crossing refuge lands. If the route approved by the PUC crosses a USFWS refuge, additional coordination will be completed to determine the requirements for a ROW easement and to ensure compliance with permitting requirements.

1.6.4 Federal Aviation Administration

According to Federal Aviation Administration (FAA) regulations, Part 77, the construction of a transmission line requires FAA notification if tower structure height exceeds 200 feet or the height of an imaginary surface extending outward and upward at one of the following slopes:

- A 100:1 slope for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of a public or military airport 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 a public or military airport where no runway is longer than 3,200 feet in length; or
- A 25:1 slope for a horizontal distance of 5,000 feet for heliports.

The PUC CCN application also requires listing private airports within 10,000 feet of any alternative route centerline. After PUC route approval, and if any of the FAA notification criteria are met for the approved route, a Notice of Proposed Construction or Alteration, FAA Form 7460-1, will be completed and submitted to the FAA Southwest Regional Office in Fort Worth, Texas at least 30 days prior to construction.

1.6.5 Texas Parks and Wildlife Department

The Texas Parks and Wildlife Department (TPWD) is the state agency with primary responsibility for protecting the state's fish and wildlife resources in accordance with Texas Parks and Wildlife Code § 12.0011(b). POWER solicited comment from TPWD during the project scoping phase of the Project, and a copy of this EA will be submitted to TPWD when the CCN application is filed with the PUC.

The Project study area includes several wildlife management areas (WMAs) and three state parks owned and managed by TPWD. If the route approved by the PUC crosses a TPWD WMA or a state park, additional coordination will be completed to determine the requirements for a ROW easement and to ensure compliance with permitting requirements.

1.6.6 Floodplain Management

Flood Insurance Rate Maps, published by the Federal Emergency Management Agency (FEMA), were reviewed for the study area and the 100-year floodplain was mapped. The Project is not anticipated to create any significant permanent changes in the existing topographical grades and will not significantly increase the stormwater runoff within the study area due to increased areas of impermeable surfaces. Coordination with the local floodplain administrator and the International Boundary and Water Commission (IBWC) will be completed as necessary.

1.6.7 International Boundary and Water Commission and Irrigation/Drainage Districts

The IBWC operates and maintains several flood control systems in the Project study area. ETT, Sharyland, and POWER have met with IBWC regarding potentially crossing flood control systems managed by IBWC. If the route approved by the PUC crosses IBWC jurisdictional waters, additional coordination will be completed to determine the requirements for ROW easements and the need for a permit. Additional permits or approvals from the local irrigation/drainage districts might be required if the Project is located adjacent to or crosses these irrigation/drainage facilities.

1.6.8 Texas Commission on Environmental Quality

The construction of the Project might require a Texas Pollution Discharge Elimination System General Construction Permit (TX150000) as implemented by the Texas Commission on Environmental Quality (TCEQ) under the provisions of Section 402 of the CWA and Chapter 26 of the Texas Water Code. The TCEQ has developed a three-tiered approach for implementing this permit which is dependent on the acreage of disturbance. No permitting is required for land disturbances of less than one acre (Tier I). If more than one acre, but less than five acres are disturbed, then a Stormwater Pollution Prevention Plan (SWPPP) must be developed and implemented during construction activities accompanied with posting a site notice and notification sent to the Municipal Separate Sewer System Operator (Tier II). If more than five acres of land are disturbed, then the requirements mentioned above for Tier II are necessary and the submittal of a Notice of Intent (NOI) and Notice of Termination (NOT) to the TCEQ is also required (Tier III). Once a route is approved by the PUC, the proposed acreage of ground disturbance will be determined and the appropriate Tier and conditions of the TX150000 permit will be evaluated.

1.6.9 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 Code of Federal Regulations [CFR] Part 60) or under state guidance (Texas Administrative Code [TAC], Title 13, Part 2, Chapter 26.7-8). The Texas Historical Commission (THC) was contacted by POWER to identify known cultural resource sites within the study area boundary. POWER also reviewed Texas Archeological Research Laboratory (TARL) records for known locations of cultural resource sites. Once a route is approved by the PUC, additional coordination with the THC might determine the need for archeological surveys or additional permitting requirements. Even if no additional surveys are required, ETT and Sharyland propose to implement an unanticipated discovery procedure during construction activities. If artifacts are discovered during construction, activities will cease and ETT and Sharyland will notify the State Historic Preservation Office (SHPO) for additional consultation.

1.6.10 Texas Department of Transportation

The Texas Department of Transportation (TxDOT) has been notified of the Project. If the route approved by the PUC crosses or occupies TxDOT ROW, it will be constructed in accordance with the rules, regulations, and policies of TxDOT. Best management practices (BMP) will be used, as required, to minimize erosion and sedimentation resulting from the construction. Revegetation will occur as required under the "Revegetation Special Provisions" and contained in TxDOT form 1023 (Rev. 9-93). Traffic control measures will comply with applicable portions of the Texas Manual of Uniform Traffic Control Devices.

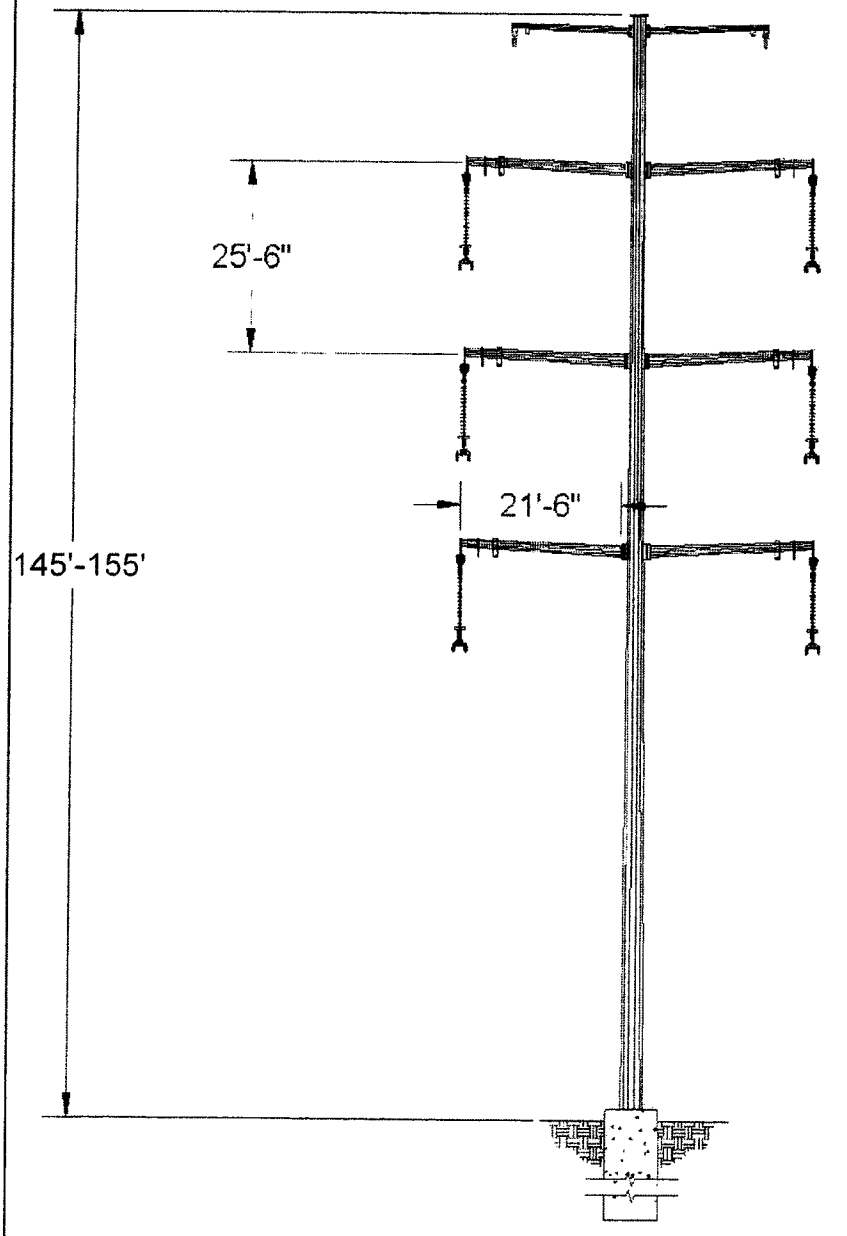
1.6.11 Texas General Land Office

The Texas General Land Office (GLO) requires a miscellaneous easement for ROW within any state owned riverbeds or navigable streams or tidally influenced waters. Coordination with the GLO will be completed after PUC approval of a route; however, no GLO easement is anticipated for this Project.

1.6.12 Texas Coastal Management Program

The purpose of the Texas Coastal Management Program (CMP) is to make more effective and efficient use of public funds and to more effectively and efficiently manage coastal natural resource areas (CNRAs) and the activities that may affect them. The program is based on goals and policies that guide the use and development of CNRAs, preserve and protect CNRAs, and improve government processes. The Coastal Coordination Council (CCC) has adopted rules promulgating the goals and policies, including protecting, preserving, restoring, and enhancing the diversity, quality, quantity, functions, and values of CNRAs while allowing for compatible use (including economic development), preventing the destruction of protective features, establishing clear guidelines, and operating in a transparent manner. The full list of goals is provided in 31 TEX. ADMIN. CODE § 501.12. The Coastal Coordination Act requires agency or subdivision actions to comply with these goals and policies. As directed in the Coastal Coordination Act, the Texas General Land Office (GLO) assists the CCC in implementing the CMP and the Texas Land Commissioner manages the program.

The Project is located within the Coastal Management Zone (CMZ) (GLO 2013) and thus permitting action is anticipated. When construction is proposed within the Texas Coastal Zone Boundary, the GLO must conduct a state or federal consistency review to determine whether the proposed activity is consistent with the CMP goals and policies. A Coastal Zone Consistency Statement must also be submitted to the USACE along with any Section 404 permit application (GLO 2013).



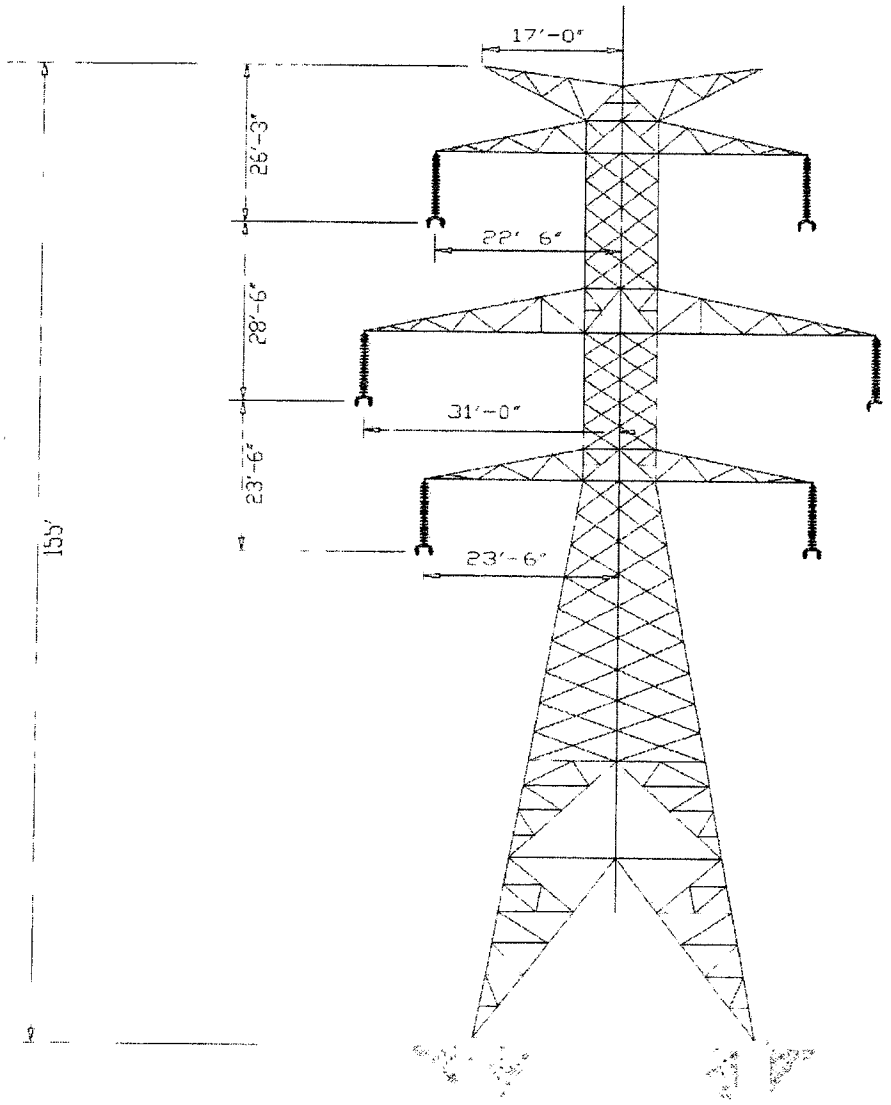
North Edinburg-Loma Alta
345 kV Transmission Line Project

Figure 1-2

TYPICAL 345 kV DOUBLE CIRCUIT STEEL MONOPOLE TANGENT STRUCTURE

ETT Electric Transmission Texas

Sharyland Utilities



North Edinburg-Loma Alta
345 kV Transmission Line Project

Figure 1-3

TYPICAL 345 kV DOUBLE CIRCUIT STEEL LATTICE STRUCTURE

ETT Electric Transmission Texas

Sharyland Utilities

2.0 DESCRIPTION OF THE STUDY AREA

2.1 ROUTING STUDY METHODOLOGY

The objective of this EA was to develop and evaluate an adequate number of geographically diverse alternative transmission line routes that comply with PURA § 37.056(c)(4)(A)-(D), P.U.C. PROC. R. 22.52(a)(4), and P.U.C. SUBST. R. 25.101(b)(3)(B), including the PUC's policy of prudent avoidance. The study approach utilized by POWER for this EA included study area delineation based on the Project endpoints; identification and characterization of existing land use and environmental constraints; and identification of areas of potential routing possibilities located within the study area. POWER identified potentially affected resources and considered each during the route development process. Regulatory agency, local official, and public meeting comments were also incorporated into the alternative route development process. Modifications, additions, or deletions of preliminary alternative links were made while considering resource sensitivities, governmental agency guidance, and public input and comments. Feasible and geographically diverse alternative routes were then selected for analysis and comparison using evaluation criteria to determine potential impacts to existing land use and environmental resources. The EA development process culminated with the ranking of the top five alternative routes by POWER from an environmental and land use perspective. With this recommendation from POWER, ETT and Sharyland also considered engineering and construction constraints, grid reliability and security issues, and estimated costs to identify one alternative route that they believe best addresses the requirements of PURA and PUC Substantive Rules. This alternative route, as well as other alternative routes that provide geographic diversity and sufficient routing options, will be submitted to the PUC in the CCN application.

2.1.1 Study Area Boundary Delineation

The first step in the development of alternative routes was to select a study area. This area needed to encompass the Project endpoints and include a sufficiently large area within which feasible, geographically diverse alternative routes could be located. The study area, which set boundaries for the data collection process, is located north of the Rio Grande in South Texas and encompasses portions of Cameron and Hidalgo counties. Major physiographic features, jurisdictional boundaries, sensitive land uses and existing utility corridors helped to define the study area boundaries (see Figure 2-1).

The Project endpoints and the study area are described below and illustrated in Figure 2-1. The study area is oriented in a northwest to southeast direction with the North Edinburg Substation located in the northwestern portion of the study area, South McAllen Substation located in the southwestern portion of the study area and the Loma Alta Substation located in the southeastern corner of the study area. More specifically, the existing North Edinburg Substation is located in Hidalgo County approximately 0.1 mile west of the intersection of farm-to-market road (FM) 1925 and FM 2061 at the northern perimeter of the city of Edinburg; the existing South McAllen Substation is located in Hidalgo County on the west side of State Highway 115 (S. Depot Road) approximately 0.2 mile north of the intersection of State Highway 115 and Sarah Avenue; and the existing Loma Alta Substation in Cameron County is located in the Brownsville Ship Channel area at the north end of Chemical Road, approximately 0.6 mile from the intersection of Chemical Road and State Highway 48. The width of the study area from north to south ranges from approximately 9 to 17 miles, depending on the location of measurement, and the length of the study area from west to east is approximately 73 miles, encompassing a total area of approximately 1,004 square miles.

The northern study area boundary on the western portion of the study area is primarily defined by the location of the North Edinburg Substation. The northern study area boundary on the eastern portion of the study area is primarily defined by the location of the La Palma Substation. In the western portion of the study area, the need for development of alternative routes that extend south towards the vicinity of the South McAllen Substation from the North Edinburg Substation tends to define the southern boundary with the limitation south being the Rio Grande and boundary with Mexico. Moving to the eastern portion of the study area and the location of the Loma Alta Substation, the southern boundary continues to be bounded by the Rio Grande and the boundary with Mexico.

The western portion of the study area extends just west of Palmhurst to provide room for the development of a set of geographically diverse routing alternatives around the extensive urban population between North Edinburg and South McAllen. The eastern boundary of the study area is primarily defined by the location of the Loma Alta Substation.

2.1.2 Base Map Development

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

Data typically displayed on the base map includes:

- Major land jurisdictions and uses;
- Major roads (including county roads (CR), FM roads, US Highways (US Hwy), State Highways (SH), and Interstate Highways (IH));
- Existing transmission line and pipeline corridors;
- Parks and wildlife management areas;
- Major political subdivision boundaries; and
- Lakes, reservoirs, rivers and ponds.

Figure 2-1 Study Area

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2.1.3 Evaluation Criteria

Land use and environmental evaluation criteria were developed to reflect accepted practices for routing electric transmission lines in the state of Texas (see Table 2-1). Emphasis was placed on acquiring information identified in PURA § 37.056(c)(4)(A)-(D), the PUC's standard CCN application and P.U.C. SUBST. R. 25.101, as well as the PUC's policy of prudent avoidance. Evaluation criteria were further refined based on data collection, reconnaissance surveys, and public input. The alternative route development process was conducted with consideration and incorporation of the evaluation criteria. Evaluation criteria data were reviewed, tabulated, and compared (see Section 4) for each resulting primary alternative route and with other factors, were ultimately used for the recommendation of the best alternative routes from an environmental and land use perspective (see Section 5), and identification of the alternative route that best addresses the requirements under PURA and PUC Substantive Rules.

TABLE 2-1 LAND USE AND ENVIRONMENTAL EVALUATION CRITERIA

LAND USE
Length of alternative route
Number of habitable structures[1] within 500 feet of ROW centerline
Number of newly affected habitable structures within 500 feet of ROW centerline
Number of habitable structures[1] potentially to be relocated/removed[2]
Length of ROW using existing transmission line ROW
Length of ROW parallel to existing transmission line ROW
Length of ROW parallel to other existing ROW (highways, pipelines, railways, canals, etc.)
Length of ROW parallel to apparent property lines[3]
Length of ROW through parks/recreational areas[4]
Number of parks/recreational areas[4] crossed by ROW centerline
Number of additional parks/recreational areas[4] within 1,000 feet of ROW centerline
Length of ROW through USFWS National Wildlife Refuges
Length of ROW through IBWC managed ROW
Length of ROW through cropland[5]
Length of ROW through orchards
Length of ROW through pasture/rangeland
Length of ROW through land irrigated by traveling systems (rolling or pivot type)
Number of pipeline crossings
Number of transmission line crossings
Number of US and State highway crossings
Number of farm-to-market road crossings
Number of cemeteries within 1,000 feet of the ROW centerline
Number of FAA registered airports with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline
Number of FAA registered airports having no runway more than 3,200 feet in length located within 10,000 feet of ROW centerline
Number of private airstrips within 10,000 feet of the ROW centerline
Number of heliports within 5,000 feet of the ROW centerline
Number of commercial AM radio transmitters within 10,000 feet of the ROW centerline

TABLE 2-1 LAND USE AND ENVIRONMENTAL EVALUATION CRITERIA

Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline
AESTHETICS
Estimated length of ROW within foreground visual zone[6] of US and State highways
Estimated length of ROW within foreground visual zone[6] of farm-to-market roads
Estimated length of ROW within foreground visual zone[6] of parks/recreational areas[4]
ECOLOGY
Length of ROW through upland woodlands
Length of ROW through bottomland/riparian woodlands
Length of ROW across mapped NWI wetlands
Length of ROW across known habitat of federally listed endangered or threatened species
Length of ROW across open water (lakes, ponds)
Number of stream crossings
Number of river crossings
Number of irrigation/drainage canal crossings
Length of ROW parallel (within 100 feet) to streams or rivers
Length of ROW across 100-year floodplains
Length of ROW within Coastal Management Program boundary
Length of ROW seaward of the Coastal Facilities Designation Line
CULTURAL RESOURCES
Number of recorded cultural resource sites crossed by ROW
Number of additional recorded cultural resource sites within 1,000 feet of ROW centerline
Number of National Register listed sites crossed by ROW centerline
Number of additional National Register listed sites within 1,000 feet of ROW centerline
Length of ROW across areas of high archeological site potential

Notes:
[1] Single-family and multi-family dwellings, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, and schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 500 feet of the centerline of a transmission project of 230 kV or more.
[2] ETT and Sharyland will potentially relocate/remove habitable structures within 75 feet of the ROW centerline.
[3] Apparent property lines created by existing roads, highways, or railroad ROWs are not "double-counted" in the length of ROW parallel to apparent property lines criteria.
[4] Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church within 1,000 feet of the centerline of the Project. This includes the Chihuahua Woods Preserve.
[5] Cropland does not include orchards.
[6] One-half mile, unobstructed

2.1.4 Data Collection and Constraints Mapping

Environmental and land use data used by POWER in the delineation and evaluation of alternative routes were drawn from a variety of sources, including readily available Geographic Information System (GIS) coverage with associated metadata; maps and published literature; information files and records from numerous federal, state, and local regulatory agencies; meetings with stakeholders; and multiple reconnaissance surveys of the study area. Data collected for each resource area was mapped within the study area utilizing GIS layers.

Maps and data layers reviewed include USGS 7.5 minute topographic maps (Environmental Systems Research Institute [Esri] 2011), NWI maps, and TxDOT county highway maps. Appraisal district

land parcel boundary data layers were readily available and used to identify apparent property boundaries as paralleling possibilities. USGS 7.5 minute topographic maps and aerial photography (Esri 2011 and National Aerial Imagery Program [NAIP] 2012) were used as the background for several of the Project maps, including the initial base map, field maps, the public involvement display boards, and the environmental and land use constraints map.

In an effort to minimize potential impacts to sensitive environmental and land use features, a constraints mapping process was used in developing and refining possible alternative routes. The geographic locations of environmentally sensitive and other restrictive areas within the study area were identified and considered during alternative route development. These constraints were mapped on topographic base maps. The alternative routes presented in this report have been selected in a manner to reduce the potential impact to land use and environmentally sensitive areas including: individual residences, congested urban areas, community facilities, subdivisions, airports, mobile irrigation systems, cemeteries, historic sites, archeological sites, wetlands and playa lakes, parks, churches, schools, and known occupied federally listed threatened and endangered species habitat.

2.1.5 Agency Consultation

A list was developed of federal, state, and local regulatory agencies, elected officials, and organizations to receive a consultation letter regarding the Project. The purpose of the letter was to inform the various agencies and officials of the Project and provide them with an opportunity to provide feedback regarding resources and potential issues within the study area. Various federal, state, and local agencies and officials that might have potential concerns and/or regulatory permitting requirements for the Project were contacted. POWER utilized websites from Cameron and Hidalgo counties and telephone confirmations to identify local officials. Consultation letters were sent in March 2012. Copies of correspondence with the various state and federal regulatory agencies and local and county officials and other organizations and departments are included in Appendix A.

Agencies/officials contacted include:

FEDERAL

- Federal Aviation Administration
- Federal Emergency Management Agency
- National Park Service
- Natural Resources Conservation Service
- US Army Corps of Engineers
- US Customs and Border Protection
- US Department of Agriculture Farm Service Agency
- US Environmental Protection Agency
- US Fish and Wildlife Service
- US International Boundary and Water Commission

STATE

- Railroad Commission of Texas
- Texas Commission on Environmental Quality
- Texas Department of Transportation (Environmental Affairs Division, Planning and Programming)

- Texas General Land Office
- Texas Historical Commission
- Texas Parks and Wildlife Department
- Texas State Soil and Water Conservation Board
- Texas Water Conservation Association
- Texas Water Development Board

LOCAL and OTHER ORGANIZATIONS

- City Officials
- Coastal Bend Land Trust
- County Farm Bureaus
- County Historical Commissions
- County Officials
- Drainage Districts
- Gulf Coast Bird Observatory
- Irrigation Districts
- LRGV Development Council
- Municipal Utility Districts
- Native Prairies Association of Texas
- National Butterfly Association
- Red Sands Groundwater Conservation District
- School Districts
- Texas Agricultural Land Trust
- Texas Cave Management Association
- Texas Land Conservancy
- The Archaeological Conservancy
- The Nature Conservancy
- Valley Land Fund
- Water Control and Improvement Districts
- Water Improvement Districts

2.1.6 Reconnaissance Surveys

Reconnaissance surveys of the study area (conducted from publicly accessible areas) were conducted by POWER personnel to confirm the findings of the research and data collection activities, identify changes in land use occurring after the date of aerial photography, and identify potential unknown constraints that might not have been previously noted in the data. Reconnaissance surveys of the study area were conducted on June 11-15, 2012; and October 8-16, 2012.

2.2 COMMUNITY VALUES, LAND USE, AND SOCIOECONOMICS

Under PURA § 37.056(c)(4)(A)-(D), "community values" is a factor for consideration in siting a transmission line route; however, the term has not been defined by the PUC. The PUC's standard CCN application form requires information concerning the following items related to community values:

- Public open-house meeting(s);
- Approval or permits required from other governmental agencies;
- Brief description of the study area traversed;
- Habitable structures within 500 feet of the centerline for the 345 kV transmission line alternative routes;
- AM and FM radio, microwave, and other electronic installations in the study area;
- FAA-registered airstrips, private airstrips, and heliports located in the area;
- Irrigated pasture or croplands utilizing center-pivot or other traveling irrigation systems in the study area;
- Parks and recreation areas in the study area; and
- Historical and archeological sites in the study area.

In addition to these items, POWER also evaluated the proposed Project for community values and resources that may not be specified by the PUC, but that might be of importance to a particular community as a whole. In several dockets the PUC and Staff have used the following as a working definition: the term "community values" is defined as "a shared appreciation of an area or other natural resource by a national, regional, or local community." Examples of such a community resource could include a park or recreational area, historical or archeological sites, or a scenic vista (aesthetics). POWER mailed consultation letters to various local elected and appointed officials and hosted public open-house meetings to identify and collect information regarding community values and community resources.

2.2.1 Land Jurisdiction

Jurisdiction does not necessarily represent ownership. Potential conflicts could arise from crossing jurisdictional boundaries, which were evaluated in this study area. The study area is located within the jurisdictional boundaries of Hidalgo and Cameron counties. All or portions of the cities of La Hoya, Penitas, Palmview, Palmhurst, Alton, Mission, McAllen, Edinburg, Pharr, Granjeno, Hidalgo, San Juan, Alamo, Donna, Weslaco, Mercedes, Progreso, Progreso Lakes, Elsa, Edcouch, La Feria, Palm Valley, Harlingen, Rangerville, San Benito, Los Indios, Rancho Viejo, Indian Lake, Los Fresnos, Brownsville, and Bayview are located within the study area. Additionally, numerous unincorporated communities are located within the study area.

2.2.2 Land Use

Existing land uses within the study area were identified and placed into the following categories: urban/developed, planned land use, agriculture, oil and gas facilities, transportation/aviation/utility features, and communication towers. Parks and recreation areas are discussed in Section 2.3. Land use information was primarily obtained through interpretation of aerial photographs, USGS topographical maps, and vehicular reconnaissance surveys from accessible public viewpoints. Planned land use features were limited to known features obtained from governmental entities and mobility authorities.

2.2.2.1 Urban/Developed

The urban/developed category represents concentrations of surface-disturbing land uses, which include habitable structures and other developed areas characterized with low, medium and high intensities. The various levels of development include a mix of residential, institutional, commercial,

and/or industrial land uses. Developed low-, medium- and high-intensity areas were identified using aerial photograph interpretation and reconnaissance surveys. These classifications are defined below:

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

The northern and southern portions of the study area are predominantly rural, while the central portion is predominantly urban. The northern portion of the study area is a mixture of rangeland/pastureland, irrigated cropland with numerous orchards, and where most of the habitable structures are associated with scattered rural subdivision properties. The southern portion of the study area is predominantly irrigated cropland with scattered rural subdivision properties. The central portion of the study area is composed of high intensity residential and commercial development.

Habitable structures were identified using aerial photographs and field reconnaissance surveys. The PUC definition of a habitable structure was used for this routing study. P.U.C. SUBST. R. 25.101(a)(3) defines habitable structures as "structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis. Habitable structures include, but are not limited to, single-family and multi-family dwellings, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, and schools."

The study area is located within the following 20 school districts: La Joya Independent School District (ISD), Mission Consolidated ISD, Sharyland ISD, Edinburg Consolidated ISD, McAllen ISD, Pharr-San Juan-Alamo ISD, Valley View ISD, Hidalgo ISD, Edcouch-Elsa ISD, Donna ISD, Weslaco ISD, Progreso ISD, Mercedes ISD, La Villa ISD, La Feria ISD, Santa Maria ISD, Harlingen Consolidated ISD, San Benito Consolidated ISD, Los Fresnos Consolidated ISD, and Brownsville ISD. A total of 355 schools were identified within the study area (TEA 2011).

2.2.2.2 Planned Land Use

The planned land use category identifies objectives and/or policies regarding land use goals and plans, including conservation easements, managed lands, and planned developments. Cities and counties typically prepare comprehensive land use plans to provide strategic direction for the individual city or county. City and county websites were reviewed and correspondence was submitted to local and county officials to identify any planned land use conflicts.

The City of Brownsville has developed the *Imagine Brownsville Comprehensive Plan* to guide its future growth and development. This plan describes the City's vision and goals for the community including with regard to land use, downtown revitalization, economic development, mobility, and infrastructure. The study area includes Brownsville, which has areas designated for open space, utilities, education, environmental uses, civic and public uses, healthcare, and emergency management (City of Brownsville 2009).

The City of Edinburg has developed the *Edinburg Gateway Plan – An Agenda for 2025* to manage future growth. This plan outlines guidelines and recommendations for land use and character, including planning for transportation, economic development, utilities, and implementation. The plan includes a future land use map which has areas predominantly designated for future agriculture, suburban, urban, auto urban, urban university, and general commercial land uses (City of Edinburg 2005).

The City of Harlingen has developed *Harlingen's Vision 2020 Comprehensive Plan* as a guide in making decisions about land use and development. This plan outlines the existing environment along with goals and objectives for land use, transportation, parks and recreation, housing, economic development, utilities, and implementation. The plan has areas designated for agriculture, open space, estate, residential, commercial, urban, civic and public, industrial, special uses, water bodies, vacant, and neighborhood conservation land uses (City of Harlingen 2002).

The City of McAllen has developed the *Foresight McAllen Comprehensive Plan* to guide its future. This plan describes the City's community overview, existing urban form, mobility, and physical development, and includes a future land use plan map. The plan has areas designated for agriculture, open space, estate, residential, commercial, urban, civic and public, industrial, special uses, water bodies, vacant, and neighborhood conservation land uses (City of McAllen 2007).

The City of Mercedes has developed the *Envision Mercedes 2025: A Community Comprehensive Plan* to address all aspects of city development. This plan is currently undergoing a major update. However, the proposed table of contents has been developed to include chapters on Demographics, Land Use, Transportation, Image, Parks and Recreation, Infrastructure, Public Safety, Economics Development and Implementation (City of Mercedes 2006).

The City of Mission has developed a future land use map. The map has areas designated for future low-, lower-, moderate, and high-density residential, commercial and public land uses (City of Mission 2010).

The City of Weslaco has developed the *Visions and Goals* Comprehensive Plan to reach a common vision. This plan describes the City's system of goals, actions, and policy statements that relate to specific plan elements. The plan has areas designated for residential, commercial, industrial, park and recreational, civic and public, water bodies, and natural areas land uses (City of Weslaco 2007).

Conservation Easements

A review of numerous non-governmental groups (e.g., the Nature Conservancy, Texas Land Conservancy) that are land trusts for conservation easements within the South Texas Region indicated several conservation easements. The Nature Conservancy and Valley Land Fund are land trusts for conservation easements identified within the study area.

A conservation easement is a restriction property owners voluntarily place on specified uses of their property to protect natural, productive or cultural features. The property owner retains legal title to the property and determines the types of uses to allow and which to 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 owners' allowances for additional developments on the land. The land trusts facilitate the easements and ensure compliance with the specified terms and conditions.

The Chihuahua Woods Preserve is owned by the Nature Conservancy and is located in the western portion of the study area, approximately five miles west of Mission on US Hwy 83 Business. The preserve provides habitat for many rare animal and plant species, including a unique cactus community. The 349-acre preserve provides walking paths for bird watching of the 30-plus resident bird species (Nature Conservancy 2013).

The Valley Land Fund has a number of conservation projects in South Texas. There are two Valley Land Fund-owned properties located within the study area, and three conservation easements. These conservation easements help the Valley Land Fund protect wildlife by preserving their natural habitats and help private landowners protect the special qualities of their property (Valley Land Fund 2013).

2.2.2.3 Agriculture

Agriculture is a significant segment of the economy throughout Texas, and the study area counties have active agricultural sectors. According to the US Department of Agriculture's (USDA) National Agricultural Statistics Service's 2007 Census of Agriculture, the total market value for agricultural products sold for both the study area counties was $426,606,000, an increase of 54% over the compared 2002 market value. Crop sales accounted for the majority of agricultural sales in both Hidalgo and Cameron counties. The number of farms in the study area counties increased from 3,224 in 2002 to 3,392 in 2007 (an increase of 5%). Detailed agricultural information for the study area counties is provided in Table 2-2.

TABLE 2-2 AGRICULTURE

COUNTY	TOTAL MARKET VALUE OF AGRICULTURAL PRODUCTS			DISTRIBUTION OF PRODUCTS (2007)		NUMBER OF FARMS		
	2002	2007	Change	Crop Sales	Livestock Sales	2002	2007	Change
Cameron County	$74,637,000	$112,350,000	51%	93%	7%	1,120	1,241	11%
Hidalgo County	$202,073,000	$314,256,000	56%	92%	8%	2,104	2,151	2%

Source: USDA 2007.

2.2.2.4 Oil and Gas Facilities

The study area is located in an area with multiple oil and gas fields. Data was obtained from the Railroad Commission of Texas (RRC) (2012) which provided a GIS layer for existing oil and gas wells, pipelines and supporting facilities. Data point categories were reviewed and included the following types: permitted locations; oil, gas, injection/disposal, core test, shut-in, brine mining, and water supply wells; observed oil wells; horizontal drain holes; and sidetrack well surface locations. The 2012 RRC dataset along with aerial photograph interpretation and field reconnaissance were used to identify and map existing oil and gas related facilities.

2.2.2.5 Transportation/Aviation/Utility Features

Transportation Features

Federal, state, and local roadways were identified using TxDOT county transportation maps, Texas Natural Resource Information System (TNRIS) data, and field reconnaissance surveys. The roadway

transportation system within the study area includes the following major roadways: US Hwy 77, US Hwy 83, US Hwy 281, US Hwy 281 Business, SH 107, SH 336, and SH 345. The roadway transportation within the study area also includes the following farm-to-market roads: FM 491, FM 492, FM 493, FM 494, FM 495, FM 676, FM 681, FM 907, FM 1015, FM 1016, FM 1423, FM 1425, FM 1426, FM 1427, FM 1577, FM 1732, FM 1924, FM 1925, FM 1926, FM 2061, FM 2062, FM 2220, FM 2221, FM 2520, FM 2521, FM 2557, FM 2556, FM 2812, FM 2894, FM 2993, FM 3067, FM 3071, and FM 3072. Numerous county and local roads (paved and unpaved) were also identified.

The TxDOT's "Project Tracker," which contains detailed information by county for every project which is or could be scheduled for construction, was reviewed to identify any state roadway projects planned within the study area. The TxDOT Project Tracker indicates that there are several roadway projects in Hidalgo and Cameron counties that are located within the study area. In Hidalgo County, there are 13 planned roadway widening projects, two bridge widening projects, two overpass/ underpass projects, two projects to construct US border facilities, one project to construct new roadway lanes, one project to construct a new toll road, one bridge replacement project, and one project to construct a bicycle/pedestrian path (TxDOT 2012). In Cameron County, there are two planned roadway widening projects, two projects to construct new roads, one project to construct a new toll road, and one project to construct a US border facility (TxDOT 2012).

The Hidalgo County Regional Mobility Authority (HCRMA) indicates there are five new roadway projects proposed for construction within the study area (HCRMA 2009). The Cameron County Regional Mobility Authority (CCRMA) also indicates several new roadway and railroad projects that are proposed for construction or are under further study (CCRMA 2009). The City of Edinburg's Gateway Plan and the City of McAllen's Comprehensive Plan include thoroughfare plans, which indicate that a number of the cities' roads could eventually be upgraded. A number of these roads occur within the study area (City of Edinburg 2005; City of McAllen 2007).

Aviation Features

Aviation facilities reviewed include public and private airports, airstrips, airfields and heliports. Review of the Brownsville Sectional Aeronautical Chart (FAA 2011) and the FAA database (FAA 2013) were used to identify FAA registered facilities. Two FAA registered public airports were identified within the study area. The McAllen Miller International Airport is located in the southwestern portion of the study area in McAllen, on the south side of US Hwy 83, and features a 7,120-foot long paved runway (FAA 2013). The Mid Valley Airport is located in the central portion of the study area in Weslaco, on the north side of US Hwy 83, and features a 4,998-foot long paved runway (FAA 2013). Four additional FAA registered public airports were identified within 20,000 feet of the study area boundary. These airports include: South Texas International Airport at Edinburg with a 5,000-foot long paved runway; Valley International with 7,257-, 5,949-, and 8,301-foot long paved runways; Port Isabel-Cameron County with 5,000-, 5,317-, 8,001-, and 4,200-foot long paved runways; and Brownsville/South Padre Island International Airport with 3,000-, 7,399-, and 6,000-foot long paved runways (FAA 2013). A total of ten private FAA registered airports and six heliports were also identified within the study area.

Three additional private FAA-registered airstrips are located outside of but within 10,000 feet of the study area boundary. No other FAA-registered heliports are located outside of but within 5,000 feet of the study area boundary (FAA 2013).

In addition, review of USGS topographic maps, aerial photograph interpretation, and field reconnaissance surveys were used in an attempt to identify private airstrips within or near the study area. Four additional private non-FAA registered airstrips were identified within the study area.

Utility Features
Utility features inventoried include existing electrical transmission lines, distribution lines, pipelines, water wells, and water tanks. Data sources used to identify existing electrical transmission and distribution lines include utility company and regional system maps, Ventyx data (Ventyx 2013), aerial imagery, USGS topographic maps, additional available planning documents, and field reconnaissance surveys. Transmission lines identified include three 345 kV transmission lines, seventy-one 138 kV transmission lines, and eleven 69 kV transmission lines. Distribution lines are prevalent throughout the developed portions of the study area; however, these features were not mapped or inventoried since they are not feasible overbuilding opportunities for a 345 kV transmission line.

In addition, numerous water wells are located throughout the study area (Texas Water Development Board [TWDB] 2012), and multiple irrigation canals are located throughout the study area.

2.2.2.6 Communication Towers

Review of the Federal Communication Commission (FCC) database (FCC 2011) indicated that twenty-two AM radio transmitters, broadcasting six AM radio stations, are located within the study area. KIRT AM 1580 is located in Mission, KRIO AM 910 is located in McAllen, KURV AM 710 is located in Edinburg, KUBR AM 1210 is located in San Juan, KVJY AM 840 is located in Pharr, and KRGE AM 1290 is located in Weslaco (FCC 2011). There is also one AM radio transmitter outside of the study area but within 10,000 feet of the boundary; KVNS AM 1700 is located in Brownsville (FCC 2011).

The FCC also indicated that there are 215 FM radio transmitters/microwave towers/other electronic installations within the study area (FCC 2011). These towers are primarily located in the central portion of the study area with several occurring near the cities and towns within the study area. There are no additional FM radio transmitters/microwave towers/other electronic installations outside of the study area boundary that are within 2,000 feet of the alternative routes.

2.2.3 Socioeconomics

The study area covers approximately 1,004 square miles in Hidalgo and Cameron counties. This section presents a summary of economic and demographic characteristics for these counties and describes the socioeconomic environment of the study area. Literature sources reviewed include publications of the US Bureau of the Census (USBOC), and the TWDB.

2.2.3.1 Population Trends

Both of the counties within the study area experienced population growth between 2000 and 2010. Hidalgo and Cameron counties experienced population growth of 36% and 21%, respectively, between 2000 and 2010. By comparison, population at the state level increased by nearly 21% between 2000 and 2010 (USBOC 2000 and 2010). According to TWDB projections, both Cameron and Hidalgo counties are projected to experience continued population growth during the next 30 years. Between 2010 and 2020, 2020 and 2030, and 2030 and 2040, population increases in Hidalgo

County are projected to be at 27%, 24%, and 18%, respectively. The population increases in Cameron County are projected to be 20%, 17%, and 15%, respectively. By comparison, the population of Texas is expected to experience population increases of 18%, 14%, and 12% over the next three decades, respectively (TWDB 2011). Table 2-3 presents past population trends and projections for Hidalgo and Cameron counties and for the State of Texas.

TABLE 2-3 POPULATION TRENDS

STATE/COUNTY	PAST		PROJECTED		
	2000	2010	2020	2030	2040
Texas	20,851,820	25,145,561	29,650,388	33,712,020	37,734,422
Cameron County	335,227	406,220	510,697	599,672	688,532
Hidalgo County	569,463	774,769	987,920	1,225,227	1,481,812

Sources: USBOC 2000 and 2010, TWDB 2011.

2.2.3.2 Employment

The civilian labor force (CLF) in the study area counties increased with the corresponding population growth. Cameron County's CLF increased by 25% (30,167 persons) between 2000 and 2011; Hidalgo County saw an increase in CLF of 50% (101,877 persons) from 2000 to 2011. By comparison, the CLF at the state level grew by 22% (2,132,288 persons) from 2000 to 2011 (USBOC 2000 and 2011). Table 2-4 presents the CLF for the study area counties and the State of Texas for the years 2000 and 2011.

Between 2000 and 2011, both of the study area counties experienced a decline in their unemployment rates. Cameron County's unemployment rate fell from 11.4% in 2000 to 8.0% in 2011. Hidalgo County's unemployment rate fell from 12.0% to 10.0%. By comparison, the State of Texas experienced a small increase in the unemployment rate from 2000 to 2011—6.1% to 7.3% (USBOC 2000 and 2011). Table 2-4 presents employment and unemployment data for the study area counties and the State of Texas for the years 2000 and 2011.

TABLE 2-4 LABOR FORCE AND EMPLOYMENT

STATE/COUNTY	2000	2011
Texas		
Labor Force	9,830,559	12,179,035
Employment	9,234,372	11,288,597
Unemployment	596,187	890,438
Unemployment Rate	6.1%	7.3%
Cameron County		
Labor Force	122,909	153,076
Employment	108,904	140,754
Unemployment	14,005	12,322
Unemployment Rate	11.4%	8.0%
Hidalgo County		
Labor Force	204,783	306,660
Employment	180,121	275,737
Unemployment	24,662	30,923
Unemployment Rate	12.0%	10.0%

Sources: USBOC 2000 and 2011.

2.2.3.3 Leading Economic Sectors

The major occupations in Cameron County in 2011 are in the category of management, business, science, and arts occupations, followed by sales and office occupations. The major occupations in Hidalgo County in 2011 are in the category of sales and office occupations, followed by management, business, science, and arts occupations (USBOC 2011). Table 2-5 presents the number of persons employed in each occupation category during 2011 in the study area counties.

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

OCCUPATION	TOTAL NUMBER OF PERSONS	
	Cameron County	Hidalgo County
Management, business, science, and arts occupations	37,931	70,009
Service occupations	34,744	66,127
Sales and office occupations	35,998	73,542
Natural resources, construction, and maintenance occupations	15,560	37,419
Production, transportation, and material moving occupations	16,521	28,640

Source: USBOC 2011.

In 2000 and 2011, the industry that employed the most people in both study area counties was educational services, and health care and social assistance. This same industry experienced the most growth in employment in Cameron and Hidalgo counties from 2000 to 2011, with increases of 44% (12,878 persons) and 73% (34,664 persons), respectively. Table 2-6 presents the number of persons employed in each of the industries in the study area counties for the years 2000 and 2011.

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

INDUSTRY GROUP	TOTAL NUMBER OF PERSONS			
	Cameron County		Hidalgo County	
	2000	2011	2000	2011
Agriculture, forestry, fishing and hunting, and mining	2,317	3,381	7,475	9,887
Construction	7,923	10,399	17,008	23,362
Manufacturing	11,298	7,745	13,349	12,520
Wholesale trade	4,013	3,784	8,863	8,528
Retail trade	13,487	17,517	24,315	40,922
Transportation and warehousing, and utilities	6,023	7,774	9,001	12,877
Information	1,659	2,201	2,984	3,411
Finance and insurance, and real estate and rental and leasing	5,321	5,308	6,708	11,791
Professional, scientific and management, and administrative and waste management services	6,511	10,831	10,946	22,856

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

INDUSTRY GROUP	TOTAL NUMBER OF PERSONS			
	Cameron County		Hidalgo County	
	2000	2011	2000	2011
Educational services, and health care and social assistance	29,176	42,054	47,346	82,010
Arts, entertainment, and recreation, and accommodation and food services	9,128	12,355	13,559	21,254
Other services, except public administration	6,299	8,634	10,315	15,860
Public administration	5,749	8,771	8,252	10,459

Source: USBOC 2000 and 2011.

2.3 PARKS AND RECREATION AREAS

The PUC recognizes parks and recreational areas as those owned by a governmental body or an organized group, club, or church. Federal and state databases and county/local maps were reviewed to identify any parks and/or recreational areas within the study area. Field reconnaissance surveys were also conducted to identify any additional park or recreational areas.

2.3.1 National/State/County/Local Parks

One national historical park was identified within the study area. The Palo Alto Battlefield (which is also a National Historic Landmark) is located at the intersection of FM 511 and FM 1847 in Brownsville, Texas. The park preserves the site of the first battle between the US and Mexico. The park currently offers walking trails along the historical US and Mexican lines of defense, interpretive exhibits along the trails and replica canons (National Park Service [NPS] 2013).

Several tracts of the Lower Rio Grande NWR are located within the study area and follow the Rio Grande along the last 275 river miles. The Lower Rio Grande NWR provides important habitat for many species that can only be found in far South Texas, restores wildlands, and creates movement corridors for wildlife connecting isolated tracts of land (USFWS 2012a). The Santa Ana NWR is partially located within the study area, positioned at the junction of two major bird migratory routes on a 2,088 acre parcel known as the "jewel of the National Wildlife Refuge System." The refuge offers 12 miles of hiking trails, an open-air tram, and guided nature walks (USFWS 2012b).

There are three state parks identified within the study area. The first park is Bentsen-Rio Grande Valley located in Mission, Texas. This park is the World Birding Center headquarters and covers over 760 acres adjoining 1,700 acres of USFWS refuge tracts. The second state park is Estero Llano Grande located in Weslaco, Texas. Estero Llano Grande is the geographic center for the World Birding Center network and offers a 230-plus acre refuge. The final park is Resaca de la Palma located in Brownsville, Texas. Resaca de la Palma has the largest tract of native habitat in the World Birding Center network with 1,200 acres (TPWD 2013d).

The Las Palomas WMA is located within the study area and provides 3,311 acres of native brush nesting habitat with farmland and wetlands for white-winged doves. The Las Palomas WMA consists of 18 units of land in Cameron, Hidalgo and Presidio counties ranging in size from two acres to 604 acres (TPWD 2013c).

The World Birding Center (WBC) offers a network of nine bird watching sites in the Rio Grande Valley. WBC provides protection of native habitat, birds, and wildlife while developing ecotourism for the local communities. The five sites that are located within the study area include: the Bentsen-Rio Grande Valley State Park, Edinburg Scenic Wetlands, Quinta Mazatlan, Estero Llano Grande State Park, and Resaca de la Palma State Park (WBC 2010).

The National Butterfly Center (NBC) is a project of the North American Butterfly Association and is located in the LRGV in Mission, Texas. The NBC provides gardens and trails that show animals and plants in wild and cultivated settings. Over 200 species of butterflies have been seen at the center (NBC 2012).

There are five county parks identified in Hidalgo County and multiple local parks identified within the cities of Alton, Brownsville, Edinburg, Harlingen, Hidalgo, La Feria, Los Fresnos, McAllen, Mission, Pharr, San Juan, and Weslaco that are located within the study area (Hidalgo County 2013, City of Alton 2012, City of Brownsville 2011, City of Edinburg 2013; City of Harlingen 2002, City of Hidalgo 2012, City of La Feria 2013, City of Los Fresnos 2013, City of McAllen 2013, City of Mission 2013, City of Pharr 2013, City of San Juan 2010, and City of Weslaco 2013). Additional recreational activities such as hunting and fishing might occur on private properties throughout the study area, but are not considered to be open to the general public.

2.3.2 Wildlife Viewing Trails

Review of the TPWD Great Texas Coastal Birding Trail - Lower Texas Coast (LTC) indicates that there are six driving loops offering a total of 28 wildlife viewing sites within the study area. The Los Ebanos Loop offers four sites within the study area. These sites include: Anzalduas Dam and County Park, Bentsen-Rio Grande Valley State Park/The World Birding Center, Chihuahua Woods Preserve of the Nature Conservancy of Texas, and Las Palomas WMA-Penitas Unit. The Santa Ana Loop provides nine sites and all are located within the study area. These sites include: Santa Ana NWR, Boys and Girls Club of Alamo, Edinburg Scenic Wetland Trails, USFWS Monte Cristo Tract, Quinta Mazatlan, McAllen Convention Center, McAllen Nature Center, McAllen Sewage Ponds, and The Hidalgo Pumphouse Discovery and Heritage Center. The Estero Llano Grande Loop has five sites and all are located within the study area. These sites include: Estero Llano Grande, Mercedes Civic Center, The Weslaco Wetlands, The Valley Nature Center, and Frontera Audubon Thicket. The Las Palomas Loop provides six sites and all are located within the study area. These sites include: Las Palomas WMA-Resaca De La Palma, Las Palomas WMA-Ebony Unit, Cannon Road, Las Palomas WMA-Anacua Unit, El Zacatal, and TxDOT Relampago Rest Stop. The Resaca Loop offers two sites within the study area. These sites include: TPWD Coastal Fisheries Field Station and Camp Lula Sams. The Laguna Madre Loop also offers two sites within the study area. These sites include: Los Fresnos and Palo Alto Battlefield (TPWD 2013b).

2.4 HISTORICAL (CULTURAL RESOURCE) VALUES

Section 37.056(c)(4)(A)-(D) of PURA incorporates historical and aesthetic values as a consideration when evaluating proposed electric transmission facilities. The PUC's standard application for a CCN further stipulates that known historical sites within 1,000 feet of an alternative route should be listed, mapped, and their distance from the centerline of the route documented in the application filed for consideration. Archeological sites within 1,000 feet of a route will be listed and their distance from the centerline documented, but they need not be shown on maps for the protection of the site.

Sources consulted to identify known sites (national, state, or local commission) shall also be listed.

The THC is the state agency responsible for preservation of the state's significant cultural resources. The THC, working in conjunction with the Texas Archeological Research Laboratory (TARL), maintains records of previously recorded cultural resource sites as well as records of previous field investigations. Information from the THC's Restricted Online Archeological Sites Atlas was acquired in addition to GIS shapefiles from TARL to identify and map locations of previously recorded cultural (archeological and historical) resources within the study area.

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

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

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

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

2.4.1 Cultural Background

The study area is within the Central and Southern Cultural Resource Planning Region as delineated by the THC (Mercado-Allinger et al.1996) and shown in Figure 2-2. Geographically, the study area is located on the southern reaches of the Gulf Coastal Plain, more specifically within the Rio Grande Embayment along the northern side of the Rio Grande (Jordan et al. 1984). This region is largely devoid of topographic relief, and what slight relief exists occurs primarily as small lake and playa basins, clay dunes, and small oxbow lakes, locally called resacas. Resacas mark ancient meanders of the Rio Grande, the Nueces River, and many other creeks that drain this region. The majority of *in situ* Native American archeological deposits in the area have been recorded in association with these features.

2.4.1.1 Prehistory

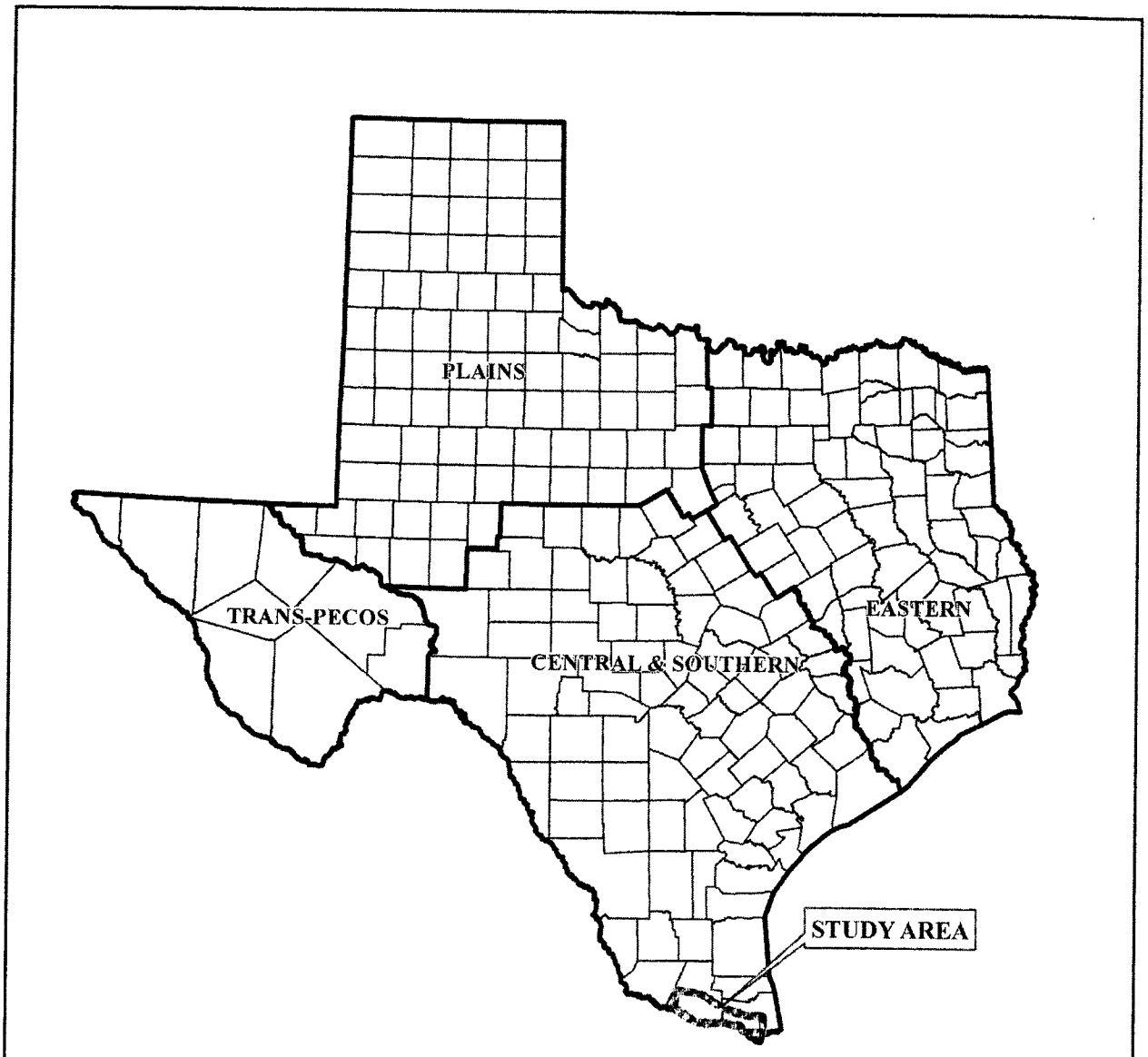
The prehistory of south Texas spans at least the last 11,500 years. The cultural chronology of the area is divided into three broad periods of cultural development based on changes evident in the archeological and environmental record. These three periods of human prehistory are called the

Paleoindian, Archaic, and Late Prehistoric periods, each representing distinct technological adaptations to changing physical and cultural environments.

Paleoindian Period (11,500-8,000 Before Present [B.P.])
The Paleoindian Period is the earliest generally accepted period of human occupation in North America. During this period, it has been postulated that prehistoric populations exploited now-extinct giant mammals, such as *Bison antiquus* and the wooly mammoth. The Paleoindian Period coincided with the end of the last major North American glaciation, known geologically as the Late Pleistocene and with the beginning of the Holocene.

In South Texas, the Paleoindian tradition is thought to have begun approximately 11,500 B.P., and is represented in its earliest period by the fluted projectile points and the specialized blade production (Hester 1995). Sites containing diagnostic dart point types such as Clovis, Plainview, and Angostura are often attributed to this early period of human occupation in South Texas and elsewhere. The late Paleoindian Period corresponds to a greater variety of point styles, including smaller side-notched points that are believed to reflect a more diverse hunting strategy.

There are dozens of archeological sites within South Texas known to contain Paleoindian components (Bousman et al. 2004). Paleoindian sites with distinctive varieties of stone artifacts, some found in association with extinct megafaunal remains, have been identified on both sides of the Rio Grande, including more than one in Starr County. However, the Paleoindian components are typically isolated and present little research potential. Consequently, very few intact Paleoindian deposits have been investigated in South Texas, and the Paleoindian Period in South Texas remains poorly understood. Paleoindian sites in the area probably reflect small-band, mobile hunting techniques often attributed to this period, common across the North American continent.



N

0 30 60 120 180 240

Miles

Source: Mercado-Allinger et al. 1996

Legend

Cultural Resource Planning Region Boundary

County Boundary

North Edinburg - Loma Alta
345 kV Transmission Line Project

Figure 2-2
Location of Study Area In Relation to the Cultural Resource Planning Regions of Texas

ETT Electric Transmission Texas

Date 1/10/2013

Sharyland Utilities

Archaic Period (8,000-1,150 B.P.)
The long-lasting Archaic Period in South Texas followed the Paleoindian Period is distinguished by changes in material culture representing cultural adaptation to the changing North American environment. It is thought that human population density gradually increased during this period, and the hunting and gathering way of life is epitomized by the Archaic tradition. The Archaic period signifies a shift to the hunting of smaller game, plant gathering, and an emphasis on the exploitation of marine resources in coastal zones. The Archaic Period is generally subdivided into three phases: Early, Middle and Late.

Hester (1995) further divides Early Archaic archeological sites and components in South Texas into the "early corner notched" and the "early basal-notched" horizons, reflecting the distinction in neighboring Central Texas. Early Archaic peoples were likely organized into small hunting and gathering bands, and were similar to their Paleoindian predecessors in their lifestyle and population density. Typical food resources probably consisted of deer, mussels, small game, fish and acorn nuts. Early Archaic archeological sites are rare in South Texas, and the settlement patterns and subsistence strategies of this period are poorly understood.

The Middle Archaic Period (4,500-2,400 B.P.) has a distinct lithic technology separating it from earlier periods. Dart points from this period are distinguished by their triangular shape. Middle Archaic dart points, such as the Tortugas and Abasolo point types, differ sharply from the stemmed points of the Early Archaic Period. This period also exhibits a large amount of distally-beveled "gouges." Use-wear analysis suggests the gouges were used for woodworking (Hester 1995). The Middle Archaic is marked by growing populations and increased population density from earlier periods, although the population density remained low. During the Middle Archaic, open campsites located along waterways were the norm. Acquisition of food resources in this period continued to be dominated by the hunting of large and small game (Hester 1995).

The Late Archaic Period (2,400-1,300 B.P.) is the best understood and best represented of the Archaic "sub-periods." Another shift in dart points occurred during this period resulting in, among others, Shumla, Ensor, Frio, Marco, and Montell point types. Ground stones are more frequently encountered in Late Archaic sites than in previous periods, consisting primarily of manos and metates. The increased usage of ground stones likely represents an increased exploitation of mesquite, acacia beans, and other plant resources. Hester suggests this shift resulted in a further increase in population density (Hester 1995). Lithic materials chemically traced to Central Texas, as well as the presence of a small amount of large, small-stemmed bifaces (common in Central Texas during the Archaic Period), suggest that trade with neighboring areas increased during the Late Archaic. Temeny (2005) demonstrates that the Brownsville Complex, marked by a shell trade network and shell industry, dates as early as the Middle and Late Archaic periods.

Late Prehistoric Period (1,150-350 B.P.)
The Late Prehistoric Period in South Texas shares many cultural traits and patterns with Central Texas. The primary hallmarks of this era are usage of the bow and arrow and the introduction of pottery. The projectile points found from this period are much smaller and lighter than the points from earlier periods of prehistoric development. These points include Fresno, Scallorn, Starr, Zavala and Perdiz points (Hester 1995). The ceramics of the Late Prehistoric, although rarely found in Rio Grande Valley sites, are typically bone-tempered and are often covered in red filming. The Olla (large water vessel) is the most common vessel style (Hester 1995). The Late Prehistoric people of the South Texas region were likely extremely mobile hunters relying heavily on bison for sustenance,

as evidenced by the numerous bison kill sites and well-preserved faunal remains present on Late Prehistoric archeological sites (Hester 1995). Human populations were larger and more stable in the Late Prehistoric than in earlier periods.

Overall, Late Prehistoric archeological sites are the most abundant of all three major prehistoric cultural periods and they exhibit evidence of increased population density and complexity. The usage of the bow may have greatly increased hunting productivity and decreased the emphasis on plant foods, although ground stone tools are still present during the Late Prehistoric. Trade connections to Central Texas and Mesoamerica are evident during the Late Prehistoric period.

While the pottery styles, lithic technologies, and hunting techniques associated with the Late Prehistoric Period in South Texas may have originated in Central Texas, there also appears to be some interaction with the large state-level societies of Mesoamerica during this period. Researchers have discovered a "Huastec" component to some archeological sites in the Rio Grande Delta. This component is primarily made up of pottery types and distinctive clay figurines (Hester 1995). Other links to Mesoamerica are also present; obsidian found on South Texas archeological sites that originated from central and western Mesoamerica, as well as jadeite and serpentine artifacts (which are relatively common in Mesoamerica) have also been discovered in the Rio Grande Delta of South Texas.

Two closely related Late Prehistoric cultural complexes appear to be geographically restricted to the LRGV, with sites discovered in the US and Mexico. MacNeish (1958) identifies shell disks; pierced shell disk beads; plugs made from a *columella* that are round in cross section; rectangular conch shell pendants; mollusc shell scrapers; and Starr, Fresno, and Matamoros projectile points as artifacts common to both Barril and Brownsville cultural complexes. Intrusive pottery of Huastec origin from southern Tamaulipas, as noted above, also appears in occupation sites and burials associated with these two cultural complexes (Anderson 1932; Mason 1935; MacNeish 1947; Terneny 2005). While the Barril complex is thought to be the earlier of the two, representative sites tend to be located almost exclusively in Mexico. Brownsville complex sites tend to occur almost exclusively in Cameron County, Texas, although the distinctive flexed burials associated with this complex have also been found in nearby Hidalgo County.

2.4.1.2 History

As Europeans began to explore Mexico and South Texas in the sixteenth century, European goods were introduced to the native groups, some of which appear in contact-era artifact assemblages. 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. By the mid-nineteenth century, the effects of diseases introduced by Europeans as well as violent cultural conflicts decimated Native American populations.

In the early nineteenth century, European culture groups had become the dominant cultural group occupying the South Texas landscape. From written, architectural and archeological sources, scholars have identified several historic period cultural themes that represent major historic period developments in the LRGV. Prominent historic themes for the region include Colonial River Settlements, Ranching, River Trade, Military, Agriculture and Heritage Tourism. All of these themes are essentially linked to the Rio Grande, the most salient geographical feature around which cultural development in the region occurred (Sanchez 1991).

European Colonial Period

Spain was the first European nation to explore and claim New World territory that included Texas and the Lower Rio Grande. For a period of more than two centuries, Spanish excursions into the Rio Grande Valley were primarily military forays designed to bolster Spain's claim to the region and prevent other European nations from establishing claims within Spanish territory. In the absence of well-established Spanish colonial settlements along the Gulf Coast, French and Anglo interests undertook their own exploration and settlement attempts in these areas. In response, Spain sent Alonso de Leon to lead the first of several expeditions seeking a French fort reportedly established north of the Rio Grande. De Leon is believed to have crossed the Arroyo Colorado in Cameron County. He eventually discovered the abandoned French fort (Fort St. Louis) in present day Victoria County (Stambaugh and Stambaugh 1954). In the mid-eighteenth century, Jose de Escandon, under the direction of the King of Spain, undertook efforts to establish permanent Spanish settlements in northern Mexico and the LRGV (Pierce 1917). Escandon's efforts, along with other subsequent expeditions, eventually provided a sufficient basis to establish a number of settlements in the region, including the small town of Pinetas that still exists today in Hidalgo County.

Ranching

Cattle ranching, as we know it today in South Texas, is derived from animal herding traditions introduced to the New World by Spaniards during the colonization period. Their methods relied on the use of horses, also introduced into the New World from Spain, to collect and herd wild cattle on the open ranges of Mexico and South Texas. These traditions were maintained during the region's history under the Republic of Mexico and adopted by Anglos entering the region that later became the Republic of Texas and eventually the state and counties that we know today.

The tradition of cattle ranching was well suited to the pattern of land grants issued by Spain and Mexico along the Rio Grande. Called *porciones*, long, narrow tracts of land were surveyed so that each tract had river frontage and reached far inland to provide grazing land for cattle and horses. This "long lot" pattern of land subdivision can be clearly seen on historical maps archived at the Texas GLO (2010) and is distinctively different than land tracts granted in other portions of south Texas. Most, if not all, of the land within the study area was originally granted by the Spanish and Mexican governments. Few of the original South Texas land grants survive intact today to reflect the traditional patterns of land use that derive from the Spanish and Mexican periods.

This agrarian way of life prevailed well into the late nineteenth century with little change until industrial-era developments enabled alternative forms of agriculture to achieve prominence. As a consequence of the twentieth century shift in favor of large-scale mechanized agriculture, many of the old ranches and ranching communities have been lost. One of the best surviving examples of such a ranching complex, however, is still located in the LRGV at Rancho Toluca, located south of Progresso. This site was listed on the NRHP in 1983 Founded in 1880 on hereditary Saenz and Cano family land grants, the ranch complex includes the Saenz family home, a church, school, and store, all constructed of yellow brick manufactured at the ranch's brick kiln (Victor 1981).

River Trade.

During the Mexican Republic period (1821-1836), settlement along the Lower Rio Grande became well established, including, in 1823, a sea port at Matamoros. Prior to this, the coastal port of Vera Cruz made the transportation of goods to and from the Rio Grande settlements difficult. As the capacity of trade increased, Matamoros grew and Americans became involved in businesses and services that increased the overall economic opportunities for the region (Graf 1942). Prominent

among these was Charles Stillman, a native of Connecticut who settled along the river in 1828 and operated a profitable mercantile. Of greater prominence for their later cattle ranching operations, Mifflin Kenedy and Richard King began their business interest in the region with a steamship operation that operated along the Rio Grande, connecting Matamoros to the Gulf of Mexico during the mid-nineteenth century (PBS&J 2003). River trade in the nineteenth century was limited by various difficulties, leaving few others to match the efforts of Kenedy and King.

Military

The LRGV has been involved, either directly or indirectly, in military actions since the Spanish Colonial period when military expeditions were sent to investigate and turn back attempts by other European colonial powers to establish a presence in the region. Near the end of the Mexican Republic's control of the region (1821-1836), the LRGV was a waypoint for military excursions led by General Santa Ana against the Texan forces assembled farther up the coast and farther inland. While the Spanish and Mexican military expeditions were important in that they were integral to the large patterns of political and cultural development of the region, little physical evidence remains from those activities.

Even after the Republic of Texas was officially formed and was independent of Mexico, the territory between the Rio Grande and Nueces River remained an area of dispute claimed by both countries. By 1846, just after Texas joined the United States, hostilities between Mexico and the United States broke out along the lower Rio Grande, with key battles between Mexican and American forces taking place at Brownsville, Palo Alto, and Resaca de la Palma, locations which today are preserved and protected as national historic battlefield monuments. The Palo Alto Battlefield, a National Historic Landmark (NHL) located within the study area, is the location of one of two critical battles of the Mexican War fought on American soil. Mexican forces were kept from the American line by American artillery under the direction of Zachary Taylor. After the battle, the Mexican troops began their retreat to a location behind the Resaca de la Palma; Taylor's victory here made the invasion of Mexico possible (Kane and Keaton 2012). Hostilities between the United States and Mexico ceased with the signing of the Treaty of Guadalupe Hidalgo on July 4, 1848, with the Rio Grande set as the international boundary between the two countries. In addition to Fort Brown at Brownsville, additional military installations were created at Rio Grande City (Fort Ringold) and Laredo (Fort McIntosh) to enforce and maintain the United States' claim to the region north of the river. These military installations were connected by a military road that followed the Rio Grande, a route that is today followed in part by US Hwy 281 and US Hwy 83.

When Texas sided with the Confederate states in the Civil War (1861-1865), the lower Rio Grande again became a focal point for military actions. Fort Brown and other military garrisons closer to the coast were directly involved in the Confederate efforts to ship cotton and other products from Texas to international markets, thereby generating much needed income for the Confederacy. Union naval forces sought to block these shipments and took control of Fort Brown for several months between November 1863 and July 1864. Although the Civil War ended on April 9, 1865, news of Lee's surrender did not reach the southern tip of Texas for several weeks and the last engagement of the Civil War occurred on May 12-13, 1865 at Palmito Ranch (Kane and Keaton 2012). The United States maintained a military presence in the region throughout the nineteenth century and continues today to be involved in border patrol activities along the international boundary defined by the Rio Grande.

Agriculture

Following the Civil War, during the Reconstruction period and through the late nineteenth century, ranching again resumed its economic dominance of the region, with cultivation of crops typically limited to a level needed for subsistence by individual families and communities. However, the fertility of the Rio Grande floodplain was recognized as early as 1870 by George Brulay, a French immigrant who developed a plantation near Brownsville, seeking to cultivate commercial crops like sugar and cotton. Brulay's efforts demonstrated, however, that successful crop cultivation in the LRGV requires irrigation at a scale that was not feasible at the time (PBS&J 2003).

The ability to pump water from the Rio Grande and irrigate farm lands at a commercial scale ultimately came in with the development of rail transportation in the early twentieth century. By 1904, the St. Louis, Brownsville and Mexico Railway was completed from Corpus Christi to Brownsville, with the Hidalgo Branch line extending along the Rio Grande northwest to Mission. As branch lines were extended to many small farming communities in the region, the railroad became known as The Spiderweb Railroad and contributed substantially to the region's development in the twentieth century by providing transportation for people and products in and out of the LRGV (PBS&J 2003). The railroad provided the means to transport heavy pumping machinery needed to lift river water into irrigation canals. As a result, agriculture became viable across the LRGV.

Today, most of the LRGV has been developed around many large-scale irrigation canal systems that dominate the landscape and make possible the Valley's citrus crops. The importance of pumping water from the river in the development of the region is reflected in the nominations of two irrigation-related cultural properties in the study area to the NRHP: The Mission Canal Company Second Lift Pumphouse and the Louisiana-Rio Grande Canal Company. The Louisiana-Rio Grande Canal Company in Hidalgo is a surviving example of the large-scale irrigated agricultural enterprises that developed in the early twentieth century (Myers and Weitze 1995). Like several other similarly styled organizations in the LRGV, the Louisiana-Rio Grande Canal Company had an enormous impact on the demographics, land use, and economic development. The company not only built an extensive irrigation canal system covering more than 40,000 acres, but also extensively promoted the sale of 20- to 40-acres farms and town lots to absentee owners. In addition to the main pumping plant on the river at Hidalgo, the company also constructed another pump house, as well as 565 miles of canals, underground irrigation pipe, and pipe drains at Hidalgo, Pharr, and McAllen (Myers and Weitze 1995).

Heritage Tourism

In recent decades, heritage tourism has become an important part of the local economy in the LRGV. However, its early development can be traced to the early twentieth century when residential land development interests began promoting tourism focused on historic sites unique to the region. Of special interest in the early decades of the twentieth century were sites associated with significant military activities and early exploration. Historic markers, for example, were erected in the Valley, as they were throughout Texas, during the State of Texas' 1936 Centennial celebration. Special historical markers commemorating historical people and events in Starr County were placed at Roma, Rio Grande City, and Fort Ringold. In Hidalgo County, Texas Centennial markers were placed at Hidalgo, Mission, and Edinburg. In Cameron County, markers were placed at Brownsville, Port Isabel and Santa Rita. In more recent decades, as heritage tourism has become increasingly important for local communities, greater efforts have been made to set aside and preserve important historic landmarks, like Fort Brown, the Palo Alto Battlefield Site, and the Resaca de Palma Battlefield site.

2.4.1.3 County Histories

Both geopolitical counties that extend into the study area share much in common historically, although each is also unique in its own way. Long before these geopolitical entities were organized, they were occupied by Native American people for approximately 11,000 years before European exploration and settlement began, as summarized above. The following historical summaries for each county are condensed from those published by the Texas State Historical Association on its *Handbook of Texas Online* website. Specific historical information about cultural resource sites associated with each county area is presented thereafter among the comprehensive results of the records review conducted for the overall study area.

Cameron County
The area now called Cameron County has long been the site of human habitation. As many as seven linguistic groups inhabited the lower Rio Grande valley when Europeans arrived. After the arrival of the Spanish in the seventeenth century, much of the native population succumbed to disease.

The region was sparsely populated at the time of the Texas Revolution and with the signing of the Treaty of Guadalupe-Hidalgo on July 4, 1848, the area became part of the United States. Much of the economy was based on trade. By the 1860s, Brownsville was a thriving city and the Civil War made it the principal port for shipment of cotton and supplies.

During the latter half of the nineteenth century Cameron County's economy was based largely on ranching. In 1904, the introduction of the St. Louis, Brownsville and Mexico Railway opened the area for settlement by Midwestern farmers, who arrived in large numbers. During the late teens and 1920s, the new settlers built irrigation systems and roads and introduced large-scale truck farming. Citrus farming became one of the Valley's leading industries. The population grew due to the influx of farmers from the Midwest and immigrants from Mexico.

The rise of agriculture was further expanded by commercial-scale truck farming of vegetable and fruit produce as well as cotton, which quickly replaced traditional corn and sorghum as cash crops. The production of cotton increased steadily after 1910 and by the 1920s it was among the area's leading cash crops. During World War II, Cameron County served as an important food production and shipping center and by the early 1960s, Cameron County had established itself as one of the state's most productive agricultural areas. The county is also a producer of oil and natural gas. In 1990, the largest towns were Brownsville, Harlingen, San Benito, Port Isabel, and La Feria (Garza and Long 2012).

Hidalgo County
The area of present day Hidalgo County has been inhabited for more than 11,000 years. Several major linguistic groups lived in the lower Rio Grande valley when Europeans entered the area, where the native groups hunted, fished, and gathered berries and fruits. In the 1750s, Spanish explorers established towns on the southern banks of the Rio Grande and settlers crossed the Rio Grande and settled the northern banks. By the 1830s, cattle ranching had grown to the point that farmers were exporting cattle to Mexico. During the American-Mexican War, Zachary Taylor laid out the Old Military Road which later became part of the Gila Route to the West Coast.

Hidalgo County was formed in 1852 during a time when its economy was characterized by stock raising, transportation, agriculture, and trade with Mexico. The county became a haven for outlaws

from both sides of the border until the 1880s when control over cattle rustlers was achieved. Ranching reached its peak 1890.

As it did in neighboring Cameron County, the arrival of the railroads transformed the economy. In 1904, the St. Louis, Brownsville and Mexico Railway stimulated the commercial scale production of citrus fruits and vegetables which could be shipped to larger markets. The train also brought an influx of settlers who established farms and grew corn and cotton. The coming of the San Benito and Rio Grande Valley Railway in 1911 made junction and the Texas and New Orleans Railroad in 1927 accelerated the growth of farming.

During the 1930s, the oil and gas industry joined farming to become the dominate activities in the county. By 1950, citrus fruit production had become the most important industry. In later years, manufacturing joined farming and oil and gas production as an important part of the economy (Garza 2012).

2.4.2 Previous Investigations

A.E. Anderson's archeological investigations of the LRGV and adjacent portions of northern Mexico in the early to mid-twentieth century have served as an early source of information for researchers seeking to develop prehistoric chronologies of the region. From 1908 to 1940, A.E. Anderson of Brownsville, Texas, collected over 2,000 artifacts from 196 sites in Cameron and Willacy counties, and an approximately equal number of artifacts from about the same number of sites in Tamaulipas, Mexico (Prewitt 1974). In his 30-year investigation, Anderson plotted each of the sites, and in 1932, described the artifacts retrieved from the sites on the Texas side of the Rio Grande (Anderson 1932). His records and data from this part of Texas, especially for the Brownsville area (Anderson 1932), provided descriptions of artifacts found in the region and identified general topographic settings for prehistoric sites. All of the sites visited by Anderson were located inland, next to remnant channels of the Rio Grande (resacas), on freshwater lakes created by eolian or karst topography, or in the clay dunes of the coastal prairie (Anderson 1932). Expanding on Anderson's early work in the regions, many subsequent archeologists have attempted to develop their own refinements and hypotheses of cultural adaptation and site location in the region.

The construction of Falcon Reservoir on the Texas and Mexico border in Starr and Zapata counties gave archeologists a unique opportunity to launch a major survey, testing, and excavation program in South Texas from 1950 to 1953. The survey produced numerous reports on the archeology of Starr and Zapata counties, as well as the archeology of a substantial portion of Mexico on the southern side of Falcon Reservoir (Terneny 2005).

Prewitt proposed that sites were most frequently located in five distinct geographic settings (Prewitt 1974): alluvial terraces adjacent to streams or rivers, broad upland remnants of Pleistocene alluvial terraces, clay dunes facing lagunas and inland lakes, resacas, and barrier islands. Hester, alternatively, proposed two geographic adaptions, including an inland savannah adaptation focused on inland grasslands and riparian environments where resources were more dispersed and limited in quantity and diversity. Hester also proposed a maritime adaptation that emphasized hunting and gathering along the coast with limited used of the adjacent inland prairies (Hester 1981).

Building on these previous investigations, Mallouf et al. (1977) developed a predictive model that was successfully used by several research teams seeking to locate sites in field surveys. Bouseman et al. (1990) report that as many as 175 prehistoric and historic sites were located using the predictive

model during surveys along drainage-ditch improvements in Hidalgo and Willacy counties. Bouseman et al. (1990) also reported that some additional sites were located at more elevated inland eolian depressions or playas which they identified as focal points for site development based on the presence of water as well as plant and animal resources.

The types of prehistoric sites encountered in the LRGV include a wide variety of open sites, burned-rock middens, shell middens, clay dune sites, lithic sites, rockshelter sites, burials, cemeteries, rock art sites, caches, and structures (Black 1989). Historic-period sites include a wide range of archeological deposits and/or structures related to the area's maritime, civic, religious, industrial, and residential development since the Spanish Colonial period.

Archeological surveys performed for regulatory compliance purposes have been numerous in the late-twentieth and early twenty-first century period, with Starr County and Hidalgo County receiving much of the attention in connection with numerous utility and infrastructure improvements in the 1980s and 1990s. Among those, the larger archeological investigations in and near the study area include investigations related to the Hidalgo-Willacy Drainage Ditch (Prewitt and Day 1981; Mercado-Allinger 1983; Hall et al. 1987; Quigg et al. 1989) and the survey conducted for the Hidalgo County Irrigation District No. 16 (Etchieson and Boyd 1982). In Cameron County, PBS&J conducted testing at four archeological sites on clay dunes (41CF18, 41CF19, 41CF50, and 41CF100 (Johnson 1990)) and later at 41CF148, 41CF150, 41CF154, and 41CF156 (Rogers 1996).

2.4.3 Records Review

GIS shapefiles identifying the locations of previously recorded cultural resources and previously conducted cultural resource investigations were requested from TARL in April of 2012. GIS records received from TARL were used to map cultural resource site locations within the study area. Previously recorded cultural resource site data available online from the Texas Historical Site Atlas (THSA) and Texas Archeological Sites Atlas (TASA) were also obtained to identify locations of designated historical sites, cemeteries, and OTHMs within the study area. TxDOT's historic bridges database was also reviewed for bridges that are listed or determined eligible for listing on the NRHP.

The review of the THSA cultural resource data indicated that 156 recorded archeological sites are within the study area. According to THC data, there are 72 cemeteries recorded within the study area, 21 of which are Historic Texas Cemeteries (HTC) (see Table 2-9). There are 123 OTHMs in the study area (see Table 2-10). These resources are summarized in Table 2-7. Of the archeological sites, only one, 41HG186, has been designated as a State Archeological Landmark (SAL). Based on the site forms on the TASA, the site appears to be a deeply buried stratified multi-component prehistoric habitation site. Two of the archeological sites, 41CF92 and 41CF3, are listed in the NRHP. These are the Palo Alto Battlefield and the Resaca De La Palma Battlefield, also listed as NHLs. The National Register District Boundary for the Resaca De La Palma Battlefield is south of the study area boundary, although the boundary of the associated archeological site extends into the study area.

Seventeen historic properties listed on the NRHP are located within the study area. These include eight historic districts and eight historic buildings. The NRHP-listed properties are shown in Table 2-8. Two of these, mentioned above, are also NHLs. No other NHLs are located within the study area.

TABLE 2-7 CULTURAL RESOURCES RECORDED WITHIN THE STUDY AREA

COUNTY	RECORDED ARCHEOLOGICAL SITES	STATE ARCHEOLOGICAL LANDMARKS	NRHP LISTED PROPERTIES	NATIONAL HISTORIC TRAILS	CEMETERIES	HTC	OTHM
Cameron	27	0	2	2	33	10	24
Hidalgo	129	1	15	0	39	11	99

Sources: NPS 2012a; THC 2012b; THC 2012c.

TABLE 2-8 NRHP PROPERTIES WITHIN THE STUDY AREA

NAME	ADDRESS	PROPERTY TYPE
Border Theater	905 North Conway Blvd., Mission	Building
Casa de Palmas	101 N. Main St.	Building
Cine El Rey	311 S. 17th St., McAllen	Building
Cortez Hotel	260 S. Texas Ave, Weslaco	Building
La Lomita Historic District	5 mi. S. of Mission on FM 1016	District
Lomita Boulevard Commercial Historic District	400 to 700 Blocks S. Conway Blvd., Mission	District
Louisiana-Rio Grande Canal Company Irrigation System	S. 2nd St. at River Levee, Hidalgo	District
Miller, Sam and Marjorie, House	707 N 15th St., McAllen	Building
Mission Canal Company Second Lift Pumphouse	6th St. and Canal, Mission	District
Mission Citrus Growers Union Packing Shed	824 W. Business TX 83, Mission	District
Oblate Park Historic District	Roughly bounded by Doherty, Keralum, W. 16th St and W 10th St., Mission	District
Palo Alto Battlefield National Historic Site	6.3 mi. N. of Brownsville at jct. of FM roads 1847 and 511	District / NHL / Texas Cultural Landscape
Rancho Toluca	FM 1015, Toluca	District
Resaca de la Palma Battlefield	North edge of Brownsville on Parades Line Rd.	Site/NHL
Roosevelt School Auditorium and Classroom Addition	407 E 3rd St., Mission	Building
Shary, John, Building	900 Doherty, Mission	Building
Teatro La Paz	514,516,518 Doherty, Mission	Building

Sources. THC 2012b; NPS 2012b.

TABLE 2-9 CEMETERIES RECORDED WITHIN THE STUDY AREA

CEMETERY NUMBER	CEMETERY NAME	COUNTY	COMMENTS
CF-C036	Raul Cavazos	Cameron	
CF-C037	El Carmen	Cameron	
CF-C063	Los Soldados	Cameron	
CF-C058	Esparza	Cameron	

TABLE 2-9 CEMETERIES RECORDED WITHIN THE STUDY AREA

CEMETERY NUMBER	CEMETERY NAME	COUNTY	COMMENTS
CF-C054	La Paloma	Cameron	
CF-C053	Old Landrum	Cameron	
CF-C052	Garcia	Cameron	
CF-C051	Gomez	Cameron	
CF-C078	Harlingen City	Cameron	
CF-C012	Weaver #2	Cameron	
CF-C075	Restlawn	Cameron	
CF-C074	La Fena	Cameron	
CF-C015	Unknown Cemetery	Cameron	
CF-C004	San Pedro at Rancho Viejo	Cameron	
CF-C023	Unknown Cemetery	Cameron	
CF-C026	Roselawn	Cameron	
CF-C027	Unknown Cemetery	Cameron	
CF-C041	Villa Nueva	Cameron	
CF-C043	La Palma	Cameron	
CF-C050	Los Indios	Cameron	
CF-C007	Palm in Field	Cameron	Historic Texas Cemetery
CF-C069	Los Cuates	Cameron	
CF-C071	La Capilla	Cameron	
CF-C011	Champion	Cameron	Historic Texas Cemetery
CF-C040	Estefana Goseascochea Cemetery	Cameron	Historic Texas Cemetery
CF-C001	Longoria	Cameron	Historic Texas Cemetery
CF-C002	Old Weaver Cemetery	Cameron	Historic Texas Cemetery
CF-C003	San Pedro	Cameron	Historic Texas Cemetery
CF-C009	Solis	Cameron	Historic Texas Cemetery
CF-C006	Zepeda	Cameron	Historic Texas Cemetery
CF-C022	San Benito City	Cameron	Historic Texas Cemetery
CF-C005	El Calaboz	Cameron	Historic Texas Cemetery
CF-C033	Alejandro Garza	Cameron	
HG-C024	Balli	Hidalgo	
HG-C075	Brewster	Hidalgo	
HG-C072	Eli Jackson	Hidalgo	Historic Texas Cemetery
HG-C073	Jackson Ranch	Hidalgo	
HG-C074	El Capote	Hidalgo	
HG-C071	Magic Valley	Hidalgo	
HG-C020	San Juan City	Hidalgo	

TABLE 2-9 CEMETERIES RECORDED WITHIN THE STUDY AREA

CEMETERY NUMBER	CEMETERY NAME	COUNTY	COMMENTS
HG-C035	St Joseph's	Hidalgo	
HG-C036	Donna City	Hidalgo	
HG-C079	Hidalgo City	Hidalgo	Historic Texas Cemetery
HG-C033	Valley Memorial Gardens	Hidalgo	
HG-C032	Laurel Hill	Hidalgo	Historic Texas Cemetery
HG-C030	San Jose	Hidalgo	
HG-C031	Temple Emanuel	Hidalgo	
HG-C028	Granjeno	Hidalgo	
HG-C058	Abram	Hidalgo	
HG-C057	Penitas	Hidalgo	
HG-C056	La Joya	Hidalgo	
HG-C012	Hillcrest Memorial Park	Hidalgo	
HG-C003	San Pedro	Hidalgo	
HG-C004	Los Pajaritos	Hidalgo	
HG-C084	Our Lady of Mercy	Hidalgo	
HG-C085	Bautista	Hidalgo	
HG-C086	Immanuel Lutheran	Hidalgo	
HG-C001	Campacuas	Hidalgo	Historic Texas Cemetery
HG-C081	Weslaco City	Hidalgo	Historic Texas Cemetery
HG-C080	Highland Memorial	Hidalgo	
HG-C083	Anacuitas	Hidalgo	
HG-C002	Nogal	Hidalgo	
HG-C005	Guzman-Toluca	Hidalgo	
HG-C008	Relampago	Hidalgo	
HG-C017	Asociacion del Cementario La Pieda	Hidalgo	Historic Texas Cemetery
HG-C082	Ebony Grove	Hidalgo	Historic Texas Cemetery
HG-C018	Guadalupe	Hidalgo	Historic Texas Cemetery
HG-C011	Restlawn	Hidalgo	Historic Texas Cemetery
HG-C016	Roselawn	Hidalgo	Historic Texas Cemetery
HG-C023	Asadores Ranch	Hidalgo	Historic Texas Cemetery
HG-C089	Garden of Angels	Hidalgo	
HG-C015	Don Patricio Gonzalez	Hidalgo	

Sources: THC 2012 and USGS Quadrangles

TABLE 2-10 OFFICIAL TEXAS HISTORICAL MARKERS WITHIN THE STUDY AREA

NAME	COUNTY
Purvis, Albanus Clemens	Cameron
San Benito	Cameron
Dunlap House	Cameron
First Presbyterian Church of San Benito	Cameron
Harlingen Cemetery	Cameron
Robertson, Col. Sam, Home of	Cameron
La Feria	Cameron
La Feria Cemetery	Cameron
Landrum House	Cameron
N/A	Cameron
Our Lady of Visitation Catholic Church	Cameron
Port of Brownsville	Cameron
Rancho Viejo	Cameron
Rancho de Santa Maria	Cameron
Sabas Cavazos Cemetery	Cameron
St. Benedict's Church	Cameron
San Benito Bank and Trust Company	Cameron
San Benito Post Office	Cameron
First Bank in La Feria	Cameron
Spiderweb Railroad	Cameron
Palo Alto, Battle of	Cameron
Longoria, Rosalio, House	Cameron
Thornton Skirmish	Cameron
Alonso de Leon Expeditions	Cameron
American Legion Hall	Hidalgo
Archer Park	Hidalgo
Battle of La Bolsa	Hidalgo
Bentsen-Rio Grande Valley State Park	Hidalgo
Bessie	Hidalgo
Brushwood Cemetery	Hidalgo
Buell School	Hidalgo
Camp Ebenezer	Hidalgo
Camp Llano Grande	Hidalgo
Fighting 69th	Hidalgo
Casa de Palmas	Hidalgo

TABLE 2-10 OFFICIAL TEXAS HISTORICAL MARKERS WITHIN THE STUDY AREA

NAME	COUNTY
Chimney Park	Hidalgo
Citrus Fruit Developed in Rio Grande Valley - Red-Meat Grapefruit	Hidalgo
1st North Dakota Infantry	Hidalgo
Saenz Don Florencio, Homestead	Hidalgo
Donna	Hidalgo
Donna Central Elementary School	Hidalgo
Donna Public Schools	Hidalgo
Edinburg Junior College Auditorium	Hidalgo
El Granjeno Cemetery	Hidalgo
El Horcon Tract and Rio Rico	Hidalgo
El Sal Del Rey, C. S. A.	Hidalgo
Everitt Building	Hidalgo
First Baptist Church of Pharr	Hidalgo
First Pharr School	Hidalgo
Pharr-San Juan-Alamo School, First	Hidalgo
First Presbyterian Church of Hidalgo	Hidalgo
Spiderweb Railroad, Former Station Site of	Hidalgo
Wood, Gregg, Home	Hidalgo
Hidalgo County	Hidalgo
Hidalgo County Bank and Trust Company	Hidalgo
Bryan, William Jennings, Home of	Hidalgo
Immanuel Lutheran Cemetery	Hidalgo
Indiana, Nebraska and Minnesota National Guards	Hidalgo
Jackson Ranch Church	Hidalgo
Closner, John, Home	Hidalgo
Shary, John H., Home	Hidalgo
Bradburn, Juan Davis	Hidalgo
Train-Truck Collision	Hidalgo
Kiwanis Club of Pharr	Hidalgo
La Lomita Chapel	Hidalgo
La Lomita Farm	Hidalgo
Louisiana-Rio Grande Canal Company	Hidalgo
McAllen First Methodist Church	Hidalgo
McAllen Lodge No. 1110, A. F and A. M	Hidalgo
McAllen Post Office	Hidalgo
Mercedes City Hall	Hidalgo

TABLE 2-10 OFFICIAL TEXAS HISTORICAL MARKERS WITHIN THE STUDY AREA

NAME	COUNTY
Moore Field	Hidalgo
Schunior, Nellie Leo, School	Hidalgo
Oblate Park	Hidalgo
Hidalgo County Jail, Old	Hidalgo
Pharr City Hall, Old	Hidalgo
Our Lady of Guadalupe Catholic Church	Hidalgo
Costilla, Padre Miguel Hidalgo y	Hidalgo
Penitas	Hidalgo
Progreso	Hidalgo
Quinta Mazatlan, Home of Jason Matthews	Hidalgo
Relampago Ranch	Hidalgo
Keralum, Rev. Pierre Yves, "The Lost Missionary"	Hidalgo
Marsh, Richard Alvis	Hidalgo
Rio Theater	Hidalgo
Sacred Heart Catholic Church	Hidalgo
Saint Joseph Catholic Church	Hidalgo
Saint Joseph's Church	Hidalgo
Saint Paul Lutheran Church	Hidalgo
San Antonio and Rio Grande Railway; "Old Flossie"	Hidalgo
San Joaquin Mission	Hidalgo
San Juan Hotel	Hidalgo
San Juan Plantation	Hidalgo
San Juan Townsite	Hidalgo
Santa Ana Land Grant	Hidalgo
Shary Building	Hidalgo
Casa de Palmas	Hidalgo
McAllen Hospital	Hidalgo
Monte Cristo	Hidalgo
Skaggs House	Hidalgo
Southern Pacific Depot	Hidalgo
Southern Pacific Depot	Hidalgo
Spiderweb Railroad	Hidalgo
Texas Citrus Fiesta	Hidalgo
The American Rio Grande Land and Irrigation System	Hidalgo
Jones, Thomas Walter	Hidalgo
Mayfield, Tom	Hidalgo

TABLE 2-10 OFFICIAL TEXAS HISTORICAL MARKERS WITHIN THE STUDY AREA

NAME	COUNTY
Hidalgo	Hidalgo
Lipscomb, W. L.	Hidalgo
Weslaco	Hidalgo
Weslaco City Hall	Hidalgo
Weslaco Water Tower	Hidalgo
Sam and Marjorie Miller House	Hidalgo
Campacuas Cemetery	Hidalgo
City of Pharr	Hidalgo
TexSun Corporation	Hidalgo
Weslaco City Cemetery	Hidalgo
First Christian Church of Weslaco	Hidalgo
The Donna News	Hidalgo
Cortez Hotel	Hidalgo
Pharr Volunteer Fire Department	Hidalgo
Asociacion del Cementerio La Piedad	Hidalgo
Eli Jackson Cemetery	Hidalgo

Source: THC 2012c.

Review of previously recorded cultural resource sites data indicates that the study area has not been examined entirely during previous archeological and historical investigations. Consequently, the review of records does not include all possible cultural resources sites 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. Within the study area, the prehistoric HPAs typically occur along resacas, streams, clay dunes, and near inland playa basins.

Historic age resources are also likely to be found near water sources. However, they will also be located in proximity to primary and secondary roads which provided access to the sites. Buildings and cemeteries are also more likely to be located within or near historic communities. Review of the Alton, Citrus City, Donna, East Brownsville, Edcouch, Edinburg, Faysville, Hargill, Harlingen, Hidalgo, Laguna Atascosa, Laguna Vista, La Blanca, La Coma, Las Milpas, La Feria, La Joya, La Paloma, Monte Christo, Los Fresnos, McCook, Mercedes, Mission, Olmito, Palmito Hill, Pharr, Rio Hondo, San Juan SE, Progreso, Santa Maria and West Brownsville topographic quadrangle maps show numerous unidentified buildings or structures within the Project area as well as rail lines, US Hwy 83 and US Hwy 281, and numerous irrigation canals within the study area. Because locations and patterns of distribution for possible historic period sites are not readily predictable or quantifiable, the route analysis process considers only recorded sites listed with the THC.

2.5 AESTHETIC VALUES

Section 37.056(c)(4)(C) of PURA incorporates aesthetics as a consideration when evaluating proposed electric transmission facilities. There are currently no formal guidelines provided for managing visual resources on private, state, or county owned lands. For the purposes of this study,

POWER defined the term "aesthetics" to accommodate the subjective perception of natural beauty in a landscape and to assess an area's scenic qualities. The visual analysis was conducted by describing the regional setting and assessing the viewer's sensitivities. Related literature, aerial photograph interpretation, and reconnaissance surveys were used to describe the regional setting and to determine the landscape character types for the area.

Consideration of the visual environment includes a determination of aesthetic values (where the major potential effect of a project on the resource is considered visual) and recreational values (where the location of a transmission line could potentially affect the scenic enjoyment of the area). POWER used the following aesthetic criteria to determine an area's aesthetic identity:

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

The study area is comprised of a primarily urban central corridor with residential and commercial development concentrated in the cities and towns, with the northern and southern portions of the study area comprised primarily of rangeland and cropland. The majority of the study area has been impacted by development activities associated with residential/commercial structures, airstrips, roadways, agriculture, and various utility corridors. Overall, the study area viewscape consists of developed areas with rangeland sloping gently toward the Rio Grande, and gently rolling hills associated with streams.

No known high-quality aesthetic resources, designated views, or designated scenic roads or highways were identified within the study area. One unofficial scenic drive was identified within the study area: US Hwy 83, or Old Military Road, from Rio Grande City to Brownsville (Rudiné 2009). Also, the study area is located within the 20-county Texas Tropical Trail Region. The trail runs along US Hwy 83 within the study area, and sites of interest within the study area include Edinburg, Mission, McAllen, Harlingen, and Brownsville (THC 2012a). Table 2-10 lists the 123 OTHMs that were identified within the study area (THC 2012b).

A review of the NPS website did not indicate any Wild and Scenic Rivers or National Monuments, within the study area (National Wild and Scenic Rivers System [NWSRS] 2011; NPS 2012). However, as described in Section 2.3.1, one National Historic Landmark/National Historical Park, Palo Alto Battlefield, is located in the eastern portion of the study area in Brownsville, Texas (NPS 2013).

Based on these criteria, the study area exhibits a moderate degree of aesthetic quality for the region. The majority of the study area maintains the feel of typical Rio Grande Valley residential communities, while the northern and southern edges maintain the feel of typical rural agricultural community. In summary, although some portions of the study area might be visually appealing, overall, the aesthetic quality of the study area is not distinguishable from that of other adjacent areas within the region.

2.6 ENVIRONMENTAL INTEGRITY

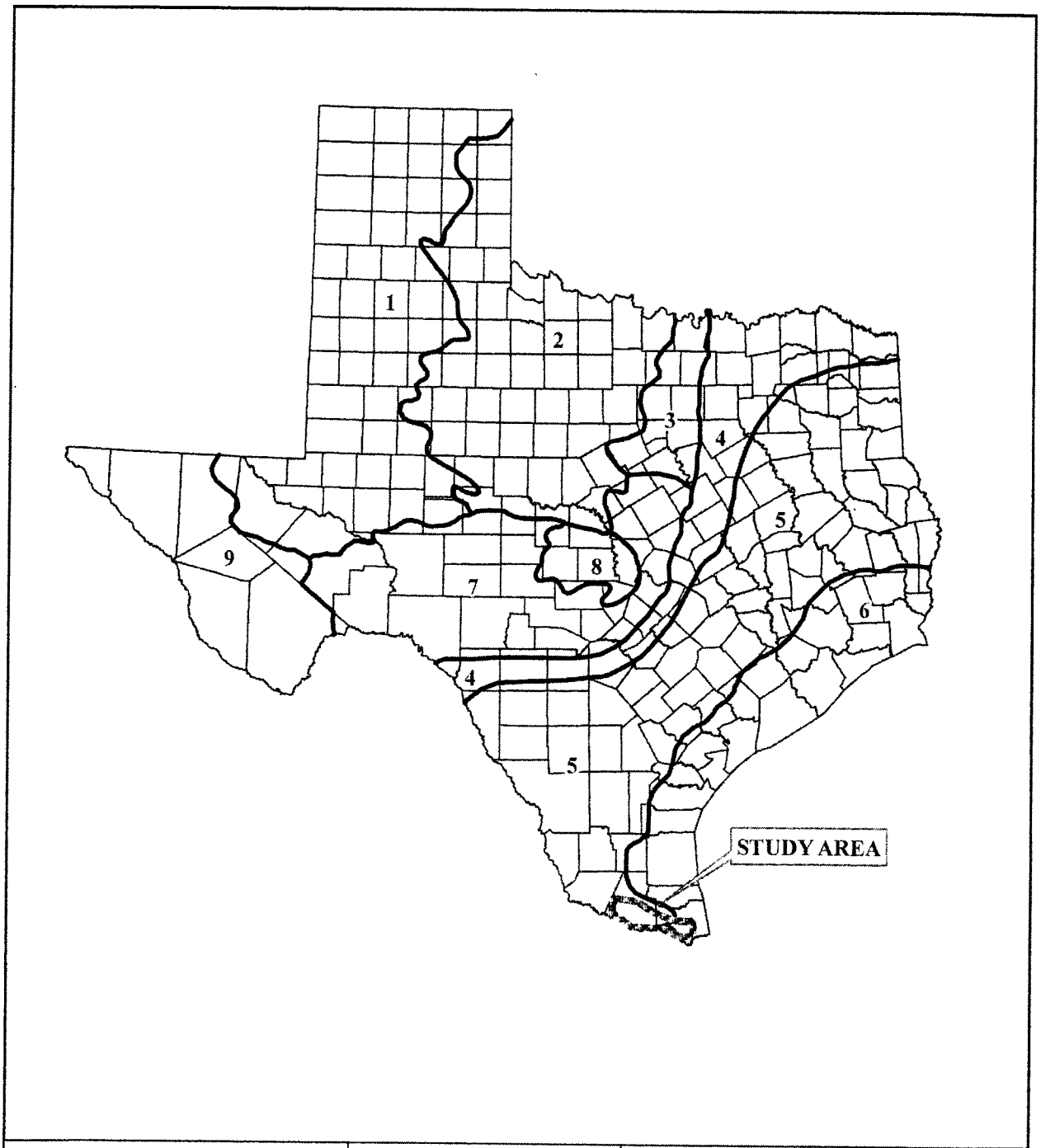
2.6.1 Physiography and Geology

As shown in Figure 2-3, the study area is located within the Interior Coastal Plains and Coastal Prairies Subprovinces of the Gulf Coastal Plains Physiographic Province (Bureau of Economic Geology [BEG] 1996). The Interior Coastal Plains is comprised of alternating belts of resistant uncemented sands among weaker shales that erode into long, sandy ridges (BEG 1996). The study area is located within the southwestern extent of the region with elevations increasing northward and westward ranging from 300 to 800 feet with a terrain of parallel ridges (questas) and valleys. Bedrock types include unconsolidated sands and muds with beds tilting towards the coastline (BEG 1996). The Coastal Prairies are nearly level with deltaic sand and mud bedrock type. Elevations within the Coastal Prairies Subprovince range from zero to 300 feet. Within the study area, elevations range between 90 feet above mean sea level (amsl) near North Edinburg to less than five feet amsl near the Brownsville Ship Channel.

Geologic formations occurring within the study area are comprised of Quaternary aged formations (BEG 1976). Alluvium formations associated with the Rio Grande extend northward along the Rio Grande floodplain. Adjacent and north of the Alluvium include the Beaumont Formation and Lissie Formations. These formations are striated with sections of windblown deposits primarily within the Weslaco area. (BEG 1976).

Quaternary Aged Formations
Alluvium deposits include floodplain deposits along the historical courses of the Rio Grande comprised of mud, silt and sand (BEG 1976). The Beaumont Formation is comprised of mostly clay, silt sand and gravel that include mainly stream channels, point bars, natural levees and backswamp deposits. Areas within the formation might be low permeable areas of clay and mud (BEG 1976). The Lissie Formation is comprised of clay, sand, silt, gravel and caliche with surfaces characterized by many undrained areas to irregular depressions (BEG 1976).

Windblown deposits include stabilized sand dune deposits and sand sheet deposits. These areas are comprised of relict eolian grains. Vegetation within these areas ranges from sparse grass to dense live oak (*Quercus virginiana*) mottes and scrub on well-established dunes (BEG 1976).



0 30 60 120 180 240
Miles

Source: Texas Bureau of Economic Geology, 1996

Legend

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

North Edinburg - Loma Alta
345 kV Transmission Line Project

Figure 2-3
Location of Study Area
In Relation to the
Physiographic
Regions of Texas

ETT Electric Transmission Texas
Date 1/10/2013

Sharyland Utilities

2.6.1.1 Geological Hazards

Several potential geologic hazards affecting the construction and operation of a transmission line were evaluated within the study area. Hazardous areas reviewed included potential karst areas with known cave locations, active or historical coal and uranium mining locations, gravel quarries, and potential subsurface contamination. No known karst geology or other karst features are known within the study area or region (Texas Speleological Survey [TSS] 1994). Review of the RRC website (2013) does not indicate any active or historical coal or uranium mining facilities within the study area. Numerous gravel and caliche quarries were identified and mapped primarily within the western extent of the study area.

Active and historical landfills within the study area were identified and mapped. Review of the TCEQ State Superfund Site database (2012a) and EPA Superfund Site database (2012a) indicated two active Superfund Sites within the study area. The Niagara Chemical Site is a State Superfund Site (EPA ID: TXD980697130) located within Harlingen that is currently in the operations and maintenance phase of remediation. Groundwater and soil contamination with lead, arsenic and pesticides is reported for the site (TCEQ 2012b). The Donna Reservoir and Canal is a federal superfund site (EPA ID: TX0000605363) that has reported high concentrations of polychlorinated biphenyls (PCBs) from an unknown source. The site extends from the pump station on the Rio Grande to the Donna Reservoir. A Remedial Investigation and Feasibility Study is currently ongoing for the site and a fish consumption advisory has been issued for the site (EPA 2012b).

2.6.2 Soils

2.6.2.1 Soil Associations

The published Natural Resource Conservation Service (NRCS) soil surveys for Hidalgo (Soil Conservation Service [SCS] 1981) and Cameron (SCS 1977) counties were used to identify and characterize the soil associations that are located within the study area. A soil association is a group of soils geographically associated in a characteristic repeating pattern and defined as a single unit.

Table 2-11 summarizes each soil association within the study area and indicates if any mapped units of the soil series within the association are considered hydric and/or prime farmlands (NRCS 2012).

TABLE 2-11 MAPPED SOIL ASSOCIATIONS WITHIN THE STUDY AREA

SOILS ASSOCIATION	DESCRIPTION	SOIL SERIES	PERCENT OF ASSOCIATION	HYDRIC SOIL	PRIME FARMLAND SOIL
Hidalgo County					
Brennan-Hidalgo	Nearly level to gently sloping, deep, moderately permeable, well drained, calcareous loamy soils	Brennan	43	No	Yes
		Hidalgo	42	No	Yes
		Other	15	NA	NA
Harlingen-Runn-Reynosa	Nearly level deep clay, slowly permeable silty clay or silty clay loam soils on terraces.	Harlingen	55	No	No
		Runn	27	No	Yes
		Reynosa	10	No	Yes
		Other	8	NA	NA
Hidalgo	Nearly level to gently sloping, deep moderately permeable, calcareous, loamy soils.	Hidalgo	90	No	Yes
		Other	10	NA	NA

TABLE 2-11 MAPPED SOIL ASSOCIATIONS WITHIN THE STUDY AREA

SOILS ASSOCIATION	DESCRIPTION	SOIL SERIES	PERCENT OF ASSOCIATION	HYDRIC SOIL	PRIME FARMLAND SOIL
McAllen-Brennan	Nearly level to gently sloping, deep, moderately permeable, well drained fine sandy loam soils.	McAllen	56	No	Yes
		Brennan	30	No	Yes
		Other	14	NA	NA
Raymondville-Hidalgo	Nearly level, deep, slowly and moderately permeable, calcareous loamy or clayey soils.	Raymondville	54	No	No
		Hidalgo	43	No	Yes
		Other	3	NA	NA
Raymondville-Mercedes	Nearly level deep slowly permeable clay loam or clay soils in uplands.	Raymondville	61	No	Yes
		Mercedes	30	No	No
		Other	9	NA	NA
Rio Grande-Matamoros	Nearly level deep moderately permeable silt loam or silty clay soils in bottomlands.	Rio Grande	42	No	No
		Matamoros	24	No	Yes
		Other	34	NA	NA
Cameron County					
Harlingen	Level and nearly level moderately well drained clays.	Harlingen	70	No	Yes
		Other	30	NA	NA
Harlingen-Benito	Level to nearly level moderately well drained to poorly drained clays.	Harlingen	45	No	Yes
		Benito	40	Yes	No
		Other	15	NA	NA
Hidalgo-Raymondville	Nearly level to gently sloping well drained and moderately well drained sandy clay loams and clay loams.	Hidalgo	40	No	Yes
		Raymondville	40	No	Yes
		Other	20	NA	NA
Laredo -Olmito	Nearly level to gently sloping well drained and moderately well drained silty clay loams and silty clays.	Laredo	65	No	Yes
		Olmito	20	No	Yes
		Other	15	NA	NA
Mercedes	Level to gently sloping moderately well drained clays.	Mercedes	75	No	Yes
		Other	25	NA	NA
Raymondville	Nearly level moderately well drained clay loams.	Raymondville	82		Yes
		Other	18	NA	NA
Rio Grande-Matamoros	Nearly level to gently sloping well drained and moderately well drained silt loams and silty clays.	Rio Grande	49	No	Yes
		Matamoros	27	No	Yes
		Other	24	NA	NA
Sejita-Lomalta-Barrada	Level poorly drained and very poorly drained clays and silty clay loams	Sejita	31	Yes	No
		Lomalta	29	Yes	No
		Barrada	24	Yes	No
		Other	16	NA	NA
Willacy-Racombes	Nearly level to gently sloping well drained fine sandy loams and sandy clay loams	Willacy	40	No	Yes
		Racombes	35	No	Yes
		Other	25	NA	NA

Notes: NA - Not Applicable.

2.6.2.2 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 2012).

Map units that are dominantly comprised of hydric soils might have small areas, or inclusions, of non-hydric soils in the higher positions on the landform, and map units dominantly made up of non-hydric soils might have inclusions of hydric soils in the lower positions on the landform (NRCS 2012).

Many of the minor soil components (identified as "Other" in Table 2-11) may include one or more soil series that are rated as hydric soils. These minor soil components would be considered hydric under some conditions, which might or might not occur where those soils occur in the study area.

2.6.2.3 Prime Farmland Soils

The Secretary of Agriculture, within 7 U.S.C. § 4201(c)(1)(A), defines "prime farmland soils" as those soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. They have the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. Additional potential prime farmlands are those soils that meet most of the requirements of prime farmland but fail because they lack the installation of water management facilities, or they lack sufficient natural moisture. These soils would be considered prime farmland if such practices were installed.

According to the NRCS Soil Data Mart (NRCS 2012), the study area contains multiple soil series designated as prime farmland soils. The soil associations listed in Table 2-11 were compared to listed prime farmland soil map units and prime farmlands were indicated if the mapped units were listed with the soil series. This does not imply that all soil series within the mapped units are considered prime farmlands nor does it imply that minor soil components (identified as "Other" in Table 2-11) are not considered prime farmland soils.

The NRCS responded to POWER's solicitation for information in a letter dated April 4, 2012 that states "[t]he proposed project may contain Important Farmland Soils; however, we do not normally consider the construction of transmission lines a conversion of Important Farmlands because the site can still be used after construction. We have completed a Farmland Conversion Impact Rating (Form AD-1006) indicating the exemption" (see Appendix A).

2.6.3 Water Resources

2.6.3.1 Surface Water

The study area is located within the Nueces-Rio Grande Coastal Basin and South Laguna Madre watershed (EPA 2012c). Upland areas within the study area are dissected by numerous irrigation and drainage canals, floodways and streams. Major surface waters within the study area include the Arroyo Colorado and La Joya Creek. The Rio Grande is located adjacent to the study area. Streamflow within the study area discharges into either the Rio Grande or the Lower Laguna Madre.

Irrigation canals within the study area primarily draw water from the Rio Grande. The Rio Grande discharges into the Gulf of Mexico near Brownsville.

Numerous reservoirs, resacas and small lakes were identified within the study area. Reservoirs mapped include La Feria, Adams Gardens, Donna, Valley Acres, Boyeye and the Mercedes District Settling Basin. Named lakes within the study area include Loma Alta, San Martin, Cuates, Bentson, Conception, Sapo, Campacucuas, Grande, Walker, Edinburgh, Reba Bass, Llano Grande, and Lions lakes. Resacas located within the study area include Sardinas, Reparo, Del Rancho Viejo, De La Palma, Del Jardin, De Las Flores, De Los Cuates, De Las Antonias and De Los Fresnos.

Under 31 TEX. ADMIN. CODE § 357.8, TPWD has designated Ecologically Significant Stream Segments (ESSS) based on habitat value, threatened and endangered species, species diversity, and aesthetic value criteria. Review of TPWD information indicates the Rio Grande is designated as ESSS from its confluence with the Gulf of Mexico in Cameron County upstream to Falcon Reservoir Dam (TPWD 2013). This designation is based on priority bottomland habitat and extensive freshwater and estuarine wetland habitats with high water quality and exceptional aquatic life use with a diverse benthic macroinvertebrate community, and high aesthetic value. The Arroyo Colorado is also designated as an ESSS from upstream of the Port of Harlingen to its mouth at the Laguna Madre. This section is located downstream of the study area boundary.

In accordance with CWA §§ 303(d) and 304(a), the TCEQ identifies surface waters for which effluent limitations are not stringent enough to meet water quality standards and for which the associated pollutants are suitable for measurement by maximum daily load. Review of the most recent TCEQ § 303(d) lists (TCEQ 2012c) indicates the Rio Grande, Brownsville Ship Channel and the non-tidal segments of the Arroyo Colorado with associated unnamed ditches do not meet the criteria established for bacteria and other contaminants within the study area. Construction of the transmission line Project is not anticipated to exacerbate any water quality issues within these surface waters.

2.6.3.2 Ground Water

Portions of the study area are located on the Western extent of the Gulf Coast aquifer, a major aquifer (TWDB 2011a). The Gulf Coast aquifer parallels the Gulf of Mexico coastline from the Louisiana to Mexican borders. It consists of several aquifers, including the Jasper, Evangeline, and Chicot aquifers, and is composed of discontinuous sand, silt, clay, and gravel beds. The maximum total sand thickness of the Gulf Coast aquifer is approximately 700 feet in the southern portion. Water quality varies with depth and locality with water quality declining towards the south, where total dissolved solids range from 1,000 to more than 10,000 milligrams per liter with high levels of naturally occurring radionuclides. Aquifer productivity decreases in the southern extent (TWDB 2011a).

The TWDB database was reviewed for public and private water wells within the study area (TWDB 2012a). Spatial data from irrigation districts were also reviewed for canals and pipelines when available. No significant active or historical flowing springs were identified within the study area (Brune 2002). A majority of the smaller springs noted are associated with the Arroyo Colorado or the Rio Grande surface waters. No flowing springs of significance are anticipated to occur within the study area due to historic land use practices within the region which have lowered the water table.

2.6.3.3 Floodplains

FEMA has mapped the 100-year floodplain within the study area which is associated with the Rio Grande and the Arroyo Colorado and their associated stream tributaries and drainage canals. The 100-year flood (1% flood or base flood) represents a flood event that has a one percent chance of being equaled or exceeded for any given year (FEMA 2012). Two primary floodways, Main Floodway and North Floodway, were constructed to divert floodwaters from the Rio Grande. These are operated and maintained by the United States Section of the IBWC. The Rancho Viejo floodway is also located within the study area. Floodway inlets include Hockney Lake and Mission Lake.

2.6.3.4 Future Surface Water Developments

The Regional Water Plan for Region M (TWDB 2011b) was reviewed for potential future water development projects within the study area. Numerous water development projects are being evaluated along the Rio Grande near the Brownsville area. The Brownsville Weir and Reservoir Project is sponsored by the BPUB and will replace the existing rock dam on the Rio Grande. The project is currently in the permitting/funding phase of development (BPUB 2013). The Banco Morales Reservoir project will be designed to divert excess flow from the Rio Grande, a desalination plant is proposed for the Port of Brownsville area and dredging resacas located within Cameron County are also proposed. These projects are all within the conceptual and/or funding phases (TWDB 2011b).

2.6.3.5 Coastal Resources

The Texas GLO must develop and implement a comprehensive plan for managing the natural resources along the Texas Gulf of Mexico coastline under the Texas CMP as specified in the Coastal Coordination Act of 1991. The easternmost extent of the study area is located within the CMZ, as defined by the Coastal Management Boundary and Coastal Facilities Designation Line.[2] The study area was reviewed for designated CNRAs (GLO 2013; USFWS 2013c; TPWD 2013f; THC 2012c and FEMA 2013), and the CNRAs within the study area were mapped. CNRAs identified within the study area include coastal wetlands (estuarine and freshwater emergent wetlands within the San Martin Lake and Bahia Grande area), submerged lands (limited to Brownsville Ship Channel) coastal historic area (Palo Alto Battlefield) and special hazard areas (FEMA floodplains).

2.6.4 Ecological Resources

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

2.6.4.1 Ecological Region

The study area lies within the Western Gulf Coast Plains Level III Ecoregion (Griffith et al. 2007). The Western Gulf Coastal Plain is a relatively flat strip of land, generally 50 to 90 miles wide, located adjacent to the Gulf of Mexico. The principal distinguishing characteristic of this ecoregion is its relatively flat topography with a high percentage of the habitat converted to croplands. Within the Western Gulf Plain Ecoregion, the Level IV Ecoregions located within the study area include the LRGV, Lower Rio Grande Alluvial Floodplain, and Laguna Madre Barrier Islands and Coastal

[2] At the Project's location along the Gulf Coast, these boundaries are identical.

Marshes ecoregions. Within the study area, the LRGV ecoregion covers portions in northern central Hidalgo County. The Lower Rio Grande Alluvial Floodplain ecoregion extends north from the Rio Grande in southern Hidalgo County and broadens into Cameron County. The Laguna Madre Barrier Islands and Coastal Marshes ecoregion is located on the eastern extent of the study area north of the Brownsville Ship Channel (Griffith et al. 2007).

The LRGV ecoregion once supported a diverse grassland/shrub community with low woodlands. Due to development, grazing and wildfire confinements over the last 150 years, invasive brush species such as mesquite (*Prosopis* spp.) and grajeno (*Celtis pallida*) now dominate the landscape (Griffith et al. 2007). Within the study area, a vast majority of the area has been converted to agricultural uses or is consumed by urban sprawl.

The Lower Rio Grande Alluvial Floodplain ecoregion consists of alluvial sands and clays of the Rio Grande floodplain. Within the study area the majority of native vegetation in this ecoregion has also been converted to agricultural uses or has been consumed by urban sprawl. Within the lower reaches of the Rio Grande, near Brownsville, historical native vegetation included subtropical upland evergreen forests with Texas ebony (*Pithecellobium flexicaule*) and deciduous hardwood forests with sugar hackberry-cedar elm (*Celtis laevigata-Ulmus crassifolia*) in the floodplains. Floodplain ridges in this area once included abundant palm trees (*Sabal mexicana*). The majority of this habitat was removed by the early 1900s, although remnant patches of this habitat may still occur.

The Laguna Madre Barrier Islands and Coastal Marshes ecoregion is characteristic of the hypersaline Laguna Madre. Within the study area north and east of Brownsville, saline-influenced soils are the extent of this ecoregion, primarily near the San Martin Lake area.

2.6.4.2 Vegetation Types

The study area is located within the South Texas Plains and Gulf Coast Prairies and Marshes vegetational areas (see Figure 2-4) (Gould et al. 1960). Native vegetation within the LRGV includes mesquite-acacia-savannah with grasses including seacoast bluestem (*Schizachyrium scoparium* var. *littorale*), plains bristlegrass (*Setaria leucopila*), paspalums (*Paspalum* spp.), buffalograss (Buchloe dactyloides), windmill grass (*Chloris verticillata*), common curly mesquite (*Hilaria belangeri*), Arizona cottontop (*Digitaria californica*), and threeawn (*Aristida* spp.) with woody vegetation including scattered honey mesquite (*Prosopis glandulosa*), blackbrush (*Acacia rigidula*), grajeno, guajillo (*Acacia berlandieri*), and cenizo (*Leucophyllum fructescens*) (Hatch et al. 1990 and McMahan et al. 1984).

Native vegetation within the Lower Rio Grande Alluvial Floodplain includes floodplain forests of Texas ebony, tepeguaje (*Leucaena pulverulenta*), anacua (*Ethretia anacua*), sugar hackberry, Texas palm, cedar elm, and Mexican ash (*Fraxinus berlandieriana*), as well as some mesquite-mixed shrub savanna with mesquite, granjeno, Texas ebony, and snake eyes (*Phaulothamnus spinescens*) (Hatch et al. 1990).