Charting Office. El Paso Sectional Aeronautical Chart, Effective June 12, 2025.

_____. 2025c. Chart Supplement South Central U.S. (Formerly known as the Airport/Facility Directory South Central U.S.). https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/dafd/. Accessed February July 2025.

_____. 2025d. Airport Data and Information Portal. Advance Facility Search. https://adip.faa.gov/agis/public/#/airportSearch/advanced. Accessed February July 2025.

Federal Communications Commission. 2025. Licensing & Database Search. https://www.fcc.gov/licensing-databases/search-fcc-databases. Accessed July 2025.

Federal Emergency Management Agency (FEMA). 2025. FEMA Flood Map Service Center. https://msc.fema.gov/portal/home. Accessed October 2025.

Federal Highway Administration. 2025. Federal Highway Administration. Byways. https://www.fhwa.dot.gov/byways. Accessed September 2025.

Fulton, S. 2010. Status Assessment and Ecological Study of *Styrax platinifolius* ssp. *Texanus*. Texas Parks and Wildlife. https://tpwd.texas.gov/business/grants/wildlife/section-6/docs/plants/e92_final_report.pdf. Accessed October 2025.

Gauthreaux, S.A., Jr. 1978. *Migratory Behavior and Flight Patterns*. In M.L. Avery (Ed.), Impacts of transmission lines on birds in flight – proceedings of a workshop (pp. 12-26). Washington, D.C.: U.S. Fish and Wildlife Service.

GoMedina. 2025. Small Town Charm Immense Opportunity. https://www.gomedinacounty.com/. Accessed December 2025.

Google Earth. 2023-2025. Aerial imagery of the study area on Google Earth Pro. Version 7.3.6.9796.

Gould, F.W., G.O. Hoffman, and C.A. Rechenthin. 1960. Vegetational areas of Texas. Texas Agricultural Extension Service; Texas Agricultural Experiment Station. https://hdl.handle.net/1969.1/162440. Accessed December 2025.

Handbook of Texas Online 2025a. History of San Antonio de Bexar Presidio: A Key Defense in Texas. *Handbook of Texas Online*https://www.tshaonline.org/handbook/entries/san-antonio-de-bexar-presidio. Accessed July 2025.

_____. 2025b. History of Camp Verde: A Frontier Post of the U.S. Army. *Handbook of Texas Online*. https://www.tshaonline.org/handbook/entries/camp-verde. Accessed July 2025.

Heitmuller, F.T. and B.D. Reece. 2003. Data base of historically documented springs and spring flow measurements in Texas: U.S. Geological Survey Open-File Report 03-315.

Hendrickson, D.A. and A.E. Cohen. 2025a. Fishes of Texas Project Database: Conchos pupfish (Cyprinodon eximus). http://txstate.fishesoftexas.org/cyprinodon%20eximius.htm. Accessed June 2025.

_____. 2025b. Fishes of Texas Project Database: Guadalupe darter (Percina apristis). http://txstate.fishesoftexas.org/percina%20apristis.htm. Accessed June 2025.

_____. 2025c. Fishes of Texas Project Database: Headwater catfish (Ictalurus lupus). http://txstate.fishesoftexas.org/ictalurus%20lupus.htm. Accessed June 2025.

_____. 2025d. Fishes of Texas Project Database: Guadalupe roundnose minnow (Dionda nigrotaeniata). http://txstate.fishesoftexas.org/dionda%20nigrotaeniata.htm#:~:text=Recognized%20as%20valid%20but%20unnamed%20species%20by%20Mayden,%28Wayne%201979%29.%20Coloration%3A%20Dorsal%20region%20dusky%20%28Cope%201880%29. Accessed June 2025.

_____. 2025e. Fishes of Texas Project Database: Plateau shiner (Cyprinella lepida). http://txstate.fishesoftexas.org/cyprinella%20lepida.htm. Accessed June 2025.

_____. 2025f. Fishes of Texas Project Database: Proserpine shiner (Cyprinella proserpina). http://txstate.fishesoftexas.org/cyprinella%20proserpina.htm. Accessed June 2025.

_____. 2025g. Fishes of Texas Project Database: Rio Grande darter (Etheostoma grahami). http://txstate.fishesoftexas.org/etheostoma%20grahami.htm. Accessed June 2025.

_____. 2025h. Fishes of Texas Project Database: Rio Grande shiner (Notropis jemezanus). http://txstate.fishesoftexas.org/notropis%20jemezanus.htm. Accessed June 2025.

_____. 2025i. Fishes of Texas Project Database: Roundnose minnow (Dionda episcopa). http://txstate.fishesoftexas.org/dionda%20episcopa.htm. Accessed June 2025.

_____. 2025j. Fishes of Texas Project Database: Speckled Chub (Macrhybopsis aestivalis). http://txstate.fishesoftexas.org/macrhybopsis%20aestivalis.htm. Accessed June 2025.

_____. 2025k. Fishes of Texas Project Database: Tamaulipas shiner (Notropis braytoni). https://txstate.fishesoftexas.org/notropis%20braytoni.htm. Accessed September 2025.

_____. 2022. Fishes of Texas Project Database (Version 3.0). http://doi.org/10.17603/C3WC70. Accessed April 2025.

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

Hershler, R., H.P. Liu, and J.J. Landye. 2011. New Species and Records of Springsnails (Caenogastropoda: Cochliopidae: Tryonia) from the Chihuahuan Desert (Mexico and United States), an Imperiled Biodiversity Hotspot." *Zootaxa* 3001: 1-32.

Hershler, R., and G. Longley. 1987. Phreatodrobia coronae, a New Species of Cavesnail from Southwestern Texas. The Nautilus 101, No. 3: 133-139.

Hester, T.R. 2004. The Prehistory of South Texas. In *The Prehistory of Texas*, Perttula, T.K, ed. Texas University A&M Press, College Station.

_____. 1995. The Prehistory of South Texas. Texas A&M Press. Available on the internet at http://www. texasbeyondhistory. net/st-plains/prehistory/images/Hester-1995-prehistorysTexas. pdf. Originally published in *From the Gulf to the Rio Grande: Human Adaptation in Central, South and Lower Pecos Texas,* Thomas R. Hester, Texas A&M University Press, College Station.

Hillis, D.M., D.C. Cannatella, T.J. Devitt, A.M. Wright. 2015. Genomic Assessment of Taxonomic Status of Central Texas *Eurycea* Salamanders. Texas Parks and Wildlife Department. https://tpwd.texas.gov/business/grants/wildlife/section-6/docs/amphibians_reptiles/tx-e-158-r_final-rpt-revised.pdf#:~:text=We%20present%20georeferenced%20locality%20data%20and%20distribution%20maps,major%20radiation%20of%20distinct%20and%20endemic%20Texas%20amphibians. Accessed June 2025.

Hofman, J.L. and R.W. Graham. 1998. The Paleo-Indian Cultures of the Great Plains. In Archaeology of the Great Plains, edited by W. Raymond Wood. pp 87-139. University Press of Kansas: Lawrence, Kansas.

Hubbs, C. 1957. Distributional patterns of Texas freshwater fishes. Southwest Naturalist 2:89-104.

Huff, P. 2025. *Texas Secession Referendum, 1861*. https://votearchive.com/tx-sec-ref-1861/. Accessed July 2025.

Hughes, J.M. 2020. Yellow-billed Cuckoo (*Coccyzus americanus*), version 1.0. In Birds of the World (P.G. Rodewald, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.yebcuc.01. Accessed April 2025.

Jasinski, L.E. 2025. Exploring the Rich History and Culture of San Antonio, Texas. *Handbook of Texas Online*. https://www.tshaonline.org/handbook/entries/san-antonio-tx. Accessed July 2025.

Johnson, R.R., R.L. Glinski, and S.W. Matteson. 2020. Zone-tailed Hawk (*Buteo albonotatus*), version 1.0. In Birds of the World (A.F. Poole and F.B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.zothaw.01. Accessed June 2025.

Justice, Glenn and John Leffler. 2025. Pecos County, Texas: Geography, History, and Economy. *Handbook of Texas Online.* Available on the internet: https://www.tshaonline.org/handbook/entries/pecos-county. Accessed July 2025.

Kenmotsu, N.A. 2021. Lower Pecos Canyonlands Archeological District. Val Verde County, Texas. National Historic Landmark Nomination Form.

Kerr County. 2025. Facilities. https://kerrcountytx.gov/kerr-county-all-departments/kerr-county-facilities#gsc.tab=0. Accessed April 2025.

Kerr Economic Development Corporation. 2025. Driving Economic Growth in Kerr County. https://kerredc.com/. Accessed December 2025.

Kohout, M.D. 2025. Gillespie County: History, Geography, and Culture. *Handbook of Texas Online*. https://www.tshaonline.org/handbook/entries/gillespie-county. Accessed July 2025.

Levihn-Coon, P. 2022. Cave Catfish. Texas Parks and Wildlife Magazine. https://tpwmagazine.com/archive/2022/oct/scout7_wildthing/index.phtml. Accessed April 2025.

Lockwood, M.W. and B. Freeman. 2014. *The TOS Handbook of Texas Birds*, Second Edition, Revised. Texas A&M University Press. College Station, Texas. 403pp.

Lockwood, M.W. 2008. Birds of the Edwards Plateau: a field checklist. Natural Resources Program, Texas Parks and Wildlife Department.

MacNeish, Richard S. 1947. A Preliminary Report on Coastal Tamaulipas. *American Antiquity* (13(1):1-15.

McCrain, J.B. 2025. Edwards County, Texas: Geography, History, and Economy. *Handbook of Texas Online.* https://www.tshaonline.org/handbook/entries/edwards-county. Accessed July 2025.

Mercado-Allinger, P.A., N.A. Kenmotsu, and T.K. Perttula. 1996. *Archeology in the Central and Southern Planning Region, Texas: A Planning Document.* Edited by Office of the State Archeologist, Special Report 35, and Department of Antiquities Protection, Cultural Resource Management Report 7. Texas Historical Commission, Austin.

Miller, M.R. and N.A. Kenmotsu. 2004. Prehistory of the Jornada Mogollon and Eastern Trans Pecos Regions of West Texas. In The Prehistory of Texas. Ed. Timothy Perttula. College Station: Texas A & M University Press.

Mueller, J.M., S.E. Sesnie, S.E. Lehnen, H.T. Davis, J.J. Giocomo, J.N. Macey, and A.M. Long. 2022. Multi-scale species density model for conserving an endangered songbird. Journal of Wildlife Management 86:e22236. https://doi.org/10.1002/jwmg.22236. Accessed September 2025.

National Audubon Society. 2023. Birds and Transmission. https://media.audubon.org/2023-08/BirdsAndTransmissionReport.pdf. Accessed December 2025.

National Conservation Easement Database. 2025. NCED Easements. https://site.tplgis.org/NCED/planningapp/. Accessed April 2025.

National Park Service (NPS). 2025a. National Parks. https://www.nps.gov/findapark/index.htm. Accessed April 2025.

_____. 2025b. National Monuments & Memorials. https://www.nps.gov/subjects/monuments/index.htm. Accessed September 2025.

_____. 2025c. National Historic Landmarks Program – Lists of National Historic Landmarks - Texas. https://www.nps.gov/subjects/nationalhistoriclandmarks/list-of-nhls-by-state.htm. Accessed July 2025.

_____. 2025d. National Battlefields. https://www.nps.gov/subjects/battlefields/index.htm. Accessed September 2025.

_____. 2025e. National Trail System. https://www.nps.gov/subjects/nationaltrailssystem/index.htm. Accessed June 2025.

_____. 2025f. National Register of Historic Places Program: Research. https://www.nps.gov/maps/full.html?mapId=7ad17cc9-b808-4ff8-a2f9-a99909164466. Accessed July 2025.

_____. 2025g. Butterfield Overland: History and Culture. https://www.nps.gov/buov/learn/historyculture/index.htm . December 2025.

_____. 2025h. El Camino Real De Los Tejas: History and Culture. https://www.nps.gov/elte/learn/historyculture/index.htm. December 2025.

_____. 2024. Nationwide Rivers Inventory. https://www.nps.gov/subjects/rivers/nationwide-rivers-inventory.htm. Accessed October 2025.

_____. 2018. Amistad Bird Studies. https://www.nps.gov/articles/amistad-bird-studies.htm. Accessed October 2025.

_____. 2016. Southwestern Willow Flycatcher. https://www.nps.gov/articles/southwestern-willow-flycatcher.htm. Accessed October 2025.

National Register of Historic Places (NRHP). 1990. Meyer Pottery Archaeological Complex. Baxer County, Texas. Reference Number 90000299.

_____. 1976. Taylor Slough Archeological Site. Uvalde County, Texas. Reference Number 76002076.

National Wild and Scenic Rivers System. 2025. National Wild and Scenic Rivers System Wild and Scenic Rivers by State. https://rivers.gov/texas. Accessed September 2025.

Natural Resources Conservation Service (NRCS). 2025a. NRCS Web Soil Survey. https://websoilsurvey.nrcs.usda.gov/app/. Accessed October 2025.

_____. 2025b. Soil Data Access Hydric Soils List. https://www.nrcs.usda.gov/publications/query-by-ssa.html. Accessed October 2025.

NatureServe. 2025a. Black Lace Cactus (*Echinocereus reichenbachii* var. *albertii*). https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.158482/Echinocereus_reichenbachii_var_albertii. Accessed October 2025.

_____. 2025b. Texas Snowbell (*Styrax platanifolius* ssp. *texanus*). https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.152043/Styrax_platanifolius_ssp_texanus. Accessed October 2025.

_____. 2025c. Conchos Pupfish (*Cyprinodon eximus*). https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.102508/Cyprinodon_eximius. Accessed October 2025.

_____. 2025d. Headwater Catfish (*Ictalurus lupus*). https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.103047/Ictalurus_lupus. Accessed October 2025.

_____. 2025e. Medina Roundnose Minnow (*Dionda nigrotaeniata*). https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.1194154/Dionda_nigrotaeniata. Accessed October 2025.

_____. 2025f. Plateau Shiner (*Cyprinella lepida*). https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.104413/Cyprinella_lepida. Accessed October 2025.

_____. 2025g. Rio Grande Darter (*Etheostoma grahami*). https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.102707/Etheostoma_grahami. Accessed October 2025.

_____. 2025h. Rio Grande Shiner (*Notropis jemezanus*). https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.104556/Notropis_jemezanus. Accessed October 2025.

_____. 2025i. Roundnose Minnow (*Dionda episcopa*). https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.102051/Dionda_episcopa. Accessed October 2025.

_____. 2025j. Speckled Chub (*Macrhybopsis aestivalis*). https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.100119/Macrhybopsis_aestivalis. Accessed October 2025.

_____. 2025k. Spotfin Gambusia (*Gambusia krumholzi*). https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.963513/Gambusia_krumholzi. Accessed October 2025.

_____. 2025l. Trans-Pecos Black-headed Snake (*Tantilla cucullata*). https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.101137/Tantilla_cucullata. Accessed October 2025.

_____. 2025m. Carolina Springs Pyrg (*Pyrgulopsis ignota*). https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.865305/Pyrgulopsis_ignota. Accessed October 2025.

Nicholson, K. E. (ed.). 2025. Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, with Comments Regarding Confidence in Our Understanding. Ninth Edition. Society for the Study of Amphibians and Reptiles. 87pp.

NOAA/National Weather Service. 2025. Radar Operations Center. NEXRAD Radar Operations Center - Site ID Location Maps. Accessed December 2025.

Ochoa, R.E. 2025. Uvalde County: History, Geography, and Economy. *Handbook of Texas Online*. https://www.tshaonline.org/handbook/entries/uvalde-county. Accessed July 2025.

Odintz, M. 2025. Kerr County, Texas: History, Geography, and Economy. *Handbook of Texas Online*. https://www.tshaonline.org/handbook/entries/kerr-county. Accessed July 2025.

Pecos Economic Development Corporation. 2025. Pecos, Texas. https://www.pecosedc.com/. Accessed December 2025.

Perttula, T.K. 2004. An Introduction to Texas Prehistoric Archeology. *In The Prehistory of Texas*, Perttula, T.K, ed. Texas University A&M Press, College Station.

Peterson, L. 2025. Atascosa County: Geography, History, and Economy. *Handbook of Texas Online*. https://www.tshaonline.org/handbook/entries/atascosa-county. Accessed July 2025.

Protected Areas Database of the United States (PADUS). 2025. Protected Areas. https://maps.usgs.gov/padusdataexplorer/. Accessed September 2025.

Purvis, J. 2025a. Big game harvest survey results 2005-06 through 2024-25. May 7, 2025. Austin: Texas Parks and Wildlife Department.

_____. 2025b. Small game harvest survey results 2005-06 through 2024-25. May 15, 2025. Austin: Texas Parks and Wildlife Department.

Railroad Commission of Texas (RRC). 2025a. Surface Coal Mine County Information. https://www.rrc.texas.gov/surface-mining/permits/surface-coal-mine-county-information/. Accessed April 2025.

_____. 2025b. Texas Uranium Mining Exploration Permits. https://www.rrc.texas.gov/surface-mining/programs/uranium-exploration/texas-uranium-exploration-permits/. Accessed April 2025.

_____. 2025c. Public GIS Map Viewer for Oil, Gas, and Pipeline Data. https://gis.rrc.texas.gov/GISViewer/. Accessed September 2025.

_____. 2023. Permits. Permitted Coal Mining Locations. Lignite Surface Mine Permit Location Map. https://www.rrc.texas.gov/surface-mining/. Accessed April 2025.

_____. 2015. Historical Coal Mining in Texas. rrc.texas.gov/surface-mining/historical-coal-mining/mining-regions-fields-and-sites/. Accessed April 2025.

RexTag. 2025. https://rextag.com/?srsltid=AfmBOorLmTjRZczFXyy8OoktarmHWQ69w8ndwYQlBFfVFsbFypz9A2UX. Accessed October 2025.

Rochelle, J.A., L.A. Lehmann, and J. Wisniewski. 1999. Forest fragmentation: wildlife and management implications. 317pp.

Roth, D. 2019. Leoncita False Foxglove (*Agalinis calycina*). EMNRD-Forestry Division. Santa Fe, NM For the USFWS, R2 Albuquerque, NM.

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

Salinas, M. 1990. Indians of the Rio Grande Delta: Their Role in the History of Southern Texas and Northeastern Mexico. University of Texas Press, Austin.

Schilz, J.L.D. 2025. The Council House Fight: A Turning Point in Comanche-Texas Relations. *Handbook of Texas Online*. https://www.tshaonline.org/handbook/entries/council-house-fight. Accessed July 2025.

Schmidly, D.J. and R.D. Bradley. 2016. The Mammals of Texas, 7th edition. University of Texas Press. Austin, Texas. 694pp.

Schoelwer, S.P. 2025. James Duff: Confederate Irregular and Freighter. *Handbook of Texas Online*. https://www.tshaonline.org/handbook/entries/duff-james. Accessed July 2025.

Schönhuth, S., D.M. Hillis, D.A. Neely, L. Lozano-Vilano, A. Perdices, and R.L. Mayden. 2012. Phylogeny, diversity, and species delimitation of the North American round-nosed minnows (Teleostei: Dionda), as inferred from mitochondrial and nuclear DNA sequences. Molecular Phylogenetics and Evolution 62(1): 427-446.

Shook, R.W. 2025. James Duff: Confederate Irregular and Freighter. *Handbook of Texas Online*. https://www.tshaonline.org/handbook/entries/duff-james. Accessed July 2025.

Simmons, A.H., A.L. Wiener Stodder, D.D. Dykeman, and P.A. Hicks. 1989. Human Adaptions and Cultural Changes in the Greater Southwest: An Overview of Archaeological Resources in the Basin Range Province. Prepared by the Desert Research Institute, Quaternary Sciences Center, University of Nevada, Reno, and the Bureau of Anthropological Research, University of Colorado, Boulder, with the Arkansas Archeological Survey, Fayetteville. Submitted to the U.S. Army Corps of Engineers, Southwestern, Division, Study Unit 4 of the Southwestern Division Archeological Overview. Contract No. DACW63-84-C-0149.

Smith, J.C. 2025. Crockett County, Texas: History, Geography, and Economy. *Handbook of Texas Online*. https://www.tshaonline.org/handbook/entries/crockett-county. Accessed July 2025.

SWCA Environmental Consultants (SWCA). 2021. CPS Energy System-wide Habitat Conservation Plan: Final, June 2021. https://www.fws.gov/sites/default/files/documents/2024-08/cps-energy-hcp-final_0.pdf. Accessed December 2025.

Terneny, T.T. 2005. A Re-Evaluation of Late Prehistoric and Archaic Chronology in the Rio Grande Delta of South Texas. PhD. Dissertation, University of Texas, Austin.

Texas Beyond History. 2026. Rock Art Styles. Published by Texas Archeological Research Laboratory at the University of Texas. https://www.texasbeyondhistory.net/plateaus/artistic/images/ras.html. Accessed January 2026.

Texas Commission on Environmental Quality (TCEQ). 2025a. Aggregate Production Site Maps. https://data.texas.gov/stories/s/Search-for-Active-Aggregate-Production-Operations/9kvs-ig69/. Accessed April 2025.

_____. 2025b. Central Registry Query – Regulated Entity Search. https://www15.tceq.texas.gov/crpub/index.cfm?fuseaction=regent.RNSearch&message. Accessed April 2025.

_____. 2025c. Index to Superfund Sites by County. http://www.tceq.texas.gov/remediation/superfund/sites/county. Accessed April 2025.

_____. 2025d. Harris Sand Pits. https://www.tceq.texas.gov/remediation/superfund/state/harris.html. Accessed April 2025.

_____. 2025e. Pioneer Oil Refining Company. https://www.tceq.texas.gov/remediation/superfund/state/pioneer.html. Accessed April 2025.

_____. 2025f. MSW Facility Viewer. https://experience.arcgis.com/experience/4f9ecf5646e04fd7ad4562b48fa2f1c7. Accessed April 2025.

_____. 2025g. Surface Water Quality Viewer. Version 4.1. https://tceq.maps.arcgis.com/apps/webappviewer/index.html?id=b0ab6bac411a49189106064b70bbe778. Accessed April 2025.

_____. 2025h. Edwards Aquifer Protection Program: What Plans You Might Need. https://www.tceq.texas.gov/permitting/eapp/eapp-workflow.html. Accessed June 2025.

_____. 2024. Texas Integrated Report of Surface Water Quality for Clean Water Act Sections 305(b) and 303(d). https://www.tceq.texas.gov/waterquality/assessment/2024-integrated-report/24txir. Accessed April 2025.

Texas Demographic Center (TDC). 2025. Data. Texas Population Projections Program. 2022 Population Projections Data Downloads. https://demographics.texas.gov/Projections/2022/. Accessed September 2025.

Texas Department of Transportation (TxDOT). 2025a. County Grid Map Search. http://www.dot.state.tx.us/apps-cg/grid_search/county_grid_search.htm. Accessed June 2025.

_____. 2025b. Project Tracker. https://apps3.txdot.gov/apps-cq/project_tracker/. Accessed June 2025.

_____. 2025c. TxDOT Historic Resources Aggregator. https://txdot.maps.arcgis.com/apps/webappviewer/index.html?id=e13ba0aa78bf4548a8e98758177a8dd5. Accessed July 2025.

Texas Education Agency. 2025. School District Locator. http://tea.texas.gov/Texas_Schools/General_Information/School_District_Locator/School_District_Locator/. Accessed April 2025.

Texas General Land Office (GLO). 2025. GIS Maps and Data. Coastal Zone Boundary. https://www.glo.texas.gov/land/land-management/gis/index.html. Accessed September 2025.

Texas Historical Commission (THC). 2025a. Texas Heritage Trails Program – Texas Hill Country Trail Region. https://texastimetravel.com/regions/hill-country-trail/heritage-sites-and-attractions/. Accessed September 2025.

_____. 2025b. Texas Heritage Trails Program – Texas Pecos Trail Region. https://texastimetravel.com/regions/pecos-trail/. Accessed September 2025.

_____. 2025c. Texas Archeological Sites Atlas. (Restricted Access): http://nueces.thc.state.tx.us/. Accessed July 2025.

_____. 2025d. Texas Historical Sites Atlas.: https://atlas.thc.texas.gov/. Accessed July 2025.

_____. 2025e. Atlas Data. https://atlas.thc.texas.gov/About/AtlasData. Accessed December 2025

Texas Land Conservancy. 2025. Our Work. Protected Lands. https://www.texaslandconservancy.org/our-work. Accessed April 2025.

Texas Parks and Wildlife Department (TPWD). 2025a. Ecologically Significant Stream Segments. https://tpwd.texas.gov/landwater/water/conservation/water_resources/water_quantity/sigsegs/. Accessed April 2025

_____. 2025b. Texas Ecosystems Analytical Mapper. https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/team/. Accessed April 2025.

_____. 2025c. TPWD Rare, Threatened, and Endangered Species of Texas Database. http://tpwd.texas.gov/gis/rtest/. Accessed April 2025.

_____. 2025d. Texas Natural Diversity Database (NDD). 2025. Texas Biological and Conservation Data System. Texas Parks and Wildlife Department. Austin, Texas.

_____. 2025e. Bunched Cory Cactus. https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/nongame/listed-species/plants/bunched_cory_cactus.phtml. Accessed April 2025.

_____. 2025f. Pecos Sunflower. https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/nongame/listed-species/plants/pecos_sunflower.phtml. Accessed April 2025.

_____. 2025g. Texas Snowbell. https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/nongame/listed-species/plants/texas_snowbell.phtml. Accessed April 2025.

_____. 2025h. Texas Wild-Rice. https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/nongame/listed-species/plants/texas_wild_rice.phtml. Accessed April 2025.

_____. 2025i. Tobusch Fishhook Cactus. https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/nongame/listed-species/plants/tobusch_fishhook_cactus.phtml. Accessed April 2025.

_____. 2025j. Interior Least Tern (*Sterna antillarum athalassos*). https://tpwd.texas.gov/huntwild/wild/species/leasttern/. Accessed June 2025.

_____. 2025k. Black Bear (*Ursus americanus*). https://tpwd.texas.gov/huntwild/wild/species/blackbear/. Accessed April 2025.

_____. 2025l. Trans-Pecos West Texas Habitat Wildlife Management Nongame Wildlife Black Bears. https://tpwd.texas.gov/landwater/land/habitats/trans_pecos/nongame/blackbear/. Accessed April 2025.

_____. 2025m. Texas Tortoise (G*opherus berlandieri*). https://tpwd.texas.gov/huntwild/wild/species/txtort/. Accessed September 2025.

_____. 2025n. TPWD - Find a Park. https://tpwd.texas.gov/state-parks/parks-map. Accessed April 2025.

_____. 2025o. Bear Creek State Park. https://tpwd.texas.gov/newsmedia/releases/?req=20250825b. Accessed November 2025.

_____. 2025p. Texas Public Hunting Locations. http://tpwd.maps.arcgis.com/apps/webappviewer/index.html?id=c9788957300943559f7b49206e8ef153. Accessed April 2025.

_____. 2023. State Wildlife Action Plan: Texas. 2023 Comprehensive Revision. https://tpwd.texas.gov/wildlife/wildlife-diversity/swap/. Accessed June 2025.

Texas Speleological Society (TSS). 2026. Texas County Karst Totals. https://www.texasspeleologicalsurvey.org/deeplong/countytotals.php. Accessed January 2026.

Texas Water Development Board (TWDB). 2025a. Water Service Boundary Viewer. GIS Data. https://www.twdb.texas.gov/mapping/gisdata.asp#DataHub. Accessed April 2025.

_____. 2025b. Draft 2026 Regional Water Plans. https://www.twdb.texas.gov/waterplanning/rwp/plans/2026/index.asp. Accessed June 2025.

_____. 2025c. Water Data Interactive. https://www3.twdb.texas.gov/apps/waterdatainteractive/groundwaterdataviewer. Accessed April 2025.

_____. 2025d. Carrizo-Wilcox Aquifer. https://www.twdb.texas.gov/groundwater/aquifer/majors/carrizo-wilcox.asp. Accessed April 2025.

_____. 2025e. Edwards (Balcones Fault Zone) Aquifer. https://www.twdb.texas.gov/groundwater/aquifer/majors/edwards-bfz.asp. Accessed April 2025.

_____. 2025f. Edwards-Trinity (Plateau) Aquifer. https://www.twdb.texas.gov/groundwater/aquifer/majors/edwards-trinity-plateau.asp. Accessed April 2025.

_____. 2025g. Trinity Aquifer. https://www.twdb.texas.gov/groundwater/aquifer/majors/trinity.asp. Accessed April 2025.

_____. 2025h. Pecos Valley Aquifer. https://www.twdb.texas.gov/groundwater/aquifer/majors/pecos-valley.asp. Accessed April 2025.

_____. 2022. State Water Plan Documents: Recommended new major water supply reservoirs map. https://www.twdb.texas.gov/waterplanning/swp/2022/index.asp. Accessed June 2025.

The Global Biodiversity Information Facility. 2025. Global Biodiversity Information Facility Home Page. https://www.gbif.org. Accessed September 2025.

The Nature Conservancy (TNC). 2025. Texas. Places We Protect. http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/texas/placesweprotect/index.htm. Accessed April 2025.

Thomas, C., T.H. Bonner, and B.G. Whiteside. 2007. Freshwater Fishes of Texas a field guide. Texas A&M University Press. College Station, Texas. 202pp.

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

Thompson, N. 2025. Kimble County, Texas: History, Geography, and Economy. *Handbook of Texas Online.* https://www.tshaonline.org/handbook/entries/kimble-county. Accessed July 2025.

Thoms, A.V. 2009. “Rock of ages: propagation of hot-rock cookery in western North America,” Journal of Archaeological Science, Vol. 36:573-591.

_____. 2008. “Ancient Savannah Roots of the Carbohydrate revolution in South-Central North America,” Plains Anthropologist Vol. 53 No. 205.

Turpin, S.A. 2011. Cultural Resource Assessment 3.4 Miles of BP Sherbino Mesa Transmission Line Corridor on University Lands Pecos County, Texas. TAS Inc. Submitted to the Texas Historical Commission, Antiquities Permit 5836. Copies Available at the Texas Historical Commission.

_____. 2004. The Lower Pecos River Region of Texas and Northern Mexico. In *The Prehistory of Texas*, Perttula, T.K, ed. Texas University A&M Press, College Station.

United States Army Corps of Engineers (USACE). 2011. Navigable Waters of the United States in the Fort Worth, Albuquerque, and Tulsa Districts Within the State of Texas. https://www.swf.usace.army.mil/Portals/47/docs/regulatory/NavList2011.pdf. Accessed April 2025.

United States Census Bureau (USCB). 2025. Explore Census Data. Advance Search. https://data.census.gov/cedsci/advanced. Accessed April 2025.

_____. 2010. Quickfacts. https://www.census.gov/quickfacts/fact/table/edwardscountytexas,crockettcountytexas,bexarcountytexas,banderacountytexas,atascosacountytexas,TX/PST045224. Accessed April 2025.

United States Department of Agriculture (USDA). 2022. 2022 Census of Agriculture – Texas – State and County Profiles. https://www.nass.usda.gov/Publications/AgCensus/2022/Online_Resources/County_Profiles/Texas/. Accessed June 2025.

_____. 2017. 2017 Census of Agriculture – Texas – State and County Profiles. https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Texas/. Accessed June 2025.

United States Department of Transportation. 2025. Federal Railroad Administration. Rail Network Development. Maps GIS. FRA Safety Maps. https://fragis.fra.dot.gov/gisfrasafety/. Accessed September 2025.

United States Fish and Wildlife Service (USFWS). 2025a. San Antonio Area Web Map. https://www.fws.gov/library/collections/terrestrial-karst-invertebrates. Accessed May 2025.

_____. 2025b. Information for Planning and Consultation (IPaC). (Project Code: 2025-0084450). Report Received November 14, 2025.

_____. 2025c. Black Lace Cactus (*Echinocereus reichenbachii var. albertii*) Range Map. https://www.fws.gov/species/black-lace-cactus-echinocereus-reichenbachii-var-albertii. Accessed June 2025

_____. 2025d. Texas Wild-rice (*Zizania texana*). https://www.fws.gov/species/texas-wild-rice-zizania-texana. Accessed June 2025.

_____. 2025e. Final Recovery Plan for the Southern Edwards Aquifer Springs and Associated Aquatic Ecosystems, Second Revision. U.S. Fish and Wildlife Service, Southwest Region, Albuquerque, New Mexico, USA. 40 pp.

_____. 2025f. San Marcos Salamander (*Eurycea nana*). https://www.fws.gov/species/san-marcos-salamander-eurycea-nana. Accessed April 2025.

_____. 2025g. Texas Blind Salamander (*Eurycea rathbuni*). https://www.fws.gov/species/texas-blind-salamander-eurycea-rathbuni. Accessed April 2025.

_____. 2025h. Golden-checked warbler (*Setophaga chrysoparia*) 5-Year Review: Summary and Evaluation. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/21297.pdf. Accessed September 2025.

_____. 2025i. Mexican Spotted Owl (*Strix occidentalis lucida*). https://www.fws.gov/species/mexican-spotted-owl-strix-occidentalis-lucida. Accessed April 2025.

_____. 2025j. Piping Plover (*Charadrius melodus*). https://www.fws.gov/species/piping-plover-charadrius-melodus. Accessed June 2025.

_____. 2025k. Southwestern Willow Flycatcher (*Empidonax traillii extimus*). https://www.fws.gov/species/southwestern-willow-flycatcher-empidonax-traillii-extimus. Accessed June 2025.

_____. 2025l. Whooping Crane (*Grus americana*). https://www.fws.gov/species/whooping-crane-grus-americana. Accessed June 2025.

_____. 2025m. False Spike (*Quincuncina mitchelli*). https://www.fws.gov/species/false-spike-quincuncina-mitchelli. Accessed April 2025.

_____. 2025n. Mexican Fawnsfoot (*Truncilla cognata*). https://www.fws.gov/species/mexican-fawnsfoot-truncilla-cognata. Accessed April 2025.

_____. 2025o. Salina Mucket (*Potamilus metnecktayi*). https://www.fws.gov/species/salina-mucket-potamilus-metnecktayi. Accessed April 2025.

_____. 2025p. Texas Fatmucket. https://www.fws.gov/species/texas-fatmucket-lampsilis-bracteata. Accessed April 2025.

_____. 2025q. Texas Fawnsfoot (*Truncilla macrodon*). https://www.fws.gov/species/texas-fawnsfoot-truncilla-macrodon. Accessed April 2025.

_____. 2025r. Texas Pimpleback (*Cyclonaias* (= *Quadrula) petrina*). https://www.fws.gov/species/texas-pimpleback-quadrula-petrina. Accessed April 2025.

_____. 2025s. Peck's Cave Amphipod (*Stygobromus pecki*). https://www.fws.gov/species/pecks-cave-amphipod-stygobromus-pecki. Accessed April 2025.

_____. 2025t. Devils River Minnow (*Dionda diaboli*). https://www.fws.gov/species/devils-river-minnow-dionda-diaboli. Accessed June 2025.

_____. 2025u. Devils River minnow (*Dionda diaboli*) 5-Year Review: Summary and Evaluation. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/29184.pdf. Accessed September 2025.

_____. 2025v. Fountain Darter (*Etheostoma fonticola*). https://www.fws.gov/species/fountain-darter-etheostoma-fonticola. Accessed June 2025.

_____. 2025w. Toothless Blindcat (*Trogloglanis pattersoni*). https://www.fws.gov/species/toothless-blindcat-trogloglanis-pattersoni. Accessed April 2025.

_____. 2025x. Widemouth Blindcat (*Satan eurystomus*). https://www.fws.gov/species/widemouth-blindcat-satan-eurystomus. Accessed June 2025.

_____. 2025y. Monarch Butterfly (*Danaus plexippus*). https://www.fws.gov/species/monarch-danaus-plexippus. Accessed June 2025.

_____. 2025z. Monarch butterfly migration map. https://www.fws.gov/media/monarch-butterfly-migration-map. Accessed June 2025.

_____. 2025aa. Tricolored Bat (*Perimyotis subflavus*). https://www.fws.gov/species/tricolored-bat-perimyotis-subflavus. Accessed June 2025.

_____. 2025ab. Pecos Assiminea (*Assiminea pecos*). https://www.fws.gov/species/pecos-assiminea-assiminea-pecos. Accessed June 2025.

_____. 2025ac. Cascade Caverns Salamander (*Eurycea latitans*). https://www.fws.gov/species/cascade-caverns-salamander-eurycea-latitans. Accessed June 2025.

_____. 2025ad. Federal Aviation Administration Wind Turbine Location Data. https://www.fws.gov/library/collections/federal-aviation-administration-faa-wind-turbine-location-data. Accessed June 2025

_____. 2024a. Central Texas Karst Invertebrates Karst Zones and Karst Fauna Regions Overview. https://www.fws.gov/library/collections/terrestrial-karst-invertebrates. Accessed April 2025.

_____. 2024b. Northern Aplomado Falcon (*Falco femoralis septentrionalis*) 5-Year Review: Summary and Evaluation. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/20670.pdf. Accessed April 2025.

_____. 2024c. Species Biological Report for Southern Edwards Aquifer Springs and Associated Aquatic Ecosystems. https://iris.fws.gov/APPS/ServCat/DownloadFile/255055. Accessed April 2025.

_____. 2024d. Final Recovery Plan for the Diamond Y Invertebrates: Diamond Tryonia (*Pseudotryonia adamantina*), Gonzales Tryonia (*Tryonia circumstriata*), Pecos Amphipod (*Gammarus pecos*). Version 1.0. Austin Ecological Services Field Office. https://ecos.fws.gov/docs/recovery_plan/DiamondYInvertebrates_FinalRecoveryPlan_20240910.pdf. Accessed June 2025.

_____. 2024e. Comanche Springs pupfish (*Cyprinodon elegans*) 5-Year Review: Summary and Evaluation. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/15852.pdf. Accessed April 2025.

_____. 2024f. Leon Springs pupfish (*Cyprinodon bovinus*) 5-Year Review: Summary and Evaluation. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/21834.pdf. Accessed June 2025.

_____. 2024g. Special Status Assessment Report for the Pecos Pupfish. Version 1.2. U.S. Fish and Wildlife Service. Albuquerque, New Mexico. https://iris.fws.gov/APPS/ServCat/DownloadFile/261253. Accessed April 2025.

_____. 2024h. Comal Springs Dryopid Beetle (*(Stygoparnus comalensis*) 5-Year Review: Summary and Evaluation. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/15786.pdf. Accessed April 2025.

_____. 2024i. Comal Springs Riffle Beetle (*Heterelmis comalensis*) 5-Year Review: Summary and Evaluation. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/15621.pdf. Accessed April 2025.

_____. 2023a. Recovery Outline *Streptanthus bracteatus* (Bracted Twistflower). https://ecos.fws.gov/docs/recovery_plan/Bracted%20Twistflower%20Recovery%20Outline_ARD%20Signed.pdf. Accessed April 2025.

_____. 2023b. Species Status Assessment of *Donrichardsia macroneuron* (Grout) H. A. Crum & L. E. Anderson. U.S. Fish and Wildlife Service Southwest Region, Albuquerque, New Mexico. Version 1.1. 48 pp. + 3 appendices.

_____. 2023c. Phantom Tryonia (*Tryonia cheatumi*) 5-Year Status Review: Summary and Evaluation. U.S. Fish and Wildlife Service Austin Ecological Services Field Office Austin, Texas. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/9483.pdf. Accessed June 2025.

_____. 2022a. Species Status Assessment Report for the Central Texas Mussels: False spike (*Fusconaia mitchelli*); Balcones spike (*Fusconaia iheringi*); Texas fatmucket (*Lampsilis bracteata*); Texas fawnsfoot (*Truncilla macrodon*); Texas pimpleback (*Cyclonaias petrina*); Guadalupe fatmucket (*Lampsilis bergmanni*); Guadalupe orb (*Cyclonaias necki*). https://www.fws.gov/sites/default/files/documents/CTX%20SSA%20report%20v2.1_Final.pdf. Accessed June 2025.

_____. 2022b. Species Status Assessment for the Toothless Blindcat (*Trogloglanis pattersoni*) and Widemouth Blindcat (*Satan eurystomus*). U.S Fish and Wildlife Services Austin Ecological Field Office. Austin, Texas. https://sanantonioreport.org/wp-content/uploads/2023/08/FINAL-Blindcat-SSA-11-1-2022.pdf. Accessed April 2025.

_____. 2021a. Government Canyon Bat Cave Spider (*Tayshaneta microps*) 5-Year Review: Summary and Evaluation. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3608.pdf. Accessed April 2025.

_____. 2021b. Rufa Red Knot (*Calidris canutus rufa*) 5-Year Review: Summary and Evaluation. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3624.pdf. Accessed April 2025.

_____. 2021c. Beetle (*Rhadine exilis*) 5-Year Review: Summary and Evaluation. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3578.pdf. Accessed April 2025.

_____. 2021d. Beetle (*Rhadine infernalis*) 5-Year Review: Summary and Evaluation. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3579.pdf. Accessed April 2025.

_____. 2020a. Cokendolpher Cave Harvestman (*Texella cokendolpheri*) 5-Year Review: Summary and Evaluation. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3025.pdf. Accessed April 2025.

_____. 2020b. Robber Baron Cave Meshweaver (*Cicurina baronia*) 5-Year Review: Summary and Evaluation. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3094.pdf. Accessed April 2025.

_____. 2020c. Species Status Assessment for the Diamond Tryonia (*Pseudotryonia adamantina*), Gonzales Tryonia (*Tryonia circumstriata*), Pecos Amphipod (*Gammarus pecos*). U.S. Fish and Wildlife Service Austin Ecological Services Field Office Austin, Texas. https://iris.fws.gov/APPS/ServCat/DownloadFile/214610. Accessed June 2025.

_____. 2019a. Recovery Plan Amendment for Black Lace Cactus. https://ecos.fws.gov/docs/recovery_plan/Final%20RP%20Amendment_black%20lace%20cactus_508%20Compliant.pdf. Accessed June 2025.

_____. 2019b. Government Canyon Bat Cave Meshweaver (*Cicurina vespera*) 5-Year Review: Summary and Evaluation. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/2804.pdf. Accessed April 2025.

_____. 2019c. Madla Cave Meshweaver (*Cicurina madla*) 5-Year Review: Summary and Evaluation. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/2809.pdf. Accessed April 2025.

_____. 2019d. Pecos Amphipod (*Gammarus pecos*). 5-Year Review: Summary and Evaluation. https://ecos.fws.gov/docs/five_year_review/doc6201.pdf. Accessed June 2025.

_____. 2019e. Helotes Mold Beetle (*Batrisodes venyivi*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service Austin Ecological Services Field Office Austin, Texas. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3048.pdf. Accessed June 2025.

_____. 2018a. Species Status Assessment Report for the Texas Hornshell (*Popenaias popeii*), Version 1.2. January 2018. Albuquerque, NM.

_____. 2018b. Pecos Gambusia (*Gambusia nobilis*) 5-Year Review: Summary and Evaluation. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/2563.pdf. Accessed June 2025.

_____. 2017. Species status assessment report for Cirsium wrightii (Wright's Marsh Thistle), Version 1.0. October 2017. Albuquerque, NM.

_____. 2016. Recovery Plan for the Ocelot (*Leopardus pardalis*): First Revision.https://ecos.fws.gov/docs/recovery_plan/Ocelot%20Final%20Recovery%20Plan_Signed_July%202016_new%20(1).pdf. Accessed June 2025.

_____. 2012. Final Recovery Plan for the Mexican Spotted Owl (*Strix occidentalis lucida*), First Revision. U.S. Fish and Wildlife Service. Albuquerque, New Mexico, USA. 413 pp.

_____. 2011. Bexar County Karst Invertebrates Recovery Plan. https://ecos.fws.gov/docs/recovery_plan/Final%202001%20Bexar%20Co%20Invertebrates%20Rec%20Plan_1.pdf. Accessed April 2025.

_____. 2005a. Pecos Sunflower Recovery Plan. Southwest Region U.S. Fish and Wildlife Service. Albuquerque, New Mexico.

_____. 2005b. Candidate Assessment: Cagle's Map Turtle. https://ecos.fws.gov/docs/candidate/assessments/2005/r2/C01X_V01.pdf. Accessed September 2025.

United States Geological Survey (USGS). 2025a. National Map Viewer. https://apps.nationalmap.gov/viewer/. Accessed March 2025.

_____. 2025b. U.S. Geological Survey and Texas Bureau of Economic Geology, Quaternary fault and fold database for the United States. Accessed October 21, 2025.

_____. 2025c. Uvalde National Fish Hatchery. https://www.fws.gov/fish-hatchery/uvalde. Accessed October 2025.

_____. 2025d. United States Wind Turbine Database. https://eerscmap.usgs.gov/uswtdb/data/. Accessed September 2025.

_____. 2014. Texas Water Science Center: Geologic Database of Texas. https://data.geographic.texas.gov/collection/?c=79a18636-3419-4e22-92a3-d40c92eced14. Accessed June 2025.

Urbanek, R.P. and J.C. Lewis. 2020. Whooping Crane (*Grus americana*), version 1.0. In *Birds of the World* (A.F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.whocra.01. Accessed June 2025.

Wallace, E. 2025. Fort Stockton: History, Economy, and Attractions. *Handbook of Texas Online*. https://www.tshaonline.org/handbook/entries/fort-stockton-tx. Accessed July 2025.

Weary, D.J. and D.H. Doctor. 2014. Karst in the United States: A digital map compilation and database: U.S. Geological Survey Open-File Report 2014–1156. http://dx.doi.org/10.3133/ofr20141156. Accessed June 2025.

Whelan, C. 2018. "Squawteat Peak," Texas Beyond History. Available online at: https://www.texasbeyondhistory.net/trans-p/images/ap8.html (accessed April 2018). Published by The University of Texas Austin.

Willard, D.E. 1978. *The impact of transmission lines on birds (and vice versa)*. In M.L. Avery (Ed.), *Impacts of transmission lines on birds in flight – proceedings of a workshop* (pp. 3-7). Washington, D.C.: U.S. Fish and Wildlife Service.

Willey, G.R. and P. Phillips. 1958. Method and Theory in American Archaeology. Chicago: University of Chicago Press.

Wright, G.D., M.J. Harner, and J.D. Chambers. 2014. Unusual wintering distribution and migratory behavior of the Whooping Crane (*Grus americana*) in 2011–2012. The *Wilson Journal of Ornithology* 126(1), 115-120. https://doi.org/10.1676/13-071.1. Accessed June 2025.