Volume 2020 Article 52

1-1-2020

Archaeological Deep Testing of the Nabors Tract, the Tomball OilField, and Approximately 1 Mile of Streamin Harris County, Texas

Richard Thompson Stark

Archaeological Deep Testing of the Nabors Tract, the Tomball OilField, and Approximately 1 Mile of Streamin Harris County, Texas

GRAY & PAPE
HERITAGE MANAGEMENT

Archaeological Deep Testing of the Nabors Tract, the Tomball Oil Field, and Approximately 1 Mile of Stream in Harris County, Texas

Texas Antiquities Permit No. 9332

Prepared for:

Berg-Oliver Associates, Inc.,
LJA Engineering, Inc.,
and
The Harris County Flood Control District

Prepared by:

Gray & Pape, Inc.
110 Avondale Street
Houston, Texas 77006

HCFCD Project ID# M124-00-00-E002

20-70701.001

Project No. 20-70701.001

Archaeological Deep Testing of the Nabors Tract, the Tomball Oil Field, and Approximately 1 Mile of Stream in Harris County, Texas

Lead Agency:
United States Army Corps of Engineers, Galveston District
and
Harris County Flood Control District
(HCFCD Project ID# M124-00-00-E002)

Texas Antiquities Permit No. 9332

Prepared for:
Berg-Oliver Associates, Inc.,
LJA, Engineering, Inc., and
Harris County Flood Control

Prepared by:
Richard Stark, Ph.D.

Gray & Pape, Inc.
110 Avondale Street
Houston, Texas 77006
(713) 541-0473

Richard Thompson Stark, Ph.D.
Principal Investigator
July 1, 2020

ABSTRACT

In March 2020, Berg-Oliver Associates, Inc. contracted with Gray & Pape, Inc., of Houston, Texas, to perform a cultural resources survey of property proposed for conveyance improvements and regional stormwater detention development in Harris County, Texas. The proposed property is located immediately west of the western Terminus of Holderrieth Road, in the southwest portion of Tomball, Harris County, Texas. The project Area of Potential Effects is defined as an approximately 251-hectare (620-acre) area. It is understood that prior archaeological research and field efforts have been completed on portions of the current Area of Potential Effects and a primary assumption of this current archaeological endeavor is that those pedestrian survey and systematic shovel testing projects were adequate to assist Gray & Pape, Inc. in preparing this report for the completion of agency review for the Area of Potential Effects (Uecker et al. 2016; McLeod et al. 2018). For project permitting purposes, the lead federal agency for the project has been identified as the United States Army Corps of Engineers, Galveston District, in coordination with Harris County Flood Control District and the Texas Historical Commission. A Texas Antiquities Permit (9332) was received prior to the commencement of fieldwork. The wetlands were mapped and flagged prior to fieldwork under SWG-2014-00651. All fieldwork and reporting activities were completed with reference to state (the Antiquities Code of Texas and the Council of Texas Archaeologists) and federal guidelines. No diagnostic nor non-diagnostic artifacts were collected in the course of the current survey. As a project permitted through the Texas Historical Commission, however, Gray & Pape, Inc. submitted project records to the Center for Archaeological Studies at Texas State University in San Marcos, Texas.

Prior to fieldwork, desktop research was performed to identify any previously recorded archaeological surveys, sites, cemeteries, National Register properties, or historical markers within the Area of Potential Effects or 1.6 kilometers (1 mile) of its boundary. This research determined that previously recorded Sites 41HR1174, 41HR1173, 41HR1007, 41HR1006, 41HR1129, 41HR1130, and 41HR1131 are located within or adjacent to the current project. Fieldwork took place in March 2020 and required 425 work hours to complete. Field investigation consisted of systematic subsurface archaeological backhoe testing, photographic documentation, and mapping. A total of 23 backhoe trenches were excavated, of which 5 were positive for buried cultural materials.

The Texas Historical Commission and United States Army Corps of Engineers requested revisiting 41HR1173 with subsurface trench testing and throughout the Area of Potential Effects, with a focus on the stream terraces, to determine if any newly recorded resources could be identified (Martin 2019). Strategic mechanical deep tests with a backhoe took place in locations of the project where planned impacts could potentially encounter deep alluvial soils or buried cultural materials. That said, this archaeological deep testing assisted Gray & Pape, Inc. in determining the extent of the previously documented historic properties within the Area of Potential Effects, as well as in determining if any deeply buried cultural materials exist within the Area of Potential Effects. Positive subsurface archaeological tests during this project consisted of four abandoned steel pipes and three clay bricks. These cultural materials relate to 41HR1173, which is recommended here as Not Eligible for listing on the National Register of Historic Places, and no further work is recommended.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

In March 2020, Gray & Pape, Inc. (Gray & Pape) was contracted by Berg-Oliver Associates, Inc. (Berg-Oliver) to conduct a subsurface archaeological survey on property proposed for conveyance improvements and regional stormwater detention west-southwest of Tomball, Texas. The scope of work for the project includes a subsurface cultural resources survey of the proposed project area, which measures approximately 251 hectares (620 acres), defined as the project's Area of Potential Effects (APE). The APE is situated with its northern boundary adjacent and south of Holderrieth/Humble Road, west of Texas Highway 249. The northern portions of the project APE extend west of the western terminus of North Humble Lake Road, and the southern boundary of the APE is north of Willow Creek Ranch Road. For project permitting purposes, the lead federal agency for the project has been identified as the United States Army Corps of Engineers (USACE), Galveston District, in coordination with Harris County Flood Control District (HCFCD) and the Texas Historical Commission (THC).

Noting prior archaeological research and field efforts completed on portions of the current APE and immediately adjacent its borders, a primary assumption of this current archaeological endeavor is that those pedestrian survey and systematic shovel testing projects were adequate to assist in preparing for fieldwork and this report for the completion of agency review for the APE (Uecker et al. 2016; McLeod et al. 2018). The general goals of this archaeological endeavor were to follow up on the previous research by systematically searching for any previously undetected deeply buried prehistoric materials along the banks of Willow Creek and its tributaries, and to revisit previously documented 41HR1173, the Plant Town Site, with backhoe trenching to establish whether previously unidentified buried archaeological resources are located within the project's APE. Specifically, background research, coupled with previous research within the APE, is to provide a formal recommendation for determining the significance of 41HR1173, as well as to address previous THC review comments indicating that, "*…it appears that only the corner of the historic site would be affected by work along the creek channel…and it is likely that deeper soils are present adjacent to the creek that would require backhoe trenching to investigate*" (Martin 2019).

The procedures followed by Gray & Pape, under collaboration with the HCFCD, fulfill the requirements set forth in the Texas Antiquities Code and the National Historic Preservation Act, other applicable historic preservation laws, and Presidential directives as they relate to the regulatory program of the USACE (33 CFR Parts 320-334) are articulated in the Regulatory Program of the USACE, Part 325 - Processing of Department of the Army Permits, Appendix C - Procedures for the Protection of Historic Properties. All fieldwork and reporting activities were completed with reference to state (the Antiquities Code of Texas) and federal (NHPA) guidelines. The APE is located on HCFCD property. Therefore, Texas Antiquities Permit No. 9332 was acquired prior to the field survey. The wetland verification for the APE is under SWG-2014-00651.

1.1 Project Description

The project area is located on the *Rose Hill and Tomball, Texas,* 7.5-minute United States Geological Survey (USGS) topographic quadrangle maps (Figures 1-1). The APE is located within an area referred to as Willow Flats, approximately 2.57 kilometers (1.6 miles) southwest of the town center of Tomball, Texas.

Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed

7/15/2020 Created in ArcGIS 10.4 for G&P Project 20-70701.001

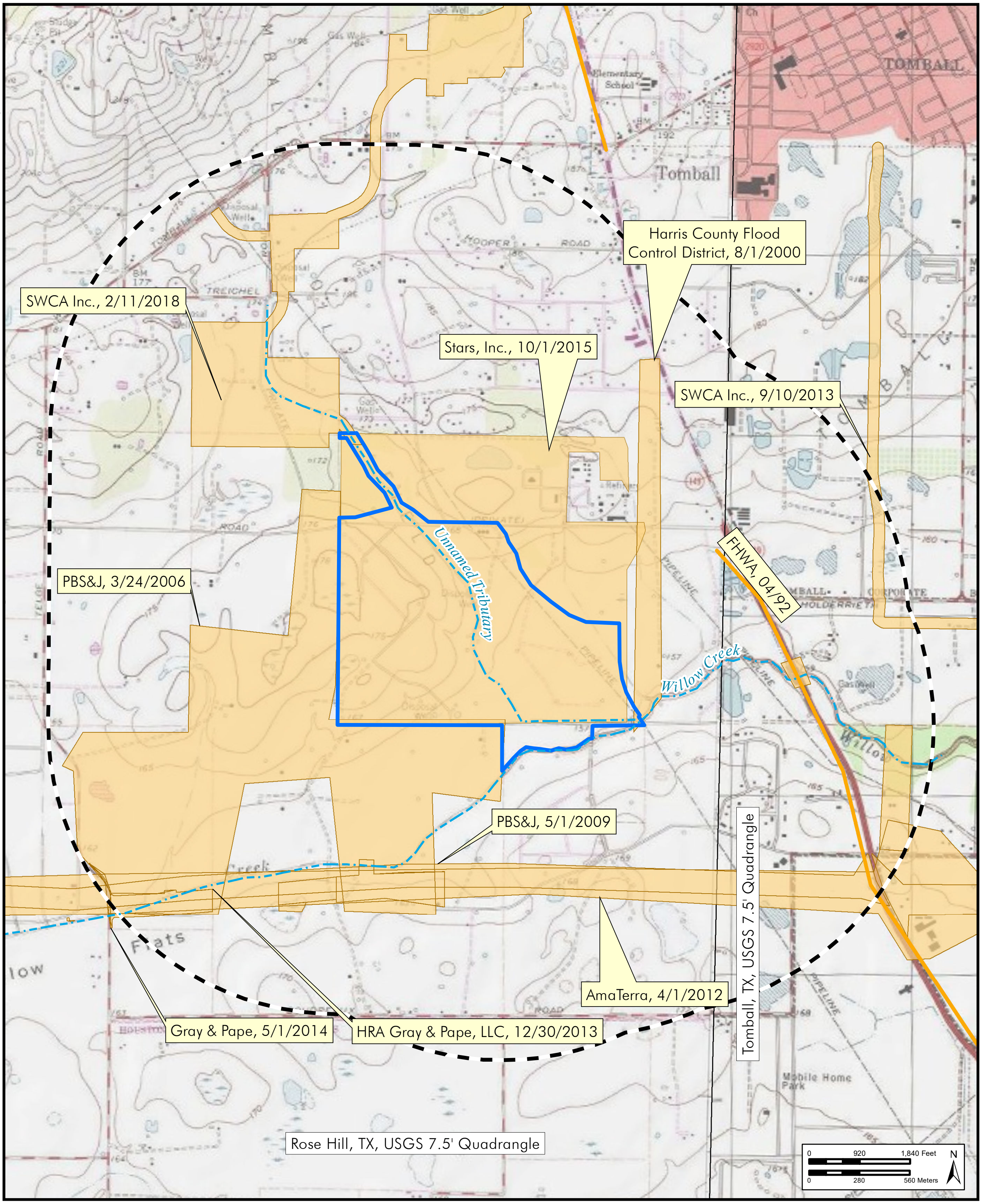
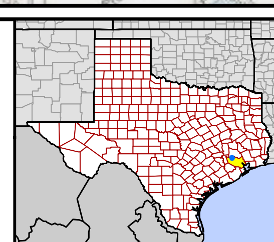


Figure 1-1
Project area location in Harris County, Texas.

GRAY & PAPE
HERITAGE MANAGEMENT

- Project Area
- Study Radius (1.6-km/1-mi.)
- Previously Recorded Area Survey
- Previously Recorded Linear Survey
- Waterways
- USGS Quadrangle Boundary



The areas immediately surrounding the northern, southern, and eastern portions of the subject tract are undeveloped. A residential area associated with the Rose Hill community is located to the west. The Willow Creek drainage exists in the southern portion of the APE, while Spring Creek is approximately 4.4 kilometers (2.7 miles) north, and tributaries of Little Cypress Creek exist approximately 4.5 kilometers (2.8 miles) to the south. Compared to its surroundings, the majority of the APE consists of undeveloped low-relief flats associated with the Willow Creek drainage and its tributaries. Current plans within the APE call for ground surface disturbances and near-surface preparation activities required as part of conveyance improvements and regional stormwater detention, including mechanical excavations, shaving, and widening to the depth of up to 9.8 meters (32 feet) below the current ground surface (Figure 1-2). This research is meant to assist the HCFCD and reviewing agencies in determining if any undocumented cultural resources exist within the APE, as well as to revisit the significance recommendation of Site 41HR1173 (The Plant Town Site).

1.2 Report Organization

This report is organized into seven numbered sections and a lettered appendix. Section 1.0 provides an overview of the project. Section 2.0 presents an overview of the environmental setting and geomorphology. Section 3.0 presents a discussion of the cultural context associated with the APE. Section 4.0 presents the research design and methods developed for this investigation. The results of this investigation are presented in Section 5.0. Section 6.0 presents the investigation summary and provides recommendations based on the results of the field survey. A list of literary references cited in the body of the report is provided in Section 7.0. All trench data, including a stratigraphic log of encountered sediments in the archaeological trench tests, are provided as an appendix.

1.3 Acknowledgements

Fieldwork was conducted in March 2020 by Principal Investigator Richard Stark, Archaeologist Jacob Hilton, and backhoe operator Francisco Campusano. Jim Hughey served as Project Manager. The report was prepared by Richard Stark. Amanda Kleopfer prepared the trench data log, with graphic illustrations and GIS support from Tony Scott and Duncan Hughey. The report was edited and produced by Jessica Bludau.

REMOVED FROM PUBLIC COPY.

Figure 1-2. Project APE, noting proposed basin depths. This figure shows areas outside the APE for this segment of the project (north of Olin Road). The APE for this scope of work is the southern portion.

2.0 ENVIRONMENTAL CONTEXT

2.1 Physiography and Geomorphology

The project is located in the Coastal Prairies physiographic region of southeast Texas, underlain by nearly flat strata of bedrock composed of deltaic sands and muds (University of Texas Bureau of Economic Geology [UT-BEG] 1996). The Geologic Atlas of Texas, Beaumont Sheet, shows the sediments underlying the proposed road project consist of Pleistocene deposits of the Willis Formation specifically, though the Beaumont and Lissie Formations dominate the Coastal Prairies and Plains overall (UT-BEG 1992).

The Texas Coastal Plain makes up part of the larger Gulf Coastal Plain, a low, level to gently sloping region extending from Florida to Mexico. The Texas Coastal Plain reaches as far north as the Ouachita uplift in Oklahoma, and as far west as the Balcones escarpment in central Texas (Abbott 2001). The basic geomorphological characteristics of the Texas coast and associated inland areas, which includes Harris County, resulted from depositional conditions influenced by the combined action of sea level changes from glacial advance in the northern portions of the continent, and subsequent downcutting and variations in the sediment load capacity of the region's rivers. Locally, Harris County is underlain by relatively recent sedimentary rocks and unconsolidated sediments ranging in age from the Miocene to Holocene (Abbott 2001; Van Siclen 1991).

Although older geologic units have been identified in the region (see Abbott 2001; Barnes 1992; Van Siclen 1991), units relevant to the study of long-term human occupation in modern-day Harris County include the Beaumont Formation, generally believed to predate human occupation in the region, and the so-called "Deweyville" terraces, positioned stratigraphically between the Beaumont and recent deposits. These terraces date to between one hundred thousand to four thousand years ago, and are characterized as consisting "of up to three inset fluvial terraces…(distinguished by the presence of)…large looping meander scars…" indicative of watercourses capable of fluvial action and discharge markedly greater than that seen today (Abbot 2001:16). Overlaying these deposits may be relatively thick or thin Holocene deposits laid down in the Harris County area by alluvial or eolian factors, or potentially, marshy environments.

Topographic relief is the result of the downcutting of sediments from fluvial action associated with the many rivers, bayous, and creeks within and around Harris County. Major drainages include the Brazos River to the west, the Colorado River to the north, and the San Jacinto River to the east. Creeks and bayous that border or dissect Harris County include Spring and Cypress creeks to the north, Cedar Bayou to the east, Buffalo Bayou in central Harris County, and Clear Creek, Brays Bayou, and Keegans Bayou to the south.

2.2 Sediments

Sediment surface texture within the Coastal Prairies varies but is typically fine-textured, with clay, clay loam, or sandy clay loam. Such variations in the region are partially attributable to the differences between the underlying geological formations. For instance, Lissie derived soils tend to be lighter colored, mostly Alfisols, typically with sandy loam, silt loam, or sandy clay loam surface textures, while the Beaumont Formation produces darker, clayey soils associated with Vertisols (Griffith et al. 2007). Willis Formation soils, on the other hand, are characterized as clay, silt, or sand siliceous granule to pebble gravel, with some petrified wood. These sediments are generally non-calcareous and deeply weathered while being locally cemented by iron oxide (UT-BEG 1992).

Three sediment units related to fluvial action and backslope deposition are mapped within the APE; Hockley Fine Sand Loam [HoB], Tomball Loam [TOMa], and the Wockley-Urban land complex. Hockley Fine Sand Loam sediments are very deep, well-drained sandy loam soils formed during the Pliocene (~5.3 to 2.6 Million Years Ago [MYA]) to early Pleistocene (~2.6 MYA to 0.7 MYA). These are loamy fluvio-marine deposits derived from igneous, metamorphic, and sedimentary rock (Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture [SSS NRCS USDA] 2019).

Archaeologists seek to identify various sources of pedoturbation, or soil-mixing processes, often manifesting as krotovina, the archaeological trace of a mud crack, animal burrow, or root cast (Schiffer 2010:49). Significant shrink-swell properties exist within sediments of the APE, along with natural bioturbation processes, especially from crawfish. In these conditions, artifacts may move downward through animal burrows or soil cracks in the dry season and heaved upwards during wet seasons as the clayey soil becomes saturated.

2.3 Paleoenvironments

Changes in Texas vegetation during the past 30,000 years offer clues about climatic changes, about the animals that once lived here, and about the hardships the earliest Texans, the Paleo-Indians, had to face in their daily quest for food and shelter. The remains of ancient plants yield the most reliable information about past vegetation. Unfortunately, most soils in southeast Texas are unfavorable for plant preservation. Typically, the less resistant plant parts decompose quickly after they are buried and leave no visible traces. However, through the techniques of phytolith (plant crystal) research, palynological (fossilized pollen) investigation, and through proxy environmental evidence from other fields, we can assemble a rough conjectural view of the major vegetational changes in Texas during the past 30,000 years.

The years 30,0000–22,500 B.C. were an interlude between two major glacial periods in North America. During this time, conditions in Texas were stable, with pollen records from Pollen evidence suggests that minor climatic fluctuations occurred, reflected in the fossil record by cyclical increases and decreases in the proportion of tree pollen to pollen from other plants. Some cycles lasted several thousand years and suggest that at times large islands of pine and juniper invaded the grasslands. Prairie remained dominant in Texas for this entire period, however, and provided grazing for many species of now-extinct animals. An extensive oak-hickory-pine forest probably dominated East Texas, but its western limit is unknown. It probably extended as far west as Huntsville.

Research indicates that during this period of the Pleistocene, much of the currently forested regions in the central United States were covered by vast prairies marked with patches of shrubs. Other research, however, suggests that a vast oak-hickory-pine forest extended across the southern United States and terminated somewhere in East or Central Texas. South Texas from San Antonio west to Del Rio and south to Mexico was probably covered by a mosaic of grassland and prairie interspersed with islands of shrubby oaks. But even minor changes in the amount of rainfall could have changed the vegetation quickly.

Between 22,500 and 8,000 B.C., changes in world climates led to a buildup of large continental ice sheets in North America that reached their maximum growth around 20,000 years ago. The disruption of wind patterns and the cooling influence of such large masses of ice in North America affected the vegetation and climate of the whole continent. In Texas, the average annual temperature dropped to about five degrees centigrade cooler than it is today. The resultant cooler and wetter climate encouraged existing forests and produced parklands. The oak-hickory-pine forests of East Texas probably did not expand significantly during this period. However, the dominant species of trees probably changed somewhat. Pollen records show that from about 22,500 to 12,000 B.C. the cooler-weather oak, elm, spruce, maple, hazelnut, alder, and birch may have dominated the forests. During the last few thousand years of this period, the large glaciers receded as the North American continent warmed.

By 10,000 years ago, the ice sheets were gone; the path of the jet stream probably moved northward to bring warmer and drier winds to much of Texas. By 8,000 B.C., the vegetation in South Texas probably looked much as it does today and as it had before 30,000 B.C.—a mosaic that changed in wet and dry years. Moisture controlled how much of the region became oak shrubs, grassland, or semidesert. The fossil pollen record reveals that the Texas climate has become progressively hotter and drier through the last 10,000 years. During that time, a number of minor climatic oscillations have occurred. For example, around 500 B.C., Texas underwent a notable cooling that allowed the forests of West Texas to expand downslope and encouraged the southward expansion of the lush grasslands of the Southern High Plains. This period of savannah expansion reached the Rio Grande and was widespread enough to encourage large herds of bison to range freely within Texas.

The forests of East and Central Texas also changed, indicated by fossil pollen records which suggest that widespread woodlands and forests probably persisted until between 3,000 and 1,500 years ago. After that time, all that remained were pockets of oak and pecan isolated in a vast grassy savanna. Contraction of East Texas forests continued until the woodlands reached their present westward margin around Huntsville. Loblolly pines probably came to dominate the forests of East Texas at this time. Fossil pollen evidence suggests that even though the early forests of East Texas may have expanded as far west as Austin, they were primarily composed of deciduous trees. Records show that the large relic stands of loblolly pines in Bastrop State Park, in Central Texas, did not expand southward, northward, or westward during the past 15,000 years. They probably did not expand even during the height of the Wisconsin glacial period around 20,000 years ago.

2.4 Ecology

The current biome within the APE is the Northern Humid Gulf Coastal Prairies, a subregion of the greater Western Gulf Coastal Plain (UT-BEG 2010). In general, the coastal plain is distinguished by both relatively flat topography and natural grassland vegetation. At an increasing distance from the coastline, the plains become older, more eroded and irregular, and have predominantly forest or savanna-type vegetation potentials. As a result, a significant portion of the land is used for crop cultivation, mostly consisting of rice, grain, sorghum, cotton, and soybeans (Griffith et al. 2007).

The more specific Northern Humid Gulf Coastal Prairies area generally encompasses the land bounded by the Gulf Coast, the city of Victoria to the southwest, and the Texas/Louisiana border to the east. The northern extent is fairly irregular but ends approximately 160 kilometers (100 miles) inland at the furthest, roughly parallel with the city of Brenham. Quaternary-age deltaic soils, silts, and clays underlie much of the coastal prairies and due to the low relief and clay subsoils, drainage is generally poor. Historically, the vegetation has consisted of mostly tallgrass grasslands with intermittent oak mottes or maritime woodlands. Some post oak savannas occur along the boundary with the East Central Texas Plains ecoregion to the northwest, while loblolly pine is scattered in the northern part of the region, near the transition to the South-Central Plains ecoregion (Griffith et al. 2007).

2.5 Land Use

The Northern Humid Gulf Coastal Prairies have an extensive history of alteration, spanning from the occupation and subsistence of native people to the introduction of large-scale domesticated livestock grazing and agriculture. Over the short course of modern times, nearly all of the coastal prairies have been altered or converted to cropland, rangeland, pasture, or urban and industrial land usage (Griffith et al. 2007). Aside from a few two-track access roads that wind their way through the property, there does not appear to be evidence of current large-scale land use within the project APE other than perhaps sporadic hiking and dirt bike trails. The current built environment surrounding the project APE includes single-home family subdivisions, with palatial estate lots with gated entryways immediately west of the project APE (Google, Inc. 2020 Nationwide Environmental Title Research, LLC [NETR] 2020).

3.0 CULTURAL CONTEXT

Based on aspects of material culture, researchers have identified eight archaeological time periods for southeast Texas. Archaeologists within the region agree on the general framework of cultural time periods while disagreeing on the temporal boundaries of these periods. The chronology used here generally follows that of Patterson (1995) and Perttula (2004) and recognizes that prehistoric/ protohistoric/historic cultural change was variable through space and time, including overlaps during transitions. This chronology is primarily based on the introduction of new artifacts, including pottery, diagnostic changes in projectile point technologies, and the introduction of writing. These artifacts parallel changes in subsistence strategies, such as bulk processing of shellfish, the introduction of plant domestication, and European cultures within the region.

3.1 Prehistory

With variations noted, southeast Texas witnessed broad-based hunting and gathering lifestyles throughout all prehistoric periods.

Early Paleoindian	10,000–8,000 B.C.
Late Paleoindian	8,000–5,000 B.C.
Early Archaic	5,000–3,000 B.C.
Middle Archaic	3,000–1,500 B.C.
Late Archaic	1,500 B.C. –A.D. 600
Late Prehistoric	A.D. 600–1528
Protohistoric	A.D. 1528–1687
Historic	A.D. 1687–1800

Southeast Texas has traditionally been viewed as a buffer zone between cultural regions. Patterson (1995:239) describes the archaeological record in this area as being an interface between the Southern Plains and the Southeast Woodlands. Along similar lines, both Shafer (1975) and Aten (1984) have categorized the Post-Archaic archaeological record of this region as "Woodland." This categorization is not meant to literally invoke the exact cultural patterns and chronology of the Woodlands culture found to the east, but as Aten (1984:74) states, "it loosely connotes activities by populations on a geographic as well as a cultural periphery of the southeastern Woodlands." Under this framework, the archaeology of Southeast Texas is a mixture of diffused technology and local innovation.

Most of the prehistoric cultural resources located between the Brazos River and Sabine Lake consist of shell middens found in estuaries or exposed in cut-banks along streams (Aten 1983; Patterson 1984). These middens usually contain faunal material as well as cultural remains such as lithic tools and pottery. Inland sites are less likely to consist of middens and are more similar to generalized open campsites. Sites of this type consist of little to no stratification due to a short occupation time, erosion, and land clearing. Thus, subsurface features are rare In both areas, sites are most often found near stream channels.

Along the Upper Texas Coast, the Early Paleoindian period begins by at least 10,000 B.C. (Aten 1983; Story 1990; Ricklis 2004). The Early Paleoindian period is characterized by unstemmed projectiles made on high-quality, and oftentimes exotic, cherts with heavily ground bases, including Clovis and Folsom fluted points. Late Paleoindian projectiles include both stemmed and unstemmed lanceolate atlatl darts, including Dalton, San Patrice, Scottsbluff, Plainview, and Angostura types. The Paleoindian Period is poorly represented in the archaeological record for the region (Aten 1983) and few intact sites for this period have been documented through systematic archaeological excavations (Ricklis 2004). Discovered in 2015, the Timber Fawn site (41HR1165) was a significant Clovis Site, including two bases of fluted Clovis points, two bifaces, eight fragments of blades, three end-scrapers, one adze, six worked flakes, one hammerstone, and one gorget observed in a buried context near the San Jacinto River in Harris County, however, a housing development destroyed the site in 2016 (Crook 2016). Approximately 24 recorded Paleoindian sites are known in Harris County (Bousman et al. 2004:64). Promising future research exists in inundated contexts, evidenced by Paleoindian artifacts washing up on the beach at McFaddin Beach, east of the APE in Jefferson County (Bennett et al. 1999; Brown 2009). Isolated Paleoindian artifacts are more common than intact sites in southeast Texas, including Clovis, Folsom, San Patrice, Plainview, Angostura, and Scottsbluff point types (Aten 1983; Story 1990; Turner and Hester 1999; Ricklis 2004). Sites from the earlier portion of the Paleoindian time period that would today be found inundated or located on shoreline would have been initially situated at open sites on tributary stream drainages at a time when the sea level was lower (Ricklis 2004; Aiuvalasit 2007; Aten 1983:157). Subsistence during the Paleoindian stage included both hunting and gathering although there was probably an emphasis on hunting. The consistent quality of Paleoindian lithic material used to make artifacts refers to fine-grained silicates, including exotic (nonlocal) chert. The scarcity of lithic materials in Southeast Texas suggests a highly mobile Paleo population (Ricklis 2004) moving in relation to available resources.

The Early Archaic period begins about 5,000- and ends around 3,000 B.C., immediately after the terminal Pleistocene geologic epoch, marking the end of the Wisconsin glaciation, the extinction of many species of megafauna in the Americas, and the onset of climate patterns similar to current conditions (Aten 1983; Story 1990). That said, the temporal chronology for the Archaic in southeast Texas is regionally variable, seemingly dependent upon proximity to the coastline, noting a relationship with stabilizing sea level in the middle Archaic. The Archaic cultural period represented in southeast Texas includes stemmed projectiles such as the deeply notched and barbed Bell/Calf Creek atlatl projectiles, as well as Keithville, Neches River, and Trinity types (Story 1990; Turner and Hester 1993; Ricklis 1994).

Diet begins a slow shift towards a broadened diet spectrum, including bulk shellfish processing and increased plant processing in the Archaic, but still includes hunting. Plant and shellfish processing technology seen during the Archaic period in southeast Texas includes fired clay-ball earth oven thermal elements or stone-lined hearths, baking pits, milling tools, and lenses of shell or fire-cracked rock (FCR) middens, although FCR is raw in southeast Texas (Story 1990). Archaic groups appear to have increased localism, with increased diversity in projectile hafting styles, reduced foraging distance indicated by lithic raw material sources, and seasonal increases in population densities.

From 3,000 to 1,500 B.C., the Middle Archaic is represented by increasing quantities of shell midden formation and diversification of projectile point types, including unstemmed Early Triangular and Tortugas points, and triangular stemmed Wells types, all with unground bases (Ricklis 2004). Characteristic Middle Archaic atlatl projectile points are relatively large and heavy, including Yarbrough, Travis, and Nolan types (Story 1990; Turner and Hester 1993; Ricklis 2004). During the Middle Archaic period, shell middens are the most ubiquitous type of archaeological site in southeast Texas (Aten 1983). These middens may have provided prehistoric inhabitants with well-drained habitational surfaces, as they contain patterned occupational debris including the remains of shellfish, such as oysters and estuarine clams, faunal material from terrestrial and aquatic vertebrates, and the earliest known human burials in the region (Aten 1983).

The Late Archaic lasted from 1500 B.C.-A.D. 600 and shows evidence for localized population increase (Aten 1983). By 2,500 years ago, the climate in this area was essentially modern. Ground-stone artifacts are found in southeast Texas made from materials from southwestern Arkansas have been found in context with human burials in cemeteries such as the Ernest Witte Site. Other indications suggest the possibility of long-distance trade (Hall 1981), but the shift to the use of more poor-quality local materials suggests less mobility (Ricklis 2004). Mortuary interments in Southeast Texas are typically represented by simple burials consisting of isolated individuals or small aggregates of individuals placed flexed or semi-flexed in shallow graves. Often there are no grave goods except personal ornaments worn on the body (Story 1990:258). This method of interment is characteristic of simply organized egalitarian societies in which rank and status differentiation are ephemeral.

Examples of highly organized mortuary traditions in the region dating to the Late Archaic are rare but are found inland in the Lower Brazos/Colorado River valleys on the western edge of the region (see Hall 1981). Burials in this tradition are characterized by systematic burial orientation and body positioning, as well as the use of red ochre and the inclusion of grave goods (Patterson 1995:247). Burial axis direction varies between sites but is often consistent within sites. Bodies are typically positioned in the extended supine position, but there are examples of extended prone and bundle burials. Perhaps the most conspicuous aspect of this mortuary tradition is the presence of exotic grave goods including boat-stones, banner-stones, gorgets, corner-tang knives, stingray spines, shark teeth, marine shell beads and pendants (Patterson 1995:247). These goods are not only indicative of long-distance exchange (corner-tang knives from the Edwards Plateau and ground-stone from Arkansas), but also suggest some level of individual rank and status. Another mortuary Late Archaic to Late Prehistoric mortuary tradition exists in the Galveston Bay Area (Patterson 1995:247; Aten et al. 1976; Ricklis 1994). Galveston Bay prehistoric burials in this tradition are often flexed or semi-flexed and associated with locally manufactured grave goods. Red ochre, marine shell beads, pendants, bird bone flutes, bone dice and awls, fishhooks, and projectile points are associated with Galveston Bay Late Archaic/Late Prehistoric burials. After the Late Archaic, most burials at inland sites do not have grave goods (Patterson 1995:248).

Projectile points in the Late Archaic are corner-notched or expanding-stemmed forms, such as the Kent and Gary types (Story 1990, Turner and Hester 1993), along with the Ensor and Godley points found in the western extremities of Southeast Texas (Ricklis 2004). During the Late Archaic, more utilitarian biface tools are prevalent as well as bone tools, and modified shell. Late Archaic artifact assemblages are very similar to the early part of the Late Prehistoric stage (Aten 1983).

The transition from the Late Archaic stage to the Late Prehistoric Period (A.D. 600-1500) is indicated by the introduction of ceramics into the assemblage (Aten 1983), moving first into the coastal region and eventually disseminating inland (Ricklis 2004). Dee Ann Story (1990:256) has suggested that the culture of Southeast Texas is distinctive enough so as to merit a separate designation by the Late Prehistoric. The "Mossy Grove" cultural tradition is a heuristic concept based on technological similarities shared by groups in this region. The primary marker of this technological tradition is plain, sandy-paste Goose Creek pottery that is found in this region from the Early Ceramic through Early Historic periods.

Pottery was first introduced into Southeast Texas from adjacent regions to the east and was present in the Galveston Bay area circa A.D. 100. By A.D. 500, pottery had diffused to the Conroe-Livingston area at the northern extent of the region (Aten 1983:297). Pottery is ubiquitous along the coastal margin and fairly detailed sequences of development have been developed for this subregion (Aten 1983). The ceramic sequence for the Galveston Bay area is particularly well defined. Aten (1984:76–81) has defined five distinct cultural periods for this area based primarily on changes in ceramic technology.

Pottery is not as prevalent at inland sites and there is less variety than that found in the coastal margin. For this reason, only a gross temporal chronology of non-tempered (mid Early Ceramic) and tempered pottery (Late Prehistoric) is outlined for inland sites (Patterson 1995:257–258; Story 1990:258). Sandy paste pottery known as Goose Creek is the most enduring ceramic type in Southeast Texas, being found in all portions of the region from the Early Ceramic through Early Historic periods. In addition to Goose Creek, four minor pottery types are found in the Early Ceramic period. These include a Tchefuncte (plain and stamped), Mandeville, and O'Neal Plain (variety Conway) types, as well as a stamped variety of Goose Creek (Aten 1983:287).

In the Late Prehistoric period, grog-tempered pottery is introduced into the archaeological record of the region (Patterson 1995:258; Story 1990:259). Based on temper size and amount, two varieties of this tempered pottery, San Jacinto Plain and Baytown Plain, variety Phoenix, occur in the region. Tempered pottery is not as common in the inland subregion as it is at coastal sites, with the Baytown variety being found only in the coastal margin (Patterson 1995:258; Aten 1983:241). Bone-tempered pottery also is found in Southeast Texas from the Early Ceramic through Protohistoric, but it is relatively rare. Aten (1983) reports the presence of this variety in the Brazos Delta-West and Conroe-Livingston Areas. In the inland subregion, bone-tempered pottery appears to date only to the Early Ceramic period (Patterson 1995:258).

Seasonal socio-subsistence orientation around domesticated crops such as corn is evident during this period, along with major technological changes, such as sandy paste ceramics and, around 700 A.D., the bow and arrow (Story 1990; Ricklis 2004). Characteristic stone projectile points related to the introduction of the bow and arrow technology are distinct from previous atlatl dart projectiles, including light, small, straight and expanded stem types that include the Delhi, Ellis, Epps, Gary, Kent, Alba, Catahoula, Cliffton, Fresno, Friley, Hayes, Perdiz, Scallorn, and Steiner points (Story 1990; Turner and Hester 1993; Ricklis 2004).

The end of the Late Prehistoric period transitioning into the Protohistoric period is technically indicated by the introduction of written language, with other concurrent shifts to European normative social behaviors, taboo, and material culture. In southeast Texas, written language was introduced with several sixteenth century European expeditions to the area, including the Narvaez expedition in 1527, the Hernando de Soto expedition in 1542, and the La Salle expedition in 1687.

Cabeza de Vaca's shipwreck in 1528 near Galveston Bay initialized an episode of tenuous European and indigenous interactions documented in written journals and letters (Hester 1999). That is, "European documentation, control, and exploitation of Texas grew slowly after initial contact in 1528" (McLeod et al. 2018:10). La Salle's settlement on Matagorda Bay was raised by indigenous Texans, likely Karankawa, in 1688.

The development of Spanish missions in Texas formalized European efforts to convert and control Texas indigenous populations. Other Spanish missions in Texas included San Francisco de los Tejas, built on the Neches River in 1690, Mission Espiritu Santo Zuniga in Matagorda Bay in 1722 and in Victoria County in 1726, Presidio Bahia and Mission Rosario, established in Goliad County in the 1750s, Mission Señora de Refugio built on the Mission River, and from 1756 to 1771 Mission San Agustín de Ahumada on the Trinity River (Newcomb 2004; Ricklis 1999; Walter 1999; Chipman and Joseph 2010:86; Weddle 2010).

European and Texas indigenous interactions were originally sporadic, and thus the Protohistoric transition occurred gradually and in geographic pockets surrounding European settlements and Catholic missions. During this transitional time, written records of observations made by the early European explorers and missionaries provide a valuable glimpse into indigenous lifeways, interactions, and distributions during the Protohistoric Period. Further, ethno-historic accounts documented during the Protohistoric provide a direct source of accounts which may be used analogously, for archaeological interpretation within the region.

Protohistoric indigenous ethnic affiliations and material culture correlate for the region are not entirely clear. Aten (1983) has defined the Brazos Delta-West Bay, Galveston Bay, and Sabine Lake archaeological areas and suggests that they may correlate with the Historic territories of the Coco, Akokisa, and Atakapa groups respectively. Similarly, historic reconstructions of the inland subregion suggest a number of possible group affiliations (Story 1990:269). The historic economic inland/coastal cycle of the Akokisa, which stretched from Galveston Bay to the San Jacinto River basin, may mean that archaeological materials in the Lake Conroe area are affiliated with this group. Alternately, these remains may be associated with the Bidais who occupied territory immediately to the north of the Akokisa groups.

During the Protohistoric period, Atakapans lived along the Lower Neches and Sabine Rivers between the San Jacinto River in Texas and Vermillion Bay, Louisiana. The Atakapans lived in five bands that roamed the border areas between Texas and Louisiana. These five bands were known as Vermilion Bayou, Mermentau, Calcasieu, Sabine and Neches, and Trinity. Several Texas tribes living along the Trinity River interacted with the Atakapans, including the Orocoquisas, Deadoes, and Bidais. These groups were probably kindred, the main difference being dialect. In terms of material culture and customs observed by the early European explorers, these groups appeared to be very similar to one another. In fact, eighteenth-century Spanish accounts used the tribal names Atakapans and Orocoquisas interchangeably.

3.2 Historic Harris County

During the transition into the Historic period in what is now Harris County, Anglo-American settlers, migrated into the region during the early 1820s, with assumed rights provided through written contracts issued by Spanish and later Mexican authorities to Stephen F. Austin and the early Republic of Texas. The lands that would become Harris County comprised the southeastern border of Austin's Colony. In July of 1824, 29 titles were granted to lands in future Harris County, with an additional 23 grants made between 1828 and 1833. In 1837 622 acres, including the APE, were granted to Chauncey Goodrich. A detailed summary of changes in ownership of APE lands from 1837 to 1933 exists within the Results section. The original grants concentrated mainly on the watercourses of the region. The early settlers in southeast Texas were mostly from the southern United States, bringing a plantation lifestyle, including African slaves. Among Austin's second colony grants, the Willow Creek settlement was known as the French Settlement, including Elizabeth Smith in 1831 and Claude Nicholas Pillot, a farmer in the area in 1837.

Harris County was formed as Harrisburg County on December 22, 1836. The county was renamed Harris in December 1839 to honor John Richardson Harris, an early pioneer who had established Harrisburg in 1826, the first townsite in the county. Harrisburg was established at the confluence of Buffalo Bayou and Brays Bayou and by the 1830s had become the major port of entry for the region and a transportation hub. Roads ran northwest to the Brazos communities of San Felipe and Washington, east to the ferry landing that crossed the San Jacinto, and west paralleling Brays Bayou to the Oyster Creek Community near present-day Stafford in Fort Bend County.

Under Mexican rule, the area surrounding Harrisburg (as it came to be spelled by 1832) was known as the San Jacinto District. The district stretched east from Lynchburg on the San Jacinto River west to the location of present-day

Richmond, and from Clear Creek in the south to Spring Creek in the north. Harrisburg County encompassed this same territory with the addition of Galveston Island. The modern boundaries of Harris County were established in 1838.

In the 1840s, large numbers of German and French immigrants settled in Harris County. The Rose Hill and Spring Creek communities included German immigrants like Johann Heinrich Theisz, who helped found the Rosehill Salem Lutheran Church in 1852 (Hazlewood 2010). The Hispanic presence in the region was relatively sparse prior to an influx of immigrants following the Mexican Revolution reflecting the ephemeral nature of Spanish and Mexican colonization.

The founding of the city of Houston by Augustus and John Allen was announced in a newspaper advertisement of August 1836. The brothers managed to convince the delegates of the first Texas Congress to establish the yet-to-be-built Houston as the first, albeit temporary (1837-1840), capital of Texas. In 1837, Houston also became the seat of Harrisburg County. The town was laid out on a grid plan with streets running parallel and perpendicular to Buffalo Bayou near the confluence of White Oak Bayou. The town grew rapidly from 12 inhabitants and 1 log cabin in January of 1837 to 1500 people and 100 houses 4 months later (Henson 2011).

Initially, the city was not segregated, and slaves lived scattered throughout the city's neighborhoods. During and after the Civil War this changed, as the racially predicated social structure continued in Houston beyond the Emancipation. Houston schools, churches, and businesses continued to be segregated and by the end of the nineteenth-century residential segregation was also present. Unfortunately, separate white, black, and later Hispanic neighborhoods divided the city.

It was not until the post-Civil war era that the region faced its first economic downturn. Without the wartime demand for agricultural goods and the loss of slave labor, planters who had overextended themselves to meet the increased demand for cotton found themselves without a market and in possession of lands with depleted soils. The immigrants that came to the area following the Civil War founded settlements along the rail lines that bisected the county. The Houston communities of Pasadena, Deer Park, Houston Heights, Bellaire, Webster, La Porte, South Houston, and Genoa developed in this manner and were eventually annexed into the city of Houston. Socio-economic recovery for the county did not occur until the construction of several railroad lines in the 1870s when the International-Great Northern Railroad and Texas Central built lines through the area.

By the mid-nineteenth century, Houston and Harris County had become a center of commerce. Products were imported into the Texas hinterland through Houston after being offloaded from ocean-going ships in Galveston. Exports included agricultural products such as cotton, corn, and cowhides. To facilitate this economic growth, the town became a railroad hub with six railways spreading from 80.5 to 160.9 kilometers (50 to 100 miles) to the northwest, east, west, south, and southeast. In 1873, Houston joined the national rail network when the Houston and Texas Central reached Denison.

In the 1880s three general stores, a sawmill, gristmill, blacksmith, wagon maker, and cotton gin existed in Rosehill (Hazelwood 2010). In the early 1900s Thomas Ball, an attorney from the Trinity Brazos Valley Railroad, and mayor of Huntsville, worked to route railroads through the community of Peck. On December 2, 1907, in the historic downtown rail depot, Peck was renamed Tomball. On May 27, 1933, the Humble Oil Company discovered oil in Tomball, ensuing a period of economic growth and the nickname, "Oil Town USA" (Hazlewood 2010).

The navigable expansion of Buffalo Bayou was essential to the commercial life of Houston and a number of private ventures were undertaken over the years to widen and deepen the channel. The USACE took control of the project in 1881, eventually creating the 15.2-meter (50-foot) deep Houston Ship Channel from Galveston Bay to a turning basin above Brays Bayou. The discovery of oil at Spindletop in nearby Beaumont in 1901 and Humble in 1903 made Houston an important center for the petroleum industry, causing a chain-reaction stimulus in other ancillary industries. With the construction of the railroads, built directly to Beaumont and Humble by 1905, other industries benefited from increasing demand and increase access to transportation networks. The region saw increased development of the lumber industry, a brief resurgence in cotton production, and by the 1910s many local farmers began growing fruits and vegetables in order to meet the food demands of Houston. Commercial timber production remained the largest revenue source for the county until the 1920s when there was a steep decline in the amount of available timber within the region due to uncontrolled logging. Rapid and widespread deforestation opened the land to a further increase in ranching and farming.

The Houston Ship Channel's inland location made it safe from Gulf storms and refineries began lining the banks in 1918. Dredging development of the Houston Ship Channel Navigation District accelerated from 1911-1919 along an 80.5-kilometer (50-mile) channel allowing for large oceanic ships. During this time Ross Sterling of the Humble Oil and Refining Company (Exxon) built refineries on the San Jacinto River and Buffalo Bayou (McLeod et al. 2018) By 1929, 40 oil companies had offices in Houston. The region saw an economic downturn when the effects of the Great Depression reached the area and continued until the post-World War II period, however, this was locally a short-lived hardship. The discovery of oil in 1933 on the JJW Cobs Farm, west of Tomball, by the Humble Oil and Refining Company, now Exxon, brought wealth to the region as well as a significant population increase. "The fast-developing drilling activity of 1934 soon indicated a substantial gas reserve over a mile below the prairie" (Nicholson 1982). The discovery encouraged the Humble Oil and Refining Company to purchase the lands within the APE to organize and house employees. One of the roughnecks/ roustabouts arriving to work for the Humble Oil and Refining Company in 1934 was Winthrop Rockefeller (Rockefeller Archive Institute 2020). Prior to being elected Governor of Arkansas (1966-1970), and immediately after being expelled from Yale, the 22-year old Rockefeller sought out the on-the-ground adventure of the Humble roughneck experience from 1934-1937, before enlisting as a Private in the 77th Infantry of the US Army. In 1935, while Rockefeller lived in the bunkhouse for single men at 41HR1173, the HCFCD was established, and in the 1940s, infrastructures such as the Addicks and Barker dams in western Harris County were constructed.

Organizing the local socio-economic growth hierarchically, the Humble Oil and Refining Company built racially segregated (all white) housing developments, stratified by the administration, management, and labor positions, including 41HR1173 (The Plant Town Site), also referred to as Humble Town, which is within the APE. This housing development was built specifically for Humble Oil and Refining Company Employees, and included single-family houses, a bunk-house for single men, a bathhouse, offices, recreation hall with a canning kitchen, a lighted tennis court, and a continually burning garbage midden pit, "fueled by gas jets" (Wagner 2016:12). The Humble housing development became, "…base of operations for the development drilling and operations of this new oil field and was to become known around Tomball as THE HUMBLE CAMP" (Nicholson 1982:1).

In 1945, in a public relations effort to create public support for petroleum-related products and programs, Roy Stryker and Standard Oil hired photographer Esther Bubley, then 24 years old, to record images of Tomball and the Humble Oil and Refining community at 41HR1173 (Bubley 1945) (Figure 3-1 through Figure 3-4). Southeast Texas soon became the richest oil-producing region in the United States. The outbreak of World War II created a demand for products made of petrochemicals. The city would go on to become one of the largest petrochemical concentrations in the United States. Oil remains a primary source of income and wealth in the region, while the majority of agricultural income comes from livestock.

Figure 3-1. 1945 photograph by Esther Bubley of activities in and around 41HR1173.

Figure 3-2. 1945 photograph by Ester Bubley of roustabouts/ roughnecks at the 41HR1173 livestock corral.

Figure 3-3. 1945 photograph by Esther Bubley, of Humble Oil and Refining Company employees, "…at the pool hall owned by E.D. Smith, Humble roustabout. Playing moon, a domino game."

Figure 3-4. 1945 Humble Oil and Refining Company employees, Tomball Field, photograph by Esther Bubley.

4.0 METHODOLOGY

4.1 Site File and Literature Review

Background review and literature research were conducted prior to fieldwork mobilization. The background literature search included a review of previously conducted cultural resource surveys in the vicinity of the proposed project area, and any historical document pertaining to the history of the area. Site file research was performed in order to identify all previously recorded archaeological sites within a 1.6-kilometer (1-mile) study radius of the project area (Figure 1-1), and any recorded historic structures eligible for the National Register of Historic Places (NRHP) listing located adjacent to the project area. Site file research was done by reviewing records maintained by the Texas Archeological Research Laboratory in Austin, Texas, and by consulting online research archives maintained by the THC.

Historical topographic and aerial maps were reviewed in order to identify any historical structures that might be located close to or within the project area. Historical maps of Texas and Texas counties were reviewed in order to better understand the history of the region and to identify any potential historical trails and important historic sites located or crossing the project area.

In addition, the Texas General Land Office (TxGLO) files and maps were consulted to identify past landowners of the tracts comprising the property area. Historical topographic maps and aerial photographs were reviewed to identify potential residential and other structures located within the project area.

4.2 Archaeological Field Methods

Archaeological investigations for this project included deep testing through the excavation and monitoring of 23 backhoe trenches. Many Fieldwork began on March 19, 2020 and concluded on Friday, March 27, 2020. Ground pre-planned trench locations were necessarily altered due to avoidance of active utility lines, mapped wetlands, temporarily inundated ground surfaces not mapped as wetlands, noxious air, and property lines.

4.2.1 Archaeological Deep Testing

Because the project APE was previously investigated with pedestrian survey and shovel testing, this archaeological endeavor focused on systematic deep testing. Mechanically excavated trenches focused on areas suspected to have a higher potential for more deeply buried intact cultural resources, such as creek banks, near stream confluences, nearby terraces, and locales of elevated relief. Deep test locations were chosen based on a combination of topography, previous research results, proximity to active stream channels, observed paleo-channels, and tributaries.

Systematic archaeological sampling with trench tests was sought to complement and expand upon the data collection of previous shovel testing within the project APE (Uecker et al. 2016; McLeod et al. 2018), sampling stream terraces and revisiting portions of 41HR1173 (The Plant Town Site). The majority of trenches, however, were placed beyond the boundaries of 41HR1173, focusing on the potential for deeply buried prehistoric materials along approximately 1.0 mile (1.6 kilometers) of an unnamed tributary and its confluence with Willow Creek.

A "no collect" strategy was utilized for encountering artifacts. That is, no diagnostic nor non-diagnostic artifacts were collected in the course of the current survey. As a project permitted through the THC, however, Gray & Pape will submit project records to the Center of Archaeological Studies at Texas State University in San Marcos, Texas.

surfaces within the project area were wet and squishy throughout the fieldwork effort. Active utilities and the mapped wetlands were avoided in the placement of trenches. Due to limited access because of the exceptionally wet ground surface conditions and property lines, Trench 12 was not excavated (Figure 4-1). The general vicinity of the planned archaeological test trench had been previously shovel tested by SWCA researchers (McLeod et al 2018) (Figure 4-2).

Figure 4-1. Impassable portion of the APE along the inundated path to the planned location for Trench 12.

Figure 4-2. Adapted image from McLeod et al. 2018:22, arrow noting previous shovel testing in the general location of abandoned Trench 12.

During the current fieldwork, noxious petroleum smells and petroleum evident within the standing water in and along the stream were observed along the unnamed tributary in the central portion of the APE (Figure 4-3). Previous research has documented the brine ponds of the area to some extent, noting that historically "…waste water ponds should have been next to every oil well drilled, but in many case, they weren't…" operators would run the water onto the ground or a nearby ditch (Wagner 2016:15). Due to the potential of encountering noxious air and sediments, planned trenches were relocated from the central portion of the project APE to the north along the unnamed stream and to the south near its confluence with Willow Creek. Mapped and unmapped utility lines were observed in the APE during fieldwork, and it is noted that some originally planned trench locations were altered due to active utilities and pipeline avoidance (Figure 4-4). All trenches were excavated by Francisco Campusano, using a rubber-tired backhoe with an approximately 1-meter (3-foot) wide-bladed bucket (Figure 4-5). The trenches were designed with applicable standards adopted by the Occupational Safety and Health Administration (OSHA). All mechanically excavated trenches measured between 5 to 9 meters (16 and 30 feet) in length, 1 meter (3 feet) in width, and were excavated to culturally sterile depths (typically depths between 2.0 and 2.5 meters [6.7 and 8.2 feet]). The trenches included ramped steps and benches to safely accommodate maximum depths of up to 250 centimeters (98.4 inches) below the ground surface.

Figure 4-3. Petroleum evident within standing water in and along the stream in the central portion of the project APE.

Figure 4-4. General view to the north of an unnamed tributary of Willow Creek, noting gas lines crossing the creek in the APE. Note that some originally planned trench locations were altered due to active utilities and pipeline avoidance.

Figure 4-5. Operator Francisco Campusano excavating at T1, using a rubber-tired backhoe with an approximately 1-meter (3-foot) wide-bladed bucket.

Samples of trench backfill were hand sifted with the pass of each backhoe bucket using ¼-inch (6.4-millimeter) wire mesh. During trenching, the walls and floors of the trenches were monitored for changes in soil color or texture potentially related to the presence of cultural features. Each trench was photographed at various angles and one wall profile of each trench was drawn and described using Munsell (2005) color charts (Figure 4-6). Soil profiles observed in all trenches were described using archaeological approaches for describing basic soil properties including color, texture, compactness, inclusions, disturbances, compactness, and ped development (Vogel 2002). Trenches were backfilled upon completion of recording (Figure 4-7). The locations of all deep testing trenches excavated during the survey were recorded with a sub-meter accurate Global Positioning System (GPS) data collector and recorded on field maps. Digital photography aided documentation of the existing conditions of the project area and fieldwork methods, with photograph locations recorded on field maps and logged with a GPS unit. As a project permitted through the THC, Gray & Pape submitted project records to the Center for Archaeological Studies (CAS) at Texas State University in San Marcos, Texas.

Figure 4-6. Documentation of T4, noting that each trench was described using archaeological approaches for describing basic soil properties including color, texture, compactness, inclusions, disturbances, compactness and ped development, with data collection in the form of geo-referenced digital photography and a hand-drawn profile illustration.

Figure 4-7. General view to the east of backfilled T1. All archaeological trenches were backfilled upon completion of data recording.

5.0 RESULTS OF INVESTIGATIONS

5.1 Results of Site File and Literature Review

Site file research was completed using the online Texas Archaeological Sites Atlas, maintained by the THC. The site file research revealed that one historic property, 41HR1173 (The Plant Town Site), is located within the current project APE.

5.1.1 Previously Recorded Surveys

According to a search of the Texas Archeological Sites Atlas, at least five previous surveys have been conducted within a 1.6-kilometer (1-mile) study radius of the project, including work by SWCA in 2018, STARS in 2015, Ama Terra in 2012, PBS&J in 2006, and HCFCD in 2000 (Table 5-1 and see Figure 1-1).

5.1.2 Previously Recorded Archaeological Resources

There are seven previously identified archaeological sites within or adjacent to the APE (Figures 1-1 and Table 5-2). They consist of Sites 41HR1006, 41HR1007, 41HR1129, 41HR1130, 41HR1131, 41HR1173, and 41HR1174. Information for each is summarized below in Table 5-2 according to site records available through the Texas Archeological Sites Atlas (THC 2020).

Background research indicates that after prehistoric times and the associated indigenous understandings of land tenure, the first private owner of the lands within the project APE is recorded as the 259 hectare (640-acre) Chauncey Goodrich Survey A/305, awarded to Army of Texas surgeon Chauncey Goodrich, awarded by the Republic of Texas in 1837 for seven months of military service. Table 5-3 is a summary of the property ownership changes for lands within the APE, from the original 1837 survey to the purchase of the property by the Humble Oil and Refining Company just prior to the construction of 41HR1173.

All Humble Oil and Refining buildings and houses built on the property were pier and beam, constructed with pine floors supported on concrete blocks, with wooden back porches surrounding public areas with "…swing sets, see-saws, and gas street-lights" (Nicholson 1982:95). Employees were allowed approximately 121 hectare (300 acres) of the property for garden and free-range livestock (Nicholson 1982:96). The population of the 41HR1173 community grew to over 450, at the time larger than neighboring Tomball. In 1955, the Humble Oil and Refining Company began relocating all of the houses and buildings built on the property to Tomball, and the final employee resident of 41HR1173, WB Nick Nicholson, moved out in 1957.

It is worth noting that this report builds directly upon the two previous archaeological endeavors by STARS and SWCA within and immediately north of the project APE, including data from shovel tests dug by the STARS and SWCA researchers (Uecker et al. 2016; McLeod et al. 2018) (Figure 5-1). The findings established by the current Gray & Pape research here concur with those of the SWCA researchers who investigated within northern portions of the project APE and indicate, "…no further cultural resources…and a finding of no historic properties affected" (McLeod et al. 2018:37), as well as that of the STARS researchers who found that within the project APE, "…only traces of roads were found within the Plant Town Site. Thus, the research team believed the site was not eligible for state or federal landmarking" (Uecker et al. 2016:i).

Table 5-1. Previously Recorded Archaeological Surveys within 1.6 Kilometers (1 Mile) of the APE.

Project Type	Fieldwork Date	Investigating Firm	Archaeological Resources Documented	Age of Cultural Materials
Area Survey	2018	SWCA	NONE	NA
Area Survey	2015	STARS	41HR1173, 41HR1174	Historic
Linear Survey	2014	Gray & Pape	NONE	NA
Linear Survey	2013	Gray & Pape	NONE	NA
Linear Survey	2013	SWCA	NONE	NA
Linear Survey	2012	Ama Terra	41HR1131, 41HR1130, 41HR1129	Historic
Linear Survey	2009	PBS&J	NONE	
Area Survey	2006	PBS&J	NONE	NA
Area Survey	2000	HCFCD	41HR10007	Historic
Linear Survey	1992	FHWA	NONE	NA

Table 5-2. Previously Recorded Archaeological Sites Located within 1.6 Kilometers (1 Mile) of the APE.

Site	Time Period	NRHP Status	Site Name/ Function
41HR1006	Historic: 1939	Recommended Not Eligible	farmstead
41HR1007	Historic: Late 20th Century	Recommended Not Eligible	Historic community trash midden
41HR1129	Historic: pre-1944	Determined Not Eligible	Tomball Community Dump
41HR1130	Historic: Late 20th Century	Determined Not Eligible	Boudreaux Road Trash Dump
41HR1131	Historic: 1901 to Contemporary	Determined Not Eligible	Boudreaux Farm
*41HR1173	Historic: 1933 to 1958	Recommended Not Eligible	Humble Oil Plant Town
41HR1174	Historic: 1900 to 1920	Recommended Not Eligible	The Wagon Site

*Denotes sites within the APE

Table 5-3. Summary of Changes in Ownership of the APE, 1837-1933.

Owner	Year Ownership Changed	Amount paid $
Chauncey Goodrich	1837	Seven months military service
Isaac Brashear, George Bringhurst, and Elizabeth Trott	1838	Deeded to the widow of deceased surveyor, with attorney and surveyor's assistant, as payment for survey work
Ashbel Smith	1840	unknown
CF Bethye and Willheim Quensell	1855	unknown
Hamblen Family	1869	$500.00
Christian, Mary and Philip Duer	1871	unknown
George Phelps	1881	unknown
Phillip Stein	1896	$1000.00
Henry Rembert	1900	$1.00
JT Mason	1900	unknown
CJ McCarthy	1902	$3200.00
Robert and Hubert Reid	1907	$7,680.00
Humble Oil and Refining Company	1933	unknown

REMOVED FROM PUBLIC COPY

Locations of shovel testing during previous archaeological research within the project APE, from Uecker et al. 2016:13.

GRAY & PAPE HERITAGE MANAGEMENT

Figure 5-1

5.1.1 Deep Testing Results

In order to test for deeply buried intact cultural resources, a total of 23 trenches (labeled T1–T23) were excavated within the project APE (Figure 5-2). None of the excavated trenches showed evidence of any prehistoric artifacts, nor possible cultural lenses of bone, shell, or charcoal, and analysis of trench strata indicates no evidence of buried paleosols.

Trenches 2 and 3 tested within the boundaries of 41HR1173, while Trenches 1, 4, 5, and 20 tested near but beyond the mapped borders of 41HR1173 to confirm spatial delineation. Observed subsurface historic artifacts include abandoned steel pipes in Trenches 2, 4, 5, and 7 (Table 5-4). The observed pipes likely represent the abandoned infrastructure of 41HR1173. Trench 6 included two reddish-yellow (7.5YR7/6) bricks in Strat II (10 to 50 centimeters below surface [cmbs] [3.9 to 19.7 inches]), bearing the impressed stamp makers mark, "Andy Cordell Reds" (Figure 5-3). These high-fired, red-orange, clay artifacts date to the early/mid- twentieth century. Similar bricks were recovered at excavations at the hurricane devasted location of the once town of Velasco (Fox et al. 1981).

Sediments observed during trenching were largely consistent across the project area as well as with USGS soils mapped for the area, noting the general expectation to encounter Hockley Fine Sandy Loam (HoB), overlying Tomball loam, overlying various clay loams from the ground surface to 200 cmbs (78.7 inches) (Soils Survey Staff 2020). The well-drained and loamy upper fluvio-marine deposits were derived from parent igneous, metamorphic and sedimentary rocks originally formed during the Pliocene (~5.3 to 2.6 MYA) and early Pleistocene (~2.6 MYA to 0.7 MYA), to be redeposited in Harris County from the middle Pleistocene throughout the Holocene (0.7 MYA to current) (SSS NRCS USDA 2020). The well-drained loams overly clays, probably those of the Beaumont Formation which appear heavily weathered and increase compaction/ density with depth. In addition to field observances of historic mechanical redeposition of sediments, natural taphonomic processed observed include root and crawfish krotovina, and filled-in mud cracks. Filled in-mud cracks, appearing in plan view as polygonal krotovina, indicate the phenomenon known as argillipedoturbation, created when the shrinking and swelling of clays cause self-mixing. Five stratigraphic profiles from Trenches 1, 6, 13, and 18 illustrate patterned variability within the project APE (Figures 5-4 to 5-7).

Table 5-4. Observed Artifacts in Archaeological Test Trenches.

Trench Number	Cultural Material Observed	Depth Below the Ground Surface (cm)	Approximate Location within the Project APE and Distance from nearest documented Historic Property
2	2-inch steel pipe	0 to 20	West-central, within 41HR1173
4	2-inch steel pipe	0 to 20	Northwest, 55 meters west of northern portion of 41HR1173
5	4-inch steel pipe	0 to 20	Northern, 70 meters north of 41HR1173
6	2 bricks	10 to 50	North-central, 92 meters north of 41HR1173
7	4 in steel pipe	100	Northern, 87 meters north of 41HR1173

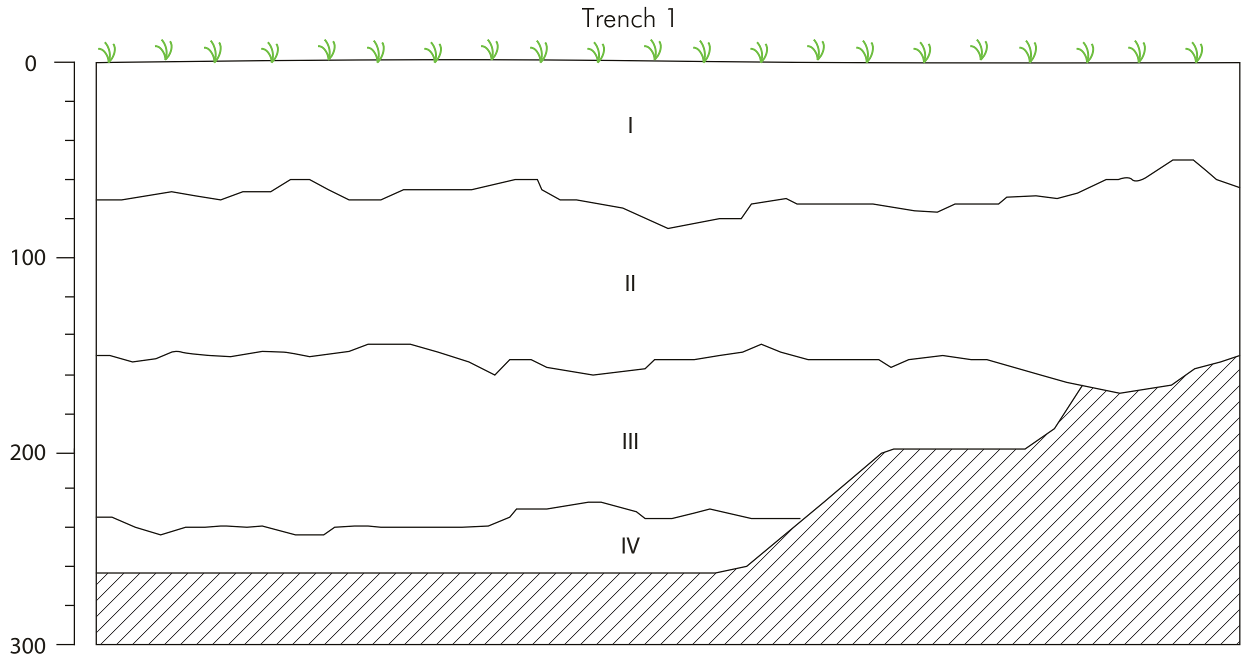
REMOVED FROM PUBLIC COPY

Archaeological test trench locations within the APE.

Figure 5-3. Bricks recovered from the upper 50 cmbs in T6 labeled "Andy Cordell Reds."

Trenches 1–5, generally located in the west and central portion of the APE, in and around the mapped boundaries of 41HR1173, included Strat I, possibly disturbed, is at ground surface comprised of brown silt and fine sandy loam (7.5YR 5/3) down to 65 cmbs (25 inches below surface), overlying Strat II, reddish yellow fine sandy clay loams (7.5YR 6/8) down to 160 cmbs (62 inches below surface), overlying Strat III, a yellow sandy clay (10YR 7/8), mottled with very pale brown and red (10YR 8/3 and 2.5YR 5/8) down to 235 cmbs (92 inches below surface), overlying Strat IV, yellowish brown very dense sandy clay (10YR 5/8) mottled with yellowish red and very dark grayish brown (5YR 5/6 and 10YR 3/2) down to the base of excavation at 250 cmbs (98 inches below surface), noting increasing compaction and increased incidence of ferric concretions with depth (Figure 5-8). Positive cultural remains in this area included abandoned 2-inch steel pipes at approximately 20 cmbs (8 inches) in Trench 2 and Trench 4 and an abandoned 4-inch steel pipe at approximately 30 cmbs (12 inches) in Trench 5 (Figure 5-9).

Trenches 6 through 8 were generally located along the eastern bank of an unnamed tributary of Willow Creek, relocated from their original positions in the central portion of the APE due to observed noxious water and air. These trenches were re-located upstream, on similar terraces of the unnamed tributary of Willow Creek. Trenches 6 through 8 include some indication of mechanical truncation and mixing of the uppermost ground surfaces, with Strat I, a brown sandy loam (7.5YR 4/2) on the ground surface down to approximately 10 cmbs (4 inches below ground surface), overlying Strat II, a pinkish silt loam (7.5YR 7/4 mottled with reddish yellow (7.5YR 6/8) down to approximately 50 cmbs (19.7 inches below ground surface), overlying Strat III, a compact pink and yellow sandy clay (7.5YR 8/3 and 10YR7/8) mottled with light gray and reddish yellow (7.5YR 7/1 and 7.5YR 6/8) down to approximately 110 cmbs (43 inches below ground surface), overlying Strat IV, a compact reddish brown sandy clay (2.5YR 5/4) mottled with yellow and strong brown (10YR 7/8 and 7.5YR 5/6) down to approximately 200 cmbs (79 inches below ground surface), overlying Strat V, a diffuse boundary with a very compact sandy clay (7.5YR 5/8) mottled with (7.5YR 7/1 and 5YR 5/8) to the base of excavation (BOE) at approximately 255 cmbs (100 inches below ground surface), noting increasing compaction and incidence of iron concretions with depth (Figure 5-10). Positive cultural remains in these trenches included two brick in the upper 50 cmbs (20 inches) of Trench 6 and an abandoned 4-inch steel pipe at 100 cmbs (40 inches) in Trench 7.



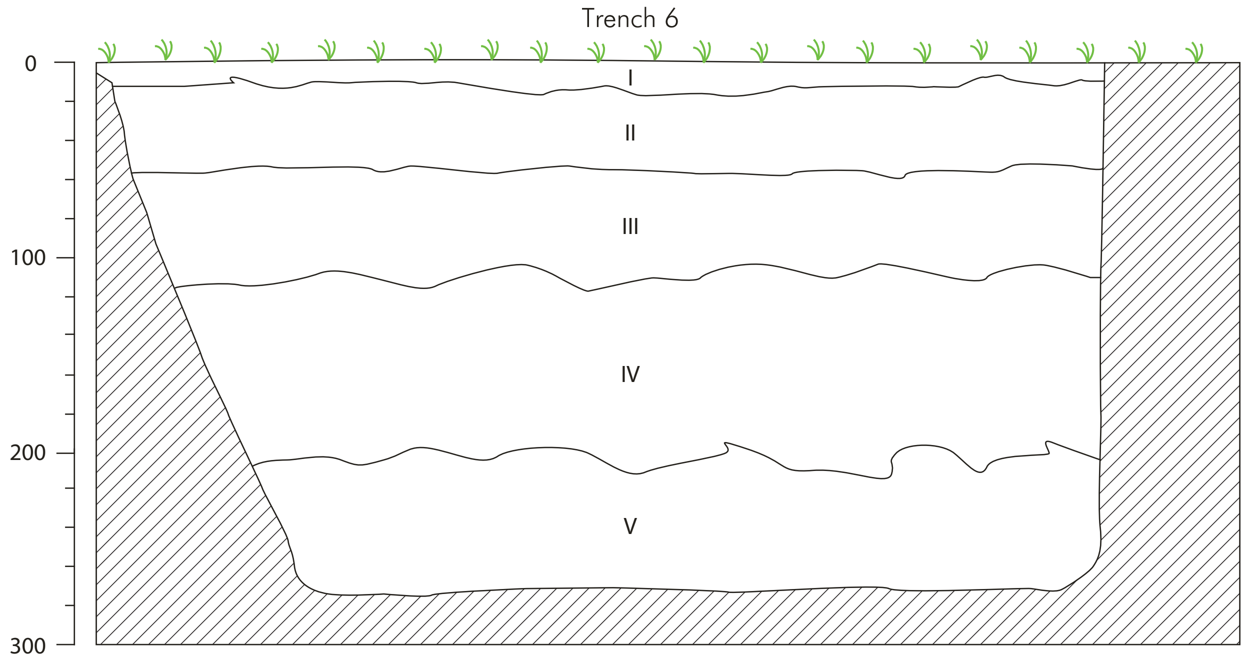
I	(0-70 cmbs) fine sandy loam (10YR5/3)
II	(70-150 cmbs) fine sandy loam (10YR5/6)
III	(150-240 cmbs) mottled clay (10YR7/6 with 7.5YR6/8 and 2.5YR4/8)
IV	(240-260 cmbs) sandy clay (10YR5/8 with 5YR5/6 and 10YR5/2)

Unexcavated

Profile illustration for Trench 1

GRAY & PAPE HERITAGE MANAGEMENT

Figure 5-4



I (1-10 cmbs)
sandy loam (7.5YR4/2)

II (10-60 cmbs)
silt loam (7.5YR7/4 with 7.5YR7/1)

III (60-120 cmbs)
silt loam (7.5YR8/3 wit 7.5YR6/8)

IV (120-200 cmbs)
compact sandy clay (2.5YR5/4 with 10YR7/8
and 7.5YR5/6)

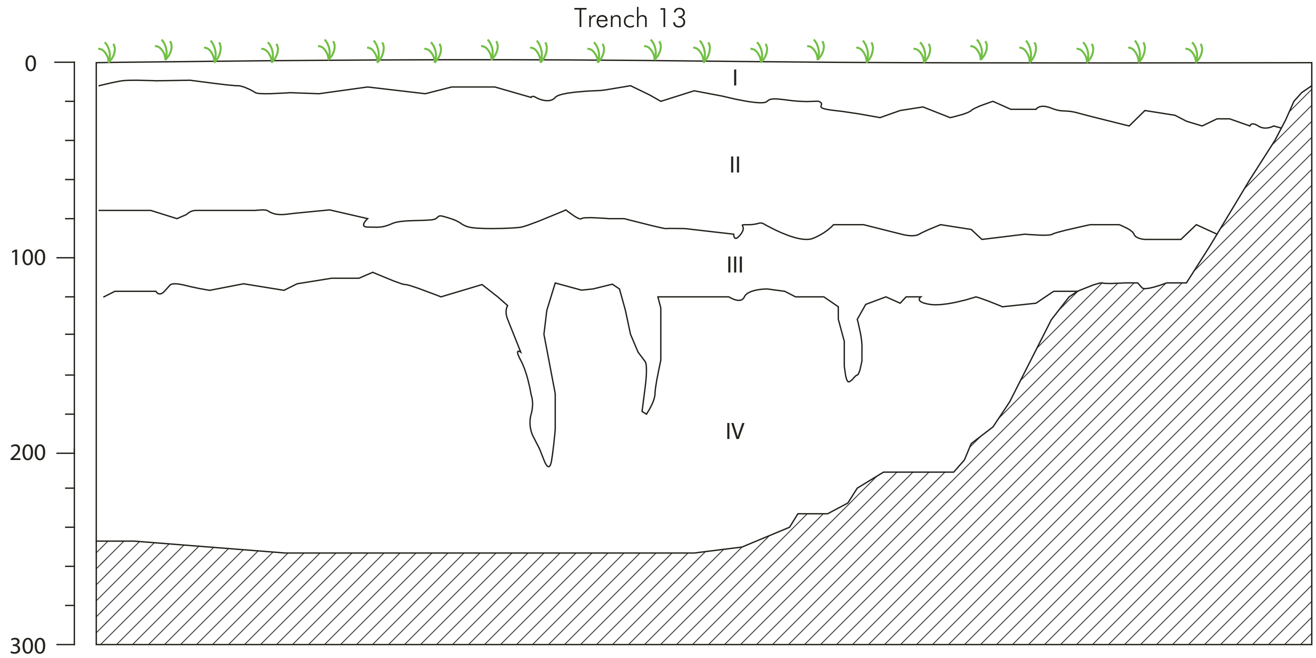
V (200-285 cmbs)
sandy clay (7.5YR5/8 with 7.5YR7/1 and 5YR5/8)

Unexcavated

Profile illustration for Trench 6

GRAY & PAPE HERITAGE MANAGEMENT

Figure 5-5

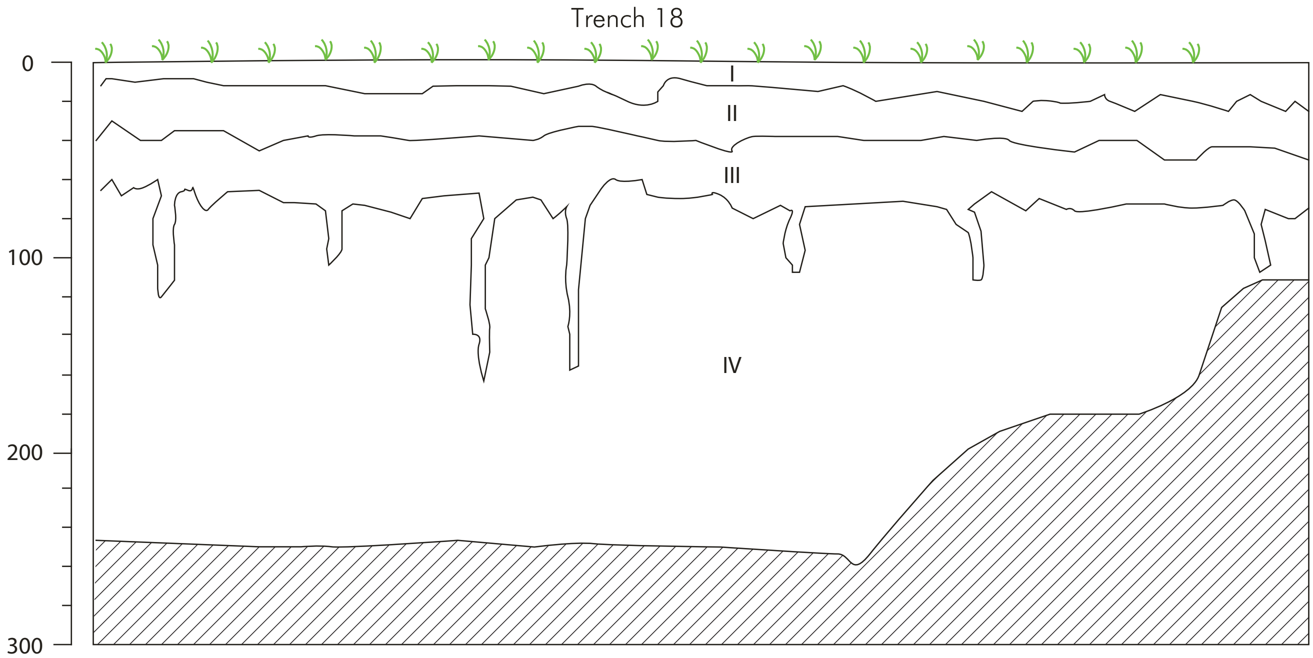


I	(0-20 cmbs) loamy sand (7.5YR6/2)
II	(20-80 cmbs) sandy loam (7.5YR7/2)
III	(80-120 cmbs) silt loam (7.4YR8/3 with 7.5YR7/6)
IV	(120-250 cmbs) sandy clay (10YR7/8 with 10YR8/2 and 5YR6/8)

Profile illustration for Trench 13

GRAY & PAPE HERITAGE MANAGEMENT

Figure 5-6

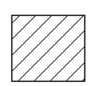


I (0-20 cmbs)
sandy loam (7.5YR3/1)

II (20-40 cmbs)
loamy sand (7.5YR6/2 with 7.5YR8/3)

III (40-160 cmbs)
loamy sand (7.5YR7/3 with 7.5YR8/4 and 7.5YR6/1)

IV (60-260 cmbs)
loamy sand (10YR8/3 with 10YR7/8 and 10YR2/1)


Unexcavated

Profile illustration for Trench 18

Figure 5-8. Profile view to the southeast of Trench 2, noting krotovina on both sides of the photo-scale with 10-meter increments.

Figure 5-9. Plan view of a portion of Trench 5, noting rust-colored staining related to a 4-inch pipe observed at 100 cmbs.

Figure 5-10. Profile view to the southwest of Trench 8, noting increasing compaction and incidence of iron concretions with depth.

Trenches 9 through 12 are generally located in the northernmost portion of the project APE, along a northeastern side of a stream bank of an unnamed tributary of Willow Creek. These trenches include a mechanically mixed/ disturbed Strat I comprising the ground surface of pinkish gray loamy sand (7.5YR6/2) mottled with very pale brown and gray (10YR 8/3 and 7.5YR 6/1) down to an abrupt and straight boundary at approximately 50 cmbs (19.7 inched below surface), overlying Strat II, a brown sandy loam (7.5YR 5/2) mottled with pink (7.5YR 8/3) down to a natural wavy boundary at approximately 150 cmbs (59 inches below surface), overlying Strat III, a pinkish gray sandy clay (7.5YR 7/2) mottled with reddish yellow and yellowish red (7.5YR 6/8 and 5YR 5/8), noting increasing compaction and incidence of iron concretions with depth.

Trench 12 was not excavated due to limited access from property lines and inundated ground surfaces after several days of rain. No cultural materials were observed in Trenches 9–12.

Trenches 13 through 17 were generally located in the southernmost portion of the project area along the northern bank of Willow Creek. These trenches include Strat I, an organic rich dark gray loamy sand on the ground surface (7.5YR 4/1) down to approximately 10 cmbs (4 inches below surface), overlying a pinkish gray loamy sand (7.5YR 6/2) down to approximately 75 cmbs (29 inches below surface), overlying Strat III, a reddish yellow silt loam with numerous crawfish krotovina (7.5YR 8/6) mottled with light gray and yellow (7.5YR 7/1 and 10YR 7/8) down to 125 cmbs (49 inches below surface), with some krotovina as deep as 200 cmbs (79 inches below surface), overlying Strat IV, a pinkish gray sandy silty clay (7.5YR 7/2) mottled with black (10YR 2/1) down to the BOE at approximately 250 cmbs (98 inches below surface), with compaction and incidence of iron concretions increasing with depth (Figure 5-11).

No cultural materials were observed in Trenches 13–17.

Trenches 18 through 24 were generally located in the south central, central, and eastern portions of the project area. These trenches include Strat I, a very dark gray organic rich sandy loam ground surface (7.5YR 3/1) down to approximately 10 cmbs (4 inches below surface), overlying [Strat II] a pinkish gray loamy sand ((7.5YR 6/2) mottled with pink (7.5YR 8/3), overlying [Start III] a pink loamy sand including numerous crawfish krotovina extending below 150 cmbs (59 inched below surface) (7.5YR 7/3) mottled with pink and gray (7.5YR 8/4 and 7.5YR 6/1), overlying Start IV, a pink loamy sand (10YR 8/3) mottled with yellow and black (10YR 7/8 and 10YR 2/1), noting increasing compaction and incidence of iron concretions with depth (Figures 5-12, 5-13, 5-14). No cultural materials were observed in Trenches 18-24.

Figure 5-11. Profile view to the south/southwest of a portion of Trench 13.

Figure 5-12. Profile view to the south of a portion of Trench 18, noting that no cultural materials were observed in Trenches 18–24.

Figure 5-13. Profile view of a portion of Trench 21.

Figure 5-14. Profile view of a portion of Trench 23.

6.0 CONCLUSIONS AND RECOMMENDATIONS

This report summarizes the results of an intensive cultural resources survey of the proposed development of floodwater detention ponds in Harris County, Texas. The proposed project area traverses mostly undeveloped forest west of the current western terminus of Holderrieth Road. The project APE encompasses a total of approximately 251 hectares (620 acres) situated on HCFCD land and Harris County properties.

This project involves both state and federal levels, with the lead federal agency being the USACE, while the HCFCD has been identified with permit coordination and corresponding reviews by the THC and the USACE, Galveston District. The goals of the survey were to determine if the project would affect any previously identified archaeological sites as defined by Section 106 of the NHPA of 1966, as amended (36 CFR 800), and to establish whether or not previously unidentified buried archaeological resources were located within the project's APE. Texas Antiquities Permit 9332 was obtained prior to conducting fieldwork. All fieldwork and reporting activities were completed with reference to state (the Antiquities Code of Texas) and federal (NHPA) guidelines.

Prior to fieldwork, desktop research was performed to identify any previously recorded archaeological surveys, sites, cemeteries, National Register properties, or historical markers within the APE or within 1.6 kilometers (1 mile) of its boundary. Seven previously recorded resources are noted, recorded during at least five previous archaeological endeavors in the vicinity of the project APE: 41HR1006, 41HR1007, 41HR1129, 41HR1130, 41HR1131, 41HR1173, and 41HR1174. This report builds directly upon the research of STARS and SWCA within and immediately north of the project APE, which found a dearth of material culture and indicated that 41HR1173 was not eligible for state or federal landmarking (Uecker et al. 2016:i).

Current fieldwork included a total of 23 archaeological trench tests mechanically excavated within the APE. Significant sources of disturbance within the project APE include previous mechanical alteration of the ground surface from the development of pipelines and roadways relating to the 41HR1173 infrastructure, as well as from natural taphonomic sources, including crawfish burrowing. Abundant crawfish bioturbation was observed within the APE, allowing for the potential high vertical mobility of cultural materials through argilliturbation processes.

In determining significance in an archaeological site, Gray & Pape generally looked for situations where future research and preservation is warranted, and specifically in the terms of the NRHP, four Criteria questions evaluate were evaluated; A: *Does the property must make a contribution to the major pattern of American history?* B: *Is the site associated with significant people of the American past?* C: *Does the locale include the work of a master of generally distinctive characteristics?* D: *Is it possible that the site may provide important information to the understanding of prehistory or history?*

Gray & Pape archaeologists are of the opinion that the completed program of systematic deep testing within the APE has adequately assessed the potential for surface and near-surface intact, significant cultural resources, as well as determining the potential for deeply buried resources or paleosols, as well as in revisiting 41HR1173 and determining its significance. Historic period cultural materials were documented in Trench 2, Trench 4, Trench 5, Trench 6, and Trench 7, none of the 23 excavated archaeological test trenches yielded what are considered to be significant cultural materials, nor indicate locales of buried paleosols where prehistoric peoples may have camped. These cultural materials are interpreted as relating to the abandoned infrastructure of 41HR1173, which is recommended here as Not Eligible for listing on the NRHP. To reiterate, the positive subsurface archaeological tests during this project consisted of four abandoned steel pipes and three clay bricks. No indications of prehistoric debris, nor buried surfaces which may contain their remains, were found. No significant historic artifacts nor cultural features were encountered during the course of the survey, and no new archaeological sites were identified. No negative impacts on any previously identified sites are anticipated from the proposed project.

Site 41HR1173 is generally relevant to the history of Tomball, the Humble Oil and Refining Company, and Exxon, and even had some association with Winthrop Rockefeller, before his military service and election as Governor of Arkansas. That said, no architecture, nor even structural remnants appear to exist in situ at 41HR1173. The artifacts encountered were a couple of secondarily deposited bricks and abandoned piping infrastructure, left at the locale after the pier and beam houses had been re-moved to Tomball. Based on these results, Gray & Pape recommends that no further cultural work be required and that the project be cleared to proceed as planned.

No archaeological features nor prehistoric paleosols (buried occupation surfaces) were observed as a result of the survey. No further work is recommended. Based on the results of archaeological deep testing no additional state-issued trinomials are being requested. The dearth of historic-era artifacts and the lack of any evidence of prehistoric cultural deposits indicates there is little to no research potential for previously recorded cultural resources within the APE. For this reason, Gray & Pape recommends that the HCFCD's proposed development of stormwater detention ponds be allowed to proceed as planned.

7.0 REFERENCES CITED

Abbott, James T.

2001 Houston Area Geoarchaeology: A framework for Archaeological Investigation, Interpretation and Cultural Resource Management in the Houston Highway District. Texas Department of Transportation, Environmental Affairs Division, Archaeological Studies Program, Report 27, March 2001.

Aiuvalasit, Michael J.

2007 The Geoarcheology of the McNeill Ranch Site: Implications for Paleoindian Studies of the Gulf Coastal Plain of Texas. Bulletin of the Texas Archeological Society 78:47-64.

Aten, Lawrence E.

1983 *Indians of the Upper Texas Coast*. Academic Press, New York.

1984 Woodland Cultures on the Texas Coast. In *Perspective on Gulf Coast History*, edited by Dave D. Davis, pp. 72-93. Ripley P. Bullen Monographs in Anthropology and History, No. 5. Florida State Museum, University Presses of Florida, Gainesville.

Aten, Lawrence E., C.K. Chandler, A.B. Wesolowsky, and R.M. Malina

1976 Excavations at the Harris County Boys' School Cemetery: Analysis of Galveston Bay Area Mortuary Practices. Texas Archeological Society Special Publication No. 3.

Barnes, V.E.

1992 *Geologic Atlas of Texas*, Beaumont Sheet, revised. Bureau of Economic Geology, University of Texas at Austin.

Bennett, James, E. Lear, and M. Straight.

1999 *Spatial Data Analysis of Artifacts Redeposited by Coastal Erosion: A Case Study of McFaddin Beach,* Texas. Project report to the U.S. Department of the Interior Minerals Management Service. Herndon, Virginia.

Bousman, C. Britt, Barry W. Baker, and Anne C. Kerr

2004 Paleoindian Archeology in Texas. In The Prehistory of Texas, edited by T. K. Perttula, pp. 15-97. Texas A&M University, Anthropology Series Number 9. Texas A&M University Press, College Station.

Brown, Kenneth

2009 McFaddin Beach. Texas Beyond History. Available at: http://www.texasbeyondhistory.net/mcfaddin. Accessed February 2020.

Bubley, Esther

1945 "Tomball, Texas, a Company Town. 1945." Esther Bubley Photography Archive, https://www.estherbubley.com/sonj_menu_frame_set.htm , accessed April 2020.

Chipman, Donald E., and Harriett Denise Joseph

2010 *Spanish Texas: 1519-1821*. University of Texas Press, Austin.

Crook, Wilson W., III
2016 Timber Fawn (41HR1165): A Clovis Site in Harris County, Texas. Report No. 26. Houston Archeological Society, Houston, Texas.

Fox, Anne, Ivey, James E. and Markey, J. Carroll
1981 "Cultural Resources Survey: Freeport, Harbor, Texas, (45-Foot) Navigation Improvement Project, Brazoria County, Texas," Index of Texas Archaeology: Open Access Gray Literature from the Lone Star State: Vol. 1981, Article 4. https://doi.org/10.21112/ita.1981.1.4 and http://scholarworks.sfasu.edu/ita/vol1981/iss1/4, accesses April 6, 2020. ISSN: 2475-9333

Google, Inc.
2020 1995-2018 Historical Aerial Imagery. Google Earth. Accessed March 2020.

Griffith, Glenn, S. Bryce, J. Omernik, and A. Rogers
2007 Ecoregions of Texas. Project report to the Texas Commission on Environmental Quality, Surface Water Quality Monitoring Program. Austin, Texas.

Hall, Grant D.
1981 *Allens Creek: A Study in the Cultural Prehistory of the Lower Brazos River Valley, Texas*. Research Report No. 61. Texas Archeological Survey, The University of Texas at Austin.

Hazlewood, Claudia
2010 "Montgomery County," Handbook of Texas Online. https://tshaonline.org/handbook/online/articles/hcm17. Accessed March 2019.

Hester, Thomas, R.
1999 Artifacts, Archaeology, and Cabeza de Vaca in Southern Texas and Northeastern Mexico. *Bulletin of the Texas Archeological Society* 70: 17–28.

Martin, B.
2019 THC project review under Section 106 of the National Historic Preservation Act and/or the Antiquities Code of Texas, Permit 7482.

McLeod, T., Butler, S., H. Curry-Shearouse
2018 Cultural Resources Survey for the Proposed M124 Channel Improvement and Detention Basin Project, Harris County, Texas. Texas Antiquities Permit Number 7902. SWCA.

Munsell Color
2005 Munsell *Soil Color Charts*. Macbeth Division of Kollomorgan Instruments Corporation, New Windsor, New York.

Nationwide Environmental Title Research, LLC (NETR)
2020 Aerial images (1957, 1995, 2004, 2009, 2010, 2012, and 2014). Topographic maps (1959, 1969, 1978, 1991, 1999, 2013, 2016). Available URL: http://www.historicaerials.com/. Accessed March 2020.

Newcomb, William
2004 Atakapans and Neighboring Groups. In *Southeast*, edited by R.D. Fogelson, pp. 659–663. Handbook of North American Indians, Vol. 14, W.C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Nicholson, Danny
1982 Tomball Area Diamond Jubilee, Inc. A Tribute to Tomball: A Pictorial History of the Tomball Area, book, 1982 Tomball, Texas. (https://texashistory.unt.edu/ark:/67531/metapth875810/m1/94/, accessed April 8, 2020), University of North Texas Libraries, The Portal to Texas History, https://texashistory.unt.edu; crediting LSC - Tomball Community Library.

Patterson, Leland W.
1995 The Archeology of Southeast Texas. *Bulletin of the Texas Archeological Society* 66:239-264.

Perttula, Timothy
2004 *The Prehistory of Texas*. Texas A&M University Press. College Station.

Ricklis, Robert A.
1994 Aboriginal Life and Culture on the Upper Texas Coast: Archaeology at the Mitchell Ridge Site, 41GV66, Galveston Island. Coastal Archaeological Research, Inc., Corpus Christi.

1999 The Spanish Colonial Missions of Espiritu Santo (41GD1) and Nuestra Señora del Rosario (41GD2), Goliad, Texas: Exploring Patterns of Ethnicity, Interaction, and Acculturation. *Bulletin of the Texas Archeological Society* 70: 133–168.

2004 Coastal Groups: Prehistoric Occupation of the Central and Lower Texas Coast and The Archaeology of Native American Occupation of Southeast Texas. In, *The Prehistory of Texas*. Edited by Tim Pertulla, Texas A&M University Press. College Station.

Rockefeller Archive Center
2020 Winthrop Rockefeller, 1912-1973: https://rockarch.org/resources/about-the-rockefellers/winthrop-rockefeller/ , accessed 4/8/2020.

Searle, Kameron K.
2009 "The Early History of Historic Montgomery County." http://www.texashistorypage.com/Early_History_of_Historic_Montgomery_County,_Texas.html. Accessed April 2020.

Schiffer, Michael
2010 Behavioral Archaeology: Principles and Practice. Routledge, Taylor and Francis Group. London and New York.

Shafer, Harry J.
1975 Comments on the Woodland Cultures of Texas. *Bulletin of the Texas Archeological Society* 46:249-254.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture (SSS NRCS USDA)

2020 Web Soil Survey. Available URL: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx Accessed April 2020.

Story, D. A.

1990 Cultural History of the Native Americans. The Archeology and Bioarcheology of the Gulf Coastal Plain, by D. A. Story, et al., 1:163-366. 2 vols. Research Series No. 38. Fayetteville: Arkansas Archeological Survey.

Texas Historical Commission (THC)

2020 Texas Archeological Site Atlas. Accessed March 2020.

Turner, Sue and Tom Hester

1999 A Field Guide to Stone Artifacts of Texas Indians. Gulf Publishing Field Guide. Taylor Trade Publishing, Lanham, MD.

Uecker, H., J. Wagner, and B. Burton

2016 A Cultural Resources Survey for the 615 Willow Creek Development Limited's Project Near Tomball, Harris County, Texas. Texas Antiquities Permit Number 7482. STARS.

University of Texas, Bureau of Economic Geology (UT-BEG)

1992 Geology of Texas. Map reproduced by the United States Geological Survey (USGS).

1996 Physiographic Map of Texas. Map reproduced by the United States Geological Survey (USGS).

Van Siclen, D.C.

1991 Surficial Geology of the Houston Area: A Series of Pleistocene (& Pliocene?) highest Sea Level Fluviodeltaic Sequences. *Transactions of the Gulf Coast Association of Geological Societies* 41:651-666.

Vogel, Greg

2002 A Handbook of Soil Descriptions for Archaeologists. Arkansas Archaeological Survey Technical Paper 11

Wagner, Janet

2016 "Archival and Historical Background Research for the 615 Willow Creek Development Limited Project Near Tomball, Harris County, Texas," Appendix in Uecker, H., J. Wagner, and B. Burton A Cultural Resources Survey for the 615 Willow Creek Development Limited's Project Near Tomball, Harris County, Texas. Texas Antiquities Permit Number 7482. STARS.

Walter, Tamra L.

1999 A Preliminary Report of the 1997 TAS Field School Excavations in Area A at the Mission Espiritu Santo de Zuniga (41VT11), Victoria County, Texas. *Bulletin of the Texas Archeological Society* 70: 97–122.

Weddle, Robert S.
2010 La Salle's Texas Settlement. *Handbook of Texas Online*. Texas State Historical Association. Available at: http://www.tshaonline.org/handbook/online/articles/uel07 . Accessed February 2020.

APPENDIX: TRENCH TEST LOG

Trench Number	Soil Description	Comments
T1	Strat I (0-70 cmbs) – dark brown (10YR 3/3) fine sandy loam	Abrupt boundary
	Strat II (70-150 cmbs) – yellowish brown (10YR 5/6) fine sandy clay loam	Common ferric nodules, iron concretions, diffuse boundary
	Strat III (150-238 cmbs) – yellow (10YR 7/6) with reddish yellow (7.5YR 6/8) and red (2.5YR 4/8) mottled (marbled) clay and sandy clay loam	
	Strat IV (238-250 cmbs) – yellowish brown (10YR 5/8) mottled with yellowish red (5YR 5/6) and very dark grayish brown (10YR 3/2) sandy clay	
T2	Strat I (0-75 cmbs) – light brown (7.5YR 6/4) mottled with reddish yellow (7.5YR 6/8) fine sandy loam, mechanically disturbed. Note that 2" steel pipe @ 20cmbs observed immediately adjacent to T2…we moved the trench slightly to accommodate abandoned pipe	Abrupt mechanical boundary,
	Strat IA (75-125 cmbs) – yellowish brown (10YR 5/6) fine sandy loam, ferric with many fine to medium iron concretions	
	Strat II (125-175 cmbs) – light brown (7.5YR 6/3) with pinkish gray (7.5YR 7/2) and red (2.5YR 4/8) mottled silty clay loam with fine to medium iron concretions	
	Strat III (175-250 cmbs) – strong brown (7.5YR 5/8) mottled with pinkish white (7.5YR 8/2) and red (2.5YR 5/8) fine sandy clay, ferric concretions	
T3	Strat I (0-50 cmbs) – brown (7.5YR 5/3) silt loam	Abrupt, wavy boundary
	Strat II (50-87 cmbs) – yellowish brown (10YR 5/6) sandy clay loam	Abrupt wavy boundary, common iron concretions
	Strat III (87-125 cmbs) – yellow (10YR 7/6) mottled with reddish yellow (7.5YR 6/8) and red (2.5YR 4/6) compact sandy clay loam	Diffuse wavy boundary, many fine to medium iron concretions
	Strat IIIA (125-220 cmbs) – brownish yellow (10YR 6/8) mottled with very pale brown (10YR 7/4) and red (2.5YR 5/8) compact sandy clay	Common iron concretions
T4	Strat I (0-50 cmbs) – brown (7.5YR 5/3) silt loam	Abrupt wavy boundary, 2" steel pipe
	Strat II (50-100 cmbs) – reddish yellow (7.5YR 6/8) mottled with brownish yellow (10YR 6/6) fine sandy clay loam	Diffuse wavy boundary, common fine to medium iron concretions
	Strat III (100-150 cmbs) – yellow (10YR 7/8) mottled with reddish yellow (7.5YR 6/8) and red (2.5YR 4/8) very compact sandy clay loam	Very diffuse boundary,
	Strat IV (150-245 cmbs) – strong brown (7.5YR 5/8) mottled with very pale brown (10YR 8/3) and red (2.5YR 5/8) very compact sandy clay	Common iron concretions
T5	Strat I (0-50 cmbs) – pink (7.5YR 7/4) mottled with light gray (7.5YR 7/1), loamy sand	Abrupt boundary, mechanically disturbed
	Strat II (50-113 cmbs) – pink (7.5YR 8/3) mottled with reddish yellow (7.5YR 7/6 and 7.5YR 6/8) silt loam	Abrupt wavy boundary, sloped, few iron concretions, 4" rusted steel pipe
	Strat III (113-200 cmbs) – reddish brown (2.5YR 5/4) mottled with yellow (10YR 7/8) and strong brown (7.5YR 5/6) very compact sandy clay	Diffuse boundary, common fine to medium iron concretions

Trench Number	Soil Description	Comments
	Strat IV (200-250 cmbs) – strong brown (7.5YR 5/8) mottled with light gray (7.5YR 7/1) and yellowish red (5YR 5/8) less compact sandy clay	Few fine to medium iron concretions
T6	Strat I (0-5 cmbs) – brown (7.5YR 4/2) sandy loam	
	Strat II (5-50 cmbs) – pink (7.5YR 7/4) mottled with reddish yellow (7.5YR 7/8) silt loam and light gray (7.5YR 7/1) sand	Abrupt and wavy boundary, 2 bricks in backdirt reading “Andy Cordell” reds
	Strat III (50-112 cmbs) – pink (7.5YR 8/3) mottled with reddish yellow (7.5YR 6/8) silt loam	Abrupt and wavy boundary
	Strat IV (112-200 cmbs) – reddish brown (2.5YR 5/4) mottled with yellow (10YR 7/8) and strong brown (7.5YR 5/6) compact sandy clay	Diffuse boundary
	Strat V (200-260 cmbs) – strong brown (7.5YR 5/8) mottled with light gray (7.5YR 7/1) and yellowish red (5YR 5/8) sandy clay	
T7	Strat I (0-62 cmbs) – Mechanical fill, mixed sandy clay loam	4” steel pipe and corresponding disturbance
	Strat II (62-100 cmbs) – brown (7.5YR 5/3) loamy sand	
	Strat III (100-150 cmbs) – light brown (7.5YR 6/4) mottled with reddish yellow (7.5YR 6/8) sandy loam	
	Strat IV (150-200 cmbs) – pink (7.5YR 7/3) mottled with brownish yellow (10YR 6/6) and yellowish red (5YR 5/8) sandy clay loam	Common medium iron concretions
	Strat V (200-250 cmbs) – light yellowish brown (10YR 6/4) mottled with yellow (10YR 7/8), yellowish red (5YR 5/8) and red (2.5YR 4/8) sandy clay	Many medium iron concretions
T8	Strat I (0-12 cmbs) – brown (7.5YR 4/2) sandy loam	
	Strat II (12-88 cmbs) – pink (7.5YR 7/3) loamy sand	Abrupt wavy boundary
	Strat III (88-125 cmbs) – pinkish gray (7.5YR 7/2) mottled with reddish yellow (7.5YR 7/6) sandy clay loam	Few iron concretions
	Strat IV (125-180 cmbs) – light brown (7.5YR 6/4) mottled with brownish yellow (10YR 6/8) and red (2.5YR 5/8) sandy clay	Few medium iron concretions
	Strat V (180-250 cmbs) – light gray (10YR 7/1) mottled with brownish yellow (10YR 6/8) and yellowish red (5YR 5/8) sandy clay	Common iron concretions
T9	Strat I (0-50 cmbs) – yellow (10YR 7/8) mottled with very pale brown (10YR 8/3) and gray (7.5YR 6/1) mostly sand with mixed loamy sand	Mechanically disturbed, abrupt straight boundary
	Strat II (50-150 cmbs) – pinkish gray (7.5YR 6/2) loamy sand with pink (7.5YR 8/3) crawfish krotovina	Clear wavy boundary
	Strat III (150-250 cmbs) – gray (7.5YR 6/1) mottled with very dark grayish brown (10YR 3/2) and yellow (10YR 7/8) sandy clay	
T10	Strat I (0-55 cmbs) – gray (7.5YR 6/1) mottled with pink (7.5YR 7/3) loamy sand	Clear wavy boundary
	Strat II (55-112 cmbs) – brown (7.5YR 5/2) mottled with pink (7.5YR 8/3) sandy loam	Clear wavy boundary, few fine to medium iron concretions

Trench Number	Soil Description	Comments
	Strat III (112-250 cmbs) – pinkish gray (7.5YR 7/2) mottled with reddish yellow (7.5YR 6/8) and yellowish red (5YR 5/8) sandy clay	Common fine to medium iron concretions
T11	Strat I (0-5 cmbs) – dark grayish brown (10YR 4/2) organic sandy loam	
	Strat II (5-65 cmbs) – pinkish gray (7.5YR 6/2) mottled with pink (7.5YR 7/3) loamy sand	Abrupt wavy boundary
	Strat III (65-100 cmbs) – pinkish gray (7.5YR 7/2) mottled with white (7.5YR 8/1) sandy loam	Diffuse wavy boundary, few fine to medium iron concretions
	Strat IV (100-165 cmbs) – pinkish gray (7.5YR 7/2) mottled with yellow (10YR 7/8) and light brown (7.5YR 6/4) sandy clay loam, lens of black (10YR 2/1) iron concretions at bottom of strat	Common fine to medium iron concretions
	Strat V (165-250 cmbs) – pink (7.5YR 8/3) mottled with brownish yellow (10YR 6/8) and gray (7.5YR 5/1) sandy loam	
T13	Strat I (0-10 cmbs) – pinkish gray (7.5YR 6/2) loamy sand with sandy loam, organics	Diffuse wavy boundary
	Strat II (10-75 cmbs) – pinkish gray (7.5YR 6/2) sandy loam	Diffuse wavy boundary
	Strat III (75-115 cmbs) – brown (7.5YR 5/3) mottled with reddish yellow (7.5YR 7/6) silt loam	Crawfish krotovina at base of strat
	Strat IV (115-250 cmbs) – yellow (10YR 7/8) mottled with very dark grayish brown (10YR 3/2) and reddish yellow (5YR 6/8) sandy clay	Common fine to medium iron concretions
T14	Strat I (0-10 cmbs) – pinkish gray (7.5YR 6/2) loamy organic sand	
	Strat II (10-70 cmbs) – pinkish gray (7.5YR 6/2) mottled with pink (7.5YR 7/3) loamy sand	
	Strat III (70-130 cmbs) – pinkish white (7.5YR 8/2) mottled with yellow (10YR 7/8) and yellowish brown (10YR 5/8) silt loam	Few medium iron concretions, crawfish krotovina
	Strat IV (130-250 cmbs) – pinkish gray (7.5YR 7/2) mottled with yellow (10YR 7/8) and black (10YR 2/1) sandy clay	Common fine to medium iron concretions
T15	Strat I (0-10 cmbs) – very dark gray (7.5YR 3/1) loamy organic sand	
	Strat II (10-50 cmbs) – brown (7.5YR 5/2) mottled with pink (7.5YR 7/3) loamy sand	Clear wavy boundary
	Strat III (50-95 cmbs) – pinkish white (7.5YR 8/2) mottled with light gray (7.5YR 7/1) and yellow (10YR 7/8) silt loam	Crawfish krotovina at base of strat
	Strat IV (95-255 cmbs) – pinkish gray (7.5YR 7/2) mottled with yellow (10YR 8/6) clay	Common fine to medium 10YR 2/1 iron concretions
T16	Strat I (0-10 cmbs) – pinkish white (7.5YR 8/2) loamy sand, organics	
	Strat II (10-30 cmbs) – pinkish gray (7.5YR 6/2) loamy sand	
	Strat III (30-100 cmbs) – pink (7.5YR 8/3) mottled with light gray (7.5YR 7/1) and yellow (10YR 7/8) silt loam	Roots, crawfish krotovina
	Strat IV (100-245 cmbs) – pinkish gray (7.5YR 7/2) mottled with yellow (10YR 8/6) silty clay	
T17	Strat I (0-40 cmbs) – brown (7.5YR 5/2) sandy loam with organics	Abrupt wavy boundary, abundant roots

Trench Number	Soil Description	Comments
	Strat II (40-65 cmbs) – pinkish gray (7.5YR 6/2) mottled with pink (7.5YR 8/3) loamy sand	Clear wavy boundary, common fine to medium iron concretions
	Strat III (65-245 cmbs) – very pale brown (10YR 8/3) mottled with yellow (10YR 7/8) and gray (7.5YR 6/1) sandy clay loam	Medium to very large calcium carbonate nodules, common fine to medium iron concretions
T18	Strat I (0-10 cmbs) – very dark gray (7.5YR 3/1) organic sandy loam	
	Strat II (10-40 cmbs) – pinkish gray (7.5YR 6/2) mottled with pink (7.5YR 8/3) loamy sand	
	Strat III (40-60 cmbs) – pink (7.5YR 7/3) mottled with pink (7.5YR 8/4) and gray (7.5YR 6/1) loamy sand	Few fine iron concretions
	Strat IV (60-254 cmbs) – very pale brown (10YR 8/3) mottled with yellow (10YR 7/8) and black (10YR 2/1) loamy sand	Common fine to medium iron concretions
T19	Strat I (0-10 cmbs) – very dark gray (7.5YR 3/1) organic sandy loam, wet	
	Strat II (10-45 cmbs) – light brown (7.5YR 6/3) mottled with pink (7.5YR 7/4) loamy sand, wet	Distinct wavy boundary
	Strat III (45-80 cmbs) – gray (7.5YR 5/1) mottled with pink (7.5YR 8/4) and strong brown (7.5YR 5/6) loamy sand, wet	Clear wavy boundary
	Strat IV (80-130 cmbs) – pink (7.5YR 8/3) mottled with brownish yellow (10YR 6/8) and pinkish gray (7.5YR 6/2) very fine sand with some silt	Distinct wavy boundary, few fine to medium iron concretions
	Strat V (130-190 cmbs) – light gray (7.5YR 7/1) mottled with brownish yellow (10YR 6/8) and red (2.5YR 4/8) sandy clay loam	Subtle texture/boundary
	Strat VI (190-250 cmbs) – brown (7.5YR 5/3) mottled with pinkish white (7.5YR 8/2), gray (7.5YR 6/1) and yellow (10YR 7/8) medium to fine sand	
T20	Strat I (0-10 cmbs) – brown (7.5YR 4/2) organic sandy loam	
	Strat II (10-35 cmbs) – light brown (7.5YR 6/3) silt loam	
	Strat III (35-75 cmbs) – very pale brown (10YR 7/4) mottled with gray (10YR 6/1) sandy clay loam	Clear wavy boundary
	Strat IV (75-125 cmbs) – very pale brown (10YR 8/2) mottled with yellow (10YR 7/8), red (2.5YR 5/6 and 2.5YR 5/8) clay	Many fine to medium iron concretions
	Strat V (125-250 cmbs) – reddish yellow (7.5YR 6/8) mottled with white (7.5YR 8/1), brownish yellow (10YR 6/8) and red (2.5YR 4/8) clay	Common medium to large iron concretions
T21	Strat I (0-40 cmbs) – light brown (7.5YR 6/3) silty sandy loam	
	Strat II (40-95 cmbs) – very pale brown (10YR 7/4) sandy loam	
	Strat III (95-250 cmbs) – reddish yellow (7.5YR 6/8) mottled with pinkish white (7.5YR 8/2), brownish yellow (10YR 6/6) and red (2.5YR 4/8) clay	
T22	Strat I (0-75 cmbs) – brown (7.5YR 5/2 and 7.5YR 5/3) mottled sandy clay loam, very wet	Tree roots, mechanical disturbance, water seeping in at 50 cmbs

Trench Number	Soil Description	Comments
	Strat II (75-175 cmbs) – pink (7.5YR 8/3) mottled with yellow (10YR 7/8) and pinkish gray (7.5YR 6/2) sandy clay	Live crawfish at 100 cmbs
T23	Strat I (0-50 cmbs) – reddish gray (5YR 5/2) mottled with pink (5YR 8/3) loamy sand	
	Strat II (50-100 cmbs) – pinkish gray (7.5YR 7/2) mottled with pink (7.5YR 8/3) and yellow (10YR 8/6) loamy fine sand	Common iron concretions
	Strat III (100-150 cmbs) – very pale brown (10YR 8/2) mottled with yellow (10YR 7/8) sandy clay loam	Roots and krotovina
	Strat IV (150-200 cmbs) – pinkish white (7.5YR 8/2) mottled with yellow (10YR 7/8) fine sand	Few fine to medium iron concretions
T24	Strat I (0-25 cmbs) – pinkish gray (7.5YR 7/2) mottled with pink (7.5YR 8/4) fine sand	Clear wavy boundary
	Strat II (25-60 cmbs) – pinkish gray (7.5YR 7/2) mottled with brown (7.5YR 5/4) fine sand	Krotovina
	Strat III (60-110 cmbs) – light gray (10YR 7/2) mottled with brownish yellow (10YR 6/8) sandy clay	
	Strat IV (110-225 cmbs) – white (5YR 8/1) mottled with yellow (10YR 8/8) and red (2.5YR 5/8) sandy clay loam	