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# Archeological Survey of the Chalupa Wind Project - Arroyo Colorado Transmission Line Crossing Cameron County, Texas

Blanton & Associates, Inc.

ENVIRONMENTAL CONSULTING • PLANNING • PROJECT MANAGEMENT

FINAL

# ARCHEOLOGICAL SURVEY OF THE CHALUPA WIND PROJECT - ARROYO COLORADO TRANSMISSION LINE CROSSING CAMERON COUNTY, TEXAS

*Antiquities Code of Texas Permit No 8655*

*Principal Investigator:*

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# ARCHEOLOGICAL SURVEY OF THE CHALUPA WIND PROJECT - ARROYO COLORADO TRANSMISSION LINE CROSSING CAMERON COUNTY, TEXAS

*By*

Jon J. Dowling, Sarah Himes Morris, and Joe Sanchez

*Prepared for*

**LA CHALUPA, LLC**

*Antiquities Code of Texas Permit No.8655*
Jon J. Dowling, Principal Investigator

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## ABSTRACT

Between December 3 and 8, 2018, Blanton & Associates, Inc. (B&A), on behalf of La Chalupa, LLC, conducted an archeological survey within the proposed Chalupa Wind Project - Arroyo Colorado Transmission Line Crossing (the Project), in Cameron County, Texas. The proposed overhead transmission line would be approximately 10.4 miles in length, 1.7 miles of which would be located on property owned by the Port of Harlingen Authority, a political subdivision of State, triggering compliance with the Antiquities Code of Texas and associated regulations outlined in 13 TAC 26. The project would also require a federal permit to be issued under the auspices of Section 10 of the Rivers and Harbors Act of 1899, which will require compliance with Section 106 of the National Historic Preservation Act and associated regulations outlined in 36 CFR 800. The project area consists of approximately 20.45 total acres. Twelve trenches were excavated in connection with this investigation. No archeological sites were identified. Based on these findings, B&A recommends that the proposed project proceed to completion without further archeological work. Curation of records generated in connection with this survey occurred at the University of Texas San Antonio's Center for Archaeological Research.

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# INTRODUCTION

This document presents results of an archeological resources survey by Blanton & Associates, Inc. (B&A) that was conducted between December 3 and 8, 2018 on behalf of Acciona Energy USA Global, LLC prior to construction of the proposed Chalupa Wind Project - Arroyo Colorado Transmission Line Crossing (the Project), in Cameron County, Texas. The Project would entail construction of an overhead transmission line connecting the proposed Chalupa Wind Project to a proposed substation to be built by American Electric Power and would be approximately 10.4 miles in length, 1.7 miles of which would be located on property owned by the Port of Harlingen Authority. Project location maps on county, topographic, and aerial bases are included as **Figures 1, 2** and **3**. The Project consists of approximately 20.45 total acres.

The proposed transmission line would necessitate crossing the Arroyo Colorado, which is considered a navigable water of the U.S. by the U.S. Army Corps of Engineers (USACE), Galveston District. Although the planned overhead electric transmission line crossing is not expected to directly impact the Arroyo Colorado or require a Section 404 Clean Water Act permit, the Arroyo Colorado is considered a navigable water at the proposed crossing location and is regulated under the Rivers and Harbors Act of 1899. As such, a Section 10 permit from the USACE will be required to authorize the transmission line crossing. Issuance of this federal permit requires compliance with Section 106 of the National Historic Preservation Act and associated regulations outlined in 36 CFR 800. At the Arroyo Colorado crossing and vicinity, transmission line tower development would be located on property owned by the Port of Harlingen Authority ("Port"), which is a political subdivision of State, triggering compliance with the Antiquities Code of Texas and associated regulations outlined in 13 TAC 26.

The Project's Area of Potential Effects (APE) for archeological resources was defined as being limited to the area of the proposed transmission line easement on Port property, which would be approximately 20.45 total acres. This area is depicted in **Figure 3**.

The purpose of the survey was to search for archeological resources within the APE, evaluate the eligibility of discovered resources for inclusion in the National Register of Historic Places (NRHP) and/or designation as a State Antiquities Landmark (SAL), and make recommendations for management of such resources by avoidance, preservation, or further investigation. One hundred percent of the APE was surveyed during the investigation. Field investigations were conducted in accordance with the Department of the Interior's Standards and Guidelines (National Park Service 1983), the Guidelines of the Council of Texas Archeologists (CTA) (1987), and the survey standards developed by the Texas Historical Commission (THC) in conjunction with the CTA (THC n.d.). Survey investigations were conducted under Antiquities Code of Texas Permit No. 8655 (Appendix C) issued to Principal Investigator Jon J. Dowling, and fieldwork was carried out by Joe Sanchez and Jon Dowling.

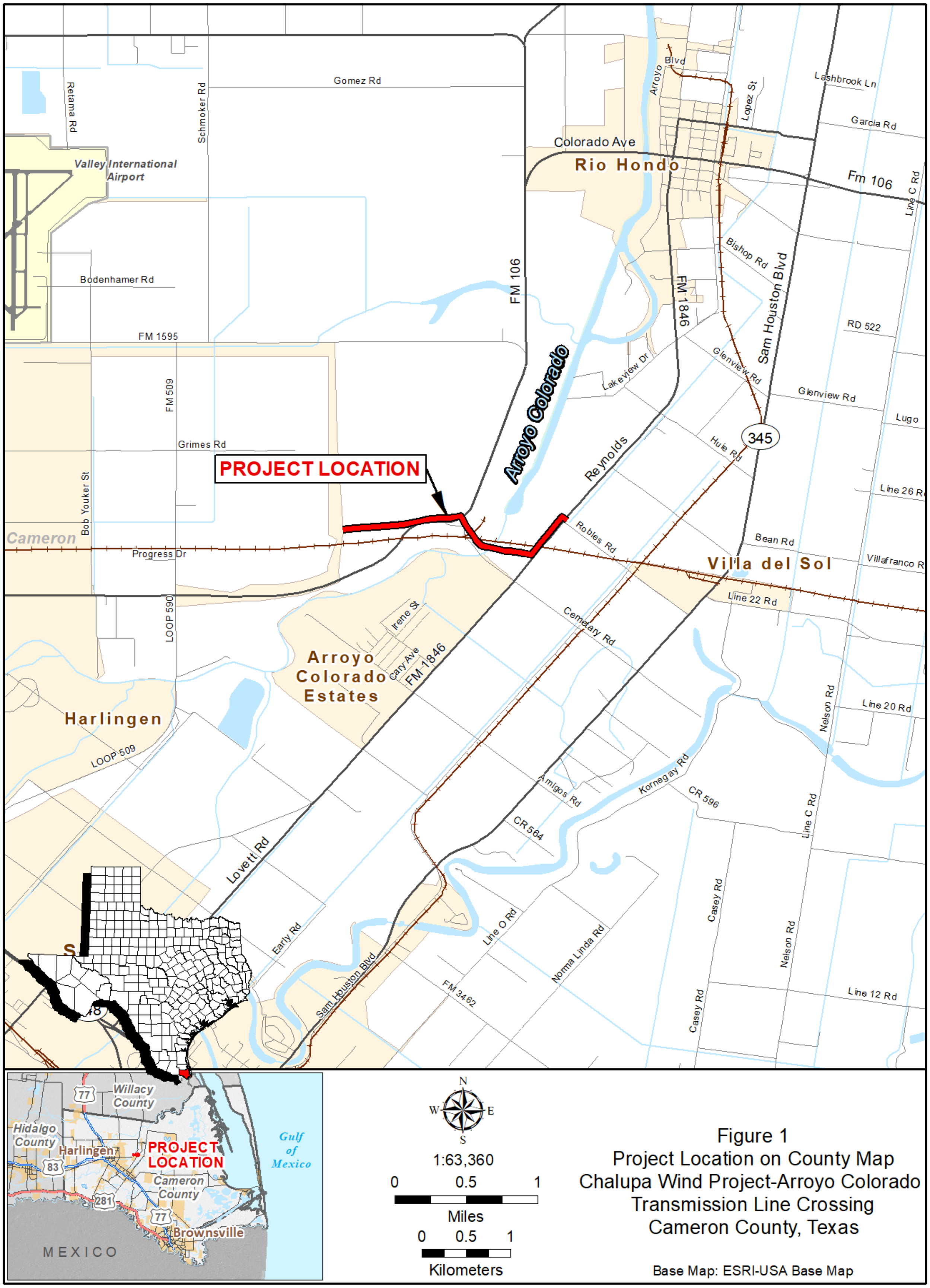


Figure 1
Project Location on County Map
Chalupa Wind Project-Arroyo Colorado
Transmission Line Crossing
Cameron County, Texas

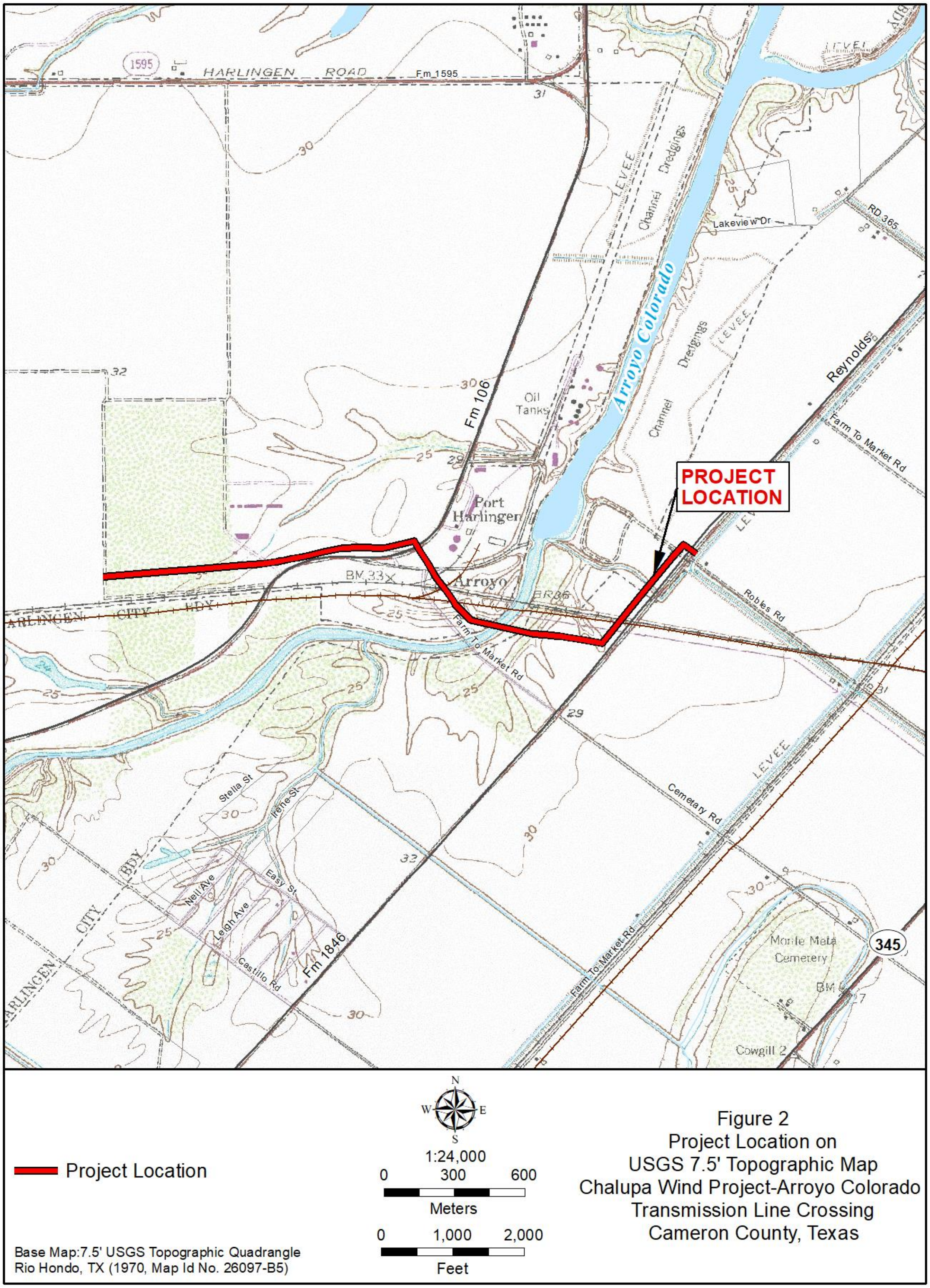


Figure 2
Project Location on
USGS 7.5' Topographic Map
Chalupa Wind Project-Arroyo Colorado
Transmission Line Crossing
Cameron County, Texas

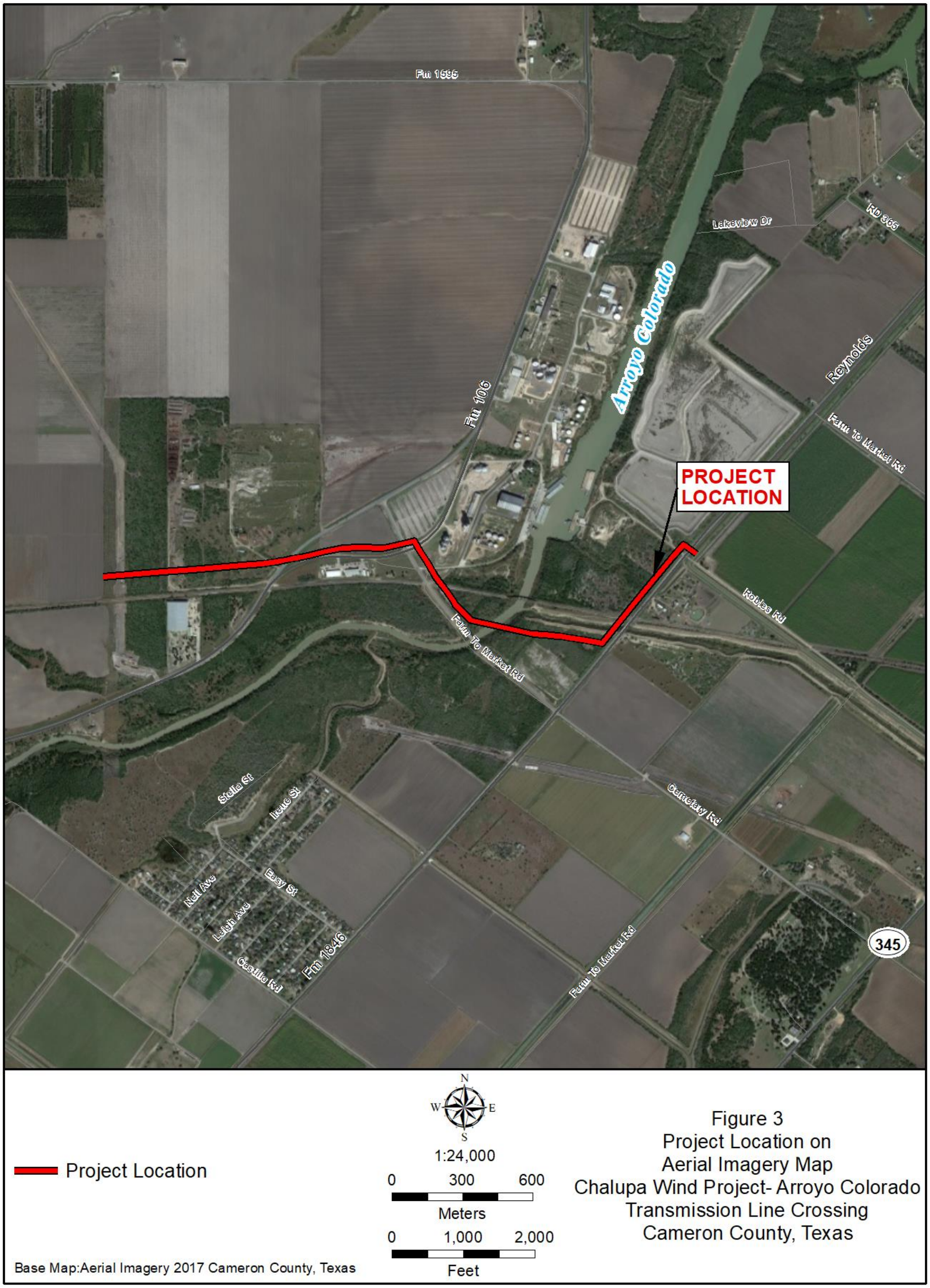


Figure 3
Project Location on
Aerial Imagery Map
Chalupa Wind Project- Arroyo Colorado
Transmission Line Crossing
Cameron County, Texas

## ENVIRONMENTAL SETTING

The APE is located in the South Texas plains and brush country that extends from the Central Texas Hill Country to the Lower Rio Grande Valley (Bureau of Economic Geology [BEG] 1992). This ecological region of Texas is predominantly dry and covered with grasses and thorny brush such as mesquite and prickly pear cacti. Several ephemeral lakes and resacas (partitioned segments of the Rio Grande) interlace the APE that occasionally fill with silt and water, creating marshes and ponds. The plants and wildlife around the resacas vary seasonally. The Lower Rio Grande Valley is a subtropical environment, which lies further south than any other part of the U.S. except Hawaii and part of Florida. It is typically very humid. Palms, subtropical woodlands, and citrus trees grow in abundance. The Spanish explorer Alonso Alvarez de Piñeda first named the river the Rio de las Palmas, "River of Palms," in 1519. The fertile land along the Rio Grande has given rise to many farms.

The Arroyo Colorado (**Figure 4**) is one of only two freshwater inputs (the other being the North Floodway), to the Lower Laguna Madre (LLM) ecosystem and serves as nursery and habitat for many recreationally important species. As an ancient distributary of the Rio Grande, the Arroyo Colorado serves as drainage for crop irrigation, municipal wastewater returns, and as a floodway during periods of heavy precipitation in the Lower Rio Grande Valley. The upper reaches of the Arroyo Colorado include areas of rich farm and citrus land and the municipalities of Mission, McAllen, Weslaco, and Harlingen. The lower Arroyo Colorado courses through an area of farms, coastal playas, and the Laguna Atascosa National Wildlife Refuge. The original stream bed of the Arroyo Colorado meandered from Mission, Texas to the LLM just north of the current discharge point. Then, in the late 1940s, the USACE dredged and channelized the lower 41-kilometer (km) segment of the Arroyo Colorado from the Port to the LLM for commercial barge traffic.

### GEOLOGY

The geological architecture of the APE consists of alluvium of the Rio Grande, which is subdivided into areas of predominantly sand (BEG 1968). Its major lithologic constituents are unconsolidated fluvial silt and sand. This formation can date to the Holocene, which is contemporaneous with prehistoric human occupation.

### SOILS

The soils in the APE consist of Mercedes Clay (Web Soil Survey 2018). They typically occur within delta plains and a typical profile consists of 0 to 74 inches of clay. Their parent material is calcareous clayey alluvium. Mercedes clay is moderately well drained.

**Figure 4. Arroyo Colorado overview, northeast**

# CULTURAL BACKGROUND

The earliest synthesis of the South Texas region's archeology was attempted by E. B. Sayles (1935), who defined several cultural complexes along the Texas coast that indicated the presence of extensive campsites inland. Later, J. Charles Kelley (1947) defined the Monte aspect in this region, and Richard MacNeish (1947, 1958) included some parts of Texas along the lower Rio Grande in his archeological survey of Tamaulipas, creating the Brownsville, Abasolo, and Repelo cultural complexes.

Suhm et al. (1954) summarized the archeology of this region, incorporating newly collected data from the Falcon Reservoir survey and excavations (Jelks 1952, 1953; Krieger and Hughes 1950). Two new foci were defined consisting of the Falcon focus and Mier focus. The Falcon focus represented the Archaic of the region, while the Mier focus, with smaller dart points and arrow points, was considered later in time. The prehistoric cultures of South Texas and its sub-areas have been most recently synthesized by Hester (1989, 1995) and Black (1989); the following brief summary draws most heavily from those sources. The cultural periods are Paleoindian (11,200 to 8,000 B.P.); Early Archaic (8,000 to 4,500 B.P.); Middle Archaic (4,500 to 2,400 B.P.); Late Archaic (2,400 to 1,200 B.P.); and Late Prehistoric (1,200 to 400 B.P.) (Black 1989:48-51). The Historic period is defined as 1519 AD to 1965 AD. A historical overview of the Lower Rio Grande Valley will follow.

## PALEOINDIAN (CA. 11,200 TO 8,000 B.P.)

The earliest evidence of the human presence in South Texas dates to the Paleoindian period. This period originally included the earliest inhabitants of the New World who spread across the American continent in the waning years of the Pleistocene era. Recent possible pre-Clovis finds in both North and South America such as the site of Monte Verde in southern Chile (Dillehay 1989, 1997) may significantly refine the chronology of New World occupation, but the finds are still sporadic and not universally accepted.

Paleoindian cultures are typically identified by their distinctive lithic technology, including well-made projectile points such as *Clovis*, *Folsom*, and *Plainview* as well as a wide range of related lanceolate forms. Other diagnostic technologies include large polyhedral blade cores and prismatic blades associated with the Clovis techno-cultural complex and large bifacial cores and ultra-thin bifaces associated with Folsom techno-cultural complex. Paleoindian materials, though rarely preserved in context, have been identified along the Lower Texas Coast. One location in particular, the La Paloma Mammoth site (41KN78), was identified in 1975 along Palo Blanco Creek in Kenedy County, approximately 145 km northwest of the APE. The site consisted of several dart points in possible association with the remains of mammoth and *Bison antiquus* (Suhm 1980). Throughout the South Texas Plains area, most of these artifacts are scattered surface finds rather than from buried stratified sites. Data from the broader area comprising southern, southwest, and central Texas indicate that primary site types from this period include open sites and rockshelters with evidence of general occupation along with specialized activities such as stone-tool making, hunting, and game processing. Stone artifact caches and human burials have also been found that date to the Paleoindian era. In the past, the Paleoindian peoples have typically been characterized as a nomadic, big-game hunting culture, but considerable evidence in nearby regions from sites such as Baker Cave suggests a broader range of subsistence activities within a rich and complex cultural tradition (Hester 1983).

Overall, the Paleoindian era is one that is marked by a gradual warming trend at the close of the final Pleistocene Wisconsonian glaciation. This warming trend is associated with a dramatically shifting faunal and floral environment, to which the various cultural traditions quickly adapted.

## ARCHAIC (CA. 8,000 TO 1,200 B.P.)

The transition from Paleoindian to the Early Archaic is difficult to define precisely, but the Archaic projectile points begin to shift from lanceolate forms to stemmed points, though some later lanceolate forms such as *Golondrina* and *Angostura* may persist longer. Unfortunately, beyond a very few excavated sites (Scott and Fox 1982), subsistence data are scarce for sites of this period. Early Archaic sites are known throughout the area, though few have been excavated, and there is very little data on such sites in the Rio Grande Plain subregion (Black 1989:49). Sites are found on high terraces and in the uplands but buried alluvial sites have also been identified. As with the Paleoindian period, the widespread distribution of artifact types and low site counts suggest a small population, small band sizes, and large territorial ranges, though as Story (1985) and Black (1989) have argued, these generalizations probably apply to a wide area of the West Gulf Coastal Plain. Regional themes in the Archaic include the emergence of a triangular tool-type tradition including the widespread use of distally beveled tools and the development of subregionalized but poorly understood mortuary complexes.

Despite its later date, the Middle Archaic of the South Texas Plains is little better known than its Early Archaic and Paleoindian antecedents. Hampered by the paucity of excavated sites and the near absence of radiocarbon dates, much must be inferred by comparisons with adjacent regions (Black 1989:49-51). By the Middle Archaic, ground stone, including manos and metates, occurs at a number of sites, perhaps indicating a greater reliance on plant materials than during previous periods and methods of food processing. Unifacial, distally beveled tools also continue, while triangular dart points characterize the projectile points of this period. Stemmed points are also present (Hester 1995:438). The persistent *Clear Fork* tool type continues in both bifacial and unifacial forms, though much smaller than its earlier variants (Turner and Hester 1999:246). Sites have been identified in the uplands as well as alluvial settings and along estuary bays in the Coastal Bend. Chronologically diagnostic artifact scatters appear for the first time in the Rio Grande delta (Black 1989:49). Middle and Late Archaic sites occur on terraces, arroyo banks, and in hilly areas overlooking arroyos and their tributaries. Hall et al. (1986) suggest a greater reliance on plant materials based on the presence of burned-rock concentrations. Population densities may have increased during this period along with more-defined territories.

Late Archaic sites in South Texas are quite numerous, and this period is better known than its predecessors. During this time, plant and marine resources probably took on a greater role than hunting of large mammals. In fact, resource specialization may have reached a peak during the late Archaic, followed by a somewhat more generalized subsistence in the subsequent Late Prehistoric period (Black 1989:51). A further increase in population is implied by the increase in site density during this period. Regional distinctions in artifact assemblages and other cultural traits also become prominent at this time.

## LATE PREHISTORIC/PROTOHISTORIC (CA. 1,200 TO 400 B.P.)

The final prehistoric period, the Late Prehistoric, is well represented in South Texas. This period is marked by the introduction of new technologies, including the bow and arrow and ceramics, as well as potentially new adaptive strategies. Site types are varied and include open campsites, lithic scatters, and cemeteries. Site types indicate local lithic styles and intrusions from adjacent areas. Local ceramic styles are infrequent if non-existent unless associated with assemblages also occurring in other regions. At the southernmost tip of the culture area, the Brownsville complex is noted for its shell-working industry and influences from groups along the Mexican coast. Regionally, the complex is thought to be confined to the Rio Grande Delta, although recent evidence has indicated it extends beyond the delta to portions of the Hebbronville Plain (Riggs 2011). The shell assemblages typically include edge-flaked Sunray Venus clam shells, conch adzes, and columella gouges as well as various ornamental bead and pendant forms made from conch body sections (Ricklis 1995:291). The lithic assemblage usually includes unstemmed arrow points (Starr and Cameron), utilized flakes and circular unifaces. Based primarily on a scant number of Huastecan sherds (typically found in northeastern Mexico) collected by A.E. Anderson, interactions between local populations and those from northeastern Mexico are postulated.

Two subperiods that have been defined for this period in Central Texas also have relevance to the Late Prehistoric of the South Texas Plains. The earliest part of this period, the Austin subperiod (beginning about 1,300 to 1,200 B.P.) reflects a certain degree of cultural and economic continuity underlying the adoption of new technologies while the later Toyah subperiod (extending roughly to the beginning of the historic era) may indicate the introduction of immigrants following a southward extension of the range of the bison. Throughout most of the state, there is an intensification of animal exploitation as evidenced by the faunal remains that occur during the Late Prehistoric period, particularly during what has been termed the Toyah Phase.

The transition to the Protohistoric/Historic period reflects catastrophic replacement of indigenous groups. Little is known of the fate of the prehistoric inhabitants of South Texas during this period. Though a number of small groups have been documented in the early historic era of south, south-central, and coastal Texas, most disappeared very quickly from the written records. In South Texas, Campbell (1988) documented the available evidence of the numerous Native American bands that roamed this region in the early historic era.

## HISTORIC (1519 AD - 1965 AD)

The first non-native intrusions into the area surrounding the APE were instigated by Spain in the sixteenth century. Alonso Alvarez de Pineda arrived to explore and map the area in 1519 sponsored by the Spanish governor of Jamaica, Francisco de Garay. His expedition was followed by subsequent *entradas* by Diego de Camargo (1520), Gonzalo de Ocampo (1523), Sancho de Caniedo (1528), and Pedro de Alvarado (1535) (EHA 1981). Ocampo’s expedition charted and named the passage between Brazos Island and Padre Island *Brazos de San Iago* (Arms of Saint James) (EHA 1981).

Subsequent concerted Spanish exploration beyond the coast in the 1600s and 1700s was focused on assessing the areas along the Rio Grande for colonization. To this end, much of the northern bank of the river was explored including expeditions by Jacinto García de Sepulveda between present-day Brownsville and Mier in 1638 (Garza and Long 2018a), and Miguel de la Garza Falcón between Boca Chica and Eagle Pass in search of suitable settlement areas in 1747 (García 2018). These *entradas* would likely have resulted in contact between native groups and European explorers in the vicinity of the APE.

Spanish colonization of south Texas did not take root until 1749 when the area became part of the Spanish province of *Nuevo Santander*, a region between the Nueces River and the southern border of today's Mexican state of Tamaulipas. The province was established for exploration and colonization to be administered by José de Escandón. Under Escandón's direction, 23 settlements were established at dependable water sources (mostly the Rio Grande) and populated by over 3,600 colonist/farmers with 15 Indian missions populated by 3,000 converted indigenous peoples (Pierce 1917). All but two of these settlements were south of the Rio Grande, with the easternmost settlement at Reynosa. Lands east of Reynosa were considered unfit for agriculture and thus colonization (EHA 1981). Although not ideal for agriculture, the vast prairie that characterized lands north of the Rio Grande was well suited for cattle grazing. Escandón's efforts represented the first and only time in the history of New Spain that a territory was settled by colonists rather than soldiers or priests (Cunningham 2010). Cunningham writes, "This colonization design had a definitive impact on the future development of the region, and provided the framework under which a civilian ranching industry would emerge and flourish (2010:iv)." Unlike other areas of Spanish Texas and New Mexico, this area spawned large-scale ranching operations, many equaling tens of thousands of acres (Cunningham 2010:228-229).

In the beginning, land grants within Escandón's colony were issued in common, designed to keep the colonists congregated in towns known as *villas del norte* and aid in protection from neighboring tribes, but by 1764, the first private grant was issued (Alonzo 2000:142; Bolton 1915:299). By the late eighteenth century, a second wave of settlement expansion had begun, splintering lands into various private grants between the Rio Grande and the Nueces River (Alonzo 2000:142).

José Salvador de la Garza established the first ranching settlement in Cameron County west of today's Brownsville at *Rancho Espiritu Santo*, latter known as *Rancho Viejo*, around 1770 (*Brownsville Herald* 1950; Garza 2018b). At the time, the *rancho* was the primary unit of social organization; a place where several families would build homes, establishing a sense of community and protection (Alonzo 2000:142). During the early nineteenth century, Mexican settlement pushed northward toward the Nueces to confront Anglo settlement like that driven by *empresarios* such as Stephen F. Austin (Alonzo 2000:142).

Early Spanish settlers were not alone in the Lower Rio Grande Valley, with several groups of indigenous peoples inhabiting areas north and south of the river during the colonization period to 1757 (Salinas 1990: 5-6). Salinas (1990:153) estimates that indigenous peoples north of the Rio Grande in the delta area numbered close to 7,500 in 1747. Documentary evidence of these groups from Escandón's expedition, as well as later accounts, provides some information regarding the identity of these peoples whose hunting and gathering subsistence strategy dictated small groups that were dispersed across the landscape. Among the 31 indigenous groups recorded by Escandón within the Rio Grande delta between the Gulf of Mexico and Reynosa in 1747, were several north of the river that included (from east to west) the Hunpuzliegut, Tunlepem, Segujulapem, Peumepuem, Cootajam, Sepinpacam, Paramatugu, Perpepug, Coucuguyapem, Tlanchugin, Pexpacux, Hueplapiaguilam, and Imasacuajulam (Salinas 1990:19, Table 1).

Native population decline and loss of ethnic identities marked the years between 1757 and 1886 (Salinas 1990: 5). By 1780, Domingo Cabello, then Governor of Tejas, listed only nine Indian groups between the lower Rio Grande and the Nueces River (Salinas 1990:67). Factors of this decline likely include epidemic diseases, especially those introduced by Europeans (e.g., smallpox, measles), sale of children to Spaniards, relocation to missions, large ranches, or cities for employment, and intermarriage with nonindigenous populations (Salinas 1990:154-156). During the late eighteenth century and the first half of the nineteenth century, remnant native peoples of the Lower Rio Grande Valley were supplanted by horse-mounted bands of immigrant Indian groups of Comanches, Kiowas, and Lipan Apaches (Valerio-Jimenez 2013). Accounts of raids by these groups on settlements and ranches along the Rio Grande for horses, livestock, and captives are documented into the late nineteenth century, when the remaining populations of such groups were forced onto reservations (Hester 1980).

Mexico declared independence from Spain in 1821 and the province of Tejas was consolidated with that of Coahuila to become the state of Coahuila y Tejas. Far removed from the state capital at Saltillo, settlements north of the Rio Grande lacked political and economic contact with the rest of Mexico. Colonization had lead substantial numbers of American immigrants into the territory and by the 1830s Mexico sought to stifle the flow. Texans, including many newly-arrived Americans, instigated a call for local self-government on March 2, 1836, declaring independence from Mexico and claiming territory north of the Rio Grande for the new republic. General Antonio López de Santa Anna sent his army to quell the rebellion. Under the command of General José Urea, Mexican forces mustered in Matamoros and travelled through Cameron County on their way to confront Texan volunteer forces lead by Francis Johnson and Dr. James Grant at San Patricio and Agua Dulce along the Nueces River west of Corpus Christi that were readying for an attack on Matamoros to gain control of the port (Roell 2018).

After defeating the Texans at San Patricio and Agua Dulce, Urea travelled on to Refugio and Goliad to confront Texan forces under Colonel James Fannin. Fannin surrendered on March 20, 1836 and his forces were later executed leading to the battle cry “Remember Goliad”. On April 3, 1836, a skirmish between the Texas Navy’s Schooner *Invincible* and the Mexican Navy’s Man-of-War *Montezuma* (also known as the *General Bravo*) occurred at *Brazos de Santiago*, the primary supply base for General Santa Anna’s Mexican forces (Bates 2004; Kesting 2018; Pierce 1917:22). Texan forces won that sea battle, were ultimately victorious in the Texan War for Independence, and General Santa Anna surrendered at San Jacinto in April 22, 1836. Afterwards, Urea and his army retreated through Cameron County to Matamoros, crossing the river on May 28, 1836 (Amberson et al. 2003:73; Stephens and Holmes 1989:21, 26).

In December 1845, the United States (US) annexed Texas by treaty to become the twenty-eighth state in the Union, but the southern boundary with Mexico remained in dispute. Mexico set the boundary at the Nueces River, while the US set it at the Rio Grande. As tensions between the two nations increased, President Polk, a newly elected expansionist, sent Bvt. Brigadier General Zachary Taylor to occupy Corpus Christi with a contingent of 3,000 men in July 1845 as a precaution against Mexican incursion but also as a show of force (Amberson et al. 2003:82). On March 8, 1846, Taylor and his army crossed the Nueces River and marched south toward the Rio Grande. At Port Isabel, the army constructed Fort Polk overlooking the bay and Brazos Santiago Pass (Amberson et al. 2003:86).

Taylor's forces of 2,400 men bivouacked on the Rio Grande at Brownsville across from Matamoros where they constructed Fort Texas in April 1846 in a deliberate display to Mexican authorities that the US claimed the international boundary at the Rio Grande, as well as to exert military control over the southern tip of Texas (Peck 1970). This act incited the Mexican forces led by General Mariano Arista, who outnumbered the Americans three to one, and on April 25, 1846, the Mexicans attacked an American scouting party lead by Captain S. B. Thornton on the north side of the river, killing 17 and taking Thornton prisoner (Peck 1970:20; Pierce 1917:27).

On May 13, 1846, the US officially declared war against Mexico and Congress authorized up to 50,000 volunteer troops to supplement the regular army. Heeding the call, a volunteer force estimated at between 7,000 and 8,000 men began arriving at Brazos Santiago where a temporary encampment, Camp Belknap, was established in the summer of 1846 ("Camp Belknap" 1996). American forces marched south into Mexico and engaged the enemy at a series of land battles that culminated in the capture of Mexico City. The war ended with the Treaty of Guadalupe Hidalgo in March 1848, which set the US-Mexico boundary at the Rio Grande.

On February 1, 1861, Texas voted to secede from the Union. On February 23, 1861, a popular vote to ratify the secession was held. On that same day a Texan force commanded by Colonel John "Rip" Ford took possession of the US military depot at Brazos Santiago in order to prevent the Union forces from evacuating considerable ordnance and materiel (Hunt 2002:9). Under Ford's direction, Texan troops began constructing fortifications at Brazos Santiago in preparation for an attack on the Union-held Fort Brown under command of Captain Bennett Hill that never happened.

The Rio Grande was the only international border of the newly formed Confederacy and as such was a coveted resource against the neutral nation of Mexico. With the Texas coast blockaded by Union forces, Matamoros, across the river in Mexico, became the international go-between for cotton, arms, munitions and provisions carried overland to Brownsville and ferried across the Rio Grande to be exchanged for revenue and goods brought in by ship to Bagdad at the mouth of the river, which were likewise brought by cart to Matamoros (Amberson et al. 2003). White's Ranch (41CF6), played a role in this exchange. The ranch was known as a shipping point for smuggled goods including cotton during the Mexican and American civil wars, and later was rumored to feature wharves used by the Kenedy-King Steamship Line. In an effort to disrupt this trade network and in a display of control to the French occupying Mexico, Union forces under Brigadier General Napoleon Dana seized Brazos Island and Brazos Santiago in November 1863, advanced inland and took Fort Brown and Brownsville. Fort Brown and Brownsville were later recaptured by Confederate forces on July 30, 1864 but the Union held Brazos Island until the end of the war, garrisoning it with troops from the 34$^{th}$ Indiana Volunteer Infantry, the 87$^{th}$ US Colored Troops, the 62$^{nd}$ US Colored Troops, and the 2$^{nd}$ Texas Cavalry (Hunt 2002:14, 52).

During their occupation of the island in 1864, the Yankees completed fortifications begun by Confederate forces in 1862 and skirmished with Confederates at Palmito Ranch on August 4 and September 9, 1864 (Hunt 2002:21, 24). Meanwhile, Confederate forces remained in encampments at Palmito Ranch, White's Ranch (also known as White House), and Lomo Ochoa (41CF18), an area under the direct command of Colonel Rip Ford in 1865 (Hunt 2002:32, 46, 58). Between May 12 and 13, 1865, Union forces comprised of men from the 62nd US Colored Troops, the 2nd Texas Cavalry (US-unmounted), and the 34th Indiana Volunteer Infantry engaged Rebel forces from Giddings' Texas Cavalry and the 2nd Texas Cavalry (CSA) and an artillery unit under the command of Colonel Rip Ford in the vicinity of White's Ranch and Palmito Ranch for the last battle of the Civil War known as Palmito Hill (Hunt 2002:58-59). Union forces retreated after heavy losses to the Confederates and returned with what was left of their companies to Brazos Island. The Palmito Ranch Battlefield, located between SH 4 and the Rio Grande, is now listed on the NRHP and as a National Historic Landmark (NHL).

During the subsequent Reconstruction Era, federal troops returned to garrison Fort Brown (Garza and Long 2018a). Soon, it became evident that the economic recovery of the Valley depended upon a railroad hub and construction of a deep-water port. The first railroad in Cameron County was built for the movement of military supplies under the direction of General Philip H. Sheridan between Brazos Santiago and White's Ranch on the Rio Grande between May 1864 and December 1865 (Garza and Long 2018a; Rozeff 2018). The Sheridan Railroad, as it was called, was destroyed in a hurricane in 1867 (Rozeff 2018). In 1872 the first railway linking Port Isabel and Brownsville was constructed by Simón Celaya (Garza and Long 2018a).

In the 1880s, small irrigation projects began in Cameron County to increase farming revenue. Later, larger scale irrigation projects of the early twentieth century and construction of the St. Louis, Brownsville, and Mexico Railway to Brownsville in 1904 lead to large scale truck farming operations. Soon large numbers of northern farmers began to arrive in the valley and the first commercial citrus orchard was planted by H. G. Stillwell, Sr. the same year. The increase in commercial farming operations created a demand for cheap and often migrant labor (Garza and Long 2018b).

As Valley production of agricultural products increased for domestic trade, developments for more lucrative international trade inspired county leaders to revisit maritime shipping and needs of the local ports. A deep water port facility had been needed since Brazos de Santiago became the first port in the eighteenth century.

## PREVIOUS ARCHEOLOGICAL WORK AND SITES

A search of the Atlas on July 30, 2018 revealed that no previously recorded archeological sites occur within the APE, or within a 1-km (0.6 mile) radius of the APE. The APE has not been subjected to previous archeological survey, but three previous investigations have occurred within 1 km of the APE (Brownlow and Clark 2006; Brownlow et al. 2005; Burden et al. 2014).

No NRHP properties, SALs, Official Texas Historical Markers, Recorded Texas Historic Landmarks, or cemeteries are situated within the APE or within a 1 km (0.6 mile) buffer thereof (Atlas 2018). The APE is also not within a designated historic district.

USGS 7.5-minute topographical quadrangle maps (1953 and 1970) and aerial photographs (1929, 1932, 1945, and 1956) were examined for indications of potential historical archeological sites within the APE (Nationwide Environmental Title Research 2018). These sources indicated one historical structure at the northwest end of the APE, which might indicate the presence of an Historic High Probability Area (HHPA).

Previous archeological research has postulated that the northern side of the Arroyo Colorado was an important locale for prehistoric burials in this region (Hester and Rodgers 1971). As several prehistoric burial sites have been recorded in the vicinity of the APE (i.e., sites 41CF13, 41CF14, 41CF134, and 41CF158), this area appears to possess high probability for such features.

## METHODOLOGY

Archeological survey work within the APE included surface examinations and trench excavations. The entire APE was subject to a walk-over examination where the ground surface was investigated for cultural material. Additionally, a total of 12 trenches were excavated along the length of the APE. Ideal locations for trench placement were largely determined by conditions on the ground observed during the walk-over examination of the ground surface. Trench placement was determined by the identification of intact/non-disturbed landscape, proximity to the Arroyo Colorado, mapped wetlands, and localities with dense thorn-brush characteristic of ocelot (*Leopardus pardalis*) habitat. Previously ditched landscape, fence-lines, and steep grades were also taken into consideration.

Trenches were excavated with a mini-excavator rather than a backhoe to better negotiate the aforementioned obstacles and habitats. Each trench extended approximately 5 meters (m) in length, 1.2 m in width, and 1.5 m in depth. The sediment matrix was scraped in approximately 10-15-centimeter (cm) levels. Each level was thoroughly examined to identify any soil color or texture changes, accumulations of snail shell, thermally altered clays, and potential cultural deposits. A representative profile wall within each trench was cleaned utilizing a geological hammer, trowel, and shovel.

For the purposes of this survey, an archeological site had to contain a certain number of cultural materials or features older than 50 years within a given area. The definition of a site is: (1) five or more surface artifacts within a 15-m radius (ca. 706.9 $m^2$), or (2) a single cultural feature, such as a hearth or burned rock midden, observed on the surface or exposed during shovel testing, or (3) a positive excavation containing at least five total artifacts, or (4) two positive excavations located within 30 m of each other. Solitary artifacts not found in association with other artifacts or features would be considered isolated finds.

Field forms generated during this investigation were completed with pencil on acid-free paper, and Global Positioning System (GPS) coordinates were captured for all trench excavations to ensure adequate coverage of the APE. All field investigations were thoroughly photo-documented. Curation of records generated in connection with this survey occurred at the University of Texas San Antonio's (UTSA) Center for Archaeological Research (CAR).

## RESULTS OF INVESTIGATIONS

Survey work consisted of a visual inspection of the entire APE complemented by the excavation of 12 trenches (**Appendix A**). The surface examination of the landscape coupled with 12 negative trenches indicated that no archeological sites or isolated finds occur within the APE. A brief description of the examination of the landscape within the APE and a summary of the results of the trench excavations will follow.

### SURFACE EXAMINATION OF THE APE

The initial visual inspection of the landscape revealed both disturbed and intact terrain within the APE. Areas directly adjacent to the Arroyo Colorado crossing (see **Figure 4**) are relatively intact with dense thorn-brush. Many of these localities have been mapped as wetlands. Some portions of landscape situated away from the Arroyo Colorado have been subject to various forms of disturbance related to railroad development (**Figure 5**), subsurface utilities (**Figure 6**), and roadway and agricultural development (**Figure 7**). The locality in the northeastern portion of the APE identified as a potential HHPA was highly disturbed and paved over with no evidence of historic structure remains.

**Figure 5. Railroad development disturbance**


**Figure 6. Subsurface utility disturbance**


**Figure 7. Agricultural and road development disturbance**

## TRENCH DESCRIPTIONS

Each trench averaged approximately 5 m in length, 1.2 m in width, and 1.5 m in depth (**Appendix B**). The sediment matrix was scraped in approximately 10-15 cm levels. Each level was thoroughly examined to identify any soil color or texture changes, accumulations of snail shell, thermally altered clays, and potential cultural deposits. Only low amounts of snail shell (whole and fragmented) were observed amidst an otherwise anthropogenically sterile matrix, devoid of features that sometimes include fired or burned clays. Soil zones typically demonstrated dense, gray clay. The only exception, Backhoe Trench (BHT) 7, contained thickly stratified, sandy deposits likely associated with past flood events from the adjacent Arroyo Colorado.

### BHT 1

BHT 1 (**Appendix A**, **Sheet 1**) extended to a maximum depth of 158 cm below surface and was comprised of three zones (**Figure 8**). *Zone I* (0-31 cm) was comprised of dry, silty clay with firm, blocky structure and dark brown (10YR3/3) coloration. Few roots were observed, while rootlets were abundant throughout. Horizontal desiccation cracking was also common. The lower zone boundary was abrupt and smooth. These combined characteristics were suggestive of a modern plow zone. *Zone II* (31-93 cm) was comprised of moist, silty clay with firm, blocky structure and gray (10YR5/1) coloration. Few roots were observed, while calcium carbonate flecking was common. Few calcium carbonate masses were noted at about 74 cm below the surface. Few snail shell fragments were observed, and vertical desiccation cracks were common throughout. The zone’s lower boundary was diffuse and smooth. *Zone III* (93-158 cm) was comprised of moist, silty clay with firm, blocky structure. The dominant matrix color was grayish brown (10YR5/2), intermixed with yellowish brown mottles (10YR5/4). Calcium carbonate flecking and masses were common throughout.

**Figure 8. Backhoe Trench 1 profile**

**BHT 2**

BHT 2 (**Appendix A**, **Sheet 1**) extended to a maximum depth of 147 cm below surface and was comprised of two zones (**Figure 9**). *Zone I* (0-34 cm) matrix was comprised of a dry, silty clay loam with firm, granular structure and brown (10YR5/3) coloration. Roots were few, while rootlets were common throughout. The zone's lower boundary was gradual and smooth. *Zone II* (34-147 cm) was comprised of moist, silty clay with very firm, blocky structure and yellowish brown (10YR5/6) coloration. Calcium carbonate flecking was common, while masses were few. Few fragmented snail shells were also observed throughout the matrix.

**Figure 9. Backhoe Trench 2 profile**

**BHT 3**

BHT 3 (**Appendix A**, **Sheet 2**) extended to a maximum depth of 137 cm below surface and was comprised of three zones (**Figure 10**). *Zone I* (0-33 cm) was characterized as a moist, firm, granular clay fill that was likely dredged from an adjacent ditch located directly south-southeast. The composition of the fill was a mixture of the lower zones comprising BHT No. 1 and No. 2. The dominant matrix color was grayish brown (10YR5/2), intermixed with light yellowish brown (10YR6/4) mottles. The lower boundary was abrupt and smooth. *Zone II* (33-92 cm) was comprised of moist, silty clay with firm, blocky structure and dark brown (10YR3/3) coloration. Bioturbation in the forms of root, worm, and insect casts were common throughout. Few primary roots, snail shell fragments, and calcium carbonate flecks were observed throughout the matrix. The zone's lower boundary was gradual and smooth. *Zone III* (92-137 cm) was comprised of moist, silty clay with very firm, blocky structure. The matrix color was grayish brown (10YR5/2), intermixed with dark brown (10YR3/3) mottles. Bioturbation in the forms of root, worm and insect casts were common, while calcium carbonate flecks and masses were few throughout.

**Figure 10. Backhoe Trench 3 profile**

**BHT 4**

BHT 4 (**Appendix A**, **Sheet 2**) extended to a maximum depth of 130 cm below surface and was comprised of three zones (**Figure 11**). *Zone I* (0-24 cm) was characterized by dry, silty clay loam with firm, blocky structure and very dark grayish brown (10YR3/2) coloration. Primary roots, rootlets and vertical desiccation cracks were common throughout the matrix. Few snail shells were also observed. The zone's lower boundary was clear and smooth. *Zone II* (24-95 cm) was comprised of dry, silty clay with firm, blocky structure and gray (10YR5/1) coloration. Few roots and rootlets were present, while calcium carbonate flecks and snail shell fragments were common throughout. The zone's lower boundary was diffuse and smooth. *Zone III* (95- 130 cm) was characterized by dry clay with very firm, blocky structure and brown (10YR5/3) coloration. Thin to very thin sandy laminae were observed throughout. Also common were fragmented snail shells and evidence of bioturbation in forms of root, worm and insect casts.

**Figure 11. Backhoe Trench 4 profile**

**BHT 5**

BHT 5 (**Appendix A**, **Sheet 3**) extended to a maximum depth of 150 cm below surface and was comprised of three zones (**Figure 12**). *Zone I* (0-18 cm) was characteristic of a plow zone and comprised of dry, sandy clay loam with firm, blocky structure and very dark grayish brown (10YR3/2) coloration. Pronounced bioturbation in the forms of root, worm and insect casts were common throughout, as were vertical desiccation cracks. The lower boundary of the zone was gradual and smooth. *Zone II* (18-133 cm) was comprised of moist, silty clay with firm, blocky structure and brown (10YR5/3) coloration. Calcium carbonate filaments and flecks were common throughout the matrix, while roots were few. The zone's lower boundary was diffuse and smooth. *Zone III* (133-150 cm) was characterized by moist, fine sandy loam with firm, blocky structure and pinkish gray (7.5YR6/2) coloration. Few calcium carbonate flecks were present, while bioturbation in the form of root, worm and insect casts were common throughout.

**Figure 12. Backhoe Trench 5 profile**

**BHT 6**

BHT 6 (**Appendix A**, **Sheet 4**) extended to a maximum depth of 143 cm below surface and was comprised of three zones (**Figure 13**). *Zone I* (0-13 cm) was characterized by dry, light yellowish brown (10YR6/4) fine sandy loam with firm, blocky structure. Root and insect pores were pronounced throughout the matrix, which also contained few fragmented snail shells. The lower boundary of this zone was abrupt and smooth, suggestive of alluvial deposition following a flood event. *Zone II* (13-36 cm) was characterized by dry, silty clay loam with firm, granular structure. Coloration of the matrix was dominated by a dark grayish brown (10YR4/2), with brown (10YR5/3) mottles. Primary roots, rootlets and calcium carbonate flecks were common throughout the matrix. Few whole and fragmented snail shells were also observed near the zone's clear and wavy lower boundary. *Zone III* (36-143 cm) was comprised of gray (10YR5/1) dry clay with very firm, blocky structure. Calcium carbonate flecks and filaments were common, while masses were few throughout the matrix. Vertical desiccation cracks were also common. Bioturbation in the form of root casts were few.

**Figure 13. Backhoe Trench 6 profile**

**BHT 7**

BHT 7 (**Appendix A**, **Sheet 5**) extended to a maximum depth of 164 cm below surface and was comprised of six zones (**Figure 14**). *Zone I* (0-24 cm) was characterized by light yellowish brown (10YR6/4) dry, friable fine sandy loam with granular structure. Horizontal desiccation cracks were common, as were roots and rootlets. Abundant evidence of bioturbation in the form of root, insect and worm casts were also present. The lower boundary of the zone was clear and smooth, and gradually sloped to the south towards Arroyo Colorado. *Zone II* (24-28 cm) was comprised of dark grayish brown (10YR4/2) dry silty clay with very firm, blocky structure, resembling a backwater deposit. The zone’s lower boundary was clear and smooth, with a pronounced slope to the south. *Zone III* (28-72 cm) was characterized by yellowish brown (10YR5/4) dry, sandy clay loam with very firm, blocky structure with fine to very fine sandy laminae throughout. The sandy laminae were light yellowish brown (10YR6/4) in color and homogenous in size. Few calcium carbonate filaments and masses inundated the matrix, while vertical desiccation cracks and bioturbation in the form of root, insect and worm casts were common. The zone’s lower boundary was abrupt and smooth, gradually sloping to the south. *Zone IV* (72-99 cm) was comprised of pale brown (10YR6/3) dry, loose, medium-grained homogenous sand. The sandy matrix also contained very thin, horizontal laminae that sloped to the south. These combined characteristics may be indicative of past flood events or alluvial overbank deposition. The lower boundary of this zone was abrupt and smooth, consistent with an erosional unconformity. *Zone V* (99-102 cm) was characterized by brown (10YR4/3) dry, silty clay with firm, blocky structure. The lower boundary was abrupt and smooth, also characteristic of an erosional unconformity. *Zone VI* (102-164 cm) was characterized by dry, light yellowish brown (10YR6/4) friable sand with thin to very thin laminae comprised of grayish brown (10YR5/2) sandy loam. Calcium carbonate flecks were common throughout the matrix and the zone sloped towards the south and adjacent Arroyo Colorado.

**Figure 14. Backhoe Trench 7 profile**

**BHT 8**

BHT 8 (**Appendix A**, **Sheet 5**) extended to a maximum depth of 133 cm below surface and was comprised of three zones (**Figure 15**). *Zone I* (0-18 cm) was characterized by brown (10YR4/3) dry, friable sandy clay loam with blocky structure. The matrix was also mixed with dark brown (10YR3/3) mottles. Insect pores, roots and rootlets were common throughout. The zone's lower boundary was abrupt and smooth. Mechanical disturbance of the zone was likely, due to its proximity to adjacent railway construction. *Zone II* (18-44 cm) was characterized by dark brown (10YR3/3) moist, fine silty clay with blocky structure. Calcium carbonate flecks were few, as were whole snail shells at approximately 25 cm below surface which occurred a thin, relatively horizontal deposit. Vertical desiccation cracks, primary roots and rootlets were common throughout the matrix. The lower boundary was gradual and smooth. *Zone III* (44-133 cm) was characterized by silty clay with blocky structure. Dominant coloration of the matrix was grayish brown (10YR5/2), intermixed with dark brown (10YR3/3) mottles. Calcium carbonate masses were few and flecks were common. Bioturbation in the forms of root and worm casts were also common throughout the matrix.

**Figure 15. Backhoe Trench 8 profile**

**BHT 9**

BHT 9 (**Appendix A**, **Sheet 6**) extended to a maximum depth of 115 cm below surface and was comprised of two zones (**Figure 16**). Zone I (0-28 cm) was characterized by grayish brown (10YR5/2) dry, silty clay loam with very firm, blocky structure. Calcium carbonate flecks, primary roots, rootlets and vertically oriented desiccation cracks were common throughout the matrix. The zone's lower boundary was diffuse and smooth. Zone II (28-115 cm) was characterized by grey (10YR5/1) dry, silty clay with very firm, blocky structure. Calcium carbonate masses were common throughout. Unlike Zone I, no vertical desiccation cracks were observed.

**Figure 16. Backhoe Trench 9 profile**

**BHT 10**

BHT 10 (**Appendix A**, **Sheet 7**) extended to a maximum depth of 125 cm below surface and was comprised of three zones (**Figure 17**). *Zone I* (0-25 cm) was characterize by dark greyish brown (10YR4/2) friable, silty clay loam with granular structure. A dense root mat was also present, suggesting this was once an old plow zone. The lower boundary of the zone was gradual and smooth. *Zone II* (25-94 cm) was characterized by moist, silty clay loam with firm, blocky structure. Bioturbation in the forms of root, worm and insect casts were common, while roots were few. The zone's lower boundary was smooth and diffuse. *Zone III* (94-125 cm) was characterized by pale brown (10YR6/3) moist clay with very firm, blocky structure. Calcium carbonate flecks were common, and masses were few.

**Figure 17. Backhoe Trench 10 profile**

**BHT 11**

BHT 11 (**Appendix A**, **Sheet 7**) extended to a maximum depth of 152 cm below surface and was comprised of two zones (**Figure 18**). *Zone I* (0-48 cm) was characterized by grayish brown (10YR5/2) moist, friable silty clay loam with granular structure. This zone occurred within a plow zone that contained modern anthropogenic debris including nylon string, beer glass and plastic fragments to maximum depths of 43 cm below surface. The lower boundary of the zone was diffuse and smooth. *Zone II* (48-152 cm) was characterized by dark gray (10YR4/1) moist, silty clay with firm, blocky structure. Vertical desiccation cracks, root casts and calcium carbonate flecks were common throughout the matrix.

**Figure 18. Backhoe Trench 11 profile**

**BHT 12**

BHT 12 (**Appendix A**, **Sheet 8**) extended to a maximum depth of 164 cm below surface and was comprised of three zones (**Figure 19**). *Zone I* (0-42 cm) was comprised of dark gray (10YR4/1) moist, friable to firm silty clay loam with granular structure and occurred within modern a plow zone. The zone's lower boundary was diffuse and smooth. *Zone II* (42-112 cm) was comprised of pale brown (10YR6/3) moist silty clay with firm, blocky structure. Bioturbation in the forms of root, insect and worm casts were common, while calcium carbonate flecks and snail shell fragments were few. The zone's lower boundary was diffuse and smooth. *Zone III* (112-164 cm) was characterized by very pale brown (10YR7/4) moist clay with very firm, blocky structure. Calcium carbonate filaments and masses were common throughout the matrix.

**Figure 19. Backhoe Trench 12 profile**

## SUMMARY AND RECOMMENDATIONS

Between December 3 and 8, 2018, B&A, on behalf of La Chalupa, LLC, conducted an archeological survey within the proposed Chalupa Wind Project - Arroyo Colorado Transmission Line Crossing, in Cameron County, Texas. The proposed transmission line would be approximately 10.4 miles in length, 1.7 miles of which would be located on property owned by the Port Authority, a political subdivision of State, triggering compliance with the Antiquities Code of Texas and associated regulations outlined in 13 TAC 26 proposed transmission line easement on Port property. The APE consists of approximately 20.45 total acres. A visual surface inspection of the APE, coupled with 12 trench excavations was carried out in connection with this investigation. No archeological sites were recorded, therefore, no deposits potentially eligible for inclusion in the NRHP and/or designation as a SAL were exposed. Based on these findings, B&A recommends that the proposed project proceed to completion without further archeological work. Curation of records generated in connection with this survey occurred at the UTSA CAR.

If it is determined that the limits of the Project expand beyond the current boundaries of the APE, then additional archeological investigations may be necessary in those areas. In the event that previously unidentified cultural materials are discovered during construction within the APE, work in the immediate area of discovery would cease and B&A and the THC will be contacted.

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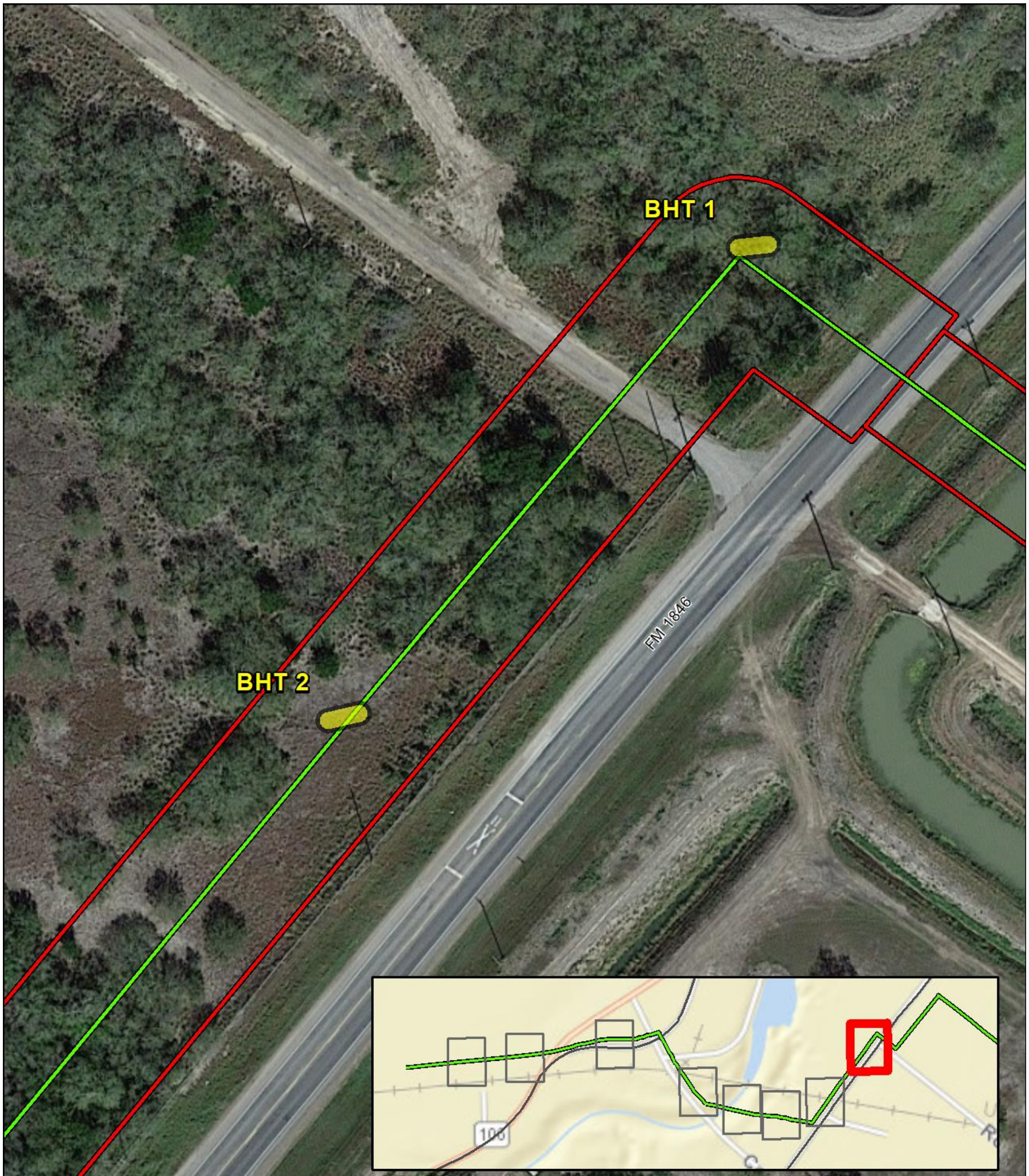
# APPENDIX A

Trench Placement within the APE



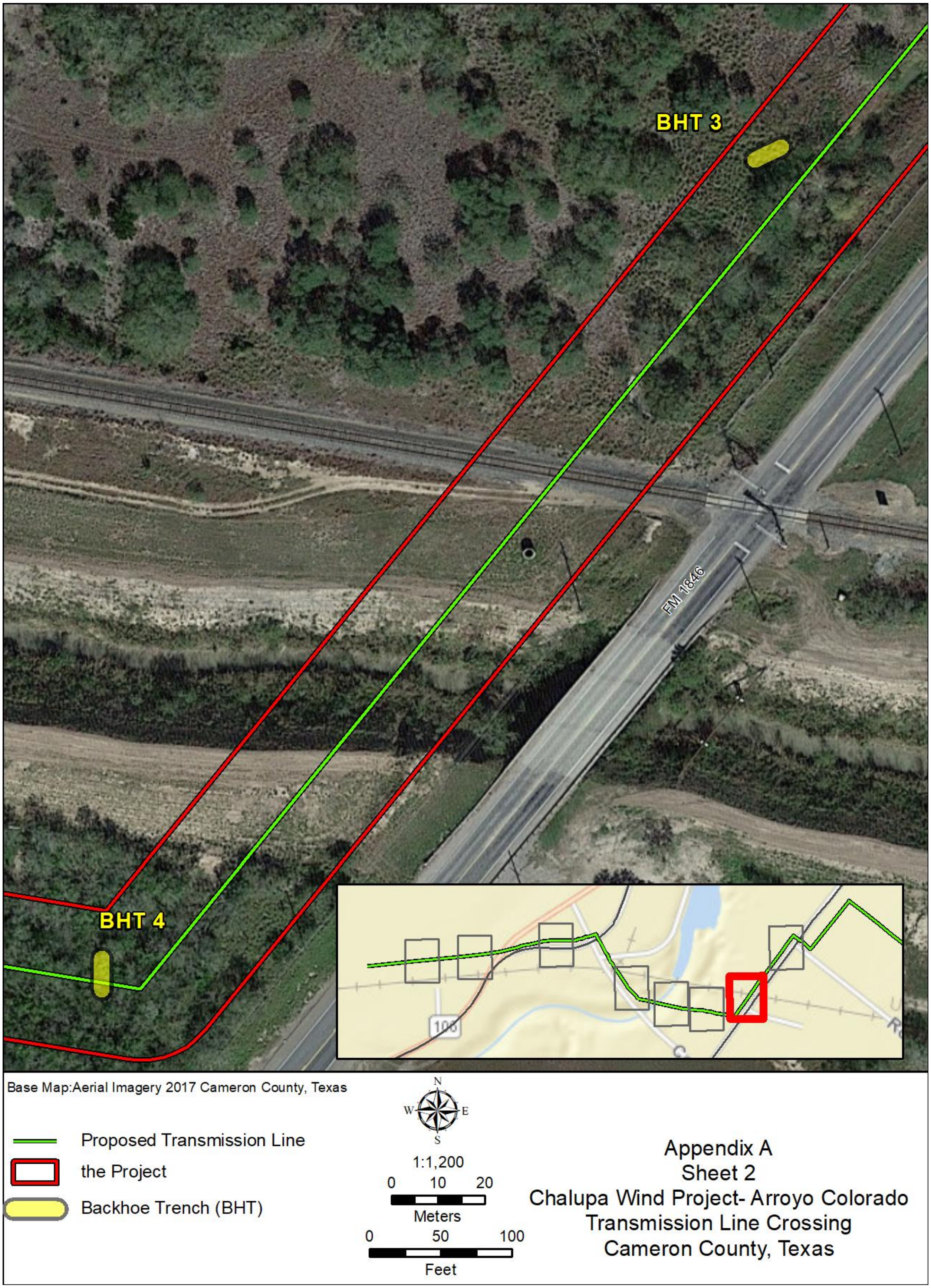

Base Map:Aerial Imagery 2017 Cameron County, Texas

Proposed Transmission Line
the Project
Backhoe Trench (BHT)

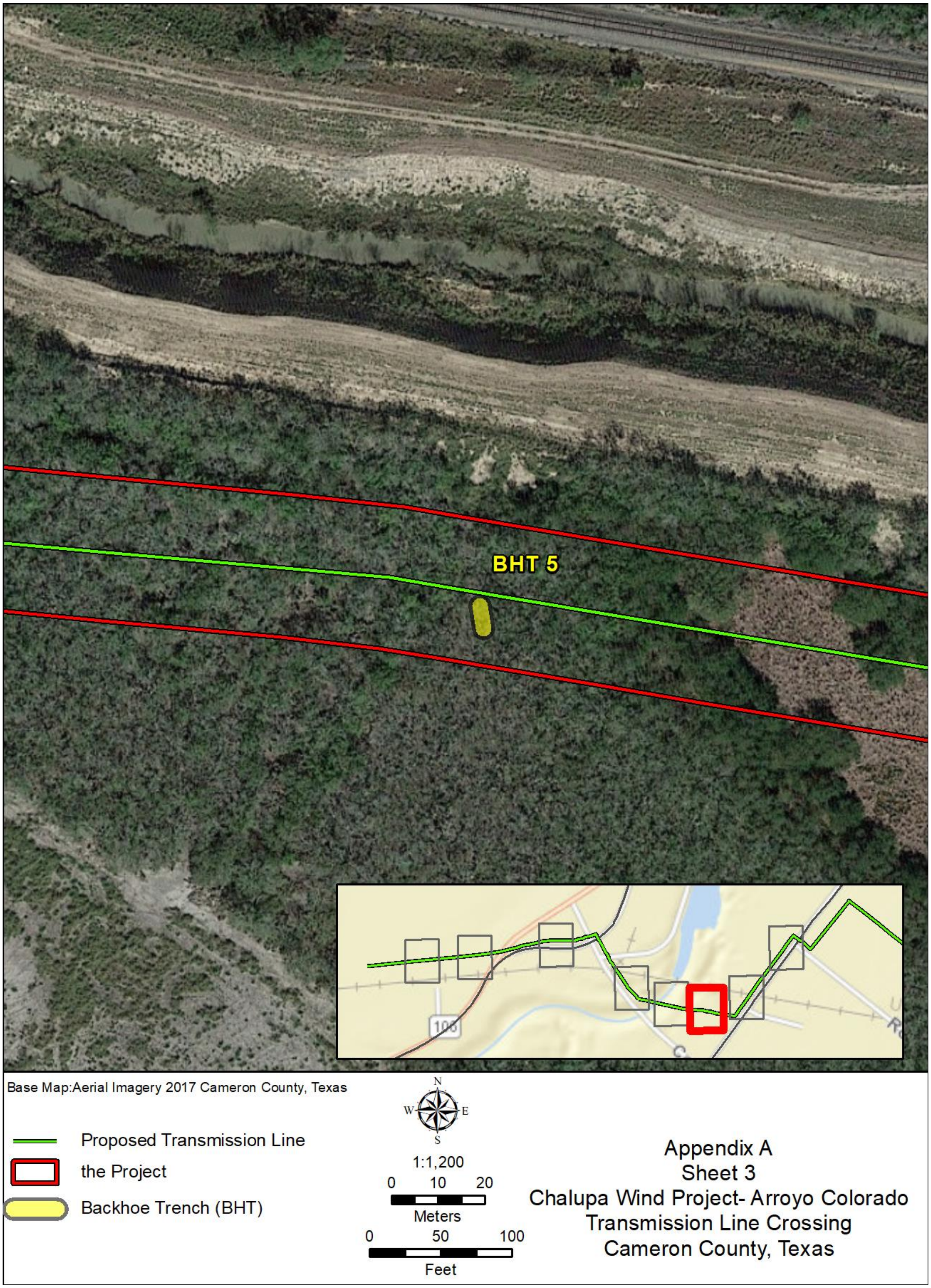
N W E S

1:1,200
0 10 20
Meters
0 50 100
Feet

Appendix A
Sheet 1
Chalupa Wind Project- Arroyo Colorado
Transmission Line Crossing
Cameron County, Texas




Appendix A
Sheet 2
Chalupa Wind Project- Arroyo Colorado
Transmission Line Crossing
Cameron County, Texas


BHT 5
100
Base Map:Aerial Imagery 2017 Cameron County, Texas
N
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Proposed Transmission Line
the Project
Backhoe Trench (BHT)
1:1,200
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Meters
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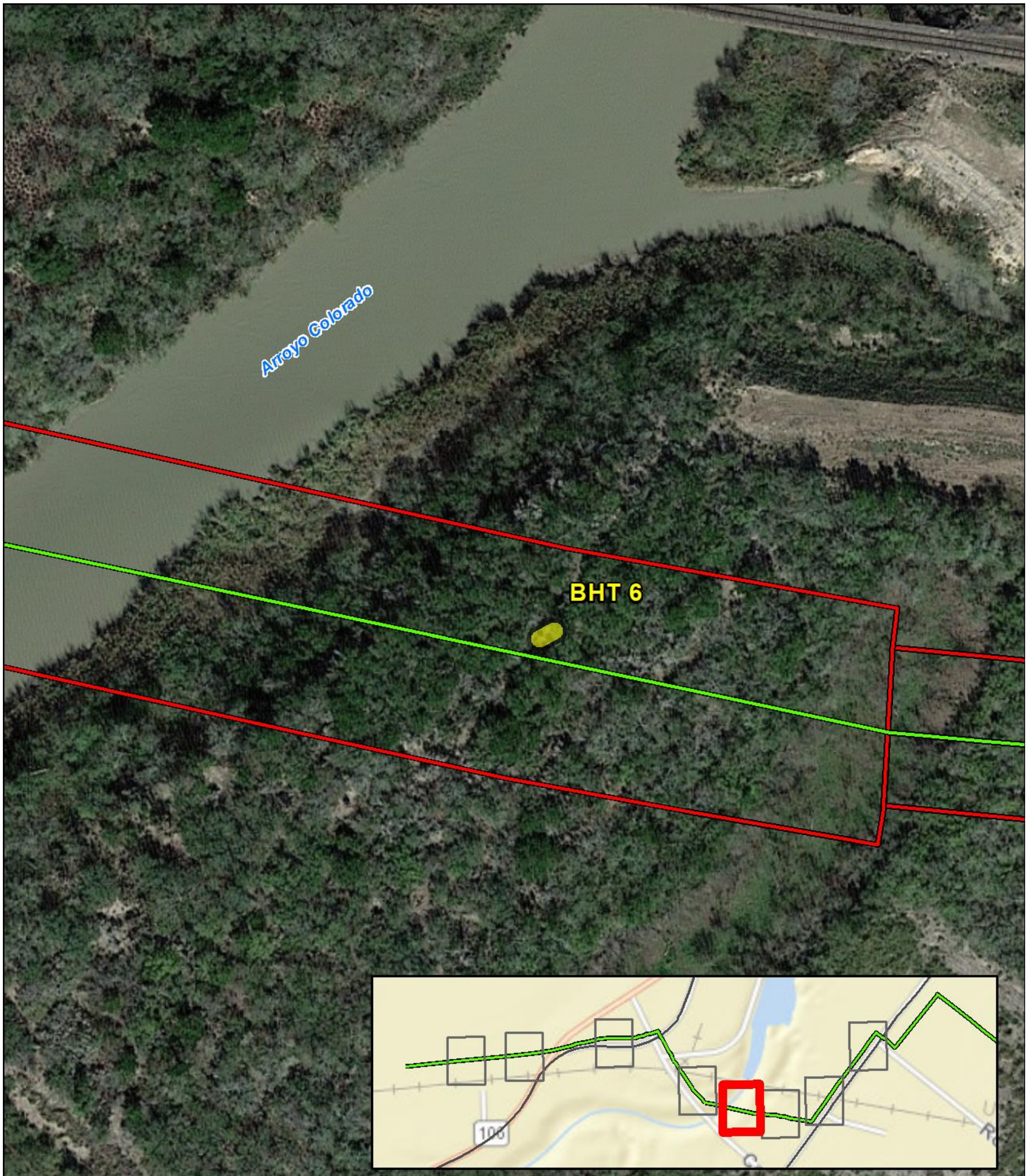
Feet
Appendix A
Sheet 3
Chalupa Wind Project- Arroyo Colorado
Transmission Line Crossing
Cameron County, Texas



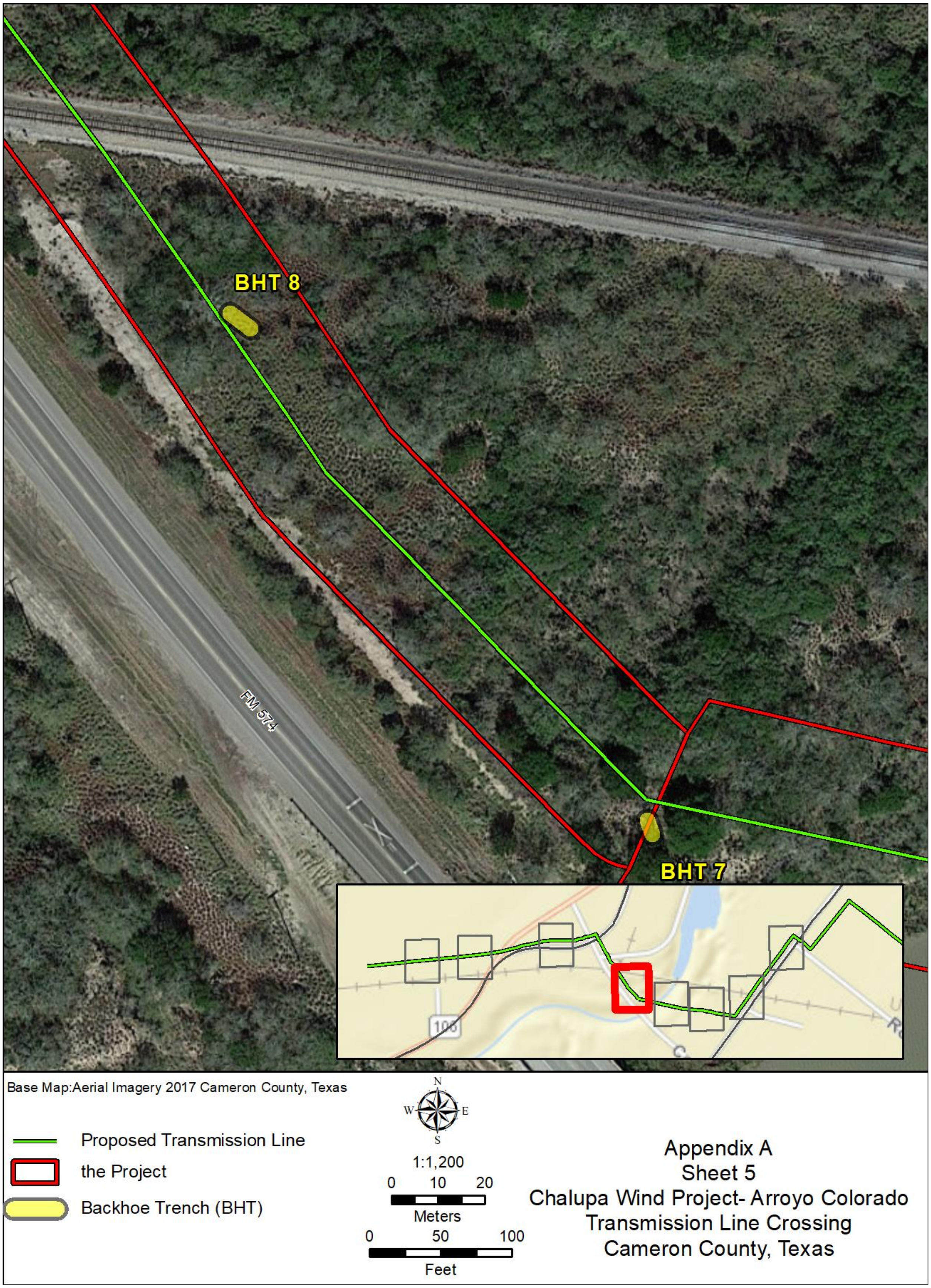

Base Map:Aerial Imagery 2017 Cameron County, Texas

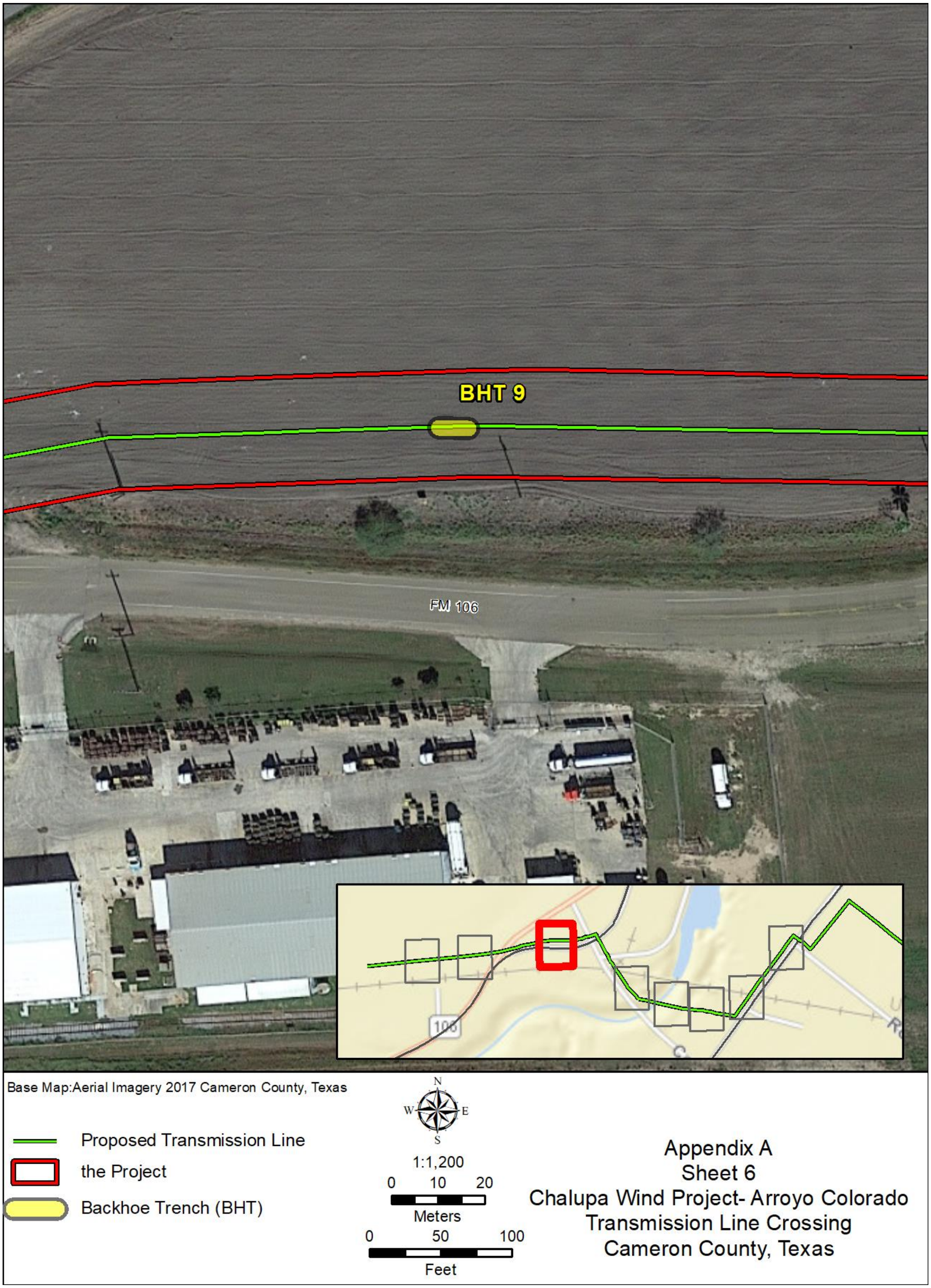
Proposed Transmission Line
the Project
Backhoe Trench (BHT)

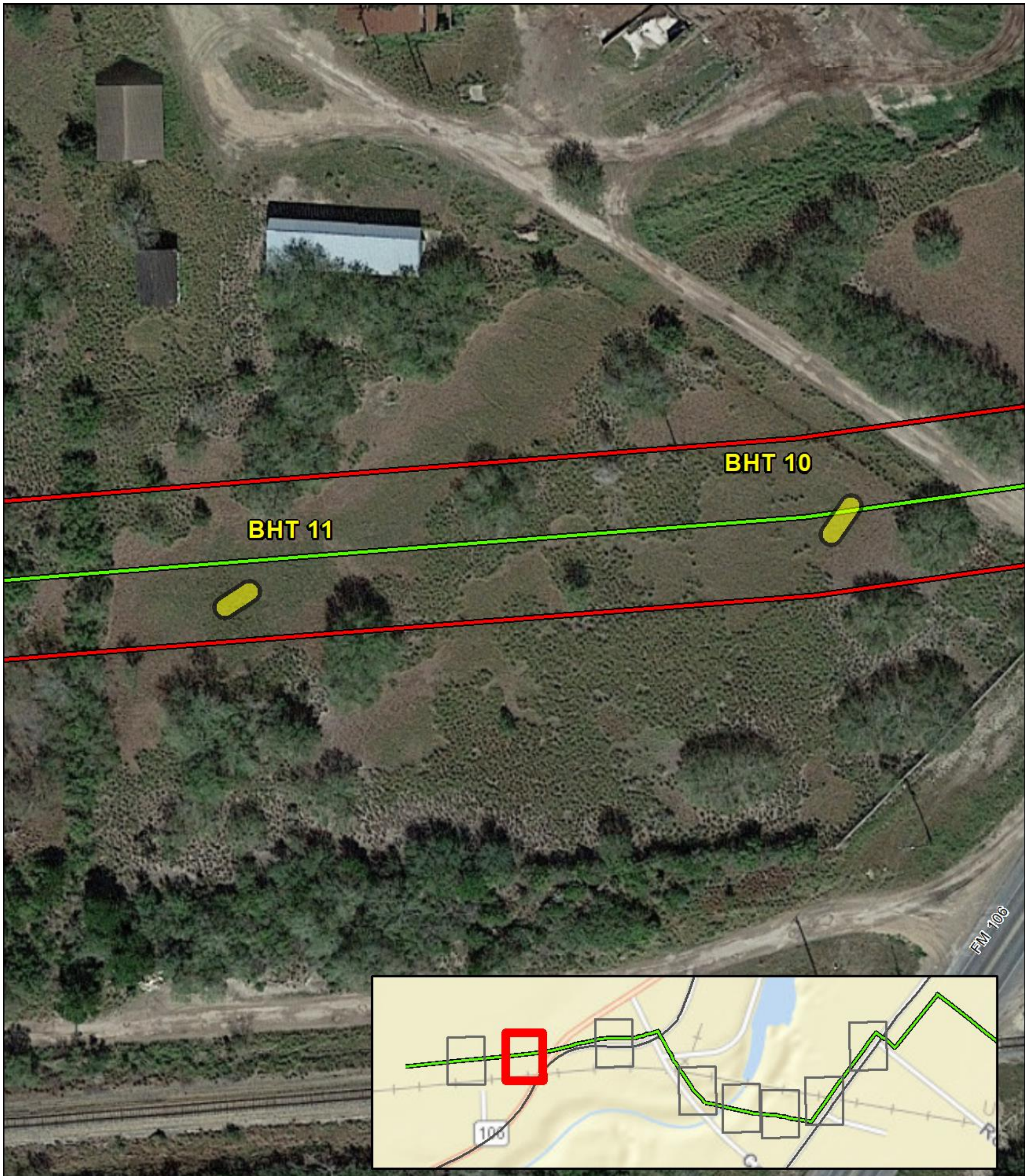
N W E S

1:1,200
0 10 20
Meters
0 50 100
Feet

Appendix A
Sheet 4
Chalupa Wind Project- Arroyo Colorado
Transmission Line Crossing
Cameron County, Texas


BHT 8
BHT 7
FM 574
100
Base Map:Aerial Imagery 2017 Cameron County, Texas
Proposed Transmission Line
the Project
Backhoe Trench (BHT)
N
W
E
S
1:1,200
0 10 20
Meters
0 50 100
Feet
Appendix A
Sheet 5
Chalupa Wind Project- Arroyo Colorado
Transmission Line Crossing
Cameron County, Texas


BHT 9
FM 106
100
Base Map:Aerial Imagery 2017 Cameron County, Texas
Proposed Transmission Line
the Project
Backhoe Trench (BHT)
N
W
E
S
1:1,200
0 10 20
Meters
0 50 100
Feet
Appendix A
Sheet 6
Chalupa Wind Project- Arroyo Colorado
Transmission Line Crossing
Cameron County, Texas



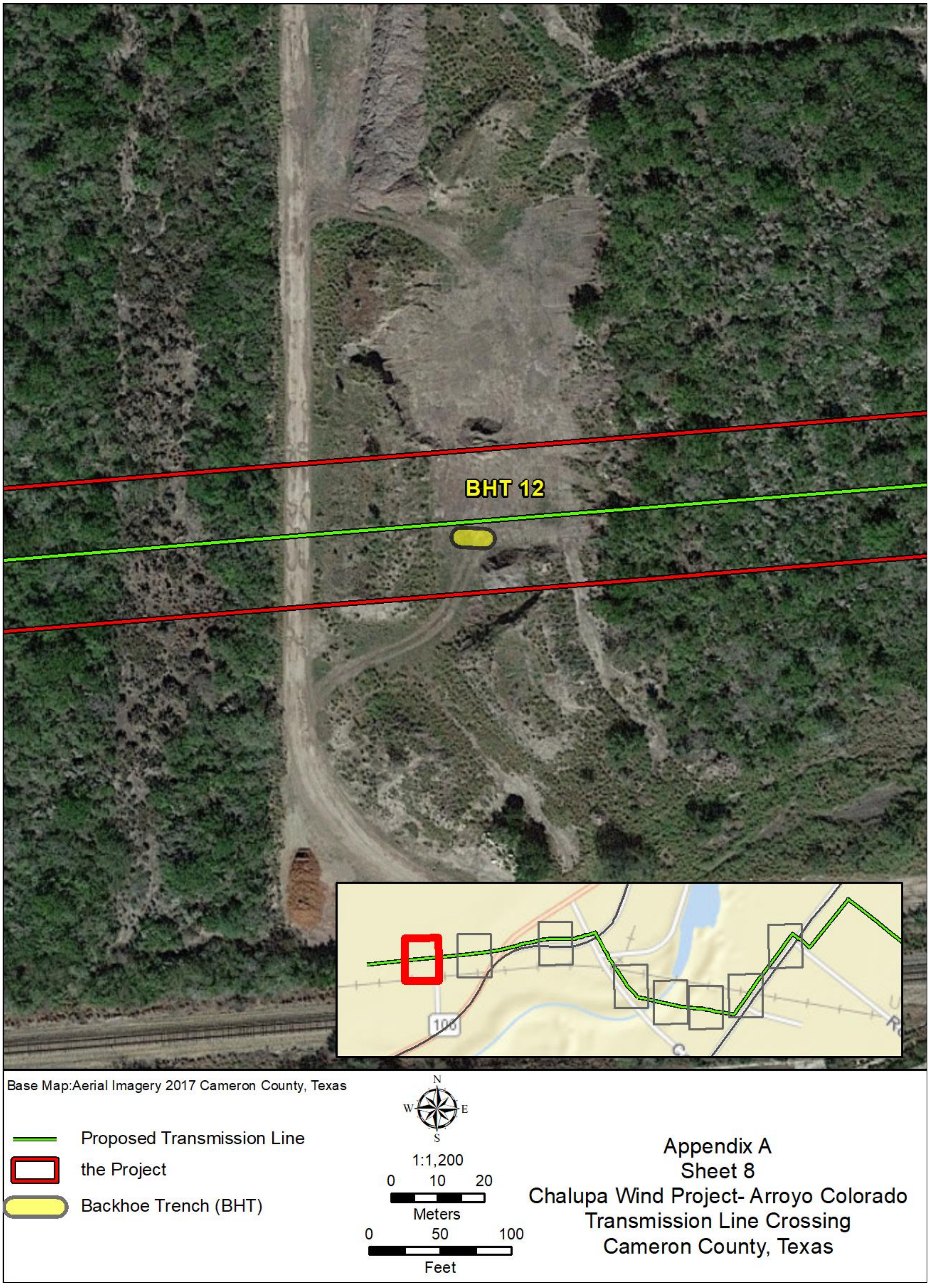

Base Map:Aerial Imagery 2017 Cameron County, Texas

Proposed Transmission Line
the Project
Backhoe Trench (BHT)

N W E S

1:1,200
0 10 20
Meters
0 50 100
Feet

Appendix A
Sheet 7
Chalupa Wind Project- Arroyo Colorado
Transmission Line Crossing
Cameron County, Texas



BHT 12
100
Base Map:Aerial Imagery 2017 Cameron County, Texas
N
W
E
S
Proposed Transmission Line
the Project
Backhoe Trench (BHT)
1:1,200
0 10 20
Meters
0 50 100
Feet
Appendix A
Sheet 8
Chalupa Wind Project- Arroyo Colorado
Transmission Line Crossing
Cameron County, Texas

# APPENDIX B

Trenching Results

**Trenching Results**

| Zone | Depth (cm) | Description |
|---|---|---|
| ***Backhoe Trench 1 (Negative)*** | | |
| Zone I | 0-31 | Dark brown (10YR3/3) silty clay loam with firm, blocky structure and dry matrix. Roots are abundant and appear to occur within the plow zone. Lower boundary is clear and smooth. |
| Zone II | 31-93 | Gray (10YR5/1) silty clay with very firm, blocky structure and moist matrix. Roots and calcium carbonate flecks are few, while carbonate masses are common. Lower boundary is smooth and diffuse. |
| Zone III | 93-158 | Grayish brown (10YR5/2) silty clay with firm, blocky structure. Matrix is moist and commonly inundated with calcium carbonate masses, root casts, and worm casts. |
| ***Backhoe Trench 2 (Negative)*** | | |
| Zone I | 0-34 | Brown (10YR5/3) silty clay loam with firm, granular structure and dry matrix. Rootlets are common, while primary roots are few. Lower boundary is gradual and smooth. |
| Zone II | 34-147 | Dark gray (10YR4/1) moist silty clay matrix with yellowish brown (10YR5/6) mottles. Structure is firm and blocky and contains few calcium carbonate masses. |
| ***Backhoe Trench 3 (Negative)*** | | |
| Zone I | 0-30 | Grayish brown (10YR5/2) mottled with light yellowish brown (10YR6/4) clay fill. Clay fill is characteristic of dredged material observed in an adjacent ditch. Lower boundary is abrupt and smooth. |
| Zone II | 30-92 | Dark brown (10YR3/3) silty clay with very firm and blocky structure. Matrix is moist and contains few calcium carbonate flecks. Lower boundary is gradual and smooth. |
| Zone III | 92-137 | Grayish brown (10YR5/2) silty clay with very firm, blocky structure. Matrix is moist and contains few calcium carbonate flecks and masses. Evidence of bioturbation is common throughout. |
| ***Backhoe Trench 4 (Negative)*** | | |
| Zone I | 0-24 | Very dark grayish brown (10YR3/2) silty clay loam characterized by blocky structure and a dry, friable matrix. Vertically oriented desiccation cracks are common. Lower boundary is clear and smooth. |
| Zone II | 24-95 | Gray (10YR5/1) silty clay with very firm, blocky structure. Matrix is dry and contains few calcium carbonate flecks. Lower boundary is diffuse and smooth. |
| Zone III | 95-130 | Brown (10YR5/3) clay with very firm, blocky structure. Matrix is dry and disrupted by very thin, sandy laminae throughout. Crushed snail shell is common. |
| ***Backhoe Trench 5 (Negative)*** | | |
| Zone I | 0-18 | Very dark greyish brown (10YR3/2) sandy clay loam. Matrix is dry and friable with granular structure. Lower boundary is gradual and smooth. |
| Zone II | 18-133 | Brown (10YR5/3) silty clay loam with firm, blocky structure. Matrix is moist and calcium carbonate filaments are common. Diffuse and smooth lower boundary. |
| Zone III | 133-150 | Pinkish gray (7.5YR6/2) fine sandy clay with very firm, blocky structure. Matrix is moist and contains few calcium carbonate flecks and masses. |
| ***Backhoe Trench 6 (Negative)*** | | |
| Zone I | 0-13 | Light yellowish brown (10YR6/4) fine sandy loam. Matrix is dry, loose and heavily impacted by bioturbation. |
| Zone II | 13-36 | Dark greyish brown (10YR4/2) silty clay loam with firm, granular structure and dry matrix. Calcium carbonate flecks are common. Lower boundary is clear and wavy. |

**Trenching Results**

| Zone | Depth (cm) | Description |
|---|---|---|
| Zone III | 36-143 | Gray (10YR5/1) silty clay with very firm, blocky structure and dry matrix. Desiccation cracks and calcium carbonate masses and filaments are common throughout. |
| ***Backhoe Trench 7 (Negative)*** | | |
| Zone I | 0-24 | Light yellowish brown (10YR6/4) fine sandy loam with dry, friable matrix and granular structure. Zone slopes towards the southern aspect of the trench and towards a first order tributary of Arroyo Colorado. Lower boundary is clear and smooth. |
| Zone II | 24-28 | Dark greyish brown (10YR4/2) silty clay with very firm, blocky structure and dry matrix. Zone slopes towards the southern aspect of the trench. |
| Zone III | 28-72 | Yellowish brown (10YR5/4) sandy clay loam with dry matrix and very firm, blocky structure. Zone is inundated by thin to very thin, homogeneous sandy laminae. Lower boundary is very abrupt and smooth. |
| Zone IV | 72-99 | Pale brown (10YR6/3) medium-grained, loose, homogeneous sandy matrix consistent with alluvial deposition. Zone slopes towards the southern aspect of the trench. Lower boundary is abrupt and smooth. |
| Zone V | 99-102 | Brown (10YR6/4) silty clay with very firm, blocky structure and dry matrix. Lower boundary is abrupt and smooth. |
| Zone VI | 102-164 | Light yellowish brown (10YR6/4) loose, dry sandy matrix. Very thin, dark-hued and sandy laminae identified throughout. Zone slopes towards the southern aspect of the trench. |
| ***Backhoe Trench 8 (Negative)*** | | |
| Zone I | 0-18 | Brown (10YR4/3) sandy clay loam with dry, friable matrix inundated heavily with root bioturbation. Lower boundary is abrupt and smooth. |
| Zone II | 18-44 | Dark brown (10YR3/3) silty clay with firm, blocky structure. Matrix is moist with vertically oriented desiccation cracks common throughout. Lower boundary is gradual and smooth. |
| Zone III | 44-133 | Grayish brown (10YR5/2) silty clay with very firm, blocky structure and moist matrix. Calcium carbonate flecks are common, carbonate masses are few. |
| ***Backhoe Trench 9 (Negative)*** | | |
| Zone I | 0-28 | Grayish brown (10YR5/2) silty clay loam with firm, blocky structure and dry matrix. Vertically oriented desiccation cracks are common throughout. Lower boundary is diffuse and smooth. |
| Zone II | 28-115 | Gray (10YR5/1) silty clay with firm, blocky structure and dry matrix. Few calcium carbonate masses and flecks. |
| ***Backhoe Trench 10 (Negative)*** | | |
| Zone I | 0-25 | Dark greyish brown (10YR4/2) silty clay loam with friable, granular structure and moist matrix. Occurs within plow zone. Lower boundary is gradual and smooth. |
| Zone II | 25-94 | Gray (10YR6/1) silty clay with firm, blocky structure and moist matrix. Few roots and insect pores. Lower boundary is diffuse and smooth. |
| Zone III | 94-125 | Pale brown (10YR6/3) clay with very firm, blocky structure and moist matrix. Calcium carbonate flecks are common, carbonate masses are few. |
| ***Backhoe Trench 11 (Negative)*** | | |
| Zone I | 0-48 | Grayish brown (10YR5/2) silty clay with friable and moist matrix. Contains modern anthropogenic debris such as string and glass fragments. Lower boundary is smooth and diffuse. |

**Trenching Results**

| Zone | Depth (cm) | Description |
|---|---|---|
| Zone II | 48-152 | Dark grey (10YR4/1) silty clay with firm and moist matrix. Vertically oriented desiccation cracks, root and insect casts, and calcium carbonate flecks are common throughout. |
| ***Backhoe Trench 12 (Negative)*** | | |
| Zone I | 0-112 | Dark gray (10YR4/1) silty clay with firm, granular structure and moist matrix. The upper 35cm of zone is impacted by the modern plow zone. Lower boundary is diffuse and smooth. |
| Zone II | 112-160 | Pale brown (10YR6/3) silty clay with firm, blocky structure and moist matrix. Calcium carbonate flecks are common, carbonate masses are few. |

# APPENDIX C

ACT Permit Application and THC Correspondence