

US EPA ARCHIVE DOCUMENT



03 March 2013

Alfred Dumauual
US Environmental Protection Agency Region 6
Air Permits Section (6PD-R)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

**RE: Request for Concurrence – Finding of Will Not Adversely Affect
Archaeological and Historic Resources
Enterprise Products Operating LLC – Mont Belvieu Complex Propane
Dehydrogenation Unit Project
Mont Belvieu, Chambers County, Texas**

Mr. Dumauual:

On behalf of Enterprise Products Operating LLC (Enterprise), Whitenton Group, Inc. (WGI) is requesting a review of the enclosed project information for the Mont Belvieu Complex Propane Dehydrogenation (PDH) Unit project in Mont Belvieu, Chambers County, Texas. Enterprise is seeking concurrence from the Texas Historical Commission (THC)/State Historic Preservation Officer (SHPO) and the United States (US) Environmental Protection Agency (EPA) that the construction and operation of the Propane Dehydrogenation Unit will not affect historic properties listed in the NRHP or that meet the criteria for the NRHP in accordance with Section 106 guidance. The proposed project also requires a New Source Review and PSD review from the Texas Commission on Environmental Quality for non-GHG emissions.

The purpose of the proposed project is to expand the existing Mont Belvieu Complex by adding a PDH Unit that will have a design propylene production capacity of 1.654 billion pounds per year and to produce hydrogen byproducts.

The proposed project is located on the northwest side of Mount Belvieu, Texas approximately 0.32 miles north of the intersection of Hatcherville Road and Crosby Road (Figure 1-Appendix A).

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Project location information:

USGS Quad	Latitude/Longitude
Sheeks	29.862594
Mont Belvieu	-94.915484

Construction of the proposed PDH unit and associated infrastructure will take place in the existing Mont Belvieu facility and adjacent Enterprise property. The limits of the earth disturbance footprint will be referred to as the "Project Area." Linear facilities associated with the proposed project will include one new pipeline and facility access roads. These linear projects are included within and limited to the Project Area. The Area of Potential Effect (APE) for the undertaking consists of the entire 181 acre Project Area. The Project Area is shown in Figures 1 and 2 of the cultural resources survey report (Appendix B).

The total area of earth disturbance is approximately 181 acres. Approximately 58 of the 181 acres is an existing extra work space within the existing Mont Belvieu Complex, which is comprised of roadbase material and existing infrastructure. The remaining 123 acres is currently utilized as a grass farm and has historically been impacted by agricultural practices. One small industrial parking lot is currently located within the 123-acre section of the Project Area.

A cultural resources archival review was conducted by Horizon Environmental Services, Inc. (Horizon) prior to the intensive cultural resources surveys. This review included a 1-mile radius of the Project Area. The results indicated the presence of no previously recorded archeological sites or cemeteries within the 1-mile radius. No historic properties were listed on the National Register of Historic Places (NRHP) within a 1.0-mile radius of the Project Area. Based on the results of the archival review, Horizon determined there is a low potential for intact, undocumented prehistoric cultural deposits or historic-era architectural or archeological resources within the Project Area. The detailed results of the archival review are included in the enclosed document titled "Intensive Cultural Resources Survey of the Proposed 181-Acre Enterprise Mont Belvieu

Complex Propane Hydrogenation Unit Project in Chambers County, Texas” (Appendix B).

Based on the results of the archival review, Horizon conducted an intensive cultural resources survey of the Project Area (181 acres) to determine if the PDH Unit project would have the potential to adversely affect any significant cultural resources. The survey was conducted on 19 December 2012 and 18 January 2013.

The Texas State Minimum Archeological Survey Standards (TSMASS) for cultural resource surveys state that, for block-area projects, a minimum of 1 subsurface probe (i.e., shovel tests, auger tests, backhoe trenches) is required per 3 acres for projects the size of the current project’s APE unless field conditions warrant excavation of more probes (e.g., due to the presence of culturally sensitive areas) or less probes (e.g., due to extensive prior disturbances or cultural low-probability areas). As such, Horizon was able to excavate a total of 58 shovel tests within 123 acres of the Project Area. The remaining 58 acres of the Project Area are within an existing extra workspace within the Mont Belvieu Complex and did not warrant subsurface probing.

The cultural resources survey of the Project Area resulted in negative findings. No cultural resources were observed on the surface of the survey area or within any of the 58 excavated shovel tests. The detailed results of the cultural resources survey are included in the enclosed document titled “Intensive Cultural Resources Survey of the Proposed 181-Acre Enterprise Mont Belvieu Complex Propane Dehydrogenation Unit Project in Chambers County, Texas” (Appendix B).

Based on the results of the archival review and intensive cultural resources survey, Enterprise is requesting concurrence from the THC/SHPO and the EPA that the proposed PDH Unit construction and operation will not affect historic properties listed in the NRHP or that meet the criteria for the NRHP in accordance with Section 106 guidance. In the unlikely event that any cultural materials are inadvertently discovered at any point during construction or operation of the Project Area, all work at the location of the discovery should cease immediately, and the THC and the EPA should be notified of the discovery. Enclosed with this letter request are Figure 1 (Appendix A) and the



cultural resources survey report (Appendix B). Please call me at 512.353.3344 if you have any questions or need additional information.

Sincerely,

A handwritten signature in black ink that reads "Jayme Shiner". The signature is written in a cursive style.

Jayme A. Shiner

Appendix A - Figure 1 - Project Location

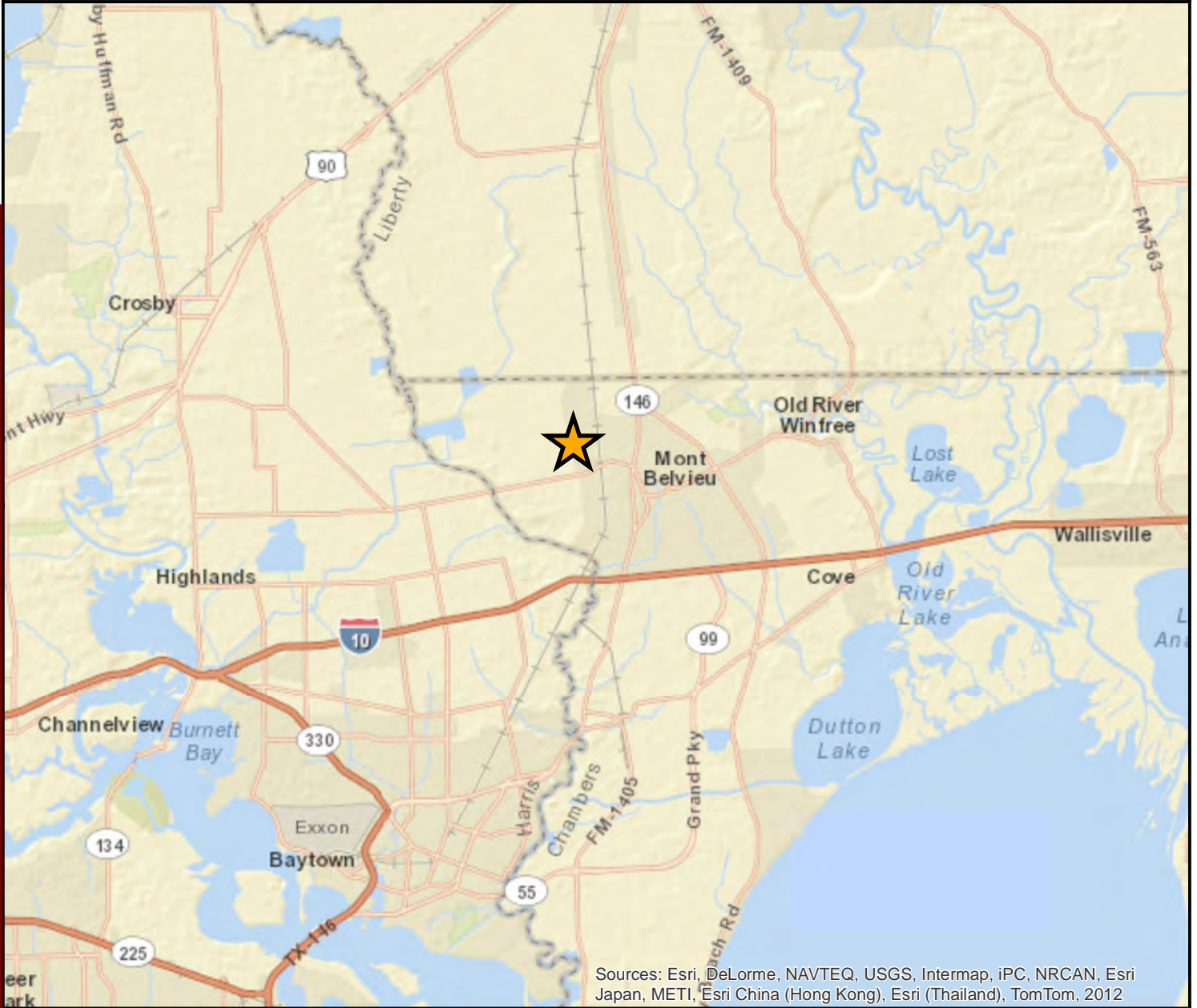
Appendix B - Intensive Cultural Resources Survey of the Proposed 181-Acre Enterprise Mont Belvieu Complex Dehydrogenation Unit Project in Chambers County, Texas

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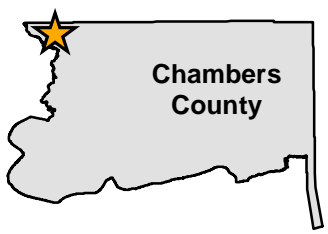
APPENDIX A

FIGURE 1 – PROJECT LOCATION

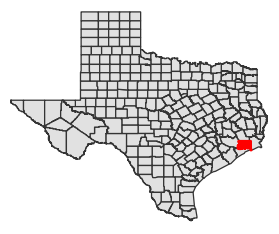
Figure 1 Project Location Propane Dehydrogenation Plant Project Chambers County, Texas



Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012



Project Location



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Background Resources: ESRI Streets Basemap	Surveyor(s): Map Created: 03/03/2013 by M. Pillion	Project Number and Information: 1280 Propane Hydrogenation Plant Project	<p>WHITENTON group environmental consultants</p> <p>3413 Hunter Road San Marcos Texas 78666</p> <div style="text-align: center;"> <p>Miles</p> </div> <div style="text-align: center;"> </div>
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APPENDIX B

CULTURAL RESOURCES SURVEY REPORT

Intensive Cultural Resources Survey of the Proposed 181-Acre Enterprise Mont Belvieu Complex Propane Dehydrogenation Unit Project Chambers County, Texas

By:

Jeffrey D. Owens



HJN 110012 AR 12

Prepared for:



Whitenton Group, Inc.
San Marcos, Texas

Prepared by:



Horizon Environmental Services, Inc.
Austin, Texas

January 2014

**Intensive Cultural Resources Survey of the
Proposed 181-Acre Enterprise Mont Belvieu Complex
Propane Dehydrogenation Unit Project
Chambers County, Texas**

By:

Jeffrey D. Owens

Prepared for:



Whitenton Group, Inc.
3413 Hunter Road
San Marcos, Texas 78666

Prepared by:



Horizon Environmental Services, Inc.
1507 South IH 35
Austin, Texas 78741

Jeffrey D. Owens, Principal Investigator
HJN 110022 AR 12

January 2014

MANAGEMENT SUMMARY

Horizon Environmental Services, Inc. (Horizon), was selected by the Whitenton Group, Inc. (Whitenton), on behalf of Enterprise Products Operating, LLC (Enterprise), to conduct an intensive cultural resources inventory and assessment of the proposed location of the Enterprise Mont Belvieu Complex Propane Dehydrogenation Unit Project (EMBC) in Mont Belvieu, Chambers County, Texas. Construction of the EMBC, associated infrastructure, and auxiliary equipment would take place within an overall proposed 73-hectare (ha) (181-acre [ac]) project site composed of 2 separate tracts that individually cover areas of 23 and 50 ha (58 and 123 ac). The larger, 50-ha (123-ac) tract, located in an agricultural field off the west side of Hatcherville Road, would be the site of the main plant and associated parking lot. The 23-ha (58-ac) tract, located off the east side of Hatcherville Road, is the site of the existing Eagle Ford Fractionator 7 & 8 industrial facility and would be used as an equipment laydown area during construction of the EMBC. The Area of Potential Effect (APE) of the proposed undertaking consists of the entire proposed 73-ha (181-ac) EMBC site composed of the 2 separate tracts discussed above. Linear facilities associated with the proposed project would include 1 proposed pipeline right-of-way (ROW) and proposed facility access roads. All linear facilities would be contained entirely within the APE as defined above.

As construction of the proposed facility would require a Prevention of Significant Deterioration (PSD) permit for Greenhouse Gases (GHG) issued by the US Environmental Protection Agency (EPA), the undertaking falls under the regulations of Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, which is invoked when federal funds are utilized or when federal permitting is required for a proposed project. The NHPA states that the Advisory Council for Historic Preservation (ACHP) and the Texas Historical Commission (THC), which serves as the State Historic Preservation Office (SHPO) for the state of Texas, must be afforded the opportunity to comment when any cultural resources potentially eligible for inclusion in the National Register of Historic Places (NRHP) are present in a project area affected by federal agency actions or covered under federal permits or funding.

On December 19 2012, and January 18, 2013, Horizon archeologists Michael Mudd, Kathryn Harrington, and Briana Nicole Smith, under the overall direction of Jeffrey D. Owens, Principal Investigator, performed an intensive cultural resources survey of the APE to locate any cultural resource properties that potentially would be impacted by the proposed undertaking.

Horizon's archeologists traversed the 73-ha (181-ac) APE and thoroughly inspected the modern ground surface for aboriginal and historic-age cultural resources. Currently, most of the 50-ha (123-ac) tract is an active agricultural field that forms part of a sod farm that was planted in St. Augustine grass at the time of the survey, though a small industrial lot occupies the northernmost portion of the tract. The 23-ha (58-ac) tract is the site of an existing industrial facility. Horizon excavated a total of 58 shovel tests during the survey, all of which were excavated in the portion of the 50-ha (123-ac) tract characterized by agricultural fields, thereby exceeding the Texas State Minimum Archeological Survey Standards requirements for the 50-ha (123-ac) tract. No shovel tests were excavated in the 23-ha (58-ac) tract, which is the site of an existing industrial facility. The fractionator plant at the latter location completely fills the 23-ha (58-ac) tract, and prior construction of this facility resulted in extensive disturbances, effectively resulting in there being no potential for cultural resources. The existing fractionator facility was photo-documented during the current survey, but there were no patches of bare, undisturbed ground that were not paved in which any shovel tests could be excavated.

No cultural resources, historic or prehistoric, were identified within the APE as a result of the survey. Based on the results of the survey-level investigations documented in this report, no potentially significant cultural resources would be affected by the proposed undertaking. In accordance with 36 CFR 800.4, Horizon has made a reasonable and good faith effort to identify archeological historic properties within the APE. No archeological resources were identified that meet the criteria for inclusion in the National Register of Historic Places (NRHP) according to 36 CFR 60.4, and no further archeological work is recommended in connection with the proposed undertaking. However, in the unlikely event that any human remains or burial accoutrements are inadvertently discovered at any point during construction, use, or ongoing maintenance in the project area, even in previously surveyed areas, all work should cease immediately and the THC should be notified of the discovery.

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1.0 INTRODUCTION

Horizon Environmental Services, Inc. (Horizon), was selected by the Whitenton Group, Inc. (Whitenton), on behalf of Enterprise Products Operating, LLC (Enterprise), to conduct an intensive cultural resources inventory and assessment of the proposed location of the Enterprise Mont Belvieu Complex Propane Dehydrogenation Unit Project (EMBC) in Mont Belvieu, Chambers County, Texas. Construction of the EMBC, associated infrastructure, and auxiliary equipment would take place within an overall proposed 73-hectare (ha) (181-acre [ac]) project site composed of 2 separate tracts that individually cover areas of 23 and 50 ha (58 and 123 ac) (Figures 1 and 2). The larger, 50-ha (123-ac) tract, located in an agricultural field off the west side of Hatcherville Road, would be the site of the main plant and associated parking lot. The 23-ha (58-ac) tract, located off the east side of Hatcherville Road, is the site of the existing Eagle Ford Fractionator 7 & 8 industrial facility and would be used as an equipment laydown area during construction of the EMBC. The Area of Potential Effect (APE) of the proposed undertaking consists of the entire proposed 73-ha (181-ac) EMBC site composed of the 2 separate tracts discussed above. Linear facilities associated with the proposed project would include 1 proposed pipeline right-of-way (ROW) and proposed facility access roads. All linear facilities would be contained entirely within the APE defined above.

As the proposed upgrades would require a Prevention of Significant Deterioration (PSD) permit for Greenhouse Gases (GHG) issued by the US Environmental Protection Agency (EPA), the undertaking falls under the regulations of Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, which is invoked when federal funds are utilized or when federal permitting is required for a proposed project. The NHPA states that the Advisory Council for Historic Preservation (ACHP) and the Texas Historical Commission (THC), which serves as the State Historic Preservation Office (SHPO) for the state of Texas, must be afforded the opportunity to comment when any cultural resources potentially eligible for inclusion in the National Register of Historic Places (NRHP) are present in a project area affected by federal agency actions or covered under federal permits or funding.

On December 19 2012, and January 18, 2013, Horizon archeologists Michael Mudd, Kathryn Harrington, and Briana Nicole Smith, under the overall direction of Jeffrey D. Owens, Principal Investigator, performed an intensive cultural resources survey of the APE to locate any cultural resource properties that potentially would be impacted by the proposed undertaking. The cultural resources investigation consisted of an archival review, an intensive pedestrian

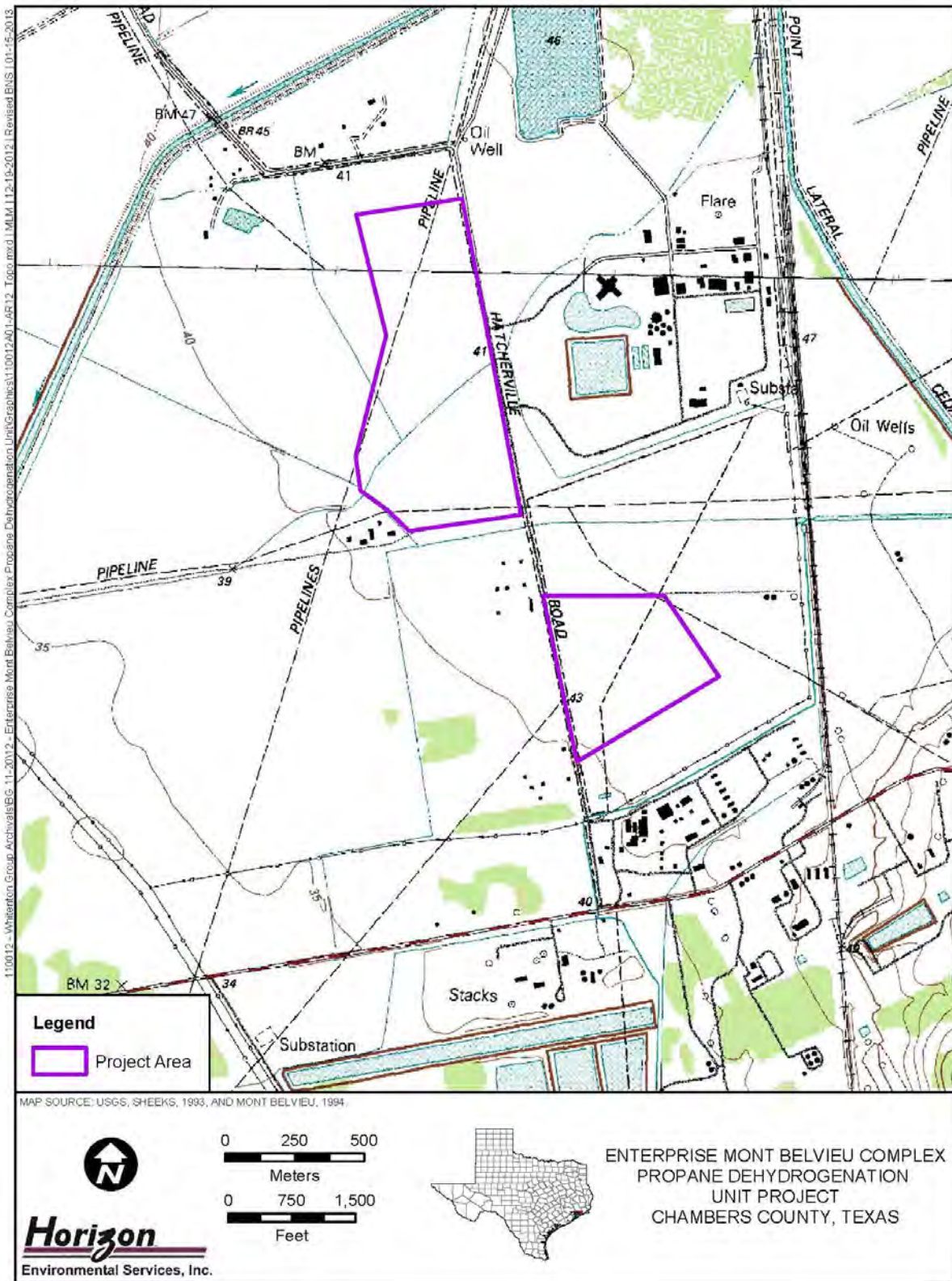


Figure 1. Location of Project Area on USGS Topographic Quadrangle

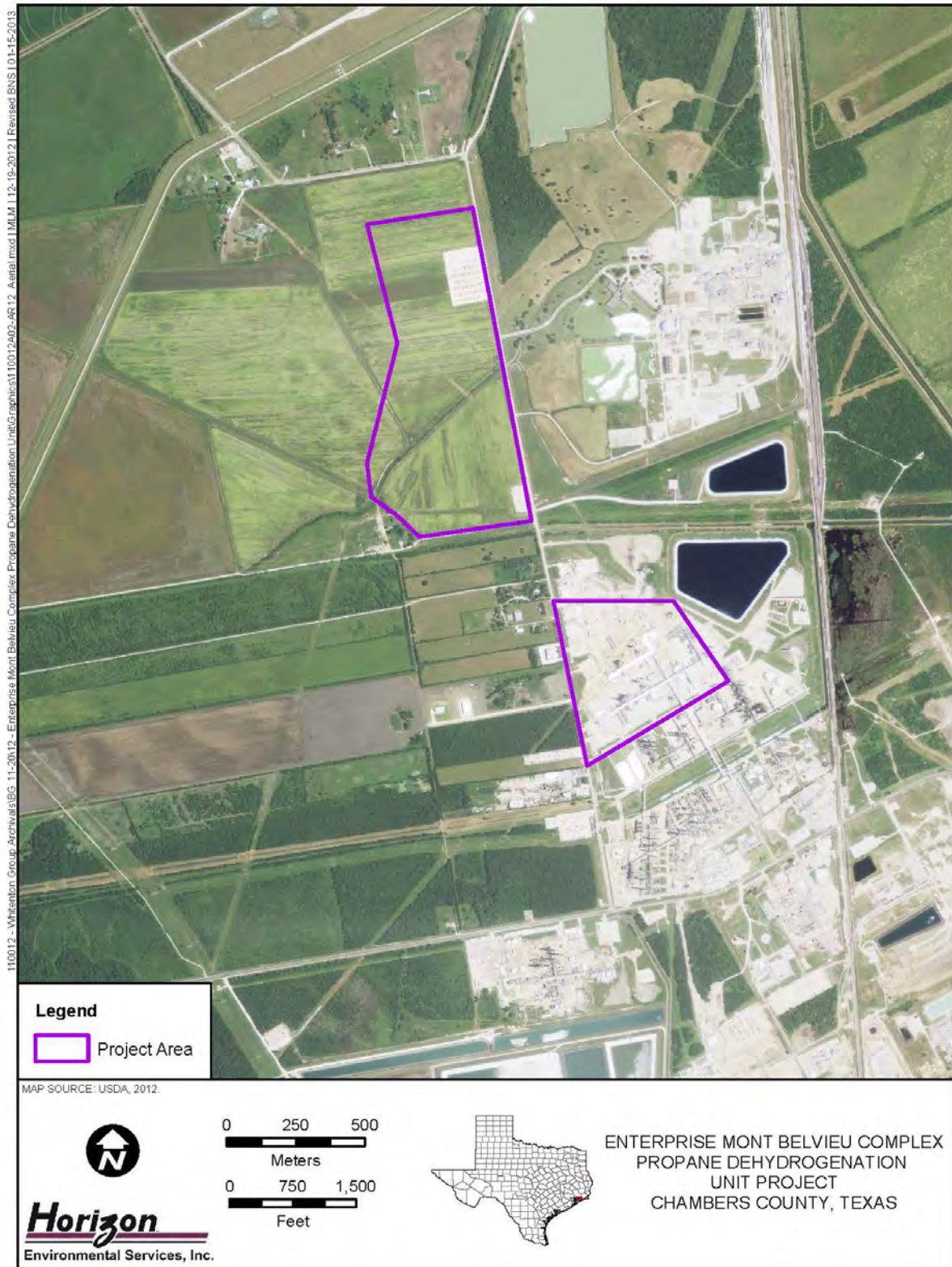


Figure 2. Location of Project Area on Aerial Photograph

survey of the APE, and the production of a report suitable for review by the State Historic Preservation Office (SHPO) in accordance with the THC's Rules of Practice and Procedure, Chapter 26, Section 27, and the Council of Texas Archeologists' (CTA) Guidelines for Cultural Resources Management Reports.

This report presents the results of this cultural resource survey. Following this introductory chapter, Chapters 2.0 and 3.0 present the environmental and cultural background, respectively, of the project area. Chapter 4.0 describes the research objectives, results of archival research, and cultural resource survey methods implemented during the survey. Chapter 5.0 presents the results of the cultural resource survey, and Chapter 6.0 presents cultural resource management recommendations for the project. Chapter 7.0 lists the references cited in the report. Appendix A summarizes shovel test data, and Appendix B contains the curriculum vitae of the Principal Investigator.

2.0 ENVIRONMENTAL SETTING

2.1 PHYSIOGRAPHY AND HYDROLOGY

The project area is located in Chambers County, Texas, in a coastal upland setting in northwestern Mont Belvieu in northwestern Chambers County, Texas. Chambers County is situated on the Gulf Coastal Plain in southeastern Texas. The Gulf of Mexico represents a structural basin formed by lithosphere deformation. The Texas Coastal Plain, which extends as far north as the Ouachita uplift in southern Oklahoma and westward to the Balcones Escarpment, consists of seaward-dipping bodies of sedimentary rock, most of which are of terrigenous clastic origin, that reflect the gradual infilling of the basin from its margins (Abbott 2001). The Houston area is underlain by rocks and unconsolidated sediments that are quite young in a geological sense, ranging from modern to Miocene in age. These consist predominantly of a series of fluviodeltaic bodies arranged in an offlapped sequence, with interdigitated and capping eolian, littoral, and estuarine facies making up a relatively minor component of the lithology. Major bounding disconformities between these formations are usually interpreted to represent depositional hiatuses that occurred during periods of sea level low stand. The oldest rocks in this fill are of Late Cretaceous age. As a result of the geometry of basin filling, successively younger rock units crop out in subparallel bands from the basin margin toward the modern coastline.

The project area is situated in a coastal upland setting northeast of Cedar Bayou, which drains directly into Trinity Bay, a bay off the Gulf of Mexico, approximately 22 kilometers (km) (14 miles [mi]) south of the project area. Drainage is generally toward the southwest toward Cedar Bayou, primarily via overland sheet flow and a network of small, channelized canals that wind across the landscape. Elevations across the 3 segments of the APE are relatively flat, averaging approximately 12 m (40 ft) above mean sea level (amsl).

2.2 GEOLOGY AND GEOMORPHOLOGY

The project area is underlain by the Beaumont Formation (Fisher 1982). The Beaumont, or Prairie, terrace is the youngest continuous coastwise terrace fronting the modern Gulf (Abbott 2001). The Beaumont Formation consists of clay, silt, and fine sand arranged in spatial patterns that reflect the distribution of fluvial (e.g., channel, point bar, levee, and backswamp) and mudflat/coastal marsh facies (Van Siclen 1985). Sandy deposits associated with littoral facies

are also frequently considered part of the Beaumont. Many investigators (cf. DuBar et al. 1991; Fisk 1938, 1940) have correlated the Beaumont terrace with the Sangamon Interglacial (ca. 130 to 75 thousand years ago [kya]), although age estimates range from Middle Wisconsinan (Alford and Holmes 1985) to 100 to 600 kya (Blum and Price 1994). While debate about the temporal affiliations of and correlations among the deposits that underlie the major coastline terraces remains active, they are of little direct geoscientific relevance because virtually all investigators agree that these deposits considerably predate the earliest demonstrated dates of human occupation in North America.

The project area is situated on a mosaic of loamy and clayey fluviomarine sediments of Late Pleistocene age (Table 1; Figure 3). The vast majority (approximately 80%) of the project area, including all the of largest, 34-ha (83-ac) tract and the smaller, 7-ha (17-ac) tract, as well as approximately half of the 23-ha (58-ac) tract, is situated on Lake Charles clay, 0 to 1% slopes (LaA), which consists of deep deposits of Late Pleistocene fluviomarine clay sediments. The remaining half of the 23-ha (58-ac) tract consists of Morey silt loam, leveled (Mo), which consists of deep deposits of silt loam and silty clay loam modified by industrial development. No Holocene-age soils or alluvial sediments are mapped within the project area.

While aboriginal cultural resources are commonly encountered in deep alluvial sediments adjacent to major streams in Texas, the relative antiquity of the fluviodeltaic loamy and clayey sediments that constitute the soils on the coastal plain, such as those that comprise the current project area, suggests that any cultural resources would be constrained to the modern ground surface, rather than in buried contexts, in erosional settings lacking integrity. Intact, buried archeological deposits may occur within alluvial sediments near major streams and in some coastal settings, though no Holocene-age sediments are mapped in the project area. Overall, the project area would appear to have a low to moderate potential for aboriginal archeological deposits, though the integrity of any archeological deposits that may be present in the APE likely would have been disturbed by agricultural plowing and development of an existing industrial facility. Historic-age cultural resources may occur in virtually any physiographic setting, though the lack of any standing structures within the APE on the relevant US Geological Survey (USGS) topographic quadrangle and recent aerial photograph suggests a reduced potential for historic-age architectural or archeological resources (see Figures 1 and 2).

Table 1. Mapped Soils Located within Project Area

Soil Name	Location	Soil Description	Typical Profile
Lake Charles clay, 0 to 1% slopes (LaA)	Coastal plains	Clayey fluviomarine deposits of Late Pleistocene age on coastal plains	0-12 in: Clay 12-36 in: Clay 36-64 in: Clay 64-80 in: Clay
Morey silt loam, leveled (Mo)	Coastal plains	Loamy fluviomarine deposits of Late Pleistocene age on coastal plains	0-12 in: Silt loam 12-42 in: Silty clay loam 42-64 in: Silty clay loam

in: Inches

Source: NRCS 2012

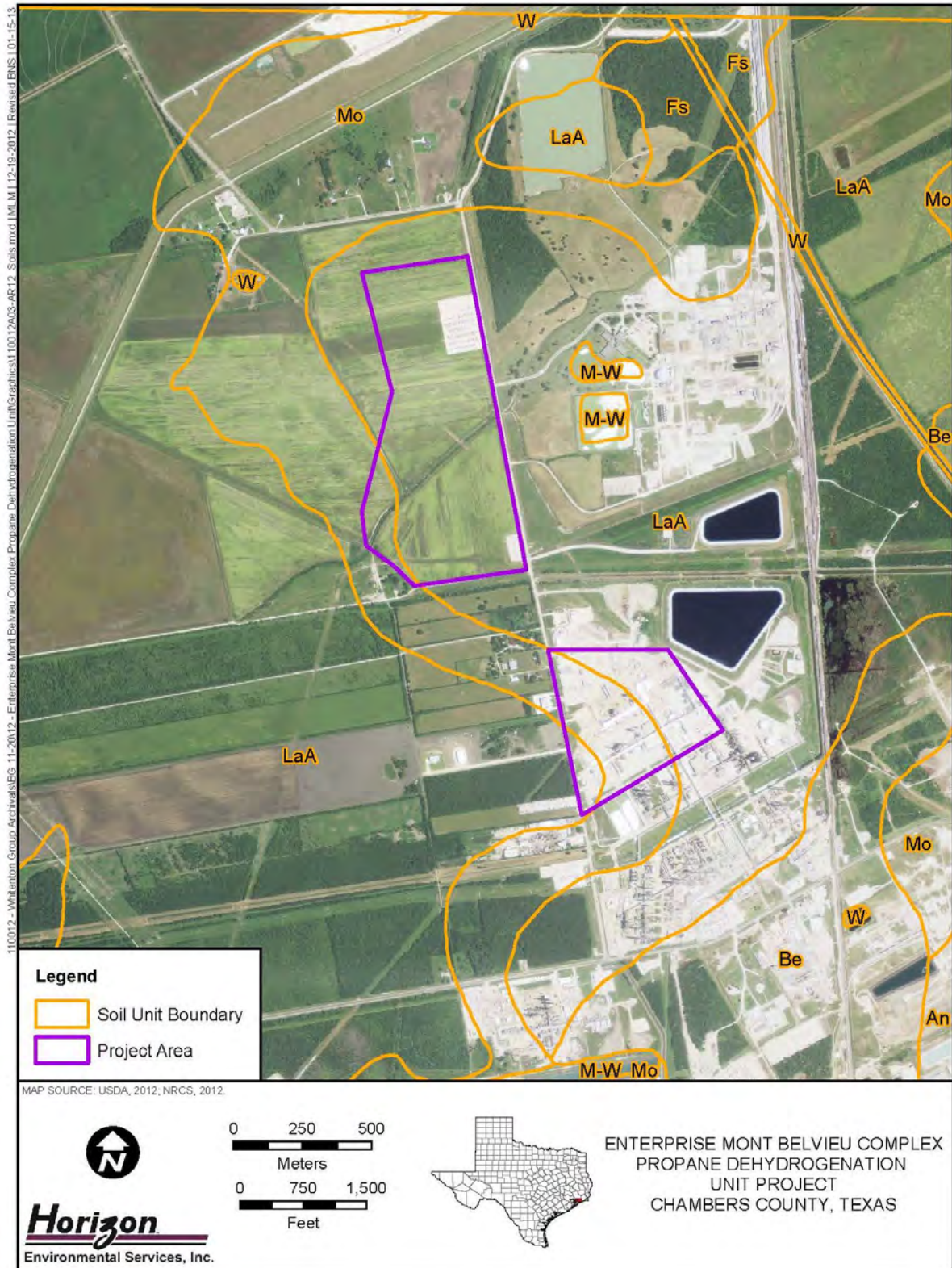


Figure 3. Distribution of Mapped Soils in Project Area

2.3 CLIMATE

Evidence for climatic change from the Pleistocene to the present is most often obtained through studies of pollen and faunal sequences (Bryant and Holloway 1985; Collins 1995). While the paleoclimatic history of the coastal region remains unclear, Bryant and Holloway (1985) present a sequence of climatic change for nearby east-central Texas that includes 3 separate climatic periods—the Wisconsin Full Glacial Period (22,500 to 14,000 B.P.), the Late Glacial Period (14,000 to 10,000 B.P.), and the Post-Glacial Period (10,000 B.P. to present). Evidence from the Wisconsin Full Glacial Period suggests that the climate in east-central Texas was considerably cooler and more humid than at present. Pollen data indicate that the region was more heavily forested in deciduous woodlands than during later periods (Bryant and Holloway 1985). The Late Glacial Period was characterized by slow climatic deterioration and a slow warming and/or drying trend (Collins 1995). In east-central Texas, the deciduous woodlands were gradually replaced by grasslands and post oak savannas (Bryant and Holloway 1985). During the Post-Glacial Period, the east-central Texas environment appears to have been more stable. The deciduous forests had long since been replaced by prairies and post oak savannas. The drying and/or warming trend that began in the Late Glacial Period continued into the mid-Holocene, at which point there appears to have been a brief amelioration to more mesic conditions lasting from roughly 6000 to 5000 B.P. Recent studies by Bryant and Holloway (1985) indicate that modern environmental conditions in east-central Texas were probably achieved by 1,500 years ago.

The modern climate of the upper Texas coast, including the region surrounding Houston, is classified as subtropical humid (Abbott 2001; Larkin and Bomar 1983), forming a transitional zone between the humid southeastern US and the semiarid to arid west. The climate reflects the influences of latitude, low elevation, and proximity to the Gulf of Mexico, which combine with the urban heat island formed by the tremendous concentration of asphalt and concrete to give the Houston area a notorious modern climate that is oppressively warm and moist throughout much of the year. As a result of proximity to the Gulf and the abundance of surface water, humidity in the early morning can approach 100% even on cloudless summer days, and it often exceeds 50% even on the warmest afternoons. Largely as a consequence of the relatively high humidity characteristic of the region, temperature patterns exhibit a moderate annual range and a modest diurnal range that increases slightly with distance from the coast. Average monthly high temperature ranges from a low of 17 to 19°C (63 to 66°F) in January to a high of 38 to 40°C (100 to 104°F) in August. Average monthly lows range from 4 to 9°C (39 to 48°F) in January to 25 to 29°C (77 to 84°F) in July and August. Annually, average low temperatures range from 15 to 21°C (59 to 69°F), and average high temperatures range from 27 to 29°C (81 to 84°F) (Abbott 2001; Larkin and Bomar 1983).

The Houston region experiences 2 precipitation peaks throughout the year (Abbott 2001). The first occurs in the late spring (i.e., May to June) due to the passage of infrequent cold fronts that spawn chains of powerful frontal thunderstorms. The second occurs in the late summer to early autumn (i.e., August to September) due to the incidence of tropical storms and hurricanes from the Atlantic and, occasionally, Pacific oceans. In contrast, winter and early spring are relatively dry, and high summer rainfall is dominated by convective thunderstorms

that are relatively brief and localized, albeit frequently intense. Average annual precipitation varies from a low of approximately 100 centimeters (cm) (40 inches [in]) to a high of more than 132 cm (52 in). Average monthly precipitation varies from less than 5 to 8 cm (2 to 3 in) in March to more than 19 cm (7.5 in) occurring locally on the coast during September. Almost all of the measurable precipitation falls as rain—snowfall is extremely rare, occurring in measurable amounts in only 1 in 10 years.

2.4 FLORA AND FAUNA

Chambers County is situated near the southeastern edge of the Texan biotic province (Blair 1950), an intermediate zone between the forests of the Austroriparian and Carolinian provinces and the grasslands of the Kansas, Balconian, and Tamaulipan provinces. Some species reach the limits of their ecological range within the Texan province. McMahon et al. (1984) further define 4 broad communities that characterize that portion of the Texan biotic province that lies on the Gulf Coastal Plain: (1) coastal marsh/barrier island, (2) coastal prairie, (3) coastal gallery forest, and (4) pine-hardwood forest (cf. Abbott 2001:24-26).

The coastal marsh/barrier island category includes well-drained, sandy, coastal environments and saline and freshwater wetlands in the coastal zone (Abbott 2001:24). Marsh vegetation is typical of areas that are seasonally wet and have substrates composed primarily of sands and silts, clays, or organic decomposition products. Vegetation assemblages are strongly controlled by texture, salinity, frequency and duration of inundation, and depth of the seasonal water table. Sandy, relatively well-drained, freshwater environments are typically dominated by little bluestem, switchgrass, Florida paspalum, and brownseed paspalum. Wetter environments are often dominated by marshhay cordgrass, seashore saltgrass, saggitaria, bulrushes, smooth cordgrass, seashore paspalum, seashore dropseed, olney bulrush, saltmarsh bulrush, saltmarsh aster, longtom, sprangletop, burhead, arrowhead, coastal waterhyssop, needlegrass rush, and other sedges and rushes. Slightly higher, better-drained environments are characterized by such taxa as seashore saltgrass, seashore paspalum, gulfdune paspalum, shoregrass, gulf cordgrass, red lovegrass, bushy sea-oxeye, and glasswort. A variety of fauna are characteristic of the shore zone. Important larger taxa include raccoon, nutria, alligators, turtles, swamp rabbit, and many birds, including ducks, geese, herons, and many smaller species. Aquatic taxa, including a wealth of fish and shellfish adapted to brackish to hypersaline conditions, are also important in the coastal zone.

The coastal prairie category consists primarily of grasses with minor amounts of forbs and woody plants in areas that are not saturated on a seasonal basis (Abbott 2001:24-26). This community is characteristic of upland areas and grades into the pine-hardwood forest to the north and east and into the coastal marsh/barrier island to the south. A wide variety of grasses are found in the prairie environments, but the principal taxa include big bluestem, little bluestem, indiagrass, eastern grama, switchgrass, brownseed paspalum, sideoats grama, silver bluestem, buffalograss, threeawn, and Texas wintergrass. Common forbs include Maximilian sunflower, Engelman daisy, blacksalmon, penstemon, dotted gayfeather, bundleflower, yellow neptunia, snoutbean, prairie clover, tickclover, wildbean, western indigo, paintbrush, bluebonnet, ragweed, croton, milkweed, vetch, verbena, and winecup. Woody plants occurring

in the coastal prairie include mesquite, honey locust, huisache, eastern baccharis, sesbania, live oak, elm, hackberry, bumelia, and coralberry. The frequency of trees increases dramatically as the coastal prairie grades into the pine-hardwood forest, forming an open woodland environment with common stands of hardwood trees and occasional pines. The coastal prairie is home to a diverse fauna, including coyote, white-tailed deer, skunks, cottontail rabbit, many small rodents, amphibians, reptiles, and a variety of permanent and migratory birds. Bison and pronghorn were also present at various times in the past.

The coastal gallery forest consists of diverse, principally deciduous trees and associated understory in floodplains and streams that traverse the outer coastal plain (Abbott 2001:26). Important taxa include water oak, pecan, poplar, American elm, cedar elm, sugarberry, ash, loblolly pine, post oak, cherrybark oak, mulberry, swamp chestnut oak, willow oak, sweetgum, hawthorn, dogwood, hickory, bois d'arc, sassafras cypress, willow, cottonwood, and sumac. Shrubs and vines such as mustang grape, greenbrier, yaupon, coralberry, possumhaw, elderberry, honeysuckle, dewberry, and blackberry are common in the understory, as are grasses such as little bluestem, big bluestem, and indiagrass. The fauna of the gallery forest include white-tailed deer, opossum, raccoon, squirrel, turkey, a variety of small mammals and rodents, turtles, snakes, and many birds. Black bear was also present at various times in the past, and a number of fish and a few varieties of shellfish are present in the streams.

The pine-hardwood forest is characterized by a mix of coniferous and deciduous trees, including longleaf pine, shortleaf pine, loblolly pine, post oak, red oak, white oak, blackjack oak, willow oak, and live oak (Abbott 2001:26). Riparian environments often support larger deciduous trees like pecan, cottonwood, hickory, beech, and American elm. Understory vegetation varies from relatively open to quite dense, and consists of shrubs, vines, forbs, and young trees. Common shrubs include acacia, yaupon, mayhaw, wild persimmon, myrtle, greenbrier, Virginia creeper, blackberry, dewberry, trumpet vine, gourd, and poison ivy. A variety of fauna is also present, including white-tailed deer, opossum, raccoon, squirrel, rabbit, mink, skunk, various small rodents, turtles, reptiles, and many different birds. Black bear was also present at times in the past, and bison and pronghorn were occasionally present in the transition zone to the coastal prairie environment.

3.0 CULTURAL BACKGROUND

The project area is located within the Southeast Texas Archeological Region, a 21-county area extending from the Colorado River on the west to the Sabine River on the east and measuring about 22 km (14 mi) inland from the Gulf of Mexico coastline. Much of the archeological record in Southeast Texas represents an interface between the Southern Great Plains and the Southeastern Woodlands (Aten 1983, 1984; Patterson 1995; Story 1990). Further distinctions are often made between the inland and coastal margin subregions of Southeast Texas. These 2 subregions are somewhat culturally distinct, and the inland subregion has a much longer chronological record. The coastal margin of Southeast Texas comprises a zone about 25 km (16 mi) inland from the coast that covers the area influenced by Gulf tidal flows on the salinity of streams, lakes, and bays. Considerable ecological variability characterizes this subregion, including woodlands, coastal prairie, lakes, wetlands, marine coastline, and barrier islands. The inland subregion also encompasses considerable ecological diversity, including mixed woodlands, coastal prairies, and dense piney woods.

The human inhabitants of Southeast Texas practiced a generally nomadic hunting and gathering lifestyle throughout all of prehistory. While many of the same labels are used to denote Southeast Texas cultural/chronological periods, the timeframe and cultural characteristics of Southeast Texas culture periods are often different than in neighboring regions. For instance, the Archaic and Late Prehistoric time periods are different in Central and Southeast Texas, and Central Texas lacks the Early Ceramic period that has been defined for Southeast Texas.

Mobility and settlement patterns do not appear to have changed markedly through time in Southeast Texas. Inland sites are usually found near a water source, usually exhibit evidence of reoccupation through time, have well-defined intrasite activity areas, tend not to be associated with satellite activity sites or separate base camps, and exhibit a range of subsistence-related activities. Inland sites also tend to contain modest pottery assemblages, fired clay balls (at some sites), abundant lithic material, and an absence of shell tools. Coastal sites tend to consist of multicomponent *Rangia* mussel shell middens that contain oyster shell tools, large quantities of pottery (in later cultural components), numerous bone tools, and only a few lithic artifacts.

3.1 PALEOINDIAN PERIOD (10,000 TO 5000 B.C.)

The initial human occupations in the New World can now be confidently extended back before 10,000 B.C. (Dincauze 1984; Haynes et al. 1984; Kelly and Todd 1988; Lynch 1990; Meltzer 1989). Evidence from Meadowcroft Rockshelter in Pennsylvania suggests that humans were present in Eastern North America as early as 14,000 to 16,000 years ago (Adovasio et al. 1990), while more recent discoveries at Monte Verde in Chile provide unequivocal evidence for human occupation in South America by at least 12,500 years ago (Dillehay 1989, 1997; Meltzer et al. 1997). Most archeologists presently discount claims of much earlier human occupation during the Pleistocene glacial period.

The earliest generalized evidence for human activities in Southeast Texas is represented by the PaleoIndian period (10,000 to 5000 B.C.) (Patterson 1995). This stage coincided with ameliorating climatic conditions following the close of the Pleistocene epoch that witnessed the extinction of herds of mammoth, horse, camel, and bison. Cultures representing various periods within this stage are characterized by series of distinctive, relatively large, often fluted, lanceolate projectile points. These points are frequently associated with spurred end-scrapers, graters, and bone foreshafts.

PaleoIndian groups are often inferred to have been organized into egalitarian bands consisting of a few dozen individuals that practiced a fully nomadic subsistence and settlement pattern. Due to poor preservation of floral materials, subsistence patterns in Southeast Texas are known primarily through the study of faunal remains. Subsistence focused on the exploitation of small animals, fish, and shellfish, even during the PaleoIndian period. There is little evidence in this region for hunting of extinct megafauna, as has been documented elsewhere in North America; rather, a broad-based subsistence pattern appears to have been practiced during all prehistoric time periods.

In Southeast Texas, the PaleoIndian stage is divided into 2 periods based on recognizable differences in projectile point styles (Patterson 1995). These include the Early PaleoIndian period (10,000 to 8000 B.C.), which is recognized based on large, fluted projectile points (i.e., Clovis, Folsom, Dalton, San Patrice, and Big Sandy), and the Late PaleoIndian period (8000 to 5000 B.C.), which is characterized by unfluted lanceolate points (i.e., Plainview, Scottsbluff, Meserve, and Angostura).

3.2 ARCHAIC PERIOD (5000 B.C. TO A.D. 100)

The onset of the Hypsithermal drying trend signaled the beginning of the Archaic stage (5000 B.C. to A.D. 100) (Patterson 1995). This climatic trend marked the beginning of a significant reorientation of lifestyle throughout most of North America, but this change was far less pronounced in Southeast Texas. Elsewhere, the changing climatic conditions and corresponding decrease in the big game populations forced people to rely more heavily upon a diversified resource base composed of smaller game and wild plants. In Southeast Texas, however, this hunting and gathering pattern is characteristic of most of prehistory. The appearance of a more diversified tool kit, the development of an expanded groundstone assemblage, and a general decrease in the size of projectile points are hallmarks of this cultural

stage. Material culture shows greater diversity during this broad cultural period, especially in the application of groundstone technology.

Traditionally, the Archaic period is subdivided into Early, Middle, and Late subperiods. In Southeast Texas, the Early Archaic period (5000 to 3000 B.C.) is marked by the presence of Bell, Carrollton, Morrill, Trinity, Wells, and miscellaneous Early Stemmed projectile points. The Bell point is the only type in this period that is closely associated with the Southern Plains. Many of the latter point types continue into the Middle Archaic period (3000 to 1500 B.C.) and several new types appear, including Bulverde, Lange, Pedernales, Williams, Travis, and probably the Gary-Kent series. The Late Archaic period (1,500 B.C. to A.D. 100) is characterized by Gary, Kent, Darl, Yarbrough, Ensor, Ellis, Fairland, Palmillas, and Marcos points.

In the western part of inland Southeast Texas, a Late Archaic mortuary tradition developed in the lower Brazos and Colorado river valleys and in the intervening area (Hall 1981; Patterson 1995). Organized burial practices actually started during the Middle Archaic period but reached full development in the Late Archaic with the use of exotic grave goods such as boatstones and bannerstones (probably used as atlatl weights), stone gorgets, corner-tang knives, stingray spines, shark teeth, and marine shell beads and pendants. Other burial practices included the systematic orientation of burial direction, body position, use of red ochre, and use of locally made grave goods, such as longbone implements and bone pins. Most burials are found in extended supine position, though some extended prone and bundle burials are also known. Burial direction is usually consistent within single sites but varies from site to site. Patterson et al. (1993) report that at least 11 sites are associated with this mortuary tradition in Austin, Fort Bend, and Wharton counties.

3.3 EARLY CERAMIC PERIOD (A.D. 100 TO 600)

The use of pottery did not start uniformly throughout Southeast Texas. Pottery manufacture appears to have diffused into this region from adjacent regions, primarily from the east along the coastal margin. Aten (1983:297) argues that pottery was being manufactured on the coastal margin of the Texas-Louisiana border by about 70 B.C., in the Galveston Bay area by about A.D. 100, in the western part of the coastal margin by about A.D. 300, and in the Conroe-Livingston inland area by about A.D. 500. The practice of pottery manufacture appears to have progressed first along the coastal margin and then moved inland (Patterson 1995). Southeastern Texas ceramic chronologies are best known in the Galveston Bay area, where Aten (1983) established a detailed chronological sequence.

The earliest ceramic periods in the Galveston Bay and neighboring Sabine Lake areas appear to be approximately contemporaneous with the earliest ceramic periods of the lower Mississippi Valley (Aten 1984). Early assemblages contain substantial quantities of Tchefuncte ceramics. In the Sabine Lake region, grog-tempered varieties of Baytown Plain and Marksville Stamped are common, while grog-tempered ceramics do not occur in the Galveston Bay area 129 km (80 mi) to the west until several hundred years later. With the principal exception of a few Tchefuncte ceramic types, other southern Louisiana ceramics are not found on the Gulf coast west of the Sabine Lake area.

Goose Creek sandy-paste pottery was used throughout Southeast Texas and somewhat farther north in the Early Ceramic, Late Prehistoric, and the early part of the Historic periods (Aten 1984; Patterson 1995; Perttula et al. 1995). The Goose Creek series is the primary utility ware throughout the prehistoric sequence in Southeast Texas, though it gives way to Baytown Plain for about 200 years during the transition between the Late Prehistoric and Historic periods before once again becoming predominant into the Historic period (Aten 1984). A minor variety, Goose Creek Stamped, occurs only in the Early Ceramic period (Aten 1983). Three other minor pottery types—Tchefuncte (Plain and Stamped), Mandeville, and O’Neal Plain *variety Conway* (Aten 1983)—were used only during the Early Ceramic period. The Mandeville and Tchefuncte types are characterized by contorted paste and poor coil wedging. Mandeville has sandy paste (like Goose Creek), while Tchefuncte paste has relatively little sand. Given their technological similarities, Mandeville and Tchefuncte may represent different clay sources rather than distinct pottery types (Patterson 1995). The bone-tempered pottery that characterizes ceramic assemblages elsewhere in Texas is not common in Southeast Texas.

3.4 LATE PREHISTORIC PERIOD (A.D. 600 TO 1500)

The onset of the Late Prehistoric period (A.D. 600 to 1500) (Patterson 1995) is defined by the appearance of the bow and arrow. Elsewhere in Texas, pottery also appears during the latter part of the Late Prehistoric period, but, as already discussed, ceramics appear earlier in Southeast Texas. Along the coastal margin of Southeast Texas, use of the atlatl (i.e., spearthrower) and spear was generally discontinued during the Late Prehistoric period, though they continued to be used in the inland subregion along with the bow and arrow through the Late Prehistoric period (Ensor and Carlson 1991; Keller and Weir 1979; Patterson 1980, 1995; Wheat 1953). In fact, Patterson (1995:254) proposes that use of the bow and arrow started in Southeast Texas as early as the end of the Middle Archaic period, using unifacial arrow points that consisted of marginally retouched flakes. In contrast, Prewitt (1981) argues for a generalized date of adoption of the bow-and-arrow hunting system at about the same time (ca. A.D. 600) in Central and Southeast Texas. In Southeast Texas, unifacial arrow points appear to be associated with a small prismatic blade technology. Bifacial arrow point types include Alba, Catahoula, Perdiz, and Scallorn. A serial sequence for these point types has not been established in Southeast Texas, though Scallorn points appear to predate Perdiz points throughout the rest of Texas.

Grog- (i.e., crushed-sherd-) tempered pottery was used in the Late Prehistoric and Protohistoric periods in Southeast Texas. The grog-tempered varieties include San Jacinto Plain and Baytown Plain *variety Phoenix Lake*. San Jacinto pottery contains a relatively small proportion of small-sized temper, while Baytown Plain has larger amounts of sherd pieces that are often visible on vessel surfaces. As previously mentioned, sandy-paste Goose Creek pottery remained in use throughout the Late Prehistoric period. Rockport Plain and Asphalt Coated pottery from the Central Texas Coast (Ricklis 1995) are found at a few sites in Southeast Texas during the Late Prehistoric and Protohistoric periods.

3.5 PROTOHISTORIC PERIOD (A.D. 1500 TO 1700)

For the most part, Protohistoric and early Historic Indian sites in Southeast Texas have not been articulated with the ethnographic record (Story 1990:258). Similarly, reconciling the ethnographic record to prehistoric Indian groups in this region is problematic. Late Prehistoric and Historic population movements further complicate this issue. Aten (1983) has reconstructed the territories of native groups present in this region in the early 18th century, including the Akokisa, Atakapa, Bidai, Coco (possibly Karankawa), and Tonkawa. The presence of the Tonkawa in Southeast Texas may be due to their rapid expansion from Central Texas in the 17th and 18th centuries (Newcomb 1993:27). The Karankawa Indians are thought to have occupied the coastal margin of this region as far east as Galveston Island and the corresponding mainland (Aten 1983). Judging by the scarcity of Rockport pottery on sites east of the San Bernard River, the ethnic association of the Karankawa Indians with the Coco tribe may be in doubt.

Protohistoric and Historic Indian sites may not be systematically recognized as such because few aboriginal artifact types changed from the Late Prehistoric to the Historic periods (Patterson 1995). Only a few non-European artifact types are useful in identifying Historic Indian sites, including Bulbar Stemmed and Guerrero arrow points and possibly Fresno and Cuney points after A.D. 1500 (Hudgins 1986). Historic period Indian sites are usually identified by the presence of glass and metal artifacts, gunflints, and European types of pottery.

3.6 HISTORIC PERIOD (CA. A.D. 1700 TO PRESENT)

The first European incursion into what is now known as Texas was in 1519, when Álvarez de Pineda explored the northern shores of the Gulf of Mexico. In 1528, Álvar Núñez Cabeza de Vaca crossed South Texas after being shipwrecked along the Texas Coast near Galveston Bay; however, European settlement did not seriously disrupt native ways of life until after 1700. The first half of the 18th century was the period in which the fur trade and mission system, as well as the first effects of epidemic diseases, began to seriously disrupt the native culture and social systems. This process is clearly discernable at the Mitchell Ridge site, where the burial data suggest population declines and group mergers (Ricklis 1994), as well as increased participation on the part of the Native American population in the fur trade. By the time heavy settlement of Texas began in the early 1800s by Anglo-Americans, the indigenous Indian population was greatly diminished. The Alabama/Coushatta Indians who currently reside in Southeast Texas are migrants who were displaced from the east in the late 18th to early 19th centuries (Newcomb 1961).

Although Spain claimed the Texas Gulf Coast, few Europeans visited the future Chambers County between 1528 and 1821¹. Protohistorically, Karankawa, Coapite, and Copane Indians lived in the area when the first European expeditions traveled the lower Trinity River. The land that became Chambers County formed part of the Atascosito (or lower Trinity

¹ The following history of Chambers County, Texas, derives from Harry (1981), Henson and Ladd (1988), and Jackson (1961), as summarized in TSHA (2012).

River) District, a subdivision of Nacogdoches in Spanish Texas. By the late 17th century, the French intruded on Spanish interests by trading with the Indians as far as the Sabine. French trader Joseph Blancpain's expedition to the area along Galveston Bay and the lower Trinity in 1754 provoked Spanish efforts to protect the region with a system of missions guarded by adjoining presidios. In 1756, Spanish missionaries established Nuestra Señora de la Luz Mission near the site of present-day Wallisville, and, to gain strategic control of the lower Trinity, soldiers constructed San Agustín de Ahumada Presidio on its east bank near what is now the Chambers-Liberty county line. Missionaries worked with Orcoquiza Indians who inhabited the region. After the 1763 Treaty of Paris removed the French threat by awarding Louisiana to the Spanish, storms and constant Indian hostility resulted in removal of the missions to another location in 1766 and abandonment of the settlements by 1772. In 1805, Spanish troops landed at what is now Smith's Point to reinforce the Atascosito ("Marshy") community; however, by 1812, few Spanish settlers had moved into the region. It was subsequently used by filibusters as a staging ground to mount attacks against Spanish Mexico.

By the early 1800s, Alabama and Coushatta Indians had arrived in the area from Alabama, assimilated the local Bidais and Orcoquizas, taken over their livestock trade with settlers along the Atascosito Road, and planted crops. A colony of French exiles from Napoleon's Grand Army under Charles François Antoine Lallemand, planning to free Napoleon and put his brother Joseph on the Mexican throne, attempted to establish themselves near the site of present-day Anahuac in 1818 but were driven out by the Spanish. Jean Laffite left the area permanently around 1820.

Mexican influence in the area increased after the Mexican war of independence from Spain in 1821, and Mexican place names replaced many earlier designations. In 1825, Perry's Point, the principal port of entry for the colonial grant, was renamed Anahuac, after the ancient capital of the Aztecs. American settlement began in 1821 at the invitation of the Mexican government. Some of Laffite's men stayed, and empresarios Haden Edwards, Joseph Vehlein, David G. Burnet, and Lorenzo de Zavala received grants in the area. The major part of what is now Chambers County became Vehlein's grant. T.J. Chambers received land for serving as chief justice of the Supreme Court of Coahuila and Texas. Chambers's home, built in 1835, today houses the county library. Other early settlers, largely from southern and western Louisiana, included Peter Ellis Bean, James Morgan, James Taylor White, and the Wallis family, which settled at the future site of Wallisville. White is believed to have introduced a herd of longhorn cattle at Turtle Bayou in 1827. Other farmers raised rice and cotton, and the lumber industry became important by the 1850s. Antebellum education in Chambers County was private.

Struggles between Anglo settlers and Mexican authorities increased as officials sought to prevent further immigration from the U.S. and maintain control. The Mexican government established Fort Anahuac in 1830 and gave command of the port at Anahuac to John Davis Bradburn, whose difficulties with the settlers culminated in the Turtle Bayou Resolutions and the eventual withdrawal of the Mexican garrison. Bradburn also arrested Francisco I. Madero, whose commission was to grant land titles to American immigrants. In a further foreshadowing of the Texas Revolution, discontented settlers rose against Mexican rule in 1835 in a conflict set

off by disagreements over Mexican tariff policy. At the same time, others chose to get along with a lax Mexican government that levied no taxes and frequently failed to enforce the law. A substantial number of these moved eastward during the Texas Revolution.

In the 1840s, the western edge of the future county was developed. Among those who acquired land was Sam Houston, who established a home at Cedar Point around 1837. The first post office was established at Anahuac, then known as Chambersea, in 1844. When the area became part of Liberty County after independence, land quarrels broke out, among them the notorious conflict between Charles Willcox and Chambers, who, with property valued at more than half a million dollars by 1860, was the county's wealthiest resident.

Chambers County was formed in 1858 from Liberty and Jefferson counties, and organized the same year with Wallisville as its county seat. By 1860, census returns reported merino sheep, 26,632 cattle, and only 344 slaves countywide, a reflection of the importance of livestock in the local economy. Of 60 families that owned slaves in 1859, John White held 33, and only 12 families among the remainder owned more than 10. Cotton growing increased in the antebellum period, but by 1860 only 100 cotton farmers operated in a county population of 1,508. Industry was confined to a steam sawmill and a shipyard.

Chambers County residents voted 109 to 26 for secession, and many participated in the ensuing conflict. The Liberty Invincibles, formed in 1861, joined Company F of the Fifth Regiment of Texas Volunteers. Others joined the Twenty-sixth Regiment of Texas Cavalry, the Moss Bluff Rebels, which became Company F of the Twenty-first Regiment of Texas Cavalry, or Company B of the Texas State Troops. Fort Chambers was established by Confederate troops in 1862 to protect the Gulf Coast, and Union troops reached Liberty by July 1865, but no major fighting occurred in Chambers County.

During Reconstruction, the county began to recover from the hardships of war, but by 1870 its population had dropped to 1,503, below the prewar total. Roughly 1/3 of this number were black, and as many as 15 African Americans were property owners. The Freedmen's Bureau opened a black school at Wallisville in 1869, and other black and white schools opened in 1871. By 1898, 13 white schools were operating with an enrollment of 324, and 10 black schools with 211. Local politics reflected a struggle for control between those seeking to institute reforms and others resistant to change. Among the most notable incidents was Gen. Joseph J. Reynolds's attempt in 1869 to remove county and city officials who did not qualify under the Iron Clad Oath. Other conflicts arose from Ku Klux Klan opposition to the Union League, which sought to enroll black voters, and from other opposition to improvements in the lives of former slaves. In 1876, the election of local officials reflected passage of a new Texas constitution that overturned many Radical Republican reforms. Thereafter, the white primary and the poll tax remained as obstacles to civil rights.

The opening of a meat-packing plant in Wallisville in the 1870s reflected the continuing importance of ranching in the Chambers County economy, though many cattlemen drove their herds north to Kansas City or shipped them after railroad service reached the area. The Whites and Jacksons maintained large ranches, and James Jackson introduced wire fencing on 26,000 acres in 1882. Price declines after the Civil War kept cotton farming to a minimum.

Brick-making on Cedar Bayou supported a Galveston building boom in the 1870s, while other manufacturers turned to boatbuilding, particularly at the Turtle Bayou Shipyard. The lumber industry centered at Wallisville helped that city to grow in the 1880s and 1890s, while Anahuac remained unoccupied.

Because railroad routes reached no farther than the county's eastern and western borders by the 1890s, with the exception of a single branch line that provided freight service to the interior, Chambers County remained isolated and dependent on steamer traffic and other water transportation to Galveston. No important towns developed in the county until 1896, when settlers from the Midwest, who also developed the port at Bolivar, helped to complete the Gulf and Interstate Railway from Beaumont to Bolivar Peninsula. Later, important railroad towns developed at Winnie and Stowell, in the extreme northeastern part of the county. Railroads in the western part of the county were first built from Dayton to the Goose Creek oilfield by Ross S. Sterling and later taken over by the Southern Pacific.

A disastrous fire at the county's wooden courthouse destroyed early records in 1875, hurricanes in 1875 and 1900 damaged crops and livestock, and a smallpox epidemic in 1877 killed many residents. Though some farmers left Chambers County after the 1875 hurricane, total farms increased from 146 to 327 between 1870 and 1900. In the latter year, the total acres in farms reached 366,436; farm value had increased tenfold in the previous 10 years. General prosperity resulted in a near doubling of the population between 1880 and 1910 from 2,187 to 4,234. In 1900, county farmers owned a total of 49,000 cattle, the highest in the county's history.

Between 1910 and 1930, tenant farmers increased from roughly 27% to more than 35% of all farmers. Mules in use as draft animals reached a high of 1,022 in 1920. In the early 1900s, canal development by the Lone Star Canal Company and other firms enabled some farmers to begin rice farming, while others in the eastern part of the county turned to truck farming. A total of 210,000 barrels of rice were harvested in 1903, and significant quantities of sweet potatoes, Indian corn, and sugar were produced by 1910. Lumber peaked at Wallisville in 1906 but declined during the panic of 1907. The largest local mill and the community's only important industry, Cummings Export Lumber Company, built by the Cummings brothers in 1898, closed in 1915 when another major hurricane blew through.

In 1906, Wallisville adopted a stock law to prevent pigs from running loose. Anahuac had become a boomtown. In 1908, Anahuac supporters filed suit and, in spite of Wallisville's genteel swine law, succeeded in making their town the county seat. Efforts to dissolve the county itself were made in 1915, 1923, and 1925 as conflicts developed over stock laws, prohibition, and the county seat question; these were complicated by offers of lower taxes from Harris and Liberty counties, whose officials hoped to cash in on Chambers County oilfields.

Despite increased agricultural production, the Chambers County population declined from 4,234 to 4,162 between 1910 and 1920, then rose again to reach a high of 5,710 by 1930 as a growing oil boom brought new residents to the area. Barbers Hill oilfield, developed after 1918, reached its peak production of 8,082,000 barrels in 1933; the field was later serviced by 5 pipelines. Oilfields were subsequently discovered at Lost Lake, Anahuac, Monroe City, Turtle

Bay, and near Hankamer, and gas reserves were developed in the eastern part of the county. Oil production provided jobs and revenue that helped the county weather the Great Depression with relatively little discomfort and brought in workers who increased the population to 7,511 by 1940. Transportation gains after 1926 included the extension of State Highway (SH) 146 from Anahuac to Stowell.

During World War II, many Chambers County residents found employment in refineries and shipyards at Baytown, Houston, Beaumont, Port Arthur, and Orange. After September 1943, rice farmers employed German prisoners of war from camps in Liberty and Chambers counties. The establishment of the Fraternity of the White Heron, the Forward Trinity Valley Association, the Texas Water Conservation Association, and the Chambers-Liberty County Navigation District advanced area water interests, including the dredging of a channel from the Houston Ship Channel to Smith Point, Anahuac, and Liberty. The Trinity Bay Conservation District was started in 1949. Major highway improvements were made to FMs 563 and 565 and SH 73, later Interstate 10.

After the war, the population grew to 7,871 by 1950 and 10,379 by 1960. By 1959, county farms totaled 483, of which roughly 62% were commercial and only 12% tenant-operated. Mining, contract construction, wholesale distribution, petroleum extraction, and natural-gas production were the chief county industries. Only 4 manufacturing firms were operating among 112 mining and mineral establishments. By 1966, though the overall population continued to increase, no populated place in Chambers County had as many as 2,500 inhabitants; 23% of the population was described as living in poverty; and the population density was only 19 persons per square mile. In this period, many black residents left for jobs in urban areas.

Growing national support for environmental preservation and passage of the 1967 National Environmental Policy Act had important effects on Chambers County. Relying upon an earlier study by the USACE in preparation for the construction of a saltwater barrier across the Trinity River to aid rice farmers, improve river navigation, and provide increased water supplies for adjacent counties, state legislators proposed a 23,200-acre reservoir and wildlife refuge that would inundate Wallisville in 1960. Despite protests, engineers purchased the townsite, the plan was approved in 1962, and work began. Excavations led to the unearthing of an aboriginal burial site and other historic-era discoveries. Ultimately, the project drew the interest of the Sierra Club and other environmental groups as well as a representative of the commercial shrimping industry, which filed suit against several state and national agencies. In 1973, a US district judge ordered construction stopped when the project was 75% complete. The USACE eventually wrote off the \$23 million investment and, in 1977, recommended a smaller project. Wallisville Heritage Park, established in 1979, henceforth preserved the townsite and some of the community's historic buildings.

4.0 RESEARCH OBJECTIVES AND METHODOLOGY

The cultural resource survey described in this report was undertaken with 3 primary research goals in mind:

1. To locate and record cultural resources occurring within the designated project area
2. To provide a preliminary assessment of the significance of these resources regarding their potential for inclusion in the National Register of Historic Places (NRHP)
3. To make recommendations for the treatment of these resources based on their NRHP assessments

The first of these goals was accomplished by means of a review of documentation on file at the Texas Historical Commission's (THC) online *Texas Archeological Sites Atlas* (Atlas), the National Park Service's (NPS) online *National Register Information System* (NRIS), the Texas State Historical Association's (TSHA) *Handbook of Texas Online*, as well as a program of intensive pedestrian survey. No cultural resources were documented within the project area as a result of the survey; as a result, the second and third goals were not brought into play. The rest of this chapter presents the results of archival research, the methodological background for the current investigations, and the specific survey methods used in the field.

4.1 ARCHIVAL RESEARCH

Prior to initiating fieldwork, Horizon personnel reviewed existing information on the THC's online Atlas (THC 2012) and the NPS's NRIS database (NPS 2012) for information on previously recorded archeological sites, cemeteries, and historic properties as well as previous cultural resources investigations conducted within a 1.6-km (1.0-mi) radius of the project area. This archival research indicated the presence of no previously recorded archeological sites or cemeteries within a 1.6-km (1.0-mi) radius of the project site (Table 2) (THC 2012), and a review of the NPS's NRIS database indicated the presence of no historic properties listed on the NRHP within the review area (NPS 2012).

Seven previous cultural resources surveys have been conducted within 1.6 km (1.0 mi) of the current project's APE (Table 2) (THC 2012). One of these previous surveys, conducted by SWCA Environmental Consultants (SWCA) in 2007 in connection with the West Texas Liquefied Petroleum Gas (LPG) Project (Wilcox et al. 2007), covered a large portion of the

Table 2. Previous Cultural Resource Surveys Conducted within 1 Mile of Project Area

Survey Name	Acres Surveyed	Survey Date	No. Sites Recorded within 1 Mile of APE	Site Nos. Recorded within 1 Mile of APE	Reference
Arbuckle NGL Pipeline	1,182	2008	0	N/A	Pertula and Nelson 2008
Cedar Bayou Terminal and Pipelines	176	2007	0	N/A	Sick and Soltysiak 2007
LDH Brine Ponds	89	2010	0	N/A	Soltysiak 2010
Mont Belvieu LP	Unknown	2011	0	N/A	Not Available
West Texas LPG Pipeline	149	2007	0	N/A	Wilcox et al. 2007
EPA Project	Unknown	1978	0	N/A	Not Available
FCC Project	Unknown	1998	0	N/A	Not Available

APE Area of Potential Effect (of current project)

NRHP National Register of Historic Places

USGS United States Geological Survey

larger, 50-ha (123-ac) tract located off the west side of Hatcherville Road within the current project's APE. The 2007 survey was an intensive cultural resources survey that included systematic pedestrian walkover with shovel testing. The remaining 6 surveys did not cover any portion of the current project area, and the smaller, 23-ha (58-ac) tract within the APE has not been previously surveyed for cultural resources.

Prehistoric archeological sites are commonly found in upland areas and on alluvial terraces near stream and river channels. The proposed project site is located on loamy and clayey fluviomarine sediments of Late Pleistocene age. One of the 2 individual segments of the APE—the larger, 50-ha (123-ac) tracts—is situated in an active agricultural field with a small industrial facility at the north end. The smaller, 23-ha (58-ac) tract is the site of an existing industrial facility. Based on the location of the project site within agricultural fields and existing industrial plants and the presence of only pre-Holocene landforms within the APE, it is Horizon's opinion that there exists a low potential for intact, undocumented aboriginal cultural resources within the boundaries of the proposed project area.

In regard to historic-era resources, the lack of visible residential structures (i.e., not associated with the modern industrial facility) in proximity to the project site on topographic and aerial maps of the project area suggests a low potential for historic-era architectural or archeological resources within the limits of the proposed project site.

4.2 SURVEY METHODS

On December 19 2012, and January 18, 2013, Horizon archeologists Michael Mudd, Kathryn Harrington, and Briana Nicole Smith, under the overall direction of Russell K. Brownlow, Principal Investigator, performed an intensive cultural resources survey of the APE to locate any

cultural resource properties that potentially would be impacted by the proposed undertaking. The APE of the proposed undertaking consists of the entire proposed 73-ha (181-ac) project site, which consists of 2 separate tracts that individually cover areas of 23 and 50 ha (58 and 123 ac). The larger, 50-ha (123-ac) tract, located in an agricultural field off the west side of Hatcherville Road, would be the site of the main plant and associated parking lot. The 23-ha (58-ac) tract, located off the east side of Hatcherville Road, is the site of the existing Eagle Ford Fractionator 7 & 8 industrial facility and would be used as an equipment laydown area during construction of the EMBC. Currently, the 50-ha (123-ac) is an active agricultural field that was part of a sod farm planted in St. Augustine grass at the time of the survey (Figures 4 to 6), and an existing industrial park is situated within the northern portion (see Figure 5). Visibility of the modern ground surface ranged from 100% to less than 30% depending on vegetative ground cover, and large pools of standing water from recent rain events were observed in many areas. The 23-ha (58-ac) tract, located off the east side of Hatcherville Road, is the site of the existing Eagle Ford Fractionator 7 & 8 industrial facility and would be used as an equipment laydown area during construction of the EMBC (Figures 7 and 8).

Horizon's archeologists traversed the APE on foot in parallel transects spaced no more than 30 m (100 ft) apart and thoroughly inspected the modern ground surface for aboriginal and historic-age cultural resources. In addition to pedestrian walkover, the Texas State Minimum Archeological Survey Standards (TSMASS) for cultural resource surveys state that, for block-area projects, a minimum of 1 subsurface probe (i.e., shovel tests, auger tests, backhoe trenches) is required per 3 acres for projects the size of the current project's APE unless field conditions warrant excavation of more probes (e.g., due to the presence of culturally sensitive areas) or less probes (e.g., due to extensive prior disturbances or cultural low-probability areas). In the event that a probe yields evidence of subsurface cultural deposits, additional probes may be necessary to determine the horizontal and vertical extent of the subsurface deposits associated with the cultural resource. Horizon excavated a total of 58 shovel tests during the survey (Figure 9), all of which were excavated in the portion of the 50-ha (123-ac) tract characterized by agricultural fields, thereby exceeding the TSMASS requirements for the 50-ha (123-ac) tract. No shovel tests were excavated in the 23-ha (58-ac) tract, which is the site of an existing industrial facility, or in the existing industrial park located in the northern portion of the 50-ha (123-ac) tract. The fractionator plant on the smaller tract completely fills the 23-ha (58-ac) tract, and prior construction of this facility resulted in extensive disturbances, effectively resulting in there being no potential for cultural resources. The existing fractionator facility was photo-documented during the current survey, but there were no patches of bare, undisturbed ground that were not paved in which any shovel tests could be excavated.

In general, shovel tests measured approximately 30 cm (12 in) in diameter and were excavated to a target depth of 1.0 m (3.3 ft) below ground surface, to the top of pre-Holocene deposits, or to the maximum depth practicable, and all sediments were screened through 6.35-millimeter (mm) (0.25-in) hardware cloth. In practice, shovel tests were terminated at depths of 30 to 40 centimeters (cm) below surface (cmbs) due to the presence of pre-Holocene sediments composed of wet, dark gray clay in surface and near-surface contexts. The Universal Transverse Mercator (UTM) coordinates of all shovel tests were determined using hand-held



Figure 4. Overview of Southern Part of 123-acre Portion of APE (Facing NW)



Figure 5. View of Industrial Park in Northern Portion of 123-Acre Tract (Facing SE)



Figure 6. View of Clay Sediments Typical of Agricultural Fields in APE



Figure 7. Overview of Existing Fractionator Plant in 58-acre Portion of APE (Facing SE)



Figure 8. View South along Hatcherville Road with Existing Fractionator Plant Visible at Left (Facing S)

Garmin ForeTrex Global Positioning System (GPS) devices based on the North American Datum of 1983 (NAD 83). Specific shovel test data are summarized in Appendix A.

Based on the physiographic setting of the project area in active agricultural fields and an existing industrial facility and the soil characteristics observed in shovel tests, surface inspection with shovel testing constituted an adequate survey technique for identifying cultural resources within the APE.

During the survey, field notes were maintained on terrain, vegetation, soils, landforms, survey methods, and shovel test results. Digital photographs were taken, and a photographic log was maintained. Horizon employed a non-collection policy for cultural resources. Diagnostic artifacts (e.g., projectile points, ceramics, historic materials with maker's marks) and non-diagnostic artifacts (e.g., lithic debitage, burned rock, historic glass, and metal scrap) were to be described, sketched, and/or photo-documented in the field and replaced in the same location in which they were found. As no cultural resources were observed during the survey, the collections policy was not brought into play.

The survey methods employed during the survey represented a "reasonable and good-faith effort" to locate significant archeological sites within the project area as defined in 36 Code of Federal Regulations (CFR) 800.3.

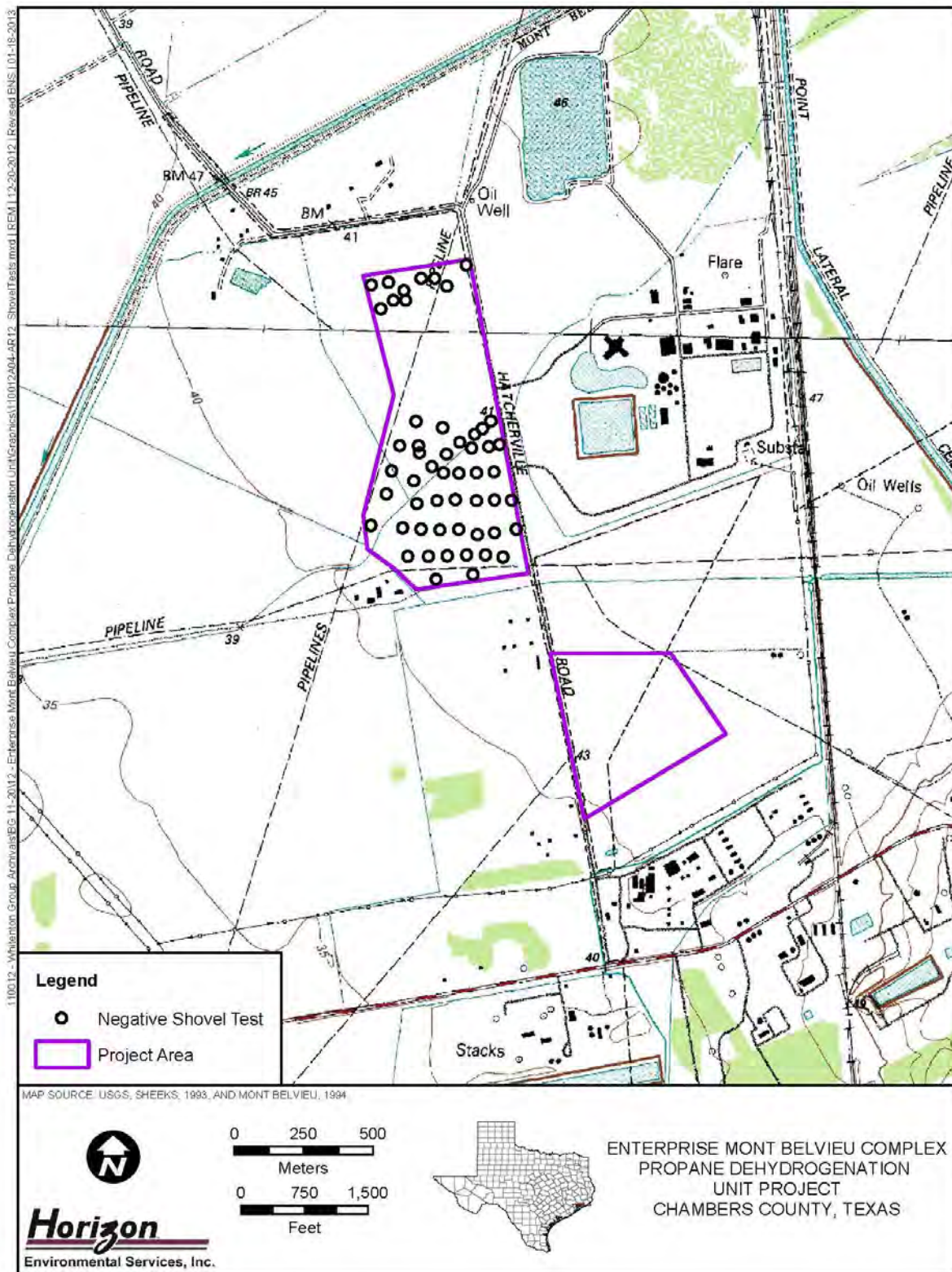


Figure 9. Locations of Shovel Tests Excavated in Project Area

5.0 RESULTS OF INVESTIGATIONS

Horizon was selected by Whitenton on behalf of Enterprise to conduct an intensive cultural resources inventory and assessment of the proposed location of the EMBC in Mont Belvieu, Chambers County, Texas. Construction of the EMBC, associated infrastructure, and auxiliary equipment would take place within an overall proposed 73-hectare (ha) (181-acre [ac]) project site composed of 2 separate tracts that individually cover areas of 23 and 50 ha (58 and 123 ac) (Figures 1 and 2). The larger, 50-ha (123-ac) tract, located in an agricultural field off the west side of Hatcherville Road, would be the site of the main plant and associated parking lot. The 23-ha (58-ac) tract, located off the east side of Hatcherville Road, is the site of the existing Eagle Ford Fractionator 7 & 8 industrial facility and would be used as an equipment laydown area during construction of the EMBC. The Area of Potential Effect (APE) of the proposed undertaking consists of the entire proposed 73-ha (181-ac) EMBC site composed of the 2 separate tracts discussed above. Linear facilities associated with the proposed project would include 1 proposed pipeline ROW and proposed facility access roads. All linear facilities would be contained entirely within the APE as defined above.

As construction of the proposed facility would require a PSD permit for GHG issued by the US EPA, the undertaking falls under the regulations of Section 106 of the NHPA of 1966, as amended, which is invoked when federal funds are utilized or when federal permitting is required for a proposed project. The NHPA states that the ACHP and the THC, which serves as the SHPO for the state of Texas, must be afforded the opportunity to comment when any cultural resources potentially eligible for inclusion in the NRHP are present in a project area affected by federal agency actions or covered under federal permits or funding.

On December 19 2012, and January 18, 2013, Horizon archeologists Michael Mudd, Kathryn Harrington, and Briana Nicole Smith, under the overall direction of Russell K. Brownlow, Principal Investigator, performed an intensive cultural resources survey of the APE to locate any cultural resource properties that potentially would be impacted by the proposed undertaking. Horizon's archeologists traversed the 73-ha (181-ac) APE and thoroughly inspected the modern ground surface for aboriginal and historic-age cultural resources. Currently, most of the 50-ha (123-ac) tract is an active agricultural field that forms part of a sod farm that was planted in St. Augustine grass at the time of the survey, though a small industrial lot occupies the northernmost portion of the tract. The 23-ha (58-ac) tract is the site of an existing industrial facility. Horizon excavated a total of 58 shovel tests during the survey, all of which were excavated in the portion of the 50-ha (123-ac) tract characterized by agricultural fields, thereby

exceeding the TSMASS requirements for the 50-ha (123-ac) tract. No shovel tests were excavated in the 23-ha (58-ac) tract, which is the site of an existing industrial facility. The fractionator plant at the latter location completely fills the 23-ha (58-ac) tract, and prior construction of this facility resulted in extensive disturbances, effectively resulting in there being no potential for cultural resources. The existing fractionator facility was photo-documented during the current survey, but there were no patches of bare, undisturbed ground that were not paved in which any shovel tests could be excavated.

No cultural resources, historic or prehistoric, were identified within the APE as a result of the survey.

6.0 SUMMARY AND RECOMMENDATIONS

6.1 CONCEPTUAL FRAMEWORK

The archeological investigations documented in this report were undertaken with 3 primary management goals in mind:

- Locate all historic and prehistoric archeological resources that occur within the designated survey area.
- Evaluate the significance of these resources regarding their potential for inclusion in the NRHP.
- Formulate recommendations for the treatment of these resources based on their NRHP evaluations.

At the survey level of investigation, the principal research objective is to inventory the cultural resources within the APE and to make preliminary determinations of whether or not the resources meet one or more of the pre-defined eligibility criteria set forth in the state and/or federal codes, as appropriate. Usually, management decisions regarding archeological properties are a function of the potential importance of the sites in addressing defined research needs, though historic-age sites may also be evaluated in terms of their association with important historic events and/or personages. Under the NHPA and the Antiquities Code of Texas, archeological resources are evaluated according to criteria established to determine the significance of archeological resources for inclusion in the NRHP and for designation as State Archeological Landmarks (SALs), respectively.

Analyses of the limited data obtained at the survey level are rarely sufficient to contribute in a meaningful manner to defined research issues. The objective is rather to determine which archeological sites could be most profitably investigated further in pursuance of regional, methodological, or theoretical research questions. Therefore, adequate information on site function, context, and chronological placement from archeological and, if appropriate, historical perspectives is essential for archeological evaluations. Because research questions vary as a function of geography and temporal period, determination of the site context and chronological placement of cultural properties is a particularly important objective during the inventory process.

6.2 ELIGIBILITY CRITERIA FOR INCLUSION IN THE NATIONAL REGISTER OF HISTORIC PLACES

Determinations of eligibility for inclusion in the NRHP are based on the criteria presented in the Code of Federal Regulations (CFR) in 36 CFR §60.4(a-d). The 4 criteria of eligibility are applied following the identification of relevant historical themes and related research questions:

The quality of significance in American history, architecture, archeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- a. [T]hat are associated with events that have made a significant contribution to the broad patterns of our history; or,
- b. [T]hat are associated with the lives of persons significant in our past; or,
- c. [T]hat embody the distinctive characteristics of a type, period, or method of construction, or that represent a significant and distinguishable entity whose components may lack individual distinction; or,
- d. [T]hat have yielded, or may be likely to yield, information important in prehistory or history.

The first step in the evaluation process is to define the significance of the property by identifying the particular aspect of history or prehistory to be addressed and the reasons why information on that topic is important. The second step is to define the kinds of evidence or the data requirements that the property must exhibit to provide significant information. These data requirements in turn indicate the kind of integrity that the site must possess to be significant. This concept of integrity relates both to the contextual integrity of such entities as structures, districts, or archeological deposits and to the applicability of the potential database to pertinent research questions. Without such integrity, the significance of a resource is very limited.

For an archeological resource to be eligible for inclusion in the NRHP, it must meet legal standards of eligibility that are determined by 3 requirements: (1) properties must possess significance, (2) the significance must satisfy at least 1 of the 4 criteria for eligibility listed above, and (3) significance should be derived from an understanding of historic context. As discussed here, historic context refers to the organization of information concerning prehistory and history according to various periods of development in various times and at various places. Thus, the significance of a property can best be understood through knowledge of historic development and the relationship of the resource to other, similar properties within a particular period of development. Most prehistoric sites are usually only eligible for inclusion in the NRHP under Criterion D, which considers their potential to contribute data important to an understanding of prehistory. All 4 criteria employed for determining NRHP eligibility potentially can be brought to bear for historic sites.

6.3 SUMMARY OF INVENTORY RESULTS

Horizon archeologists performed an intensive cultural resources survey of the APE to locate any cultural resource properties that potentially would be impacted by the proposed

undertaking. The APE was traversed by Horizon's archeologists, the modern ground surface was thoroughly inspected for cultural resources, and a total of 58 shovel tests were excavated within the APE. No cultural resources, historic or prehistoric, were identified within the APE as a result of the survey.

6.4 MANAGEMENT RECOMMENDATIONS

Based on the results of the survey-level investigations documented in this report, no potentially significant cultural resources would be affected by the proposed undertaking. In accordance with 36 CFR 800.4, Horizon has made a reasonable and good faith effort to identify archeological historic properties within the APE. No archeological resources were identified that meet the criteria for inclusion in the NRHP according to 36 CFR 60.4, and no further archeological work is recommended in connection with the proposed undertaking. However, in the unlikely event that any human remains or burial accoutrements are inadvertently discovered at any point during construction, use, or ongoing maintenance in the project area, even in previously surveyed areas, all work should cease immediately and the THC should be notified of the discovery.

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APPENDIX A:

Shovel Test Data

Table A-1. Shovel Test Summary Data

ST No.	UTM Coordinates ¹		Depth (cmbs)	Soils	Artifacts
	Easting	Northing			
BS-1	314425	3306751	0-20	Wet black clay	None
BS-2	314354	3306676	0-20	Wet black clay	None
BS-3	314262	3306703	0-20	Very dark grayish-brown clay	None
BS-4	314207	3306623	0-20	Very dark grayish-brown clay	None
BS-5	314144	3306688	0-20	Very dark grayish-brown clay	None
BS-6	314117	3306594	0-20	Very dark grayish-brown clay	None
BS-7	314083	3306680	0-20	Very dark grayish-brown clay	None
BS-8	314162	3306623	0-20	Very dark grayish-brown clay	None
BS-9	314201	3306659	0-20	Very dark grayish-brown clay	None
BS-10	314312	3306703	0-20	Very dark grayish-brown clay	None
KH-1			0-30	Gray clay	None
			30-35	Mottled red and gray clay	
KH-2	314527	3305785	0-30	Gray clay	None
KH-3	314465	3305779	0-35	Grayish-brown clay	None
KH-4			0-35	Grayish-brown clay	None
			35-40	Grayish-brown clay with red mottling	
KH-5			0-35	Grayish-brown clay	None
			35-40	Grayish-brown clay with red mottling	
KH-6			0-35	Grayish-brown clay	None
			35-40	Grayish-brown clay with red mottling	
KH-7			0-35	Grayish-brown clay	None
			35-40	Grayish-brown clay with red mottling	
KH-8	314342	3306002	0-35	Grayish-brown clay	None
KH-9	314399	3306000	0-30	Grayish-brown clay	None
KH-10	314462	3306001	0-35	Grayish-brown clay	None
KH-11	314526	3306004	0-30	Grayish-brown clay	None
KH-12	314545	3306104	0-30	Grayish-brown clay	None
KH-13	314513	3306189	0-30	Grayish-brown clay with red mottling	None
KH-14	314456	3306141	0-30	Grayish-brown clay	None
KH-15	314244	3306188	0-30	Grayish-brown clay	None
KH-16	314253	3306099	0-30	Grayish-brown clay	None
KH-17	314186	3306099	0-30	Grayish-brown clay	None

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Table A-1. Shovel Test Summary Data (cont.)

ST No.	UTM Coordinates ¹		Depth (cmbs)	Soils	Artifacts
	Easting	Northing			
KH-18	314157	3306009	0-30	Gray clay	None
MM-1	314558	3305699	0-30	Dark gray clay	None
MM-2	314493	3305706	0-20	Dark grayish-brown clay	None
MM-3	314426	3305706	0-20	Dark grayish-brown clay	None
MM-4	314356	3305703	0-30	Dark gray clay	None
MM-5	314289	3305702	0-30	Dark gray clay	None
MM-6	314215	3305702	0-30	Gray clay	None
MM-7	314316	3305617	0-30	Gray clay	None
MM-8	314450	3305636	0-30	Dark gray clay	None
MM-9	314247	3305891	0-30	Dark gray clay	None
MM-10	314319	3305901	0-30	Dark gray clay	None
MM-11	314385	3305905	0-30	Dark grayish-brown clay	None
MM-12	314461	3305901	0-30	Dark grayish-brown clay	None
MM-13	314527	3305904	0-30	Dark grayish-brown clay	None
MM-14	314588	3305902	0-30	Dark grayish-brown clay	None
MM-15	314506	3306096	0-30	Dark gray clay	None
MM-16	314444	3306091	0-30	Dark gray clay	None
MM-17	314483	3306162	0-30	Dark gray clay	None
MM-18	314402	3306112	0-30	Dark gray clay	None
MM-19	314340	3306164	0-30	Dark gray clay	None
MM-20	314354	3306068	0-30	Dark gray clay	None
MM-21	314301	3306025	0-30	Dark gray clay	None
MM-22	314236	3305973	0-30	Dark grayish-brown clay	None
MM-23	314255	3306073	0-30	Dark gray clay	None
MM-24	314137	3305925	0-30	Dark gray clay	None
MM-25	314082	3305812	0-30 30+	Dark grayish-brown silty loam Grayish-brown clay	None
MM-26	313990	3305726	0-30	Dark grayish-brown clay	None
MM-27	313686	3305830	0-30	Dark gray clay	None
MM-28	313763	3305827	0-30	Dark gray clay	None
MM-29	313682	3305743	0-30	Dark gray clay	None
MM-30	313690	3305649	0-30	Dark gray clay	None

¹ All UTM coordinates are located in Zone 14 and utilize the North American Datum of 1983 (NAD 14)

*Intensive Cultural Resources Survey of the Proposed 181-Acre
Enterprise Mont Belvieu Complex Propane Dehydrogenation Unit Project, Chambers County, Texas*

cmbs = Centimeters below surface

ST = Shovel test

UTM = Universal Transverse Mercator

APPENDIX B:

Curriculum Vitae for Principal Investigator

EXPERTISE

- Prehistoric Archeology
- Historic Archeology

RESEARCH AREAS

- Eastern North America (esp. Midwest, Southeast)
- Great Plains
- American Southwest

AREAS OF EXPERTISE

- Project Management
- Archival and Historical Research
- Archeological Survey, Testing, and Data Recovery
- National Register of Historic Places (NRHP) Evaluations
- Section 106 of the National Historic Preservation Act (NHPA)
- Antiquities Code of Texas (ACT)
- Native American Graves Protection and Repatriation Act (NAGPRA)
- Lithic and Ceramic Analysis
- Technical Writing and Editing
- Quality Assurance/Quality Control

EDUCATION

- A.B.D., Anthropology, Southern Methodist University, 1997
- M.A., Anthropology, New York University, 1995
- B.A., Anthropology, New York University, 1991

Mr. Owens is an accomplished cultural resources professional with more than 23 years of experience in archeological fieldwork, research and analysis, and cultural resources management (CRM). He is an adept principal investigator and project manager, proficient at managing suites of turnkey, fast-turnaround projects as well as long-term, multidisciplinary research projects. He is fully versed in historic and environmental preservation laws, assessing the National Register of Historic Places (NRHP) eligibility of cultural resources, and developing management plans for historic properties that ensure compliance with applicable federal, state, and local laws while ensuring projects meet construction schedules and adhere to budgetary constraints.

Mr. Owens has planned, implemented, and successfully completed cultural resources survey, testing, and data recovery projects in Arizona, Arkansas, Illinois, Louisiana, Mississippi, Missouri, New Jersey, New Mexico, New York, Oklahoma, Pennsylvania, and Texas. He has completed hundreds of projects for a broad range of clients in the public and private sectors, including oil and gas exploration, development, and transportation; ethanol and petrochemical production; coastal and inland residential, commercial, and industrial land development; solid waste landfills; dredging activities; municipal planning; reservoir development; coastal port and channel improvements; transportation infrastructure; water and wastewater transportation and treatment; electricity generation and transportation; military reservations; and university research.

Mr. Owens also regularly contributes cultural resources oversight to the preparation of environmental regulatory documents, including Environmental Assessments (EA), Environmental Impact Statements (EIS), Biological Assessments (BA), and Categorical Exclusions (CE) for National Environmental Policy Act (NEPA) compliance projects.

Mr. Owens' project management style incorporates innovative leadership skills, resourcefulness, versatility, swift adaptability, and attention to the bottom line. His success is due in part to his thorough familiarity with federal, state, and local historic preservation laws and long-standing personal relationships with regulatory agency reviewers.

CERTIFICATIONS/QUALIFICATIONS

- Meets all Secretary of the Interior's standards for performing cultural resources investigations
- Permittable to perform cultural resource investigations on federal and state projects
- Listed on qualified cultural resource consultant lists in numerous states
- Pre-certified by TxDOT for Service 2.10.1 (Archeological Surveys, Documentation, Excavations, Testing, Reports, and Data Recovery Plans) and Service 2.11.1 (Historical and Archival Research)

PROFESSIONAL AFFILIATIONS

- Register of Professional Archaeologists (RPA)
- Council of Texas Archeologists (CTA)
- Texas Archeological Society (TAS)

CORPORATE HEADQUARTERS

PROFESSIONAL EXPERIENCE

Archaeological Principal Investigator/Project Manager Horizon Environmental Services, Inc. 1507 South IH-35 Austin, Texas 78741 (512) 328-2430	Jan 2005 Present
Project Archaeologist/Managing Editor TRC Environmental Corporation 505 East Huntland Drive, Suite 250 Austin, Texas 78752 (512) 454-8716	Mar 2002 – Jan 2005
Senior Editor Consulting Partners (now part of Beeline Learning Solutions) 14911 Quorum Drive, Suite 120 Dallas, Texas 75254 (972) 813-0465	Oct 1999 – Aug 2001
Project Archaeologist Geo-Marine, Inc. 2201 K Avenue, Suite A2 Plano, Texas 75074 (972) 423-5480	Aug 1997 – Oct 1999
Departmental/Teaching Assistant Southern Methodist University Department of Anthropology 3225 Daniel Avenue, Room 208 Dallas, Texas 75205 (214) 768-2684	Sep 1995 – Jun 1997
Project Archaeologist Soil Systems, Inc. (now part of PaleoWest) 1121 North 2nd Street Phoenix, Arizona 85004 (602) 261-7253	Oct 1994 – Sep 1995
Archeological Field Technician John Milner Associates, Inc. 535 North Church Street West Chester, Pennsylvania 19380 (610) 436-9000	Jun 1994 – Oct 1994 Nov 1993 – Dec 1993
Departmental Assistant New York University Department of Anthropology 25 Waverly Place, Rufus D. Smith Hall New York, New York 10003 (212) 998-8550	Aug 1991 – Jun 1994

Field Technician

Dec 1993

Institute for Long Island Archaeology
State University of New York – Stonybrook
Department of Anthropology
Circle Road, Social & Behavioral Sciences Buildings, 5th Floor
Stonybrook, New York 11794
(631) 632-7620

Crew Chief

Sep 1993 – Nov 1993

Greenhouse Consultants, Inc.
32 Park Place
Newark, New Jersey 07102
(973) 623-9091

Research Associate

May 1993 – Sep 1993

AquaTerra Environmental Services Corporation
(now AquaTerra Environmental Solutions, Inc.)
[New York office no longer in business]
New York, New York

Crew Chief

Jun 1992 – Jul 1992

New York University
Department of Anthropology
25 Waverly Place, Rufus D. Smith Hall
New York, New York 10003
(212) 998-8550

Jun 1990 – Jul 1990

Archaeological Consultant

Nov 1991 – Dec 1991

TAMS Consultants, Inc.
300 Broadacres Drive
Bloomfield, New Jersey 07003
(973) 338-6680

TECHNICAL PUBLICATIONS

- n.d. *Intensive Cultural Resources Survey of the Proposed Eagle Mountain Stream Electric Station, Tarrant County, Texas.* HJN 080122.80 AR. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Intensive Cultural Resources Survey of the Proposed Tradinghouse Power Plant Tract, McLennan County, Texas.* HJN 080122.79 AR. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Intensive Cultural Resources Survey of the Proposed DeCordova II Power Plant Tract, Hood County, Texas.* HJN 080122.78 AR. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Cultural Resources Survey Report: Proposed Prue Road at French Creek (LC-6) Improvements, San Antonio, Bexar County, Texas.* HJN 130025. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Cultural Resources Survey and Construction Monitoring for the Proposed Kansas City Southern K478.0 Bridge Construction and Railroad Alignment Project, Bowie County, Texas.* HJN 130023. Horizon Environmental Services, Inc., Austin, Texas.

- n.d. *Archeological and Historical Investigations for the Proposed Dell Medical School Phase 1 Project, Austin, Travis County, Texas.* HJN 130112. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Proposed Alpha Olefin Chemical Company, LLC, Alpha Olefins Plant, Freeport, Brazoria County, Texas—Cultural Resources Assessment.* HJN 110012.21. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Intensive Cultural Resources Survey of the Proposed 0.67-acre Lindshire Lane Wastewater System Improvements Project, Austin, Travis County, Texas.* HJN 130138. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Archeological and Geoarcheological Investigations, M&G Resins USA, LLC/ChemTex International, Inc., Proposed Jumbo Project, Corpus Christi, Nueces County, Texas (with Charles D. Frederick).* HJN 080122.56. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Intensive Cultural Resources Survey of the Proposed Enterprise Mont Belvieu Complex Fractionation Units 9 and 10 Project, Chambers County, Texas.* HJN 110012.17. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Intensive Cultural Resources Survey of 5.9 Miles of Proposed Subsurface Utility Relocations, FM 1637 Expansion Project, Waco, McLennan County, Texas.* HJN 130031. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Proposed Victoria Power Station Expansion Project, Victoria, Victoria County, Texas—Cultural Resources Review.* HJN 110012.11. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Intensive Cultural Resources Survey for the Proposed INVENERGY Energy Center, Ector County, Texas.* HJN 080122.54. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Intensive Cultural Resources Survey for the Proposed Kansas City Southern K478.0 Bridge Construction and Railroad Alignment Project, Little River County, Arkansas.* HJN 130023. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Intensive Cultural Resources Survey for the Proposed Southern Company Natural Gas Plant, Trinidad, Henderson County, Texas.* HJN 080122.53. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Intensive Cultural Resources Survey of Proposed Yoakum Cryogenic Gas Processing Plant Expansion Areas, Lavaca County, Texas.* HJN 110012.15. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Intensive Cultural Resources Assessment of Proposed INVISTA Victoria Plant Improvements, Victoria County, Texas.* HJN 130035. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Proposed Equistar Chemicals, L.P., Corpus Christi Complex Expansion Project, Corpus Christi, Nueces County, Texas—Cultural Resources Assessment.* HJN 110012.13. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Intensive Cultural Resources Survey of the Proposed 78-Acre La Paloma Energy Center Tract, Harlingen, Cameron County, Texas.* HJN 080122.31. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Proposed Clinker Production Increase at the CEMEX Construction Materials South, LLC, Balcones Cement Plant, Comal County, Texas—Cultural Resources Review.* HJN 080122.39. Horizon Environmental Services, Inc., Austin, Texas.

- n.d. *Intensive Cultural Resources Survey of the Proposed 77-Acre Pinecrest Energy Center Tract, Lufkin, Angelina County, Texas.* HJN 080122.40. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Proposed Guadalupe Generating Station Expansion Project, Marion, Guadalupe County, Texas—Cultural Resources Review.* HJN 130016. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Intensive Cultural Resources Survey of the Proposed 181-Acre Enterprise Mont Belvieu Complex Propane Dehydrogenation Unit Project, Chambers County, Texas.* HJN 110012.12. Horizon Environmental Services, Inc., Austin, Texas.
- n.d. *Intensive Cultural Resources Survey of a Proposed 20-Acre Expansion Tract Adjacent to an Existing PL Propylene, LLC, Facility, Houston, Harris County, Texas.* HJN 080122.30. Horizon Environmental Services, Inc., Austin, Texas.
- 2013 *Intensive Cultural Resources of a Proposed 12.6-acre Apartment Complex Development, Belton, Bell County, Texas.* HJN 130212. Horizon Environmental Services, Inc., Austin, Texas.
- 2013 *Intensive Cultural Resources Survey of the Proposed University Boulevard and Parcel 150 Pipeline Rights-of-Way, Round Rock, Williamson County, Texas.* HJN 130118. Horizon Environmental Services, Inc., Austin, Texas.
- 2013 *Intensive Cultural Resources Survey of a Proposed 171.0-Acre Residential Development, Conroe, Montgomery County, Texas.* HJN 130162. Horizon Environmental Services, Inc., Austin, Texas.
- 2013 *Intensive Cultural Resources Survey of Segments of Browder Loop Road, Eldridge Lane, and North Butch Arthur Road, San Jacinto County, Texas.* HJN 130103. Horizon Environmental Services, Inc., Austin, Texas.
- 2013 *Intensive Cultural Resources Survey of 4 USACE Jurisdictional Areas on Chesapeake Energy Corporation's Proposed JEA West Lateral Pipeline Right-of-Way, Dimmit County, Texas (with R.K. Brownlow).* HJN 130087.04. Horizon Environmental Services, Inc., Austin, Texas.
- 2013 *Intensive Cultural Resources Survey of Chesapeake Energy Corporation's Proposed Sugarland DIM H Well Pad and Access Road, Dimmit County, Texas (with R.K. Brownlow).* HJN 130087.03. Horizon Environmental Services, Inc., Austin, Texas.
- 2013 *A Cultural Resources Assessment of the USACE Jurisdictional Areas along BridgeTex Pipeline Company, LLC's, Proposed BridgeTex North Pipeline ROW (with R.K. Brownlow and J.L. Cochran).* HJN 120166 AR. Horizon Environmental Services, Inc., Austin, Texas.
- 2013 *Intensive Cultural Resources Survey of the Proposed 545-Acre Kansas City Southern Railroad Wylie Intermodal Facility, Wylie, Collin County, Texas.* HJN 130042. Horizon Environmental Services, Inc., Austin, Texas.
- 2013 *Intensive Cultural Resources Survey of a USACE Jurisdictional Area on a Proposed 4.6-Acre HEB Grocery Store Expansion Tract, Georgetown, Williamson County, Texas.* HJN 120085. Horizon Environmental Services, Inc., Austin, Texas.
- 2013 *Cultural Resources Investigations along the Proposed Lone Star Competitive Renewable Energy Zone (CREZ) 345-kV Transmission Line Right-of-Way in North-Central Texas, Vols. I and II (with Jennifer L. Cochran, Russell K. Brownlow, and Raymundo Chapa).* HJN 100137. Horizon Environmental Services, Inc., Austin, Texas.

- 2013 *Intensive Cultural Resources Survey of the San Antonio River Outfall Project, San Antonio, Bexar County, Texas.* HJN 120150. Horizon Environmental Services, Inc., Austin, Texas.
- 2012 *Intensive Archeological Survey for the Proposed Brushy Creek Regional Trail Gap Project, Round Rock, Williamson County, Texas.* HJN 080151. Horizon Environmental Services, Inc., Austin, Texas.
- 2012 *Intensive Archeological Survey for the Proposed San Gabriel River Trail Extension Project, Georgetown, Williamson County, Texas.* HJN 120057. Horizon Environmental Services, Inc., Austin, Texas.
- 2012 *Intensive Cultural Resources Survey of the 1,102-Acre Creekside Park West Tract, Harris County, Texas (with Raymundo Chapa).* HJN 100142. Horizon Environmental Services, Inc., Austin, Texas.
- 2012 *Intensive Cultural Resources Survey of Two 0.9-Acre HDD Locations on the Trinity River, Madison and Houston Counties, Texas.* HJN 120009.14. Horizon Environmental Services, Inc., Austin, Texas.
- 2012 *Intensive Cultural Resources Survey of a USACE Jurisdictional Area on the Proposed 18.5-Acre Esperanza Crossing Tract, Austin, Travis County, Texas.* HJN 120052. Horizon Environmental Services, Inc., Austin, Texas.
- 2012 *Intensive Cultural Resources Survey, One USACE Jurisdictional Area, Existing East Red Segment 1 Pipeline Maintenance Activities, Clay County, Missouri.* HJN 120075. Horizon Environmental Services, Inc., Austin, Texas.
- 2012 *Intensive Cultural Resources Survey, Two USACE Jurisdictional Area Dig Sites (#253 and #261) on the Existing Eskridge to Kearney Pipeline Maintenance Activities, Clay County, Missouri.* HJN 120075. Horizon Environmental Services, Inc., Austin, Texas.
- 2012 *Intensive Cultural Resources Survey for the Penn City Coal Expansion Project, Houston, Harris County, Texas.* HJN 110097. Horizon Environmental Services, Inc., Austin, Texas.
- 2012 *Intensive Cultural Resources Survey for the Lake Anahuac East Levee Project, Anahuac, Chambers County, Texas (with Sally Victor).* HJN 120004. Horizon Environmental Services, Inc., Austin, Texas.
- 2012 *Intensive Cultural Resources Survey, One USACE Jurisdictional Area on the Existing Eskridge to Kearney Pipeline Right-of-Way, Platte County, Missouri.* HJN 120075. Horizon Environmental Services, Inc., Austin, Texas.
- 2012 *Intensive Cultural Resources Survey of the Proposed 0.6-Mile-Long Rattler Road Extension Project, San Marcos, Hays County, Texas.* HJN 120036. Horizon Environmental Services, Inc., Austin, Texas.
- 2011 *Intensive Cultural Resources Survey of 6 Jurisdictional Stream Crossings for the City of Hamshire Water System Improvements Project, Hamshire, Jefferson County, Texas.* HJN 110070. Horizon Environmental Services, Inc., Austin, Texas.
- 2011 *Cultural Resources Investigations on the Proposed Waller Creekside Apartments Tract, Austin, Travis County, Texas.* HJN 110116. Horizon Environmental Services, Inc., Austin, Texas.
- 2011 *Intensive Cultural Resources Survey of the Woodland Oaks Wastewater Treatment Plant Proposed 1.3-Acre Expansion Tract, Houston, Harris County, Texas.* HJN 100024. Horizon Environmental Services, Inc., Austin, Texas.

- 2011 *Intensive Archeological Survey of the Farm-to-Market Road 1660 Realignment Project, Hutto, Williamson County, Texas.* HJN 090047. Horizon Environmental Services, Inc., Austin, Texas.
- 2011 *Intensive Archeological Survey of a 3.7-Acre Tract in San Marcos, Hays County, Texas.* HJN 110124. Horizon Environmental Services, Inc., Austin, Texas.
- 2011 *Intensive Cultural Resources Survey of USACE Jurisdictional Areas on the Proposed Whispering Pines Par 3 Golf Course Tract, Trinity County, Texas.* HJN 110031. Horizon Environmental Services, Inc., Austin, Texas.
- 2011 *Archeological Avoidance Plan for the Proposed Washburn 3D Seismic Survey Project, Houston, Harris County, Texas.* HJN 110122. Horizon Environmental Services, Inc., Austin, Texas.
- 2011 *Intensive Cultural Resources Survey of the Orange County Sewer and Natural Gas Infrastructure Improvements Project, Orange County, Texas.* HJN 110121. Horizon Environmental Services, Inc., Austin, Texas.
- 2011 *Intensive cultural Resources Survey for the McInnish Park Water System Improvements Project, Carrollton, Dallas County, Texas.* HJN 110135. Horizon Environmental Services, Inc., Austin, Texas.
- 2011 *Intensive Cultural Resources Survey for the City of Liberty Wastewater System Improvement Project, Liberty County, Texas.* HJN 110005. Horizon Environmental Services, Inc., Austin, Texas.
- 2011 *Cultural Resource Investigations to Offset Mechanical Impacts to the Clear Creek Golf Course Site (41CV413), Fort Hood, Texas (with J. Michael Quigg, Christopher Lintz, Grant D. Smith, and David DeMar).* TRC Technical Report No. 02353. ARM Series, Research Report No. 60. TRC Environmental Corporation, Austin, Texas.
- 2011 *Archeological Avoidance Plan for the Proposed North Clinton Dome 3D Seismic Survey Project, Houston, Harris County, Texas.* HJN 110011. Horizon Environmental Services, Inc., Austin, Texas.
- 2010 *Cultural Resources Assessment and Avoidance Plan for Shot Holes, Source Lines, and Access Routes, Shelby East 3D Seismic Survey Project, Sabine National Forest, San Augustine and Shelby Counties, Texas.* HJN 090017. Horizon Environmental Services, Inc., Austin, Texas.
- 2010 *Intensive Cultural Resources Survey of the 10.6-Acre Helbig Road Tract, Beaumont, Jefferson County, Texas.* HJN 100099. Horizon Environmental Services, Inc., Austin, Texas
- 2010 *Intensive Cultural Resources Survey of the 44-Acre Creekside Park, Section 18, Tract, The Woodlands, Harris County, Texas.* HJN 100079. Horizon Environmental Services, Inc., Austin, Texas.
- 2010 *Intensive Cultural Resources Survey of the 66-Acre Royal Shores Tract, Kingwood, Harris County, Texas.* HJN 100005. Horizon Environmental Services, Inc., Austin, Texas.
- 2010 *Intensive Cultural Resources Survey of the Proposed 74 Ranch Pittman 1-H Well Pad, Campbellton, Atascosa County, Texas.* HJN 100093.01. Horizon Environmental Services, Inc., Austin, Texas

- 2010 *Intensive Cultural Resources Survey of the Proposed 74 Ranch Axis 1-H Well Pad, Campbellton, Atascosa County, Texas.* HJN 100093.02. Horizon Environmental Services, Inc., Austin, Texas
- 2010 *An Intensive Cultural Resources Survey of the USACE Jurisdictional Areas within Eagle Rock Energy Partners' Proposed "20" East Texas Mainline Extension Pipeline Right-of-Way in Nacogdoches County, Texas.* HJN 100019. Horizon Environmental Services, Inc., Austin, Texas.
- 2010 *An Intensive Cultural Resources Survey of a Proposed HDD Location Under an Abandoned Tram Road in Nacogdoches County, Texas.* HJN 100019. Horizon Environmental Services, Inc., Austin, Texas.
- 2010 *Intensive Cultural Resources Survey for the Green Valley Special Utility District's Water Supply Improvement Project, Guadalupe County, Texas.* HJN 090102. Horizon Environmental Services, Inc., Austin, Texas.
- 2010 *Intensive and Reconnaissance Survey of the Proposed Lake Halbert Water Treatment Plant Expansion Project, Corsicana, Navarro County, Texas.* HJN 100015. Horizon Environmental Services, Inc., Austin, Texas.
- 2010 *Intensive Cultural Resources Survey of a Proposed 2.9-Mile-Long Force Main Right-of-Way, Houston, Harris County, Texas.* HJN 100051. Horizon Environmental Services, Inc., Austin, Texas.
- 2010 *Intensive Cultural Resources Survey of a 13.9-Acre Tract for the Proposed Fort Bend County MUD No. 116 Wastewater Treatment Plant Project, Richmond, Fort Bend County, Texas.* HJN 100047. Horizon Environmental Services, Inc., Austin, Texas.
- 2010 *Intensive Cultural Resources Survey of a Proposed 3,100-Foot-Long Erosion-Control Bulkhead on the T-BAR-O Ranch, Llano County, Texas.* HJN 100075. Horizon Environmental Services, Inc., Austin, Texas.
- 2010 *Intensive Cultural Resources Survey of the 21.6-Acre Kalentari Tract, San Marcos, Hays County, Texas.* HJN 100055. Horizon Environmental Services, Inc., Austin, Texas.
- 2010 *Intensive Cultural Resource Survey of a 14.8-Acre Tract on Williams Gully in Houston, Harris County, Texas.* HJN 090127. Horizon Environmental Services, Inc., Austin, Texas.
- 2010 *Intensive Cultural Resources Survey of the Proposed Crossroad Exhibit Hall Expansion, Fort Griffin State Historic Site, Shackelford County, Texas.* HJN 090019. Horizon Environmental Services, Inc., Austin, Texas.
- 2010 *Intensive Phase I Cultural Resources Survey of 3.5 Miles of M2 LGS, LLC's, Proposed Natural Gas Pipeline Right-of-Way on the Mansfield Battlefield, DeSoto Parish, Louisiana.* HJN 090055.025. Horizon Environmental Services, Inc., Austin, Texas.
- 2009 *Intensive Archeological Survey of the US Highway 69 Expressway and Reliever Route, Jacksonville, Cherokee County, Texas.* HJN 080173. Horizon Environmental Services, Inc., Austin, Texas.
- 2009 *Intensive Cultural Resource Survey of the Proposed 5.4-Acre Floral Gardens Senior Living Apartments Tract, Houston, Harris County, Texas.* HJN 090129. Horizon Environmental Services, Inc. Austin, Texas.

Jeffrey D. Owens, M.A., R.P.A.

- 2009 *Intensive Cultural Resource Survey, PEC Marshall Ford to Buttercup Substations Transmission Line Rebuild Project, Travis and Williamson County, Texas.* HJN 090096. Horizon Environmental Services, Inc. Austin, Texas.
- 2009 *Intensive Cultural Resources Survey of the Possum Kingdom Lake Hike and Bike Trail, Phase III, Palo Pinto County, Texas.* HJN 090053. Horizon Environmental Services, Inc., Austin, Texas.
- 2009 *Intensive Cultural Resource Survey of the Proposed 2.2-Acre Junker-Spencer Well No. 69, Fannett, Jefferson County, Texas.* HJN 090079. Horizon Environmental Services, Inc., Austin, Texas.
- 2009 *Cultural Resource Survey of the Proposed 60-Acre Harrison Ranch Park, Dripping Springs, Hays County, Texas.* HJN 090080. Horizon Environmental Services, Inc. Austin, Texas.
- 2009 *Intensive Cultural Resource Survey of the Tyrrell Park Storm Water Detention Pond Project, Beaumont, Jefferson County, Texas.* HJN 090042. Horizon Environmental Services, Inc. Austin, Texas.
- 2009 *Intensive Cultural Resource Survey of 7 Miles of Proposed Dredge Disposal Areas along Green Pond Gully, Beaumont, Jefferson County, Texas.* HJN 090041. Horizon Environmental Services, Inc. Austin, Texas.
- 2009 *Intensive Cultural Resource Survey of for the Lumberton Lift Station Rehabilitation Project, Loeb, Hardin County, Texas.* HJN 080008. Horizon Environmental Services, Inc. Austin, Texas.
- 2009 *An Intensive Cultural Resources Survey of the Port of Houston Authority's 43-Acre Acryl Tract, Seabrook, Harris County, Texas.* HJN 080163. Horizon Environmental Services, Inc. Austin, Texas.
- 2009 *Intensive Cultural Resource Survey of 34 Acres of Dredge Disposal Areas along Bayou Din, Beaumont, Jefferson County, Texas.* HJN 090038. Horizon Environmental Services, Inc. Austin, Texas.
- 2009 *Intensive Cultural Resources Survey of the 2.8-Acre Harris County MUD No. 148 Wastewater Treatment Plant No. 2, Harris County, Texas.* HJN 090048. Horizon Environmental Services, Inc., Austin, Texas.
- 2009 *Intensive Cultural Resources Survey of the Round Rock ISD 181-Acre Pearson/ England Tract, Round Rock, Williamson County, Texas.* HJN 090027. Horizon Environmental Services, Inc., Austin, Texas.
- 2009 *Intensive Cultural Resources Survey of the Round Rock ISD 12.8-Acre Stone Oak School Tract, Round Rock, Williamson County, Texas.* HJN 090006. Horizon Environmental Services, Inc., Austin, Texas.
- 2009 *Intensive Cultural Resources Survey of the 136-Acre Sweetwater Ranch Tract, Travis County, Texas.* HJN 090005. Horizon Environmental Services, Inc., Austin, Texas.
- 2009 *Intensive Cultural Resources Survey of the Elm Fork Relief Interceptor Segment EF-3 Project, Dallas and Farmers Branch, Dallas County, Texas.* HJN 080185. Horizon Environmental Services, Inc., Austin, Texas.
- 2009 *Intensive Cultural Resources Survey of Oak Branch Drive at US Highway 290 and Nutty Brown Road, Hays County, Texas.* HJN 080166. Horizon Environmental Services, Inc., Austin, Texas.

- 2009 *Intensive Cultural Resources Survey of the Bachelor Creek Interceptor Project, Terrell, Kaufman County, Texas.* HJN 080132. Horizon Environmental Services, Inc., Austin, Texas.
- 2009 *Intensive Cultural Resources Survey of the Washington Street Improvements Project, Sherman, Grayson County, Texas.* HJN 080179. Horizon Environmental Services, Inc., Austin, Texas.
- 2009 *Intensive Cultural Resources Survey of the Canyon Creek Drive Extension Project, Sherman, Grayson County, Texas.* HJN 080178. Horizon Environmental Services, Inc., Austin, Texas.
- 2008 *Archeological Surveys and Impact Evaluations in the Texas Department of Transportation's Abilene, Brownwood, Fort Worth, and Waco Districts, 2006-2008.* HJN 080104. Texas Department of Transportation, Environmental Affairs Division, Archeological Studies Program, Report No. 112. Horizon Environmental Services, Inc., Austin, Texas.
- 2008 *Intensive Cultural Resources Survey of the Wells Ranch Carrizo Groundwater Project, Bexar, Gonzales, and Guadalupe Counties, Texas.* HJN 070157. Horizon Environmental Services, Inc., Austin, Texas.
- 2008 *Intensive Cultural Resource Survey of the Westwood Water Supply Corporation Water System Improvements Project, Jasper County, Texas.* HJN 080060. Horizon Environmental Services, Inc., Austin, Texas.
- 2008 *Intensive Cultural Resources Survey of 1,118 Feet of the Bethune Gathering System Pipeline Right-of-Way, Sam Rayburn Reservoir, Nacogdoches County, Texas.* HJN 060042. Horizon Environmental Services, Inc., Austin, Texas.
- 2008 *Intensive Cultural Resources Survey of 15 Earthen Levee Segments on White's Ranch, Jefferson and Chambers Counties, Texas.* HJN 070196. Horizon Environmental Services, Inc., Austin, Texas.
- 2008 *Intensive Cultural Resources Survey of the 107-Acre Juno Lake No. 1 Reservoir Project, Trinity and Polk Counties, Texas.* HJN 080034. Horizon Environmental Services, Inc., Austin, Texas.
- 2008 *Intensive Cultural Resources Survey of a 0.9-Acre Tract Between Broadway and Garfield Streets, Del Rio, Val Verde County, Texas.* HJN 080091. Horizon Environmental Services, Inc., Austin, Texas.
- 2008 *Intensive Cultural Resource Survey of the Green Acres Storm Water System Project, Fannett, Jefferson County, Texas.* HJN 080068. Horizon Environmental Services, Inc., Austin, Texas.
- 2008 *Intensive Cultural Resources Survey of USACE Jurisdictional Areas on the Sunchase Tract, Austin, Travis, and Bastrop Counties, Texas.* HJN 080079. Horizon Environmental Services, Inc., Austin, Texas.
- 2008 *Intensive Cultural Resources Survey of 2 USACE Jurisdictional Areas on the 70-Acre Regal Oaks Tract, Travis County, Texas.* HJN 080041. Horizon Environmental Services, Inc., Austin, Texas.
- 2008 *Intensive Cultural Resources Survey of the Proposed 10-Acre Mitchell Island Development, The Woodlands, Montgomery County, Texas (with Russell K. Brownlow).* HJN 070183. Horizon Environmental Services, Inc., Austin, Texas.
- 2008 *The Varga Site: A Multicomponent, Stratified Campsite in the Canyonlands of Edwards County, Texas, Volume I (with J.M. Quigg, P.M. Matchen, G. Smith, R.A. Ricklis, M.C. Cody,*

- and C.D. Frederick). TRC Technical Report No. 35319. TRC Environmental Corporation, Austin, Texas.
- 2008 *Phase I Cultural Resource Investigations for the Deer Park LPG Terminal Project in Chambers and Harris Counties, Texas* (with Price Laird, Larissa Thomas, and Paul Matchen). TRC Environmental Corporation, Austin, Texas.
- 2007 *Intensive Cultural Resources Survey of 5 USACE Jurisdictional Waterway Impact Areas on the 418-Acre Watersedge Tract, Travis County, Texas*. HJN 070011. Horizon Environmental Services, Inc., Austin, Texas.
- 2007 *Intensive Cultural Resources Survey of the North Brushy Creek Interceptor Extension, Phase 1, Cedar Park, Williamson County, Texas*. HJN 060258. Horizon Environmental Services, Inc., Austin, Texas.
- 2007 *Cultural Resources Survey of 2.4 Miles of Proposed Pipeline Reroutes, Dripping Springs Wastewater Treatment System, Dripping Springs, Hays County, Texas*. HJN 050073.002. Horizon Environmental Services, Inc., Austin, Texas.
- 2007 *Intensive Cultural Resources Survey of the Loop 4 Extension Project, Buda, Hays County, Texas*. HJN 070071. Horizon Environmental Services, Inc., Austin, Texas.
- 2007 *Intensive Archeological Survey of 5.6 Miles of US 290 from US 183 to Gilleland Creek, Travis County, Texas*. HJN 040029.006. Horizon Environmental Services, Inc., Austin, Texas.
- 2007 *Intensive Cultural Resources Survey of 3,550 Feet of Jurisdictional Waterways on the 112-Acre Brushy Creek Business Park Tract, Williamson County, Texas*. HJN 050006. Horizon Environmental Services, Inc., Austin, Texas.
- 2007 *Intensive and Reconnaissance Cultural Resources Survey of the Bexar Metropolitan Water District's Trinity Aquifer Water Supply Project, Bexar County, Texas*. HJN 070012. Horizon Environmental Services, Inc., Austin, Texas.
- 2007 *Intensive Cultural Resources Survey of the 65.5-Acre Southeast Metropolitan Park Expansion and 2.3-Mile Raw Water Pipeline Right-of-Way, Austin, Travis County, Texas*. HJN 070062. Horizon Environmental Services, Inc., Austin, Texas.
- 2007 *Intensive Cultural Resources Survey of Section 404 Jurisdictional Waterways on the 260-Acre Winding Creek Tract, Williamson County, Texas*. HJN 070032. Horizon Environmental Services, Inc., Austin, Texas.
- 2007 *An Intensive Cultural Resources Survey and Subsequent NRHP Eligibility Testing of the USACE Jurisdictional Areas within the Proposed 4.5-Mile Townsen Road Right-of-Way, Montgomery and Harris Counties, Texas* (with Abigail Peyton and Russell K. Brownlow). HJN 050161. Horizon Environmental Services, Inc., Austin, Texas.
- 2007 *Intensive Cultural Resources Survey of 2.0 Miles of the Proposed Grande Avenue Extension Project, New Copeland Road to SH 110, Tyler, Smith County, Texas*. HJN 070066. Horizon Environmental Services, Inc., Austin, Texas.
- 2007 *Intensive and Reconnaissance Cultural Resources Survey of the City of Meridian 14.8-Mile Treated Water Delivery System, Bosque County, Texas*. HJN 050182. Horizon Environmental Services, Inc., Austin, Texas.
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