SAL	State Antiquities Landmark
SCS	Soil Conservation Service
SH	State Highway
SWPPP	Storm Water Pollution Prevention Plan
TARL	Texas Archeological Research Laboratory
TASA	Texas Archeological Site Atlas
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
THSA	Texas Historical Site Atlas
TNRIS	Texas Natural Resource Information System
TPWD	Texas Parks and Wildlife Department
TSS	Texas Speleological Society
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
TXNDD	Texas Natural Diversity Database
US Hwy	U.S. Highway
USACE	U.S. Army Corps of Engineers
USBOC	U.S. Bureau of the Census
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTSA	University of Texas-San Antonio
VORTAC	VHF Omnidirectional Range / Tactical Aid to Navigation

1.0 DESCRIPTION OF THE PROPOSED PROJECT

1.1 SCOPE OF THE PROJECT

LCRA Transmission Services Corporation (LCRA TSC) proposes to design and construct a new single-circuit 138-kilovolt (kV) transmission line located in Gillespie County and a portion of western Blanco County and/or northern Kendall County, depending on the final route location. This new transmission line will connect a planned Central Texas Electric Cooperative (CTEC) electric substation to LCRA TSC's existing Kendall-to-Mountain Top 138-kV transmission line (T342) in northern Kendall and western Blanco counties. CTEC plans to construct its substation (currently called Blumenthal Substation[1]) at one of nine potential locations in the Blumenthal area of eastern Gillespie County. The proposed Blumenthal Substation location will be determined as a part of this project. The T342 tap point will also be determined as a part of this project, and it will be located at one of five potential locations along LCRA TSC's existing T342 transmission line which runs immediately south and east of Gillespie County between Kendall and Blanco counties. The entire project will be approximately 10.4 to 17.0 miles in length, depending on the final route selected. Figure 1-1 shows the location and extent of this project.

LCRA TSC requests Public Utility Commission of Texas (PUCT) approval to amend its Certificate of Convenience and Necessity (CCN) for this project. LCRA TSC will own, operate and maintain all transmission line facilities, including conductors, wires, structures, hardware, and easements. CTEC will acquire, build and operate the new Blumenthal Substation.

1.2 PURPOSE AND NEED

The proposed project is needed to provide 138-kV transmission service to a new electric load-serving substation (Blumenthal Substation). The Blumenthal Substation is needed to ensure that the electric service requirements of existing and future end-use consumers in a broad area are met in a reliable, efficient, and cost-effective manner.

The electric service needs of end-use consumers in a large area in southeastern Gillespie County, western Blanco County, and northern Kendall County are served by CTEC from the Goehmann Lane Substation. The electric load in this area has been growing at a high rate over the last few years and coupled with the existing need for electric service in the area of

[1] For purposes of this document and the CCN application, CTEC's proposed new substation is called "Blumenthal." CTEC may choose a different name for the new substation at a later date.

southeastern Gillespie County and the remoteness to the Goehmann Lane Substation, the present electric system's capability to reliably and adequately serve the electric load will soon be exceeded in the very near future.

The electric load in this winter peaking area grew approximately 11 percent between 2006 and 2011. The area consists of several small communities located generally along and south of United States Highway (US Hwy) 290 between Fredericksburg and Johnson City. In terms of meter growth (new end-use consumers), over the last 12 years this specific area has grown at a rate that is three times the overall CTEC system annual meter growth rate and is projected to continue. Commercial developments, many in the form of wineries, have been attracted to this area in part due to the area's climate and soil required for this industry, as well as proximity to a major thoroughfare. The expansion of this highway, by the Texas Department of Transportation (TxDOT), is already underway within this growth area.

Presently, approximately 43 percent of the total electric load served out of the Goehmann Lane Substation is located in the remote area to the southeast of Fredericksburg. There are no other substations immediately to the east of this area to provide back-up service (see area map provided as Attachment 4 to this Application). The distance between the Goehmann Lane Substation and the most remote end-use consumers, located in the southeastern most portion of CTEC's service area, is approximately 24 miles. As the need for electric service continues to increase, a corresponding decrease in reliability of service will impact a larger number of end-use consumers due to the remoteness of the electric load to the source for transmission service to the area (i.e., the existing Goehmann Lane Substation). In terms of distribution service reliability, distribution system studies performed by CTEC revealed that the electric load of the two distribution feeders out of the Goehmann Lane Substation, which now supply the remote area electric load, will each exceed seven megawatts (MW) in the winter of 2018. This projected loading level violates CTEC's distribution feeder loading criteria by 16 percent. Continued electric load growth on the CTEC distribution system in this area, will exhaust available feeder capacities to such extremes that normal condition system performance will be threatened and reserve feeder capacity will not be available to respond to contingency conditions.

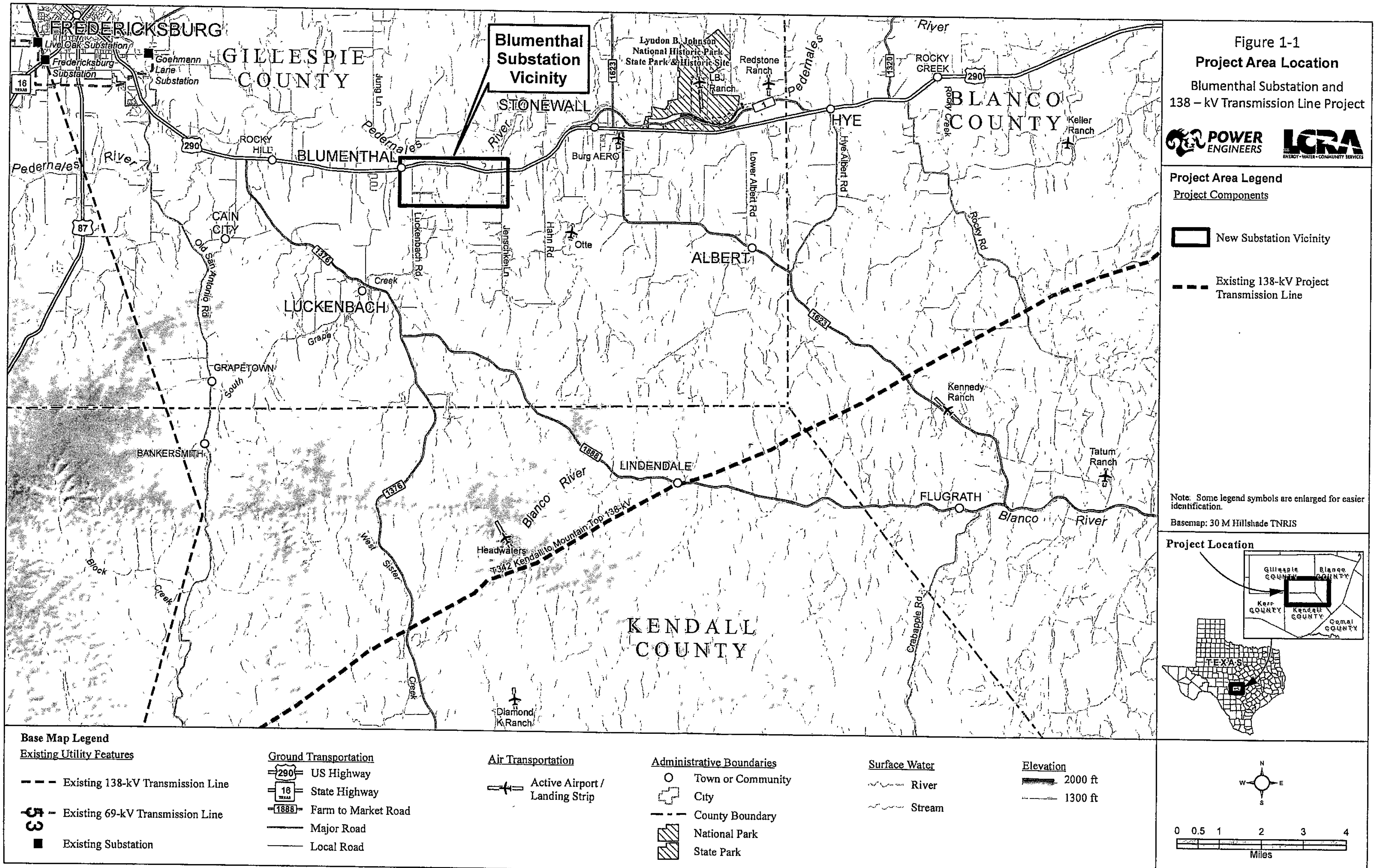

Figure 1-1
Project Area Location
Blumenthal Substation and 138 – kV Transmission Line Project

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In terms of substation and transmission service reliability, the Goehmann Lane Substation, located in Fredericksburg, contains two electric power transformers with a combined winter capacity rating of approximately 38 MW. The total peak electric load supplied by the Goehmann Lane Substation reached 22.8 MW in the winter of 2011, and its overall peak electric load reached 31.5 MW in the winter of 2010. This substation is radially-supplied by a 4-mile 69-kV transmission line (i.e., supplied by a single transmission line) tapped to the 0.8-mile Fredericksburg to Live Oak 69-kV transmission line.

The Fredericksburg-Live Oak-Goehmann Lane 69-kV transmission line, Goehmann Lane's sole transmission line source, has experienced 17 outages over the past nine years for a total outage time of over 24 hours. More recently, in February 2013 and April 2013, a failure in this sole transmission line source to the Goehmann Lane Substation resulted in the loss of electric service to 4,000 end-use customers for more than two hours.

Continuing to serve the area's electric load without the proposed project will result in transmission service degradation impacting a large number of end-use consumers. On a broader scale, power flow studies indicate that by 2018 the area's 138- and 69-kV transmission system is projected to experience violations of system operating limits during contingency conditions. Existing transmission elements that are key sources to the area will overload (i.e., exceed 100 percent of the nominal thermal rating) during a single contingency condition.

1.3 AGENCY ACTIONS

This environmental assessment (EA), prepared by POWER Engineers, Inc. (POWER), in support of LCRA TSC's application to amend its CCN from the PUCT, is intended to provide information on certain environmental and land use factors contained in Section 37.056(c)(4) of the Texas Utilities Code and the PUCT's Substantive Rule 25.101(b)(3)(B). This EA may also be used in support of any other local, state, or federal permitting requirements, if necessary.

Where the proposed transmission line crosses a state-maintained road or highway, LCRA TSC will obtain a permit from the TxDOT. If any portion of the transmission line will be accessed from a state-maintained road or highway, LCRA TSC will obtain a permit from TxDOT. Where the proposed transmission line is parallel to TxDOT roads, LCRA TSC will place the transmission line structures on private property and not within the road right-of-way (ROW). LCRA TSC does not propose to place any structures of the transmission line within any highway ROW for reasons including, but not limited to, safety, reliability, and compliance with the Texas Administrative Code, specifically TxDOT's Utility Accommodation Rules.

After the PUCT approves a route for the project and if the approved route will cross any Kendall County roads, LCRA TSC will provide the Kendall County Engineer with a *Notice of Proposed Construction on County Right-of-Way*. LCRA TSC will coordinate with Blanco and Gillespie county engineers regarding crossing of county roads as appropriate.

Since more than one acre will be disturbed during construction of the project, a Storm Water Pollution Prevention Plan (SWPPP) will be prepared; and since more than five acres will be disturbed, a Notice of Intent (NOI) will be submitted by LCRA TSC to the Texas Commission on Environmental Quality (TCEQ). The controls specified in the SWPPP will be monitored in the field.

After approval of this application and prior to construction, a detailed Natural Resources Assessment (NRA) and Cultural Resources Assessment (CRA) will be performed on the approved transmission line route. Depending upon the results of these assessments, permits or regulatory approvals may be required from the U.S. Army Corps of Engineers (USACE) or the U.S. Fish and Wildlife Service (USFWS). If LCRA TSC encounters previously unassessed artifacts or cultural resources during project construction, LCRA TSC will stop construction in the immediate vicinity of the site. LCRA's staff archaeologist will notify and consult with the Texas Historical Commission (THC) and LCRA TSC design staff. The outcome of consultation with THC could be that LCRA TSC would simply avoid a newly encountered site by spanning or going around it. If avoidance is not possible, then mitigative actions may be required.

Similarly, as LCRA TSC identifies other obstacles and engineering constraints along the approved route, LCRA TSC will adjust alignments, adjust structure locations/heights, and/or take other actions considering the approved route's length, location, cost, and schedule.

After alignments and structure locations/heights are adjusted and set, LCRA TSC will make a final determination of the need for Federal Aviation Administration (FAA) notification, based on structure locations and structure designs. In some areas, if necessary, LCRA TSC could use lower-than-typical heights and LCRA TSC could add marking and/or lighting to certain structures.

Appropriate measures will be taken during engineering design following the PUCT's Final Order to ensure that special provisions, consistent with the Final Order, address any identified environmental and ROW concerns. If necessary, these measures will be added to construction documents, specifications, or other instructions. Following completion of the design, a preconstruction meeting will be held which will include a review of these provisions. A physical inspection of the project will be performed following project completion to ensure all appropriate measures have been taken during construction.

LCRA TSC will report the transmission line project to the PUCT on LCRA TSC's Monthly Construction Progress Report, beginning with the first report following the filing of a CCN application, and in each subsequent monthly progress report until construction is completed and actual project costs have been reported. As required by the PUCT, LCRA TSC will submit locational and attribute data for the approved route after it is constructed.

1.4 DESCRIPTION OF PROPOSED DESIGN AND CONSTRUCTION

1.4.1 Design Considerations

The line will be designed and operated as a 138-kV electric transmission line with a single 336.4 kcmil aluminum conductor, steel-reinforced (ACSR) "Linnet" conductor per phase and one 3/8-inch 7-strand high-strength steel shield wire or fiber optic ground wire (OPGW). The transmission line will be rated for operation at 535 amperes, yielding a nominal 127-MVA capacity. The configurations of the conductor and shield wires will provide adequate clearance for operation at 138-kV, considering icing and wind conditions. The project will be designed and constructed to meet or exceed the specifications set forth in the appropriate edition of the National Electrical Safety Code (NESC) and will comply with all applicable state and federal statutes and regulations. The results of the Natural/Cultural Resource Assessments will be considered when designing and placing new structures.

1.4.2 Typical Structures and Easements

LCRA TSC proposes to use 138-kV single-circuit steel and/or concrete pole structures for typical tangent, angle, and deadend structures. LCRA TSC has also considered other structure types including H-frames and lattice towers. The geometries of the proposed and alternative, typical tangent, angle and deadend structures are shown on Figures 1-2 through 1-10. These structure geometries are illustrative. All of these structure types are capable of being constructed, operated, and maintained within the proposed easement widths described below.

In some areas, such as, but not limited to, transmission line crossings and highway crossings, lower than typical, higher than typical, or alternative structure types may be constructed. In some locations and along certain route segments (potentially but not limited to Segments Q1, S, T, U and V), only H-frame structures can be used to avoid potential impacts to an existing FAA communication beacon located just south of US Hwy 290. Actual structure types may differ slightly based on newer or different designs available at the time of construction.

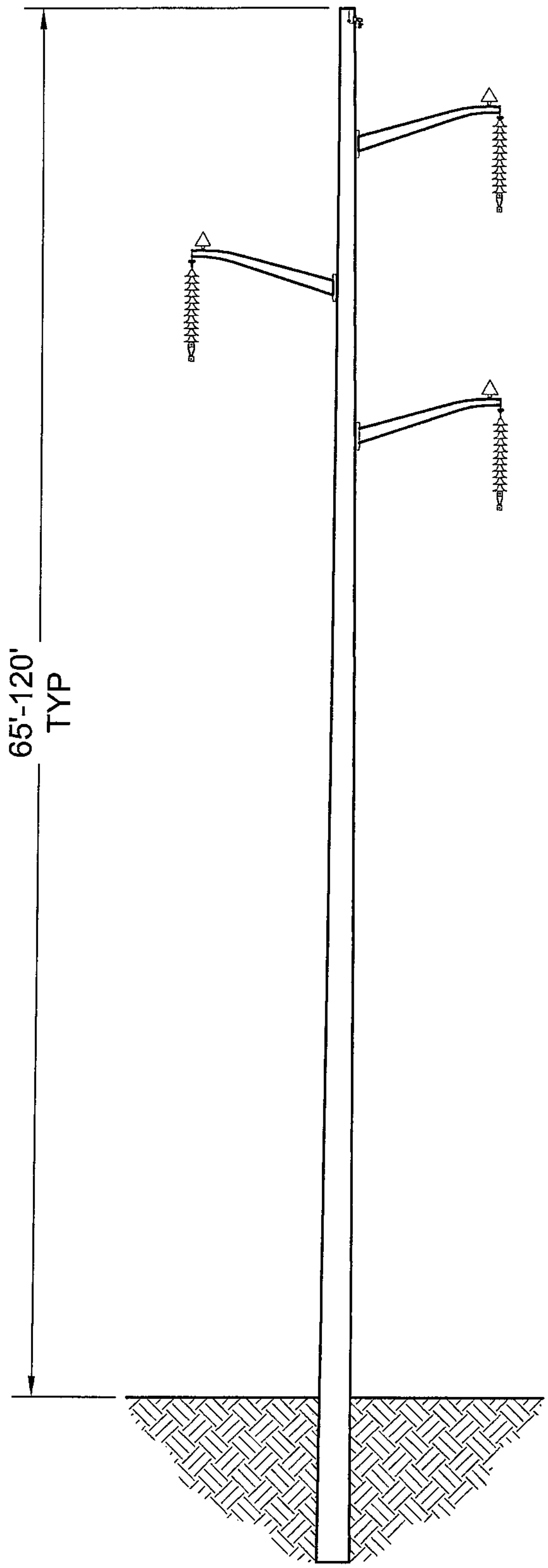
New single-circuit 138-kV transmission facilities will typically be constructed on new ROW within easements ranging from approximately 80 to 130 feet in width, and using typical spans that range from approximately 600 to 1,000 feet. In some areas, spans could be more or less than the typical spans, depending upon terrain and other engineering constraints. Easement widths could also vary to address similar concerns. Access easements and/or temporary construction easements may be needed in some areas.

1.4.3 Substation and Tap Point

The proposed new transmission line will connect CTEC's new Blumenthal Substation to the existing LCRA TSC 138-kV electric transmission line that runs from Kendall to Mountain Top (T342) through northern Kendall and western Blanco counties.

An approximately two acre tap point site will be constructed where the new transmission line connects to T342. The following will be located at the tap point site: three substation A-frame structures, three 138-kV motor operated switches with interrupters, a 138-kV operating bus, a power voltage transformer, a control house, a motor-operated switch panel, and a remote terminal unit. LCRA TSC will acquire the property to accommodate the tap point site.

The new Blumenthal Substation will be approximately three acres in area and will be owned by CTEC. The Blumenthal Substation will be designed and constructed by CTEC and will include facilities owned and/or operated by both CTEC and LCRA TSC. The LCRA TSC facilities will include a substation A-frame structure, a motor operated switch with interrupters, a 138-kV operating bus, a motor-operated switch panel, and a remote terminal unit. The CTEC facilities will include two 138-kV disconnect switches, a power transformer, low voltage distribution bays, and a control house.



Source: LCRA 2014

Project Location

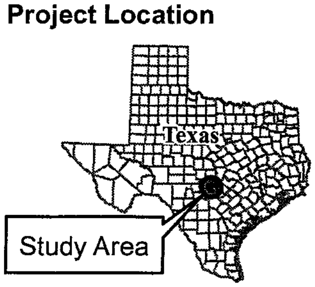


Figure 1-2

138-kV DELTA TANGENT POLE (STEEL OR CONCRETE)

Blumenthal Substation and
138-kV Transmission Line Project

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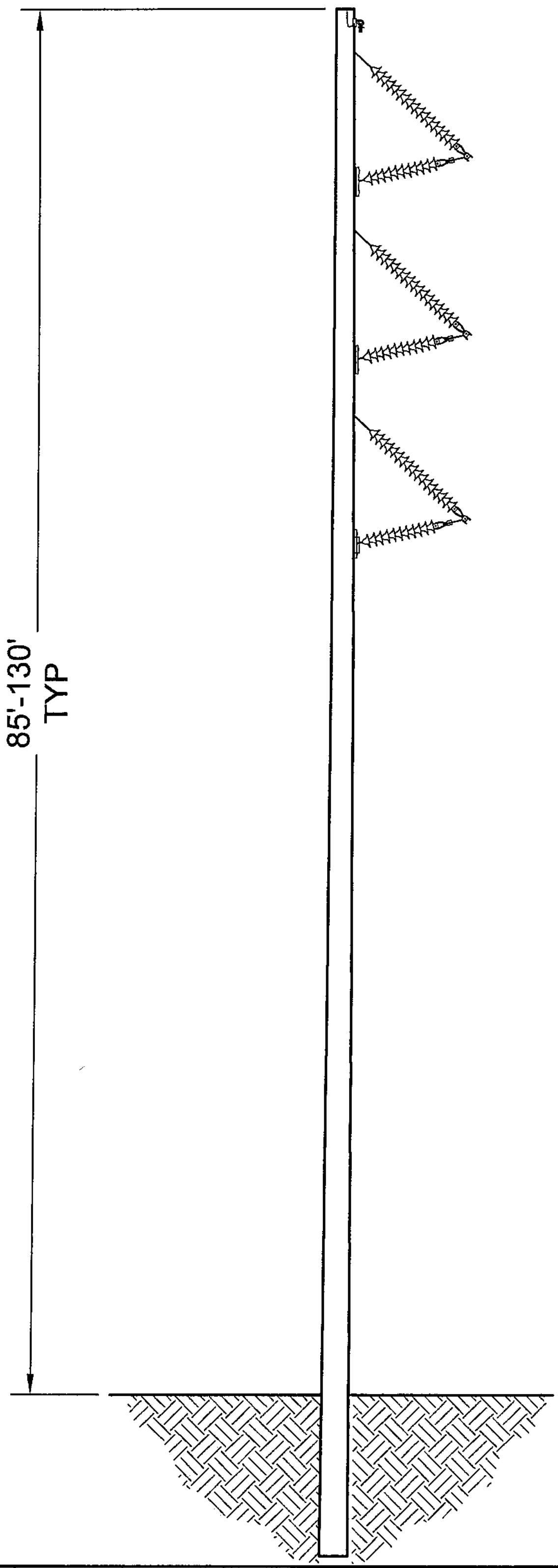

Source: LCRA 2014

Project Location

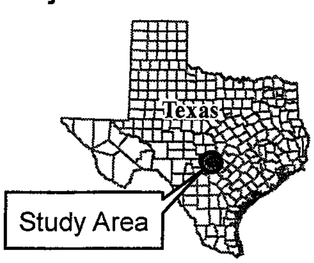

Figure 1-3

138-kV VERTICAL TANGENT / ANGLE POLE (STEEL OR CONCRETE)

**Blumenthal 138-kV
Transmission Line Project**

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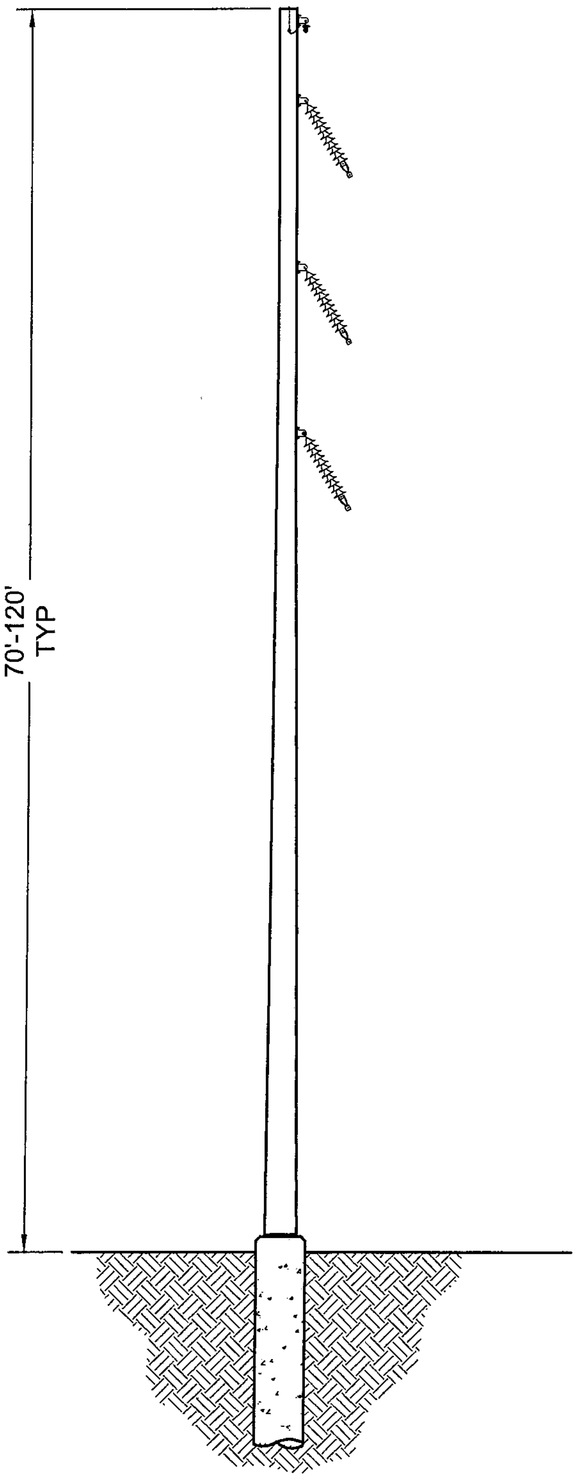

Source: LCRA 2014

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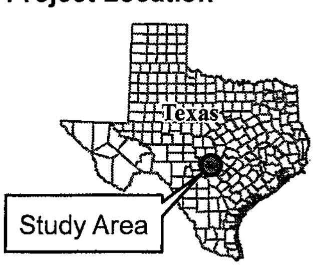

Figure 1-4

138-kV STEEL ANGLE POLE

Blumenthal Substation and 138-kV Transmission Line Project

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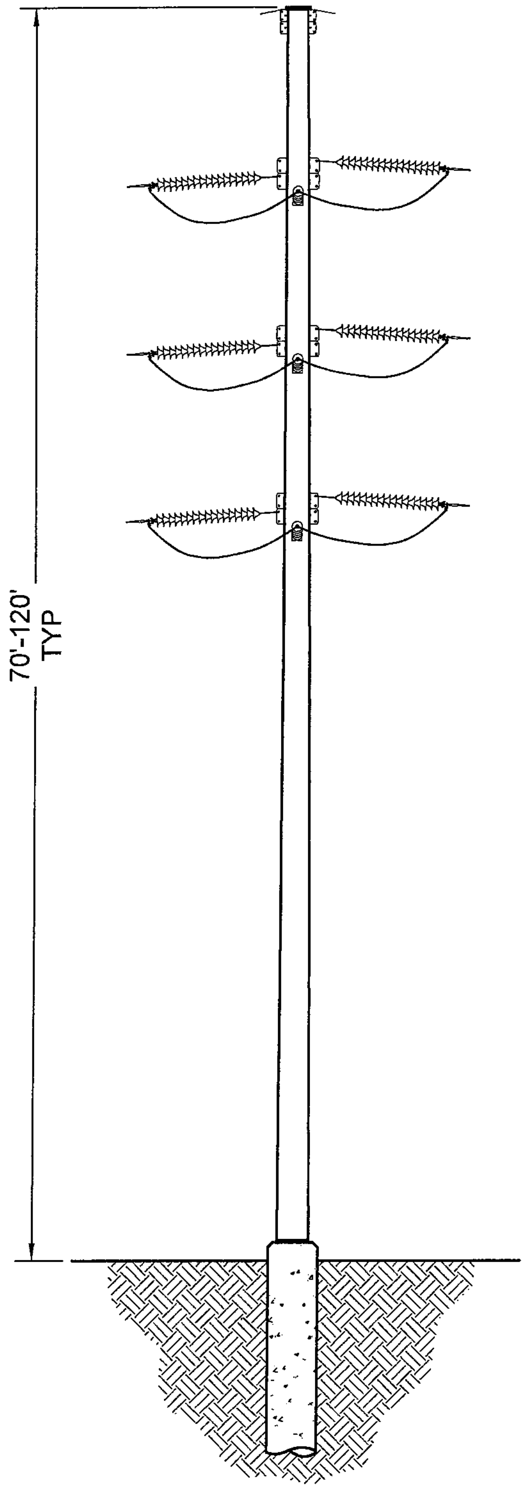

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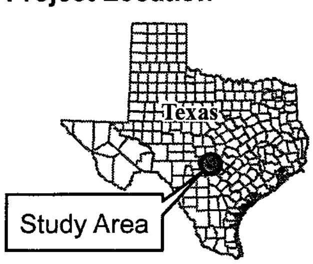

Figure 1-5

138-kV STEEL DEAD-END POLE

Blumenthal Substation and 138-kV Transmission Line Project

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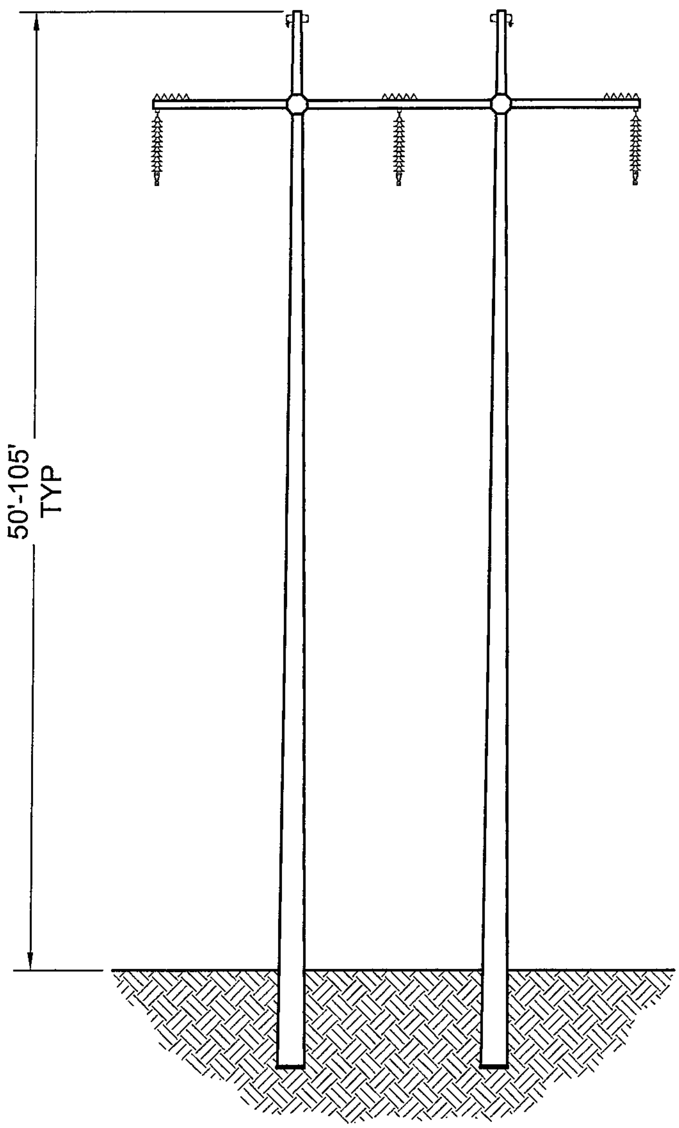


Source: LCRA 2014

Project Location

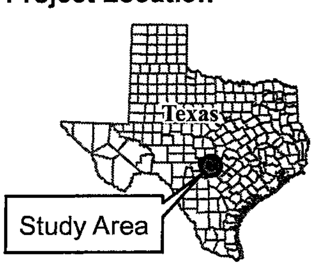
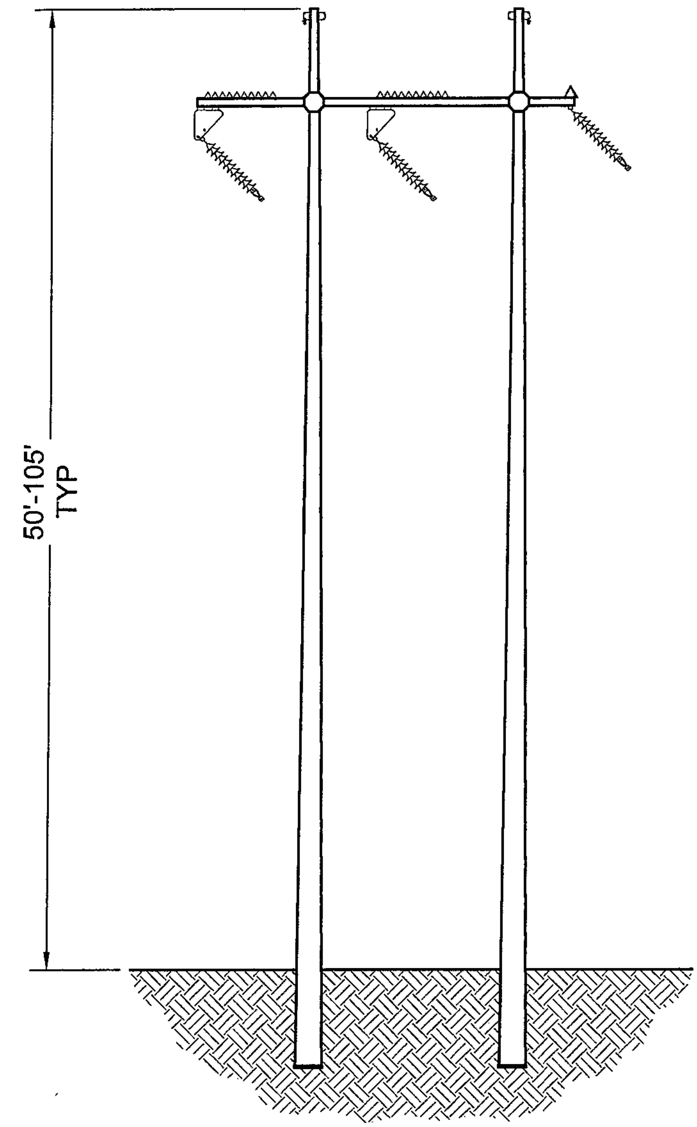


Figure 1-6

138-kV TANGENT H-FRAME (STEEL OR CONCRETE)

Blumenthal Substation and
138-kV Transmission Line Project



Source: LCRA 2014

Project Location

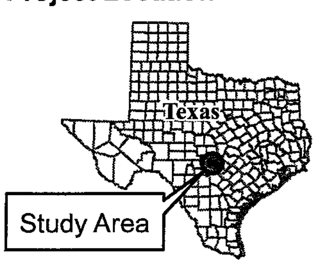


Figure 1-7

138-kV ANGLE H-FRAME (STEEL OR CONCRETE)

Blumenthal Substation and
138-kV Transmission Line Project

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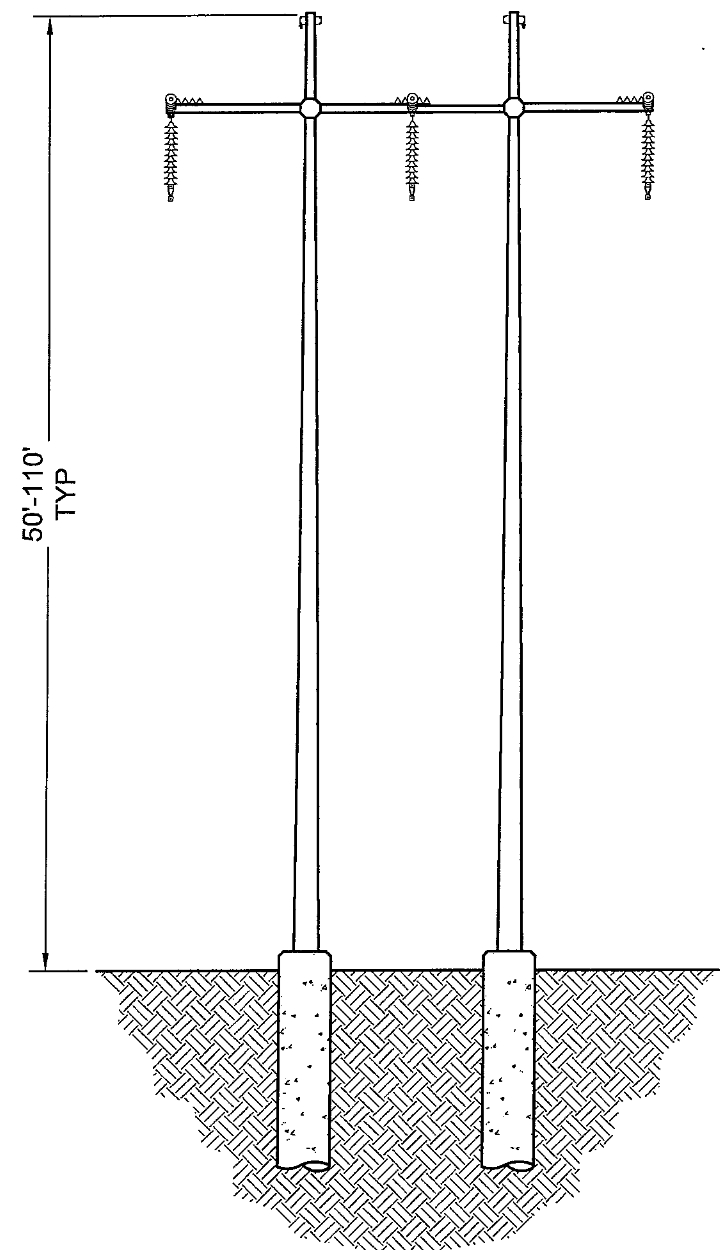

Source: LCRA 2014

Project Location

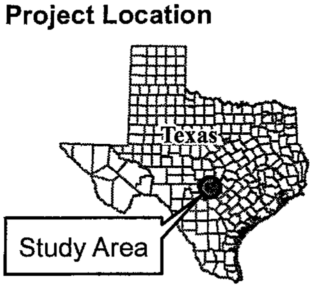

Figure 1-8

138-kV STEEL DEAD-END H-FRAME

**Blumenthal Substation and
138-kV Transmission Line Project**

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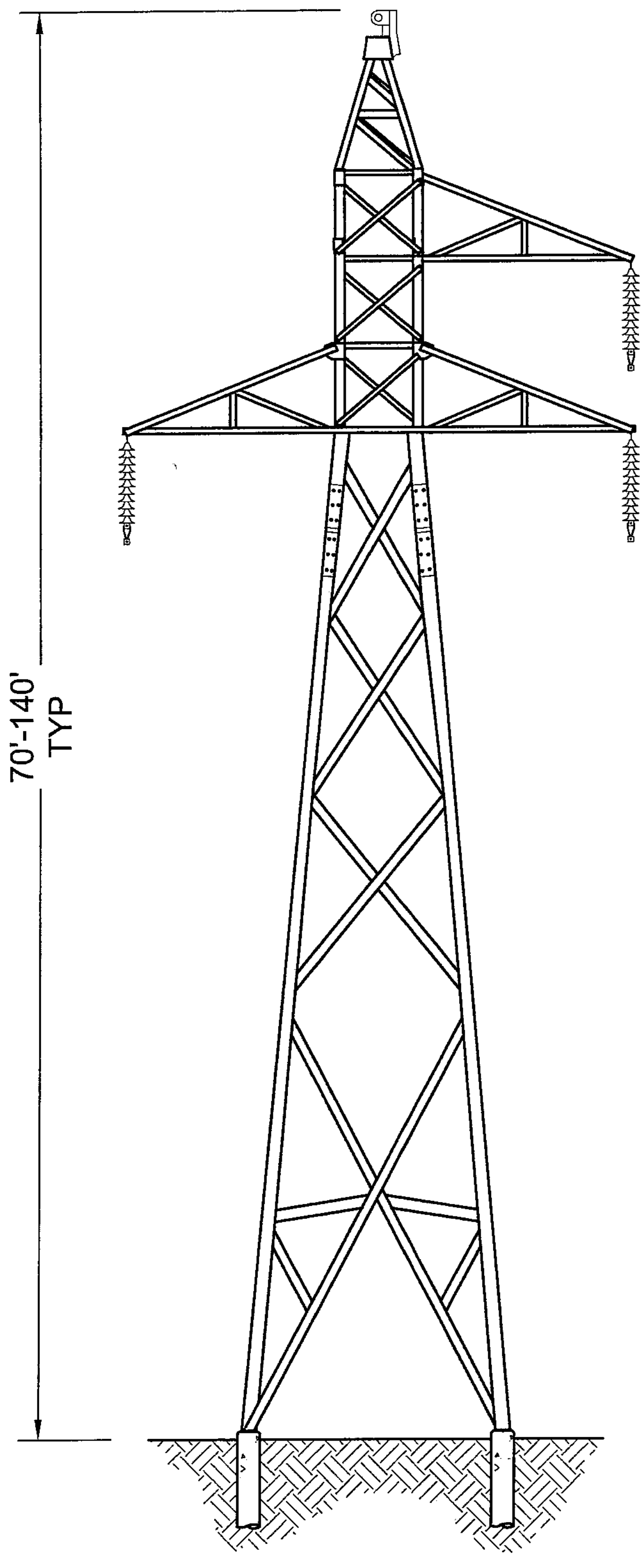

Source: LCRA 2014

Project Location

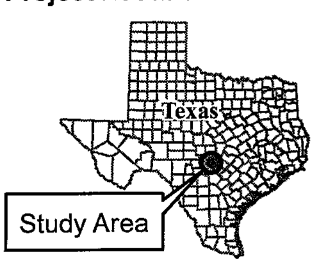

Figure 1-9

138-kV DELTA STEEL LATTICE TOWER (TANGENT, ANGLE OR DEAD-END)

Blumenthal Substation and
138-kV Transmission Line Project

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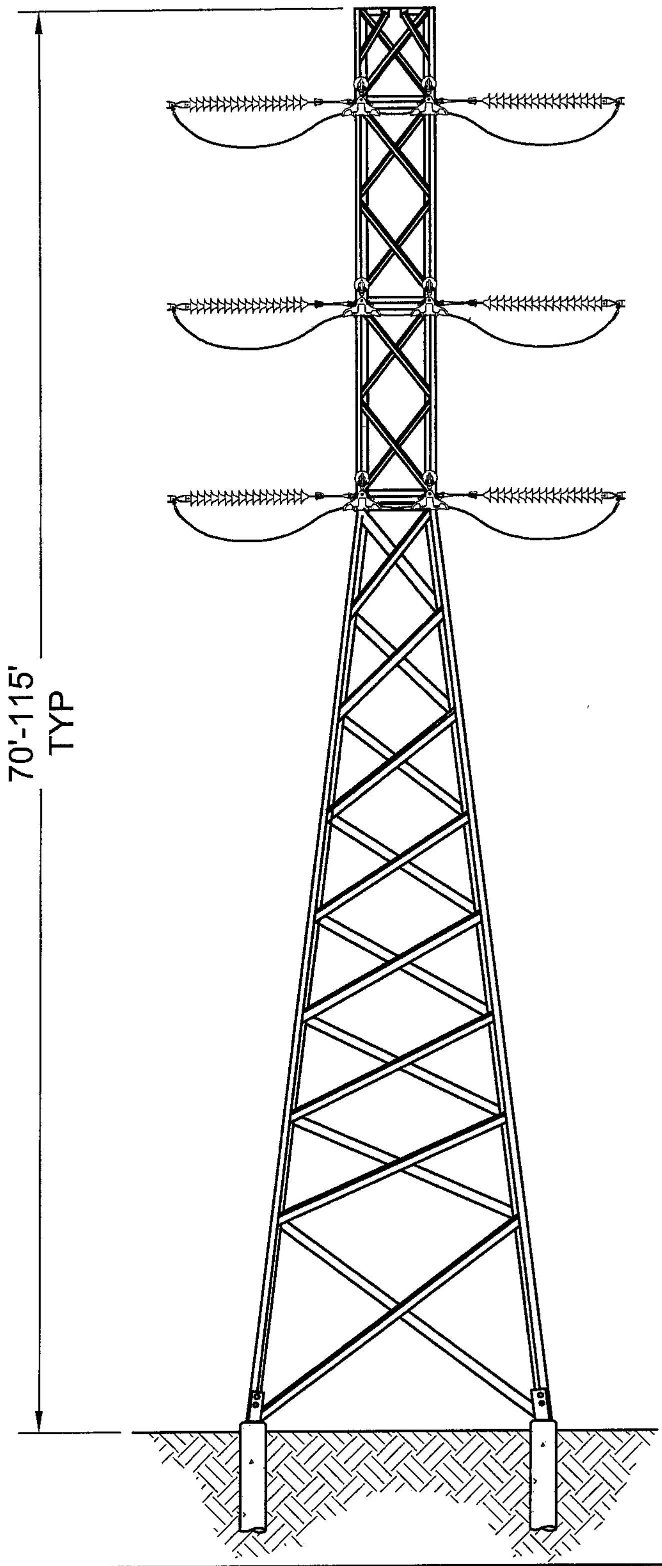

Source: LCRA 2014

Project Location

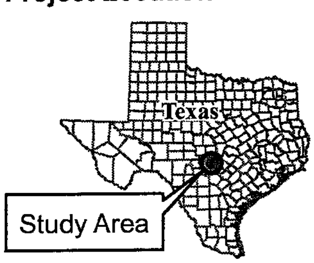

Figure 1-10

138-kV VERTICAL STEEL DEAD-END LATTICE TOWER

Blumenthal Substation and 138-kV Transmission Line Project

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1.5 CONSTRUCTION CONSIDERATIONS

Projects of this type require removal of vegetation, excavating for installation of foundations, structure assembly and erection, conductor and shield wire installation, and cleanup when the project is complete.

After alignments and structure locations/heights are set, construction specifications will be prepared and construction will be conducted with attention to the conservation of natural and cultural resources. The following criteria will help to attain this goal:

1. Efforts will be made to avoid oil spills and other types of pollution, particularly while performing work in the vicinity of streams, ponds, and other water bodies.
2. Water used for construction purposes is typically not taken from streams or other bodies of water. Should water from streams be used, it will be limited to volumes that will not cause harm to the ecology or aesthetics of the area.
3. Precautions will be taken to prevent the possibility of accidentally starting range fires, in compliance with fire laws and regulations.
4. Tension stringing of conductors will be employed where possible to reduce the amount of vegetation removal before final conductor locations are established. Helicopters may be considered for use in some areas, potentially including areas where clearing may be prohibited.
5. Precautions will be taken to prevent the spread of oak wilt. ROW preparation will adhere to LCRA's Corporate Oak Wilt Policy (see Appendix F).
6. When practical, in areas of known endangered or threatened species habitat and in consultation with the USFWS, construction will be performed during seasons of low occurrence or during the non-breeding season (species dependent).
7. The project will comply with the TCEQ construction general permit for storm water discharges.
8. If any previously unassessed archaeological materials are uncovered during construction, construction will cease in the immediate area of the discovery, LCRA's Cultural Resources team will be contacted, and LCRA TSC will take appropriate actions consistent with those previously described in Section 1.3.
9. ROW preparation will be performed in accordance with the provisions discussed below, in order to diminish soil disturbance during construction.

1.5.1 Right-of-Way Preparation

Trees and brush in the ROW are removed to ensure safe operation of and access to the line. Any required tree or brush removal will be performed as specified by LCRA TSC in its construction documents.

The ROW will be used for access during construction operations. Ingress and egress through private property may be required in limited circumstances to reduce construction impacts. In the event ingress and egress through private property is necessary, existing private roads may be used where practical. In some cases, culverts may be used to cross creeks and tributaries. Where culverts are not used, creek crossings may consist of rock or cobble placed on the stream bottom. The following factors, thoughtfully implemented and applicable to this project, will minimize the potential adverse effects of this electric transmission line on the pre-existing environment:

1. The time and method of ROW preparation will take into account soil stability, the prevention of silt deposition in water courses, and practical measures for the protection of natural vegetation and protection of adjacent resources, such as natural habitat for wildlife.
2. A flail mower may be used instead of bulldozers with dirt blades, where such use will preserve the cover crop of grass, low-growing brush, and similar vegetation.
3. Vegetation will typically be removed in a straight path.
4. Removal of vegetation and grading of construction areas such as storage areas or setup sites will be performed in a manner that will diminish erosion and conform to the natural topography.
5. Vegetation removal will be performed in accordance with construction plans which will be developed in accordance with natural and cultural resource regulations and in a manner that will diminish marring and scarring of the landscape, or silting of streams, while ensuring that the line can be constructed, operated, and maintained safely and in accordance with state and federal regulations governing utility construction.
6. Vegetation removal will be performed in a manner that diminishes the amount of flora and fauna disturbed during construction of the transmission line, except to the extent necessary to establish appropriate clearance for the transmission line.
7. Vegetation removal and construction activities, including temporary or permanent access roads in the Waters of the United States or in the vicinity of streambeds, will be performed in

a manner to diminish damage to the natural condition of the area and in accordance with USACE requirements.

8. Vegetation removal will not be performed until a SWPPP has been prepared and a NOI has been submitted to TCEQ for the project.
9. Erosion control devices will be constructed where necessary to prevent soil erosion in the ROW, in accordance with the SWPPP. Erosion control devices will be maintained and inspections conducted until the site is sufficiently re-vegetated, as required by the SWPPP.
10. Roads will be provided with erosion-control measures, which may include side drainage ditches or culverts in accordance with the SWPPP.
11. Roads will be stabilized if constructed on steep slopes. Where feasible, service and access roads will be constructed jointly.
12. In or near areas where ROWs enter dense vegetation and cross major highways or rivers of high scenic value, a screen of natural vegetation may be left in the ROW while still allowing for access to the ROW.

1.5.2 Structure Assembly and Erection

Survey crews will stake or otherwise mark structure locations. Soil borings and soils testing will provide the parameters for foundation designs for new structures. Construction crews will install structures by excavating circular holes and placing in them a reinforced, concrete foundation or a direct-embed pole. Where direct-embedded poles are used, crews will install them by excavating oversized holes, lifting and setting the structure, and backfilling with native soils, select fill, or concrete, depending on soil conditions at the site. Where structures with foundations are used, after foundations have cured sufficiently, crews will set structures. Following structure erection, crews will install the conductor and shield wire suspension assemblies. Conductor suspension assemblies may include porcelain and/or polymer insulators. Structure grounds will be installed using external ground rods or counterpoise. In some areas, avian-perching deterrents will be installed above suspension assemblies.

Although vehicular traffic is a very large part of this operation, construction crews will take care to diminish damage to the ROW by minimizing the number of pathways traveled.

1.5.3 Conductor and Shield Wire Installation

Conductors, also referred to as wire, and shield wires (for lightning protection) will be installed via a tensioning system. Tensioning systems typically use ropes threaded through stringing blocks or dollies for each conductor and shield wire. Conductor and shield wires will be pulled by the ropes and held tight by a tensioner to keep the wires from coming in contact with the ground and other objects which could damage the wire. In addition, guard structures (temporary wood-pole structures) will be installed where the transmission line crosses overhead electric power lines, overhead telephone lines, roadways, or other areas requiring an additional margin of safety during wire installation. After the wire is tensioned to the required sag, the wire will be taken out of the blocks and placed in the suspension and dead-end clamps for permanent attachment.

1.5.4 Cleanup

The cleanup operation involves stabilizing disturbed areas, the removal of debris, and the restoration of items damaged by the construction of the project. The following criteria will guide the cleanup of construction debris and the restoration of the area's natural setting. Further requirements may be imposed by land management agencies.

1. Construction equipment, supplies, and LCRA TSC or contractor property will be dismantled and removed from the ROW when construction is complete.
2. Construction waste, with the possible exception of cleared vegetation, will be removed prior to completion of the project.
3. If cleared vegetation is mulched, it may be spread out over the ROW, given to the landowner or nursery as a product for beneficial use, or picked up and taken to a landfill.
4. Burning is not typically conducted, but may be used as a means of disposal, if no practical alternative exists. Any material to be burned will be piled in a manner and in locations that will cause the least fire risk. Care will be taken to prevent fire or heat damage to trees, shrubs, and structures adjacent to the ROW and substation. Burning will conform to local fire and air quality regulations.
5. Soil which has been excavated during construction and not used will be evenly backfilled onto a cleared area, spread to conform to the terrain and the adjacent land, or removed from the site.
6. Replacement of soil adjacent to water crossings for access roads will be at slopes less than the normal angle of repose for the soil type involved.
7. If temporary roads are used, they will be removed and the original slopes will be restored and re-vegetated as required by the SWPPP.

8. If natural re-vegetation will not provide ground cover in a reasonable length of time, seeding, sprigging or hydro-seeding of restored areas may be used to encourage growth of grasses and other vegetation that is ecologically desirable.
9. Where site factors make it unusually difficult to establish a protective vegetative cover, other restoration procedures may be advisable to prevent erosion, such as the use of gravel, rocks, or concrete.
10. LCRA TSC will return each affected landowner's property to its original contours and grades unless otherwise agreed to by the landowners' representatives. However, LCRA TSC will not restore a landowner's property to its original contours and grades if doing so will affect the safety or stability of the project's structures or the safe operation and maintenance of the line.

1.6 MAINTENANCE

Periodic inspection of the ROW, structures, and line will be performed by the LCRA TSC Line Operations Department in order to provide for the safe and reliable operation of the transmission line. The major maintenance item will be the necessary removal of trees and other vegetation that have the potential to interfere with the safe and reliable operation of the transmission line. Preservation of the environmental, natural and cultural resource conservation factors, designed and built into transmission system siting, require a thoughtful, comprehensive program for maintaining the facilities. The following factors will be incorporated into LCRA TSC's maintenance program for this project.

1. Native vegetation, particularly that of value to fish and wildlife, that has been preserved during the construction process and that does not impede access nor have the potential to grow close enough to the transmission line to pose a hazard to the safe operation and maintenance of the transmission line, will be allowed to grow in selected parts of the ROW.
2. Once a cover of vegetation has been established, it will be properly maintained to ensure public safety and a reliable, functioning transmission system.
3. Access roads and service roads, where practical, will be maintained with native grass cover. Where grading is necessary, access and service roads will be graded to the proper slope in order to prevent or diminish soil erosion.
4. If used, U.S. Environmental Protection Agency (USEPA) approved herbicides will be carefully selected and carefully applied to diminish effects on desirable indigenous plant life, and selective application will be used whenever appropriate. To preserve the natural

environment, it is essential that herbicides be applied in a manner fully consistent with the protection of the entire environment, particularly the health of humans and wildlife.

5. Maintenance inspection intervals will be established by LCRA TSC and routine maintenance will be conducted, when possible, while access roads are firm or dry.
6. Aerial and ground maintenance inspection activities of the transmission line facility will include observation of soil erosion problems, fallen timber, and conditions of the vegetation that require attention. As an erosion-control measure, native shrubs, forbs, or grasses may be planted.
7. Transmission line ROW can be used for appropriate types of multiple-use concepts, such as trails suitable for hiking, biking, bird watching, farming, ranching and livestock grazing, wildlife production, and recreational or commercial hunting operations as long as the activity does not impact public safety or inhibit safe operation and maintenance of the electrical system.

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2.0 DESCRIPTION OF THE STUDY AREA

The study approach utilized by POWER for this EA included the characterization and identification of environmental constraints and potential routing opportunities for the project. To accomplish this task, once the project endpoints were provided and the study area boundaries established, a base map was developed and several methodologies were then incorporated to collect pertinent environmental and land use data. Methodologies utilized for the development and identification for preliminary and proposed alternative routes are provided in Section 4.0.

The project endpoints for this project include the proposed CTEC Blumenthal Substation and the existing LCRA TSC Kendall-Mountain Top 138-kV transmission line (T342). The CTEC Blumenthal Substation is proposed in the vicinity where Luckenbach Road and Jenschke Lane intersect with US Hwy 290. The study area boundaries were defined to include feasible geographically diverse alternatives for the location of a new 138-kV transmission line. Major physiographic features, jurisdictional boundaries, sensitive resources, land uses, and existing linear corridors (roadways and utilities) helped to define the study area boundaries (Figure 2-1). The study area covers approximately 146 square miles.

After delineation of the study area, a project base map was prepared and used to display resource data for the project area. Resource data categories and factors that were determined appropriate for evaluation were selected and mapped for interpretation and analysis. The base map provides a broad overview of various resource locations indicating routing constraints and areas of potential routing opportunities.

Data displayed on the base map includes but is not limited to:

- Major land jurisdictions and uses
- Major roads (including county roads [CR], farm-to-market [FM] roads, state highways [SH])
- Existing transmission line and pipeline corridors
- Parks and recreation areas
- Major political subdivision boundaries
- Rivers, streams, and ponds

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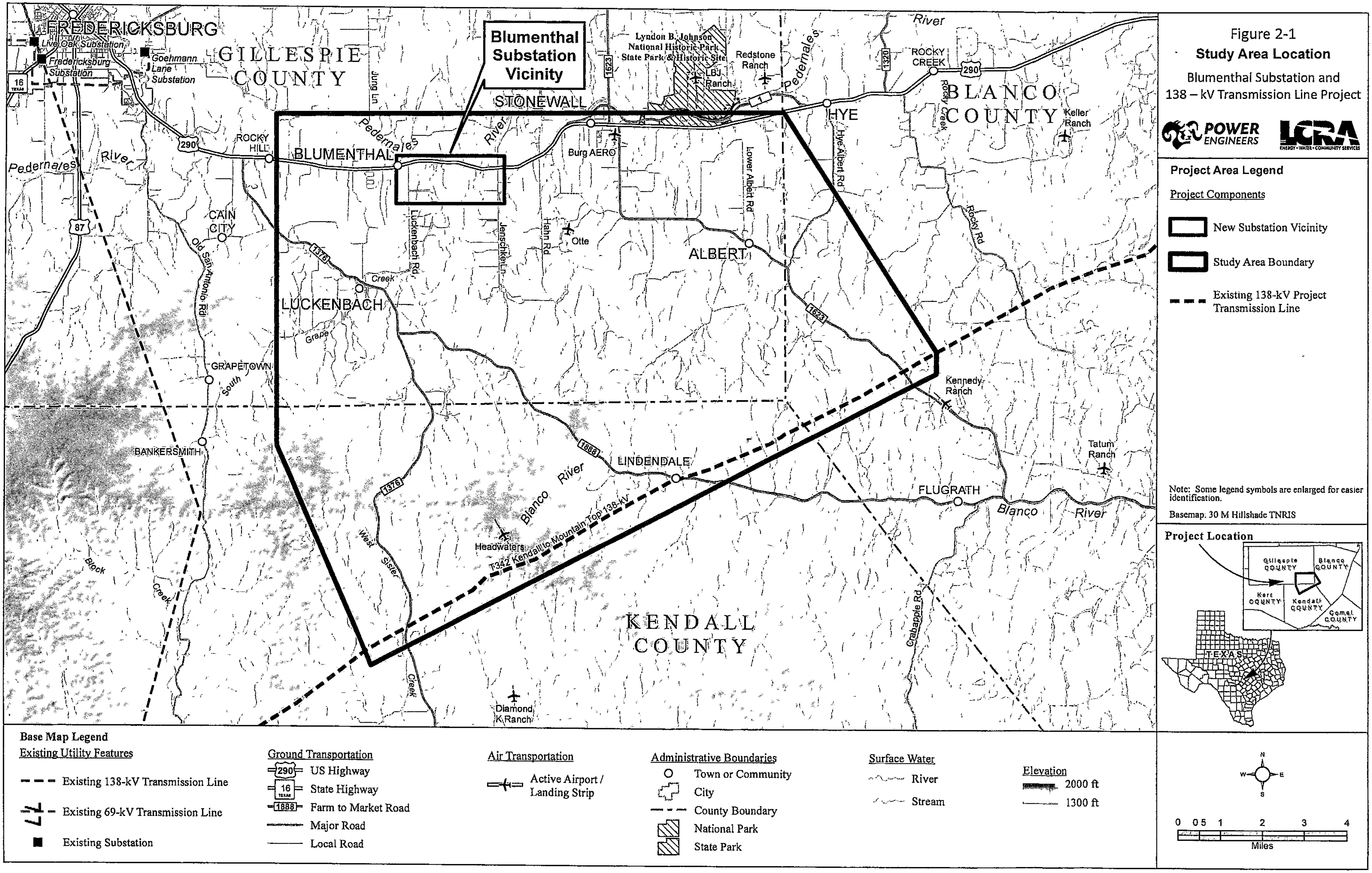

Figure 2-1
Study Area Location
Blumenthal Substation and 138 – kV Transmission Line Project

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Several methods were used to collect and review environmental and land use data including incorporation of readily available Geographic Information System (GIS) coverage with associated metadata, review of maps and published literature, review of files and records from numerous federal, state and local regulatory agencies, and reconnaissance surveys of the study area. Inventory data for each resource area were collected and mapped within the study area using GIS programs and software.

Maps and/or data layers reviewed include, but were not limited to, the United States Geological Survey (USGS) 7.5 minute topographic maps, National Wetland Inventory (NWI) maps, TxDOT county highway maps, county appraisal district land parcel boundary maps, and recent aerial imagery flown on August 2, 2013.

Various federal, state, and local agencies and officials that may have potential concerns and/or regulatory permitting requirements for the proposed project were contacted. A list of federal, state, and local regulatory agencies was developed to receive a consultation letter regarding the proposed project. The purpose of the letter was to inform the various agencies of the proposed project and to provide them with an opportunity to disseminate information regarding resources and potential issues within the study area. Copies of correspondence with local/county departments and the various federal, state, and local regulatory agencies are included in Appendix A.

Ground reconnaissance surveys of the study area (limited to public viewpoints) were conducted by POWER personnel to confirm the findings of data collection activities, to identify changes in land use occurring after the date of the available aerial photography, and to identify potential unknown constraints that may not have been previously noted in the data. Ground reconnaissance surveys of the study area were conducted on the following dates:

- July 15, 2013
- October 23 - 24, 2013
- September 2, 2014

The following sections summarize the data collection methods and describe the environmental setting for each resource within the study area.

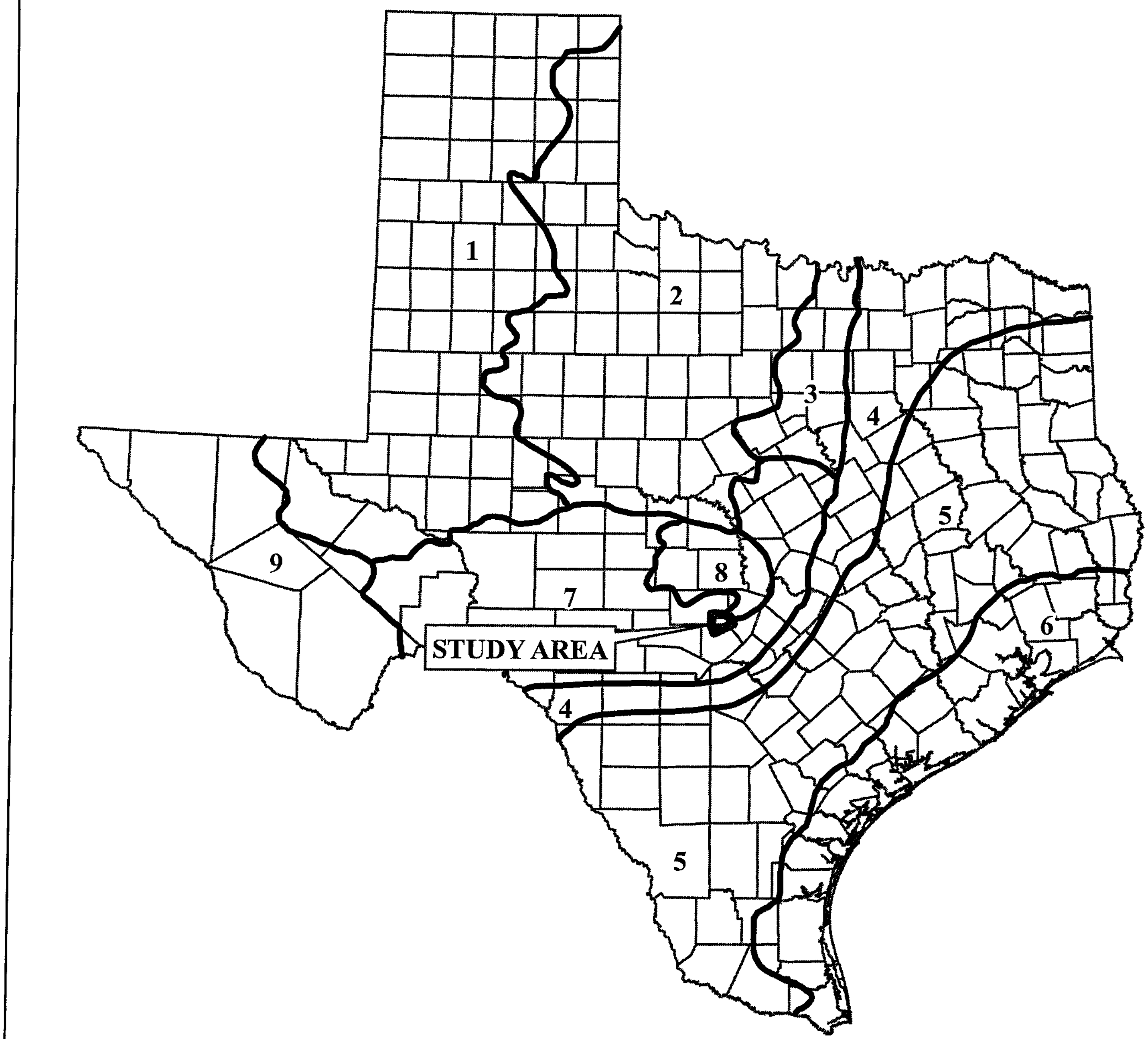
2.1 PHYSIOGRAPHY

As shown in Figure 2-2, the study area is primarily located with the Edwards Plateau Physiographic Province and the northeast portion is located within the Central Texas Uplift Physiographic Province (Bureau of Economic Geology [BEG] 1996). This area of the Edwards Plateau is characterized by flat upper surfaces, interspersed by drainages that open up into larger draws or box canyons. Bedrock types typically include cretaceous limestone and dolomite. The Central Texas Uplift is characterized as a knobby plain; surrounded by questas with bedrocks of granite, metamorphic and sediment materials. Elevations in the Edwards Plateau range between 3,000 feet above mean sea level (amsl) within the western and northern portions, to 450 feet amsl as you move towards the Gulf coast. Elevations within the Central Texas Uplift range from 800 to 2,000 feet amsl. Elevations in the study area range between 1,400 feet along the Pedernales River to 1,900 feet amsl in the hills of the southern portion of the study area (BEG 1996).

2.2 GEOLOGY

The BEG (1986) geologic atlas map (Llano Sheet) was reviewed for geologic formations that occur within the study area. Geologic formations occurring within in the study area include Quaternary, Cretaceous, Ordovician, and Cambrian aged formations. The Quaternary aged formations include alluvium and caliche deposits. The Glen Rose Limestone, Hensell Sand, and Edwards Limestone make up Cretaceous-aged formations. Ordovician aged formations include the Gorman Formation and Tanyard Formation. The Cambrian aged formations include members of the Wilberns Formation (BEG 1986; USGS 2012). Descriptions of the various geologic formations mapped within the study area are described in the following sections.

Quaternary aged rock groups within the study area include alluvium and caliche deposits. Alluvium deposits contain clay, silt, sand, gravel and organic matter. The alluvium deposits are more recent and may be located above the floodplain in areas with frequent flooding along the rivers, creeks, and streams. Caliche deposits are carbonate sediment deposits and alluvial fan deposits also typically located near floodplains (BEG 1986; USGS 2012).



Source: Texas Bureau of Economic Geology, 1996

Legend

Physiographic Region Boundary

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

County Boundary

Figure 2-2

LOCATION OF THE STUDY AREA IN RELATION TO THE PHYSIOGRAPHIC REGIONS OF TEXAS

Blumenthal Substation and 138-kV Transmission Line Project

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Cretaceous aged formations include the Glen Rose Limestone, Hensell Sand, and the Edwards Limestone. All of these formations are from the Mesozoic era in the early Cretaceous. The Glen Rose Limestone is primarily limestone with some clay, mud, or sandstone. The Hensell Sand overlies older rocks and typically consists of limestone with sand, conglomerate, and shale. The Edwards Limestone typically consists of carbonate limestone with some dolomite and chert (BEG 1986; USGS 2012).

Ordovician aged formations include the Gorman and Tanyard formations. These are both early Ordovician formations from the Paleozoic era. The Gorman Formation typically consists of carbonate limestone with some dolomite in the lower sections and chert in the upper parts. The Tanyard Formation typically consists of carbonate limestone in the upper and lower sections with dolomite in the middle parts (BEG 1986; USGS 2012).

Cambrian aged formations include the Wilberns Formation showing Point Peak, Morgan Creek Limestone, and Welge Sandstone Members, undivided. This formation dates to the Paleozoic era from the Cambrian-Furongian age. The Point Peak Member is mostly siltstone, limestone, and shale. The entire formation typically consists of limestone, medium-grained sediment, conglomerate, and siltstone (BEG 1986; USGS 2012).

Geological Significant Features

Several potential significant features affecting construction and operation of the transmission line were reviewed within the study area. Potentially hazardous areas reviewed include karst areas with known cave locations, fault lines, historical coal/uranium mining locations and subsurface contamination. Review of Texas Speleological Survey (TSS) maps and database did not indicate any karst regions or known cave locations located within the study area (TSS 1994); although, karst features and formations may occur within this geologic region (USGS 2012). Review of the USGS data and geologic atlas maps did not indicate any seismic or quaternary faults identified within the study area (BEG 1986; USGS 2013a). Railroad Commission of Texas (RRC) data were reviewed and did not indicate any historical or current coal/uranium mining activities within the study area (RRC 2007, 2012).

Subsurface contamination (soils or groundwater) from previous commercial activities or dumps/landfills may require additional considerations during routing and/or may create a potential hazard during construction activities. Review of USEPA Superfund/National Priority

List Sites (USEPA 2012) and TCEQ State Superfund Sites (TCEQ 2013) did not indicate any federal or state listed sites within the study area. TCEQ (2007) data identifies one landfill within the study area. The Stonewall Beautification Landfill is located just south of the Community of Stonewall, Texas.

2.3 SOILS

2.3.1 Soil Associations

The published Natural Resource Conservation Service (NRCS) soil surveys for Blanco, Gillespie, and Kendall counties (Soil Conservation Service [SCS] 1975, 1979, 1981) were used to identify and characterize the soil associations that encompass the study area. A soil association is a group of soils geographically associated in a characteristic repeating pattern and defined as a single unit (NRCS 2013). Soil associations occurring within the study area are listed in Table 2-1, which summarizes each soil association identified within the study area and indicates if any mapped units of the soil series within the association are considered prime farmlands and/or hydric soils (NRCS 2013).

TABLE 2-1 MAPPED SOIL ASSOCIATIONS WITHIN THE STUDY AREA

SOIL ASSOCIATION BY COUNTY	DESCRIPTION	SOIL SERIES	PERCENT OF ASSOCIATION	HYDRIC SOIL	PRIME FARMLAND SOIL
Blanco County[1]					
Brackett-Purves-Doss	Shallow, loamy and clayey, undulating and hilly soils on uplands; some soils are stony	Brackett	37	No	No
		Purves	15	No	No
		Doss	8	No	No
		Other	40	-	-
Eckrant-Brackett	Very shallow and shallow, clayey and loamy, undulating and hilly soils on uplands; some soils are stony	Eckrant	35	No	No
		Brackett	31	No	No
		Other	34	-	-
Krum-Lewisville	Deep, clayey, loamy, nearly level and gently sloping soils on foot slopes and stream terraces.	Krum	65	No	Yes
		Lewisville	15	No	Yes
		Other	20	-	-
Gillespie County[2]					
Tarrant-Brackett	Very shallow to shallow, clayey to loamy, undulating to hilly soils on uplands	Tarrant	70	No	No
		Brackett	15	No	No
		Other	15	-	-

TABLE 2-1 MAPPED SOIL ASSOCIATIONS WITHIN THE STUDY AREA

SOIL ASSOCIATION BY COUNTY	DESCRIPTION	SOIL SERIES	PERCENT OF ASSOCIATION	HYDRIC SOIL	PRIME FARMLAND SOIL
Luckenbach-Pedernales-Heatly	Deep, sandy to loamy, gently sloping soils on uplands and terraces	Luckenbach	25	No	Yes
		Pedernales	21	No	Yes
		Heatly	16	No	No
		Other	38	-	-
Frio-Guadalupe	Deep, loamy, nearly level to gently sloping and undulating soils of bottom lands	Frio	44	No	Yes
		Guadalupe	25	No	No
		Other	31	-	-
Doss-Denton	Shallow to moderately deep, clayey, gently sloping soils on uplands	Doss	55	No	No
		Denton	37	No	Yes
		Other	8	-	-
Kendall County[3]					
Brackett-Eckrant	Shallow and very shallow, undulating to hilly, loamy and clayey soils; most are gravelly or stony; on uplands	Brackett	35	No	No
		Eckrant	25	No	No
		Other	40	-	-
Eckrant-Comfort-Tarpley	Very shallow and shallow, gently undulating, clayey soils, most are stony; on uplands	Eckrant	30	No	No
		Comfort	22	No	No
		Tarpley	20	No	No
		Other	28	-	-
Oakalla-Boerne-Nuvalde	Deep, nearly level to gently sloping, loamy and clayey soils, on flood plains and stream terraces	Oakalla	23	Yes	Yes
		Boerne	18	No	Yes
		Nuvalde	17	No	Yes
		Other	42	-	-

[1](SCS 1979), [2](SCS 1975), [3](SCS 1981)

2.3.2 Prime Farmland Soils

The Secretary of Agriculture, within United States Code 7-4201(c)(1)(A), defines prime farmland soils as those soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. They have the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. Additional potential prime farmlands are those soils that meet most of the requirements of prime farmland but fail because they lack the installation of water management facilities, or they lack sufficient natural moisture. The U.S. Department of Agriculture (USDA) would consider these soils as prime farmland if such practices were installed. According to the NRCS Web Soil Survey (NRCS 2013) there are multiple soil series designated as prime farmland within the study area. The soil associations are listed in Table 2-1.

The NRCS responded to POWER's solicitation for information in a letter dated August 23, 2013 (Appendix A). The NRCS concluded that 1,100 acres of prime farmland are located within the study area and that a determination of potential environmental effects cannot be completed without an exact location of the site.

Typically the construction of a new transmission line is not considered a conversion of Prime and Important Farmlands because the area within the ROW between the transmission line structures can still be used for agricultural purposes after construction. As a result, no long-term adverse impacts to prime farmland soils are anticipated and without a federal nexus the project would be exempt from the regulations listed under Part 523 - Farmland Protection Policy Act Manual; Subpart B; 523.10,B (8).

2.3.3 Hydric Soils

The National Technical Committee for Hydric Soils defines hydric soils as soils that were formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation (NRCS 2013).

According to the NRCS Web Soil Survey Database for the study area counties (NRCS 2013), the Oakalla series listed within the Oakalla-Boerne-Nuvalde association is identified as a hydric soil and other minor soil components within each soil associations may also be designated as hydric. Table 2-1 lists whether there are map unit components that are rated as hydric soils in the study area. Minor soils (Other) within each association were not evaluated for this criterion.

2.4 MINERAL AND ENERGY RESOURCES

The RRC website was reviewed and oil/gas wells, pipelines, and supporting facilities were identified through the RRC database and during field reconnaissance surveys (RRC 2013). Multiple gravel quarries were identified within the study area through review of USGS 7.5 minute topographic maps and during field reconnaissance surveys.

2.5 WATER RESOURCES

2.5.1 Surface Water

Water resources evaluated for this study include lakes, ponds, rivers, streams and floodplains. Information on water resources within the study area was obtained from a variety of sources including the Texas Water Development Board ([TWDB] 2009, 2010a), National Hydrology Dataset (NHD) (USGS 2013c), USGS topographical maps, aerial photographs, and through field reconnaissance.

The study area is located entirely within the Colorado and Guadalupe river basins. The Pedernales River meanders from west to east within the northern portion of the study area. The Pedernales River eventually drains into the Colorado River at Lake Travis, approximately 32 miles northeast of the study area. The Blanco River originates from multiple springs located in northwestern Kendall County. It meanders from west to east, and eventually joins with the San Marcos River near the City of San Marcos, Texas, approximately 50 miles southeast of the study area. Other named perennial and intermittent streams within the study area include Snake, Grape, Hunters, Hopts, Threemile, Williams, Rocky, Meier, Wenzel, West Sister, Falls, Hopfs and Jung creeks. Most creeks within the study area flow in a northerly direction and into the Pedernales River. The exceptions are Meier Creek which flows east into the Blanco River and Wenzel and Jung creeks which flows south, eventually into the Guadalupe River. Several additional ponds, stock tanks, and SCS reservoirs were also identified within the study area, including Schumann Lake. There were no major reservoirs identified within the study area.

The Texas Water Development Board (TWDB) 2012 State Water Plan and the regional water plans (Regions K and L) were reviewed and did not indicate any proposed reservoir projects within the study area (TWDB 2010b, 2010c). Smaller ponds identified within the study area were mapped using the NHD and aerial photography.

Under 31 TAC 357.8, Texas Parks and Wildlife Department (TPWD) has identified Ecologically Significant Stream Segments (ESSS) based on habitat value, threatened and endangered species, species diversity, and aesthetic value criteria. Review of the TPWD ESSS (2013a) data indicated the Pedernales and Blanco rivers within the study area are designated as ESSS based on high water quality, exceptional aquatic life, high-exceptional aesthetic value, and exceptional aquatic life use.

In accordance with Section 303(d) and 304(a) of the Clean Water Act (CWA), the TCEQ identifies surface waters for which effluent limitations are not stringent enough to implement water quality standards and for which the associated pollutants are suitable for measurement by maximum daily load. Review of the TCEQ 303(d) (2010) does not identify any of these surface waters within the study area.

2.5.2 Ground Water

The major ground water aquifers mapped within the study area include the Trinity and Edwards-Trinity Aquifers. The Trinity Aquifer covers a large area across central and northeast Texas. It consists primarily of limestone, sand, clay, gravel, and conglomerates. The average freshwater saturated thickness is about 600 feet with total dissolved solids, sulfates, and chloride increasing with the depth of the aquifer. The Edwards-Trinity Aquifer covers a large area across southwest Texas. The southern portion of the study area is located within the drainage area of the Edwards-Trinity Aquifer. Water is contained within limestone and dolomite of the Edwards Group and sands of the Trinity Group. The average freshwater saturated thickness is approximately 430 feet, with total dissolved solids ranging from 100 to 3,000 parts per million. Irrigation is the main use of this water, followed by municipal and livestock uses (TWDB 2011a).

The minor ground water aquifers mapped within the study area include the Ellenburger-San Saba and Hickory Aquifers. The Ellenburger-San Saba and Hickory Aquifers are found in parts of the Llano Uplift in Central Texas. They outcrop to create a circular pattern around the Llano Uplift. Total dissolved solids are typically less than 1,000 milligrams per liter. The Ellenburger-San Saba has a maximum thickness of about 2,700 feet and water is held in cracks, cavities, and channels. The Hickory Aquifer has a maximum thickness of 480 feet and average saturated thickness of 350 feet. Gross alpha radiation, radium, and radon naturally occur within this aquifer (TWDB 2011a).

Other ground water resources such as public and private water wells and natural springs were identified using the TWDB data (TWDB 1975, 2010a, 2013), USGS topographic maps (USGS 2013b), and Springs of Texas (Brune 2002). Wenzel Spring was identified in the southern portion of the study area, along Wenzel Creek. Other unnamed springs and seeps may be located in the study areas because of the permeable nature of the study area soils and bedrock.

2.5.3 Floodplains

Federal Emergency Management Agency (FEMA) floodplain mapping data was reviewed for the study area. Based on FEMA Flood Insurance Rate Maps (FIRMs), the 100-year floodplains within the study area are associated with low lying creek beds, river bottoms, and associated depressional areas. The 100-year flood (1% flood or base flood) represents a flood event that has a 1% chance of being equaled or exceeded for any given year (FEMA 2013).

2.6 ECOLOGICAL RESOURCES

Information on sensitive wildlife and vegetation resources within the study area was obtained from a variety of sources, including correspondence with the USFWS and TPWD. Additional information was obtained from published literature and technical reports. All biological resource data for the study area were mapped utilizing GIS.

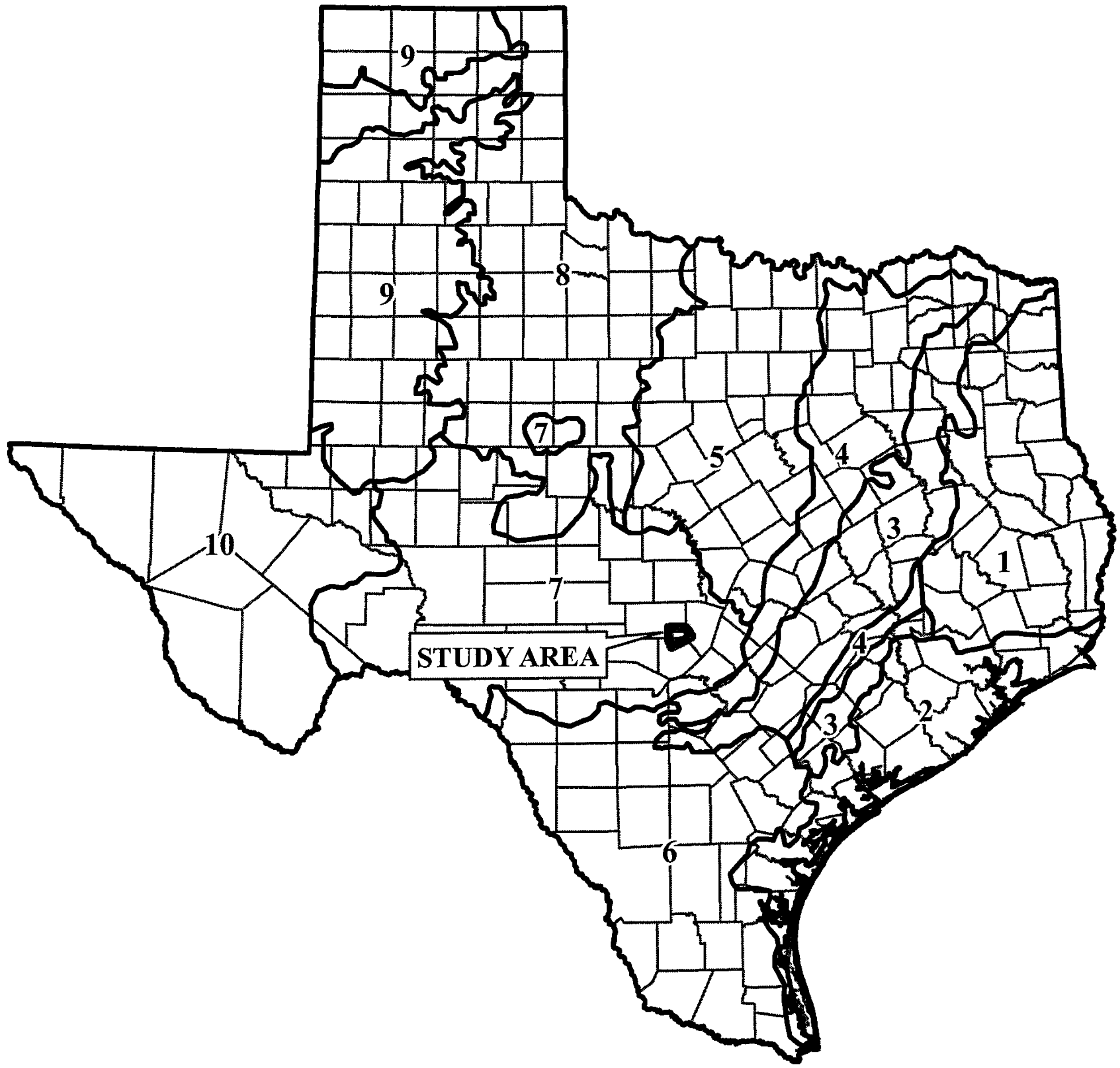
For the purpose of this routing study, emphasis was placed on obtaining known locations of unique vegetative communities and habitat for special status species that have been previously documented within the study area. Special status species include those listed by the USFWS as threatened, endangered, proposed, or candidate; and those listed by TPWD as threatened, endangered or as a rare species. A GIS file of known occurrences for listed species and/or sensitive vegetative communities was obtained from the TPWD Texas Natural Diversity Database (TXNDD) on August 04, 2013 and on September 19, 2014. Although the TXNDD (2013, 2014) was reviewed, these data do not preclude the potential for a species to exist within the study area. Only a thorough review of existing habitats and/or a species specific survey could determine the presence or absence of a special status species.

2.6.1 Vegetation

As shown in Figure 2-3, the study area is located in the eastern portion of the Edwards Plateau Vegetational Area (Gould 1960). Within this region, the study area is located within the Edwards Plateau Woodlands and Balcones Canyonlands Level IV Ecoregions (Griffith et al. 2007). Frye et al. (1984) describe the typical vegetation types within the study area as Live Oak (*Quercus fusiformis*) – Ashe Juniper (*Juniperus ashei*) Parks, Live Oak – Mesquite (*Prosopis glandulosa*) – Ashe Juniper Parks, and Live Oak – Ashe Juniper Woods. General descriptions of the historical climax vegetative communities associated with each ecoregion are in the paragraphs provided below. The tree and shrub species potentially occurring within the study area are summarized in Table 2-2. Their occurrence and density depends on location, hydrology, soil type and magnitude of previous ground disturbance or land management activities (Wrede 2010).

Edwards Plateau Ecoregion

The Edwards Plateau Ecoregion is a limestone plateau dissected by sparse perennial and intermittent streams. Because of the limestone substrates, karst features may be common in this region. Karst features form from the erosion and dissolution of limestone and allow underground drainage. Because of the poor and rocky soils, this region is mostly used for grazing cattle, goats, sheep, or other livestock. Within the northern portion of the study area, peach orchards and vineyards are also common. Hunting is also an important source of income for many landowners. Historically, fire was an important factor to the Edwards Plateau ecosystem. Today, with the absence of regular fires, woody vegetation has encroached on many native grasslands. Most of this region is covered by juniper-oak (*Juniperus – Quercus* spp.) or mesquite-oak (*Prosopis – Quercus* spp.) savanna (Griffith et al. 2007). Tall-grasses including cane bluestem (*Bothriochloa barbinodis*), big bluestem (*Andropogon gerardii*), indiangrass (*Sorghastrum nutans*), little bluestem (*Schizachyrium scoparium*), and switchgrass (*Panicum virgatum)* may be common in protected areas with good soil moisture. Short and mid-grasses including side-oats grama (*Bouteloua curtipendula*), buffalograss (*Bouteloua dactyloides*), and Texas grama (*Bouteloua rigidiseta*) may be common on shallower and rocky soils (Hatch et al. 1990). In heavily grazed areas curly mesquite (*Hilaria belangeri*) and Texas wintergrass (*Nassella leucotricha*) are common. Wildflowers, such as Texas bluebonnets (*Lupinus texensis*), Indian blanket (*Gaillardia aestivalus*), coreopsis (*Coreopsis basalis*), and winecup (*Callirhoe digitata*), are common in the spring (Griffith et al. 2007).



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Miles

Source: Gould, F.W., Hoffman, G.O., and Rechenthin, C.A. 1960, modified

Legend

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

Figure 2-3

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

Blumenthal Substation and 138-kV Transmission Line Project

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TABLE 2-2 REPRESENTATIVE TREE/SHRUB SPECIES WITHIN THE STUDY AREA

COMMON NAME	SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME
Agarita	*Berberis trifoliata*	Japanese privet	*Ligustrum japonicum*
American beautyberry	*Callicarpa americana*	Lacey oak	*Quercus laceyi*
American elm	*Ulmus americana*	Lindheimer's silktassel	*Garrya ovata var. lindheimeri*
American sycamore	*Platanus occidentalis*	Little walnut	*Juglans microcarpa*
Aromatic sumac	*Rhus aromatica*	Live oak	*Quercus fusiformis*
Ashe juniper	*Juniperus ashei*	Texas mountain laurel	*Sophora secundiflora*
Bald cypress	*Taxodium distichum*	Mexican buckeye	*Ungnadia speciosa*
Black dalea	*Dalea frutescens*	Mexican plum	*Prunus mexicana*
Black willow	*Salix nigra*	Netleaf hackberry	*Celtis laevigata var. reticulata*
Blackjack oak	*Quercus marilandica*	Pecan	*Carya illinoinensis*
Bois d'arc	*Maclura pomifera*	Pink mimosa	*Mimosa borealis*
Box elder	*Acer negundo*	Possumhaw	*Ilex decidua*
Bur oak	*Quercus macrocarpa*	Post oak	*Quercus stellata*
Carolina buckthorn	*Frangula caroliniana*	Red buckeye	*Aesculus pavia var. flavescens*
Catclaw acacia	*Acacia roemeriana*	Red mulberry	*Morus rubra*
Cedar elm	*Ulmus crassifolia*	Retama	*Parkinsonia aculetata*
Chinaberry	*Melia azedarach*	Rough-leaf dogwood	*Cornus drummondii*
Chinese tallow	*Triadica sebifera*	Rusty blackhaw	*Viburnum rufidulum*
Chinkapin oak	*Quercus muehlenbergii*	Shin oak	*Quercus sinuata*
Chittamwood	*Sideroxylon lanuginosum*	Texas ash	*Fraxinus texensis*
Common buttonbush	*Cephalanthus occidentalis*	Texas buckeye	*Aesculus glabra var. arguta*
Eastern cottonwood	*Populus deltoides*	Texas kidneywood	*Eysenhardtia texana*
Elbowbush	*Forestiera pubescens*	Texas madrone	*Arbutus xalapensis*
Escarpment black cherry	*Prunus serotina var. eximia*	Texas mulberry	*Morus microphylla*
Evergreen sumac	*Rhus virens*	Texas persimmon	*Diospyros texana*
Eve's necklace	*Sophora affinis*	Texas red oak	*Quercus buckleyi*
Flameleaf sumac	*Rhus lanceolata*	Texas redbud	*Cercis canadensis var. texensis*
Hawthorn	*Crataegus spp.*	Tickle tongue	*Zanthoxylum hirsutum*
Honey mesquite	*Prosopis glandulosa*	Western soapberry	*Sapindus drummondii*
Hop tree	*Ptelea trifoliata*	Whitebrush	*Aloysia gratissima*
Huisache	*Acacia farnesiana*	Yaupon holly	*Ilex vomitoria*

Source: Wrede 2010.

Edwards Plateau Woodlands

The Edwards Plateau Woodlands are characterized by rolling hills and broad flat valleys. Historically, this region consisted of savanna grassland with scattered plateau live oak, Texas red oak *(Quercus buckleyi),* and Ashe juniper. These mottes create nurseries for shrubby understory species such as Texas persimmon (*Diospyros texana*) and agarita (*Mahonia trifoliolata*) (Griffith et al. 2007).

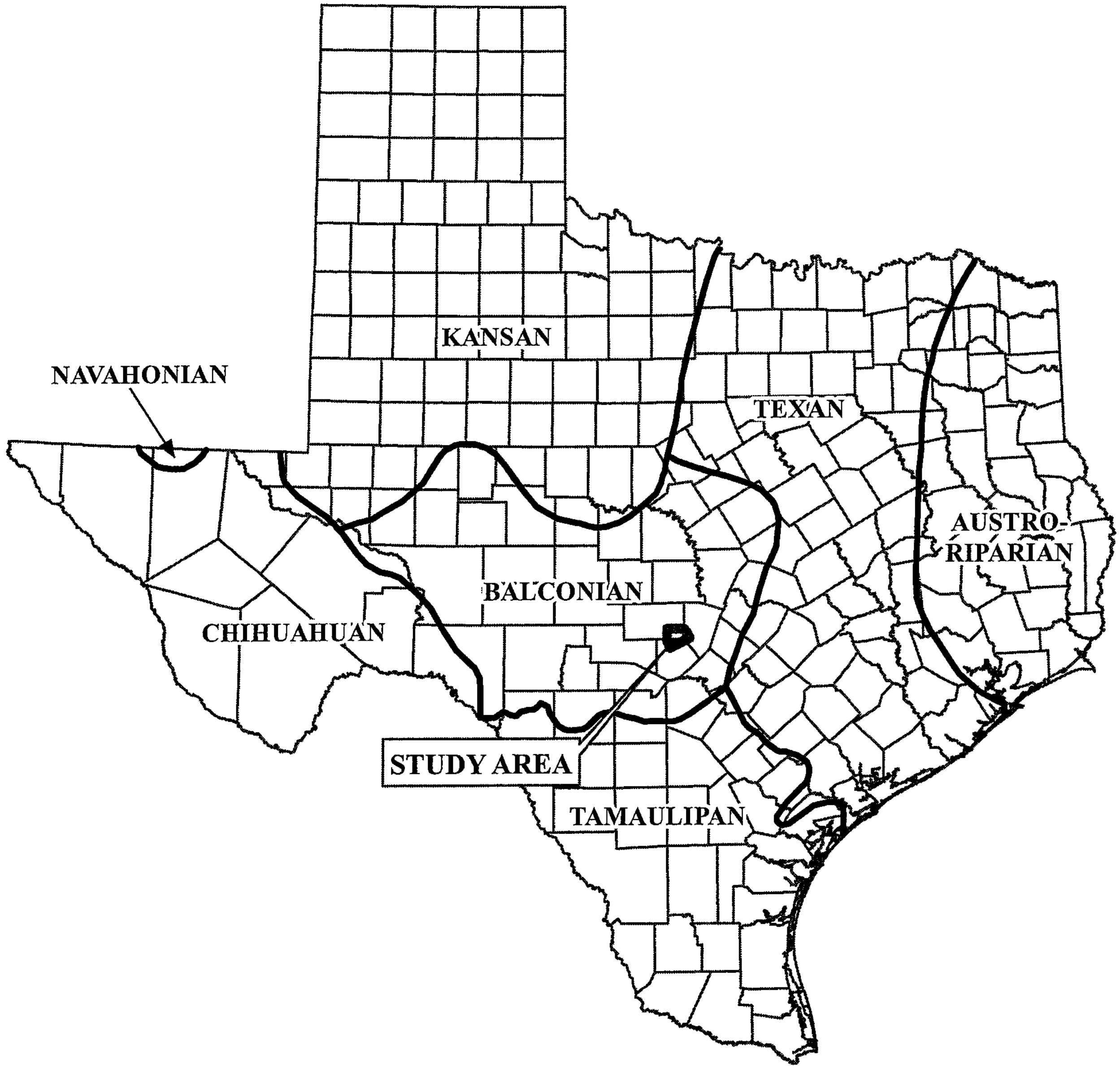
Balcones Canyonlands

The Balcones Canyonlands is the eroded southern/eastern portion of the Edwards Plateau, where streams have exposed the Glen Rose Limestone. This region is characterized by springs, creeks, and rivers that have created deep limestone canyons and sinkholes with karst formations common locally. Vegetation in this region varies by soil and moisture availability. Vegetation communities include mesic riparian forests, upland woodlands, evergreen woodlands, and oak savanna, oak-juniper woodlands. Riparian areas within protected canyons may support species such as elm (*Ulmus spp.*), buckeye (*Aesculus spp.*), boxelder (*Acer negundo*), Carolina basswood (*Tilia caroliniana*), and escarpment black cherry (*Prunus serotina var. eximia*). Woodlands and savanna typically support tree species such as Texas red oak, Ashe juniper, cedar elm (*Ulmus crassifolia*), hackberry (*Celtis* spp.), live oak, and shin oak (*Quercus sinuata*) (Griffith et al. 2007).

2.6.2 Terrestrial Wildlife

The study area is located within the Balconian Biotic Province (see Figure 2-4) as described by Blair (1950). At the time of publication, species diversity within the Balconian Biotic Province was noted to include 15 different anurans (frogs and toads), seven urodeles (salamanders and newts), 36 snake species, 16 lizards, two land turtles, and 57 species of mammals (Blair 1950).

Amphibian species (frogs, toads and salamanders and newts) that may occur within the study area are listed in Table 2-3. Frogs and toads may occur in all vegetation types, while salamanders are typically restricted to moist hydric habitats (Tipton et al. 2012).



N
W E
S

0 30 60 120 180 240

Miles

Source: Blair, 1950, modified

Legend

Biotic Province Boundary

County Boundary

Figure 2-4

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

Blumenthal Substation and 138-kV Transmission Line Project

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TABLE 2-3 REPRESENTATIVE AMPHIBIAN SPECIES OCCURRING WITHIN THE STUDY AREA

COMMON NAME	SCIENTIFIC NAME
Frogs/Toads	
American bullfrog	*Lithobates catesbeianus*
Blanchard's cricket frog	*Acris blanchardi*
Cope's gray treefrog	*Hyla chrysoscelis*
Couch's spadefoot	*Scaphiopus couchii*
Cliff chirping frog	*Eleutherodactylus marnockii*
Eastern green toad	*Anaxyrus debilis debilis*
Gray treefrog	*Hyla versicolor*
Gulf Coast toad	*Incilius nebulifer*
Red-spotted toad	*Anaxyrus punctatus*
Rio Grande leopard frog	*Lithobates berlandieri*
Spotted chorus frog	*Pseudacris clarkii*
Texas toad	*Anaxyrus speciosus*
Western narrow-mouthed toad	*Gastrophryne olivacea*
Woodhouse's toad	*Anaxyrus woodhousii*
Salamander/Newt	
Texas salamander	*Eurycea neotenes*
Western slimy salamander	*Plethodon albagula*

Source: Dixon 2013.

Reptiles (turtles, lizards and snakes) that may typically occur in the study area are listed in Table 2-4. These include those species that are more commonly observed near water (i.e., aquatic turtles) and those that are more common in terrestrial habitats (Dixon 2013).

TABLE 2-4 REPRESENTATIVE REPTILIAN SPECIES OCCURRING WITHIN THE STUDY AREA

COMMON NAME	SCIENTIFIC NAME
Turtles	
Cagle's map turtle	*Graptemys caglei*
Eastern mud turtle	*Kinosternon subrubrum*
Eastern musk turtle	*Sternotherus odoratus*
Spiny softshell	*Apalone spinifera*
Ornate box turtle	*Terrapene ornata*
Red-eared slider	*Trachemys scripta elegans*
Snapping turtle	*Chelydra serpentina*
Texas map turtle	*Graptemys versa*
Texas river cooter	*Pseudemys texana*
Yellow mud turtle	*Kinosternon flavescens*
Lizards	
Common spotted whiptail	*Aspidoscelis gularis*
Crevice spiny lizard	*Sceloporus poinsettii*
Eastern collared lizard	*Crotaphytus collaris*
Eastern six-lined racerunner	*Aspidoscelis sexlineata sexlineata*

TABLE 2-4 REPRESENTATIVE REPTILIAN SPECIES OCCURRING WITHIN THE STUDY AREA

COMMON NAME	SCIENTIFIC NAME
Great plains skink	*Plestiodon obsoletus*
Green anole	*Anolis carolinensis*
Little brown skink	*Scincella lateralis*
Mediterranean gecko	*Hemidactylus turcicus*
Prairie lizard	*Sceloporus consobrinus*
Short-lined skink	*Plestiodon tetragammus brevilineatus*
Spot-tailed earless lizard	*Holbrookia lacerata*
Texas alligator lizard	*Gerrhonotus infernalis*
Texas greater earless lizard	*Cophosuarus texanus texanus*
Texas horned lizard	*Phrynosoma cornutum*
Texas spiny lizard	*Sceloporus olivaceus*
Texas tree lizard	*Urosaurus ornatus ornatus*
Snakes	
Black-necked gartersnake	*Thamnophis cyrtopsis*
Black-tailed rattlesnake	*Crotalus molossus*
Broad-banded copperhead	*Agkistrodon contortrix laticinctus*
Bullsnake	*Pituophis catenifer sayi*
Checkered gartersnake	*Thamnophis marcianus*
Chihuahuan hook-nosed snake	*Gyaloipion canum*
Chihuahuan nightsnake	*Hypsiglena jani*
Desert kingsnake	*Lampropeltis splendida*
Diamond-backed watersnake	*Nerodia rhombifer*
Eastern hog-nosed snake	*Heterodon platirhinos*
Eastern yellow-bellied racer	*Coluber constrictor flaviventris*
Flat-headed snake	*Tantilla gracilis*
Glossy snake	*Arizona elegans*
Great plains ratsnake	*Pantherophis emoryi*
Lined snake	*Tropidoclonion lineatum*
Long-nosed snake	*Rhinocheilus lecontei*
Milksnake	*Lampropeltis triangulum*
Plain-bellied watersnake	*Nerodia erythrogaster*
Plains black-headed snake	*Tantilla nigripes*
Ring-necked snake	*Diadophis punctatus*
Rough earthsnake	*Virginia striatula*
Rough greensnake	*Opheodrys aestivus*
Striped whipsnake	*Coluber taeniatus*
Texas brownsnake	*Storeria dekayi texana*
Texas coralsnake	*Micrurus tener*
Texas gartersnake	*Thamnophis sirtalis annectens*
Texas patch-nosed snake	*Salvadora grahamiae lineata*
Texas threadsnake	*Rena dulcis*
Western coachwhip	*Coluber flagellum testaceus*
Western cottonmouth	*Agkistrodon piscivorus leucostoma*

TABLE 2-4 REPRESENTATIVE REPTILIAN SPECIES OCCURRING WITHIN THE STUDY AREA

COMMON NAME	SCIENTIFIC NAME
Western diamond-backed rattlesnake	*Crotalus atrox*
Western groundsnake	*Sonora semiannulata*
Western ratsnake	*Pantherophis obsoletus*
Western ribbonsnake	*Thamnophis proximus*

Source: Dixon 2013.

Numerous avian species are present within the study area. Bird species occurring within the study area include resident and summer/winter resident migratory species. Year-round residents are listed in Table 2-5. Winter residents that may occur in the study area are listed in Table 2-6. Summer residents that may occur in the study area are listed in Table 2-7 (Lockwood and Freeman 2014). Additional transient bird species may migrate within or through the study area in the spring and fall and use the area to rest and feed before continuing migration. The likelihood for occurrence of each species will depend upon suitable habitat and the season. Migratory birds are protected under the Migratory Bird Treaty Act (MBTA).

TABLE 2-5 REPRESENTATIVE RESIDENT BIRD SPECIES OCCURRING WITHIN THE STUDY AREA

COMMON NAME	SCIENTIFIC NAME
American coot	*Fulica americana*
American crow	*Corvus brachyrhynchos*
American robin	*Turdus migratorius*
Barn owl	*Tyto alba*
Barred owl	*Strix varia*
Bewick's wren	*Thryomanes bewickii*
Black vulture	*Coragyps atratus*
Black-crested titmouse	*Baeolophus atricristatus*
Black-crowned night-heron	*Nycticorax nycticorax*
Black-throated sparrow	*Amphispiza bilineata*
Blue jay	*Cyanocitta cristata*
Blue-gray gnatcatcher	*Polioptila caerulea*
Brown-headed cowbird	*Molothrus ater*
Bushtit	*Psaltriparus minumus*
Cactus wren	*Campylorhynchus brunneicapillus*
Canyon towhee	*Melozone fusca*
Canyon wren	*Thryothorus ludovicianus*
Carolina chickadee	*Poecile carolinensis*
Carolina wren	*Thryothorus ludovicianus*
Cassin's sparrow	*Peucaea cassinii*
Chipping sparrow	*Spizella passerina*
Common grackle	*Quiscalus quiscula*
Common raven	*Corvus corax*
Crested caracara	*Caracara cheriway*
Curve-billed thrasher	*Toxostoma curvirostre*
Downy woodpecker	*Picoides pubescens*

TABLE 2-5 REPRESENTATIVE RESIDENT BIRD SPECIES OCCURRING WITHIN THE STUDY AREA

COMMON NAME	SCIENTIFIC NAME
Eastern bluebird	*Sialia sialis*
Eastern meadowlark	*Sturnella magna*
Eastern phoebe	*Sayornis phoebe*
Eastern screech-owl	*Megascops asio*
Eurasian collared-dove	*Streptopelia decaocto*
European starling	*Sturnus vulgaris*
Field sparrow	*Spizella pusilla*
Golden-fronted woodpecker	*Melanerpes aurifrons*
Grasshopper sparrow	*Ammodramus savannarum*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Great horned owl	*Bubo virginianus*
Greater roadrunner	*Geococcyx californianus*
Great-tailed grackle	*Quiscalus mexicanus*
Green kingfisher	*Chloroceryle americana*
Horned lark	*Eremophila alpestris*
House sparrow	*Passer domesticus*
House finch	*Haemorhous mexicanus*
Inca dove	*Columbina inca*
Killdeer	*Charadrius vociferus*
Ladder-backed woodpecker	*Picoides scalaris*
Lark sparrow	*Chondestes grammacus*
Loggerhead shrike	*Lanius ludovicianus*
Mourning dove	*Zenaida macroura*
Northern bobwhite	*Colinus virginianus*
Northern cardinal	*Cardinalis cardinalis*
Northern mockingbird	*Mimus polyglottos*
Pyrrhuloxia	*Cardinalis sinuatus*
Red-shouldered hawk	*Buteo lineatus*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*
Rock pigeon	*Columba livia*
Rock wren	*Salpinctes obsoletus*
Rufous-crowned sparrow	*Aimophila ruficeps*
Turkey vulture	*Cathartes aura*
Verdin	*Auriparus flaviceps*
Western scrub-jay	*Aphelocoma californica*
White-winged dove	*Zenaida asiatica*
Wild turkey	*Meleagris gallopavo*
Wood duck	*Aix sponsa*

Source: Lockwood and Freeman 2014.

TABLE 2-6 REPRESENTATIVE WINTER BIRD SPECIES OCCURRING WITHIN THE STUDY AREA

COMMON NAME	SCIENTIFIC NAME
American goldfinch	*Spinus tristis*
American kestrel	*Falco sparverius*
American pipit	*Anthus rubescens*
American wigeon	*Anas americana*
American woodcock	*Scolopax minor*

TABLE 2-6 REPRESENTATIVE WINTER BIRD SPECIES OCCURRING WITHIN THE STUDY AREA

COMMON NAME	SCIENTIFIC NAME
Bald eagle	*Haliaeetus luecocephalus*
Blue-headed vireo	*Vireo solitarius*
Brewer's blackbird	*Euphagus cyanocephalus*
Brown creeper	*Certhia americana*
Brown thrasher	*Toxostoma rufum*
Bufflehead	*Bucephala albeola*
Burrowing owl	*Athene cunicularia*
Cackling goose	*Branta hutchinsii*
Canvasback	*Aythya valisineria*
Cedar waxwing	*Bombycilla cedrorum*
Chestnut-collared longspur	*Calcarius ornatus*
Common yellowthroat	*Geothlypis trichas*
Dark-eyed junco	*Junco hyemalis*
Double-crested cormorant	*Phalacrocorax auritus*
Fox sparrow	*Passerella iliaca*
Gadwall	*Anas strepera*
Golden-crowned kinglet	*Regulus satrapa*
Greater yellowlegs	*Tringa melanoleuca*
Green-winged teal	*Anas crecca*
Harris's sparrow	*Zonotrichia querula*
Hermit thrush	*Catharus guttatus*
Hooded merganser	*Lophodytes cucullatus*
House wren	*Troglodytes aedon*
Lark bunting	*Calamospiza melanocorys*
Le Conte's sparrow	*Ammodramus leconteii*
Least sandpiper	*Calidris minutilla*
Lesser scaup	*Aythya affinis*
Lincoln's sparrow	*Melospiza lincolnii*
Mallard	*Anas platyrhynchos*
Marsh wren	*Cistothorus palustris*
Merlin	*Falco columbarius*
Northern flicker	*Colaptes auratus*
Northern harrier	*Circus cyaneus*
Northern pintail	*Anas acuta*
Northern shoveler	*Anas clypeata*
Orange-crowned warbler	*Oreothylpis celata*
Osprey	*Pandion haliaetus*
Pied-billed grebe	*Podilymbus podiceps*
Pine siskin	*Spinus pinus*
Red-breasted nuthatch	*Sitta canadensis*
Redhead	*Aythya americana*
Ring-billed gull	*Larus delawarensis*
Ring-necked duck	*Aythya collaris*
Ruby-crowned kinglet	*Regulus calendula*
Ruddy duck	*Oxyura jamaicensis*
Sandhill crane	*Grus canadensis*
Savannah sparrow	*Passerculus sandwichensis*
Sedge wren	*Cistothorus platensis*
Sharp-shinned hawk	*Accipiter striatus*

TABLE 2-6 REPRESENTATIVE WINTER BIRD SPECIES OCCURRING WITHIN THE STUDY AREA

COMMON NAME	SCIENTIFIC NAME
Short-eared owl	*Asio flammeus*
Song sparrow	*Melospiza melodia*
Sora	*Porzana carolina*
Spotted sandpiper	*Actitis macularia*
Spotted towhee	*Pipilo maculatus*
Swamp sparrow	*Melospiza georgiana*
Vesper sparrow	*Pooecetes gramineus*
Western meadowlark	*Sturnella neglecta*
White-crowned sparrow	*Zonotrichia leucophrys*
White-throated sparrow	*Zonotrichia albicollis*
Wilson's snipe	*Gallinago delicata*
Winter wren	*Troglodytes troglodytes*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Yellow-rumped warbler	*Setophaga coronata*

Source: Lockwood and Freeman 2014.

TABLE 2-7 REPRESENTATIVE SUMMER BIRD SPECIES OCCURRING WITHIN THE STUDY AREA

COMMON NAME	SCIENTIFIC NAME
Acadian flycatcher	*Empidonax virescens*
Ash-throated flycatcher	*Myiarchus cinerascens*
Barn swallow	*Hirundo rustica*
Bell's vireo	*Vireo bellii*
Belted kingfisher	*Megaceryle alcyon*
Black-and-white warbler	*Mniotilta varia*
Black-capped vireo	*Vireo atricapilla*
Black-chinned hummingbird	*Archilochus alexandri*
Blue grosbeak	*Passerina caerulea*
Bronzed cowbird	*Molothrus aeneus*
Cattle egret	*Bubulcus ibis*
Cave swallow	*Petrochelidon fulva*
Chimney swift	*Chaetura pelagica*
Chuck-will's-widow	*Antrostomus carolinensis*
Cliff swallow	*Petrochelidon pyrrhonota*
Common gallinule	*Gallinula galeata*
Common nighthawk	*Chordeiles minor*
Common poorwill	*Phalaenoptilus nuttallii*
Cooper's hawk	*Accipiter cooperii*
Dickcissel	*Spiza americana*
Eastern wood-pewee	*Contopus virens*
Golden-cheeked warbler	*Setophaga chrysoparia*
Great crested flycatcher	*Myiarchus crinitus*
Green heron	*Butorides virescens*
Indigo bunting	*Passerina cyanea*
Lesser goldfinch	*Spinus psaltria*
Louisiana waterthrush	*Parkesia motacilla*
Neotropic cormorant	*Phalacrocorax brasilianus*
Northern parula	*Setophaga americana*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Orchard oriole	*Icterus spurius*