

US EPA ARCHIVE DOCUMENT



26 October 2012

Revised 15 February 2013

Alfred Dumauual

US Environmental Protection Agency Region 6

Air Permits Section (6PD-R)

1445 Ross Avenue, Suite 1200

Dallas, TX 75202-2733

RE: Request for Concurrence – Finding of Will Not Affect Archaeological and Historic Resources

KM Liquids Terminals LLC - Galena Park Terminal Condensate Splitter Project

Galena Park, Harris County, Texas

Mr. Dumauual:

On behalf of KM Liquids Terminals LLC (KMLT), Whitenton Group, Inc. (WGI) is requesting a review of the enclosed project information for a condensate splitter project in Harris County, Texas. WGI is seeking concurrence on behalf of KMLT from the Texas Historical Commission (THC)/State Historic Preservation Officer (SHPO) and the United States (US) Environmental Protection Agency (EPA) that the construction and operation of the condensate splitter will not affect historic properties listed in the NRHP or that meet the criteria for the NRHP in accordance with Section 106 guidance. The proposed project requires a Prevention of Significant Deterioration (PSD) air quality permit for greenhouse gas (GHG) emissions from the USEPA; and, therefore, is subject to regulation under Section 106 of the National Historic Preservation Act. The proposed project also requires a Non-Attainment New Source Review from the Texas Commission on Environmental Quality for non-GHG emissions.

The purpose of the proposed project is to construct and operate a new 100,000 barrels per day (bbl/day) condensate splitter at the existing KMLT Galena Park Terminal. The proposed condensate splitter will consist of two trains which will each process 50,000 bbl/day of petroleum condensate material to obtain products suitable for commercial use. Construction will occur in two phases. The second 50,000 bbl/day train will be

constructed within 18 months of completion of the first 50,000 bbl/day train. The proposed project is located in Galena Park, Harris County, Texas, approximately 0.4 mile northwest of the intersection of Federal Road and Clinton Drive (Figure 1).

Project location information:

USGS Quad	Latitude/Longitude
Pasadena	29.734898 -95.218420

Construction of the proposed Galena Park condensate splitter unit, associated infrastructure, and auxiliary equipment will take place on KMLT property, within the existing Galena Park Terminal property boundary. The limits of the earth disturbance footprint will be referred to as the "Project Area." The Area of Potential Effect (APE) for the undertaking consists of the entire 49.3-acre Project Area. Construction of the proposed condensate splitter, associated infrastructure, and auxiliary equipment will take place within the existing Galena Park Terminal. The project footprint will also include two new pipelines within one right-of-way that will connect the condensate splitter facility to the existing industrial facility immediately south of the Project Area. The Project Area is shown in Figures 2 and 3.

The total area of earth disturbance is approximately 49.3 acres. Approximately 21 of the 49 acres are covered with an expanse of fill material approximately 6 to 10 feet deep. The material was placed in the Project Area in 2008 and consists of material excavated during the construction of a ship dock (Ship Dock 4) and associated loading berth at a separate location on the Galena Park Terminal property. The material was placed in the Project Area because it was determined to be the most appropriate available space at the time of construction of Ship Dock 4.

Twenty-eight acres is a woodland habitat that has historically been impacted by development including utility lines, access roads, and what appear to be man-made inlets connected to Hunting Bayou. The pipeline right-of-way is located within an existing industrial facility.

Earth disturbance activities will include the installation of 482 Auger Cast In Place (ACIP) Piles in Phase I and 384 in Phase II. The estimated depth of disturbance for the ACIP Piles is identified below.

- 12 (Phase 1 = 0, Phase II = 12) piles with 18" diameter and depth of 40 feet starting at 4 feet below final grade
- 224 (Phase 1 = 44, Phase II = 180) piles with 18" diameter and depth of 50 feet starting at 4 feet below final grade
- 462 (Phase I = 176, Phase II = 286) piles with 18" diameter and depth of 60 feet starting at 4 feet below final grade
- 239 (Phase I = 123, Phase II = 116) piles with 18" diameter and depth of 70 feet starting at 4 feet below final grade
- 79 (Phase 1 = 75, Phase II = 4) piles with 24" diameter and depth of 30 feet starting at 4 feet below final grade
- 64 (Phase I = 32, Phase II = 32) piles with 24" diameter and depth of 70 feet starting at 4 feet below final grade
- 24 (Phase I = 12, Phase II = 12) piles with 24" diameter and depth of 75 feet starting at 4 feet below final grade

The two pipelines will be built at a depth of approximately 4 feet below final grade.

A cultural resources archival review was conducted by Horizon Environmental Services, Inc. (Horizon) on 19 March 2012. This review included a 1-mile perimeter of the Project Area. The results indicated the presence of 11 previously recorded archeological sites, 1 cemetery, and 1 isolated grave. No historic properties were listed on the National Register of Historic Places (NRHP) within a 1.0-mile perimeter of the Project Area. Based on the results of the archival review, Horizon determined there is a moderate to high potential for undocumented prehistoric cultural deposits within any undisturbed areas adjacent to Hunting Bayou within the Project Area. The detailed results of the archival review are included in the enclosed document titled "An Intensive Cultural Resources Survey of the Proposed Galena Park Terminal Condensate Splitter Project in Harris County, Texas."

Based on the results of the archival review, Horizon conducted an intensive cultural resources survey of the Project Area (49.3 acres) to determine if the condensate splitter project would have the potential to adversely affect any significant cultural resources. The survey was conducted on 10 May 2012.

The Texas State Minimum Archeological Survey Standards (TSMASS) require a minimum of 1 shovel test per 2.0 acres for projects between 11.0 and 100.0 acres in size. As such, TSMASS calls for a total of 23 shovel tests within the approximately 49.3-acre Project Area. Horizon was only able to excavate a total of 17 shovel tests within the Project Area due to the fact that roughly the southern half of the Project Area was covered by artificial fill deposits that precluded effective shovel testing efforts. The originally defined Project Area boundaries extended to the north, up to Hunting Bayou. As such, the majority of the excavated shovel tests were concentrated along the banks of the bayou where the potential for prehistoric cultural deposits was highest. However, subsequent boundary revisions shifted the northern boundary of the Project Area to the south, away from areas having an increased potential for prehistoric cultural deposits. As a result, several of the excavated shovel tests are located outside of the current Project Area. Since the proposed pipeline right-of-way is located within an existing industrial facility, shovel testing in this portion of the project area was not feasible.

The cultural resources survey of the Project Area resulted in negative findings. No cultural materials were observed on the surface of the survey area or within any of the 17 excavated shovel tests. The detailed results of the cultural resources survey are included in the enclosed document titled "An Intensive Cultural Resources Survey of the Proposed Galena Park Terminal Condensate Splitter Project in Harris County, Texas."

At the request of the EPA, Horizon emailed a digital copy (PDF) of the negative survey report entitled *An Intensive Cultural Resources Survey of the Proposed Galena Park Terminal Condensate Splitter Project in Harris County, Texas* to Mr. Bill Martin at the THC for a preliminary informal review and discussion. While reviewing the PDF of the report, Russ Brownlow of Horizon discussed the methodology and findings presented in the report with Mr. Martin over the phone on 8 February 2013. Mr. Martin indicated that he saw no issues with the findings and recommendations presented in the report and that

he would concur with both when the EPA submits the report for formal agency review by his office.

Based on the results of the archival review and intensive cultural resources survey, WGI is requesting concurrence on behalf of KMLT from the THC/SHPO and the EPA that the proposed condensate splitter construction and operation will not affect historic properties listed in the NRHP or that meet the criteria for the NRHP in accordance with Section 106 guidance. In the unlikely event that any cultural materials are inadvertently discovered at any point during construction or operation of the Project Area, all work at the location of the discovery should cease immediately, and the THC and the EPA should be notified of the discovery. Enclosed with this letter request are Figures 1-3, photographs of the proposed Project Area, and the Intensive Cultural Resources Survey report. Please call me at 512.353.3344 if you have any questions or need additional information.

Sincerely,

Jayme A. Shiner

Enclosures:

Figure 1 - Project Location

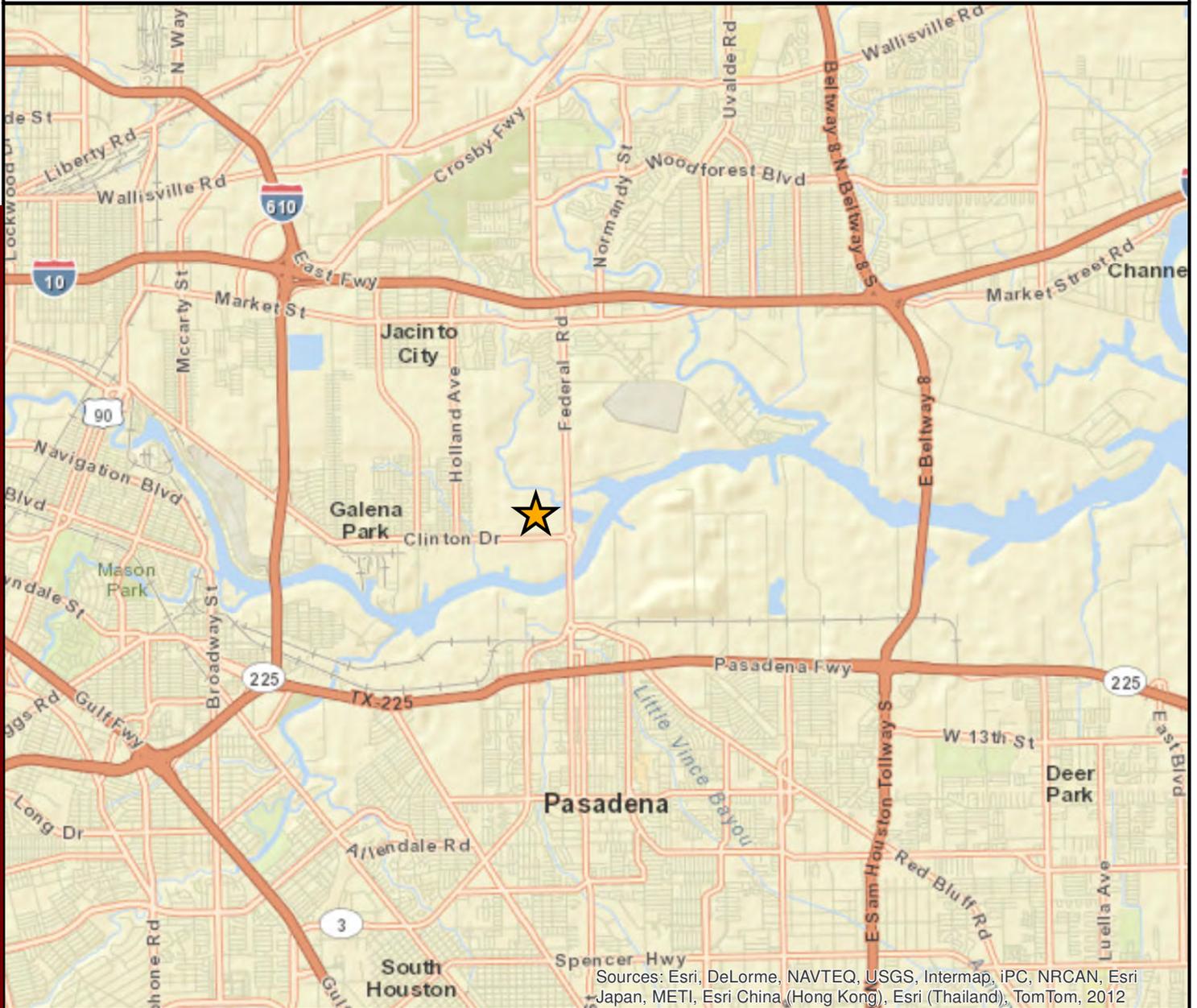
Figure 2 - Project Area – Aerial Photograph

Figure 3 - Project Area – Topographic Map

Photographic Log

An Intensive Cultural Resources Survey of Kinder Morgan's Proposed Galena Park Splitter Project in Harris County, Texas

Figure 1 Project Location Galena Park Terminal Condensate Splitter Project Harris County, Texas



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

US EPA ARCHIVE DOCUMENT



Harris County



Project Location



Background Resources:
USGS 100K DRG
Esri USA Topo Basemap

Surveyor(s):
Jayme Shiner PWS
Bryan Whisenant

Project Number and Information:

1209
Galena Park Condensate Splitter
Biological Assessment

GPS and Coordinate Type:
Trimble Geo XH 6000 Series
UTM NAD 1983
Zone 15 North

Map Created:
06/03/2012 by JS
Revised 2/21/2013



3413 Hunter Road San Marcos Texas 78666

0 7,500 15,000

— Feet



Figure 2
Project Area - Aerial Photograph
Galena Park Terminal Condensate Splitter Project
Harris County, Texas



Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community, Copyright © 2012 Esri, DeLorme, NAVTEQ, TomTom

 **Project Area**
 (~49.3 Acres)

US EPA ARCHIVE DOCUMENT

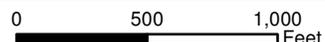
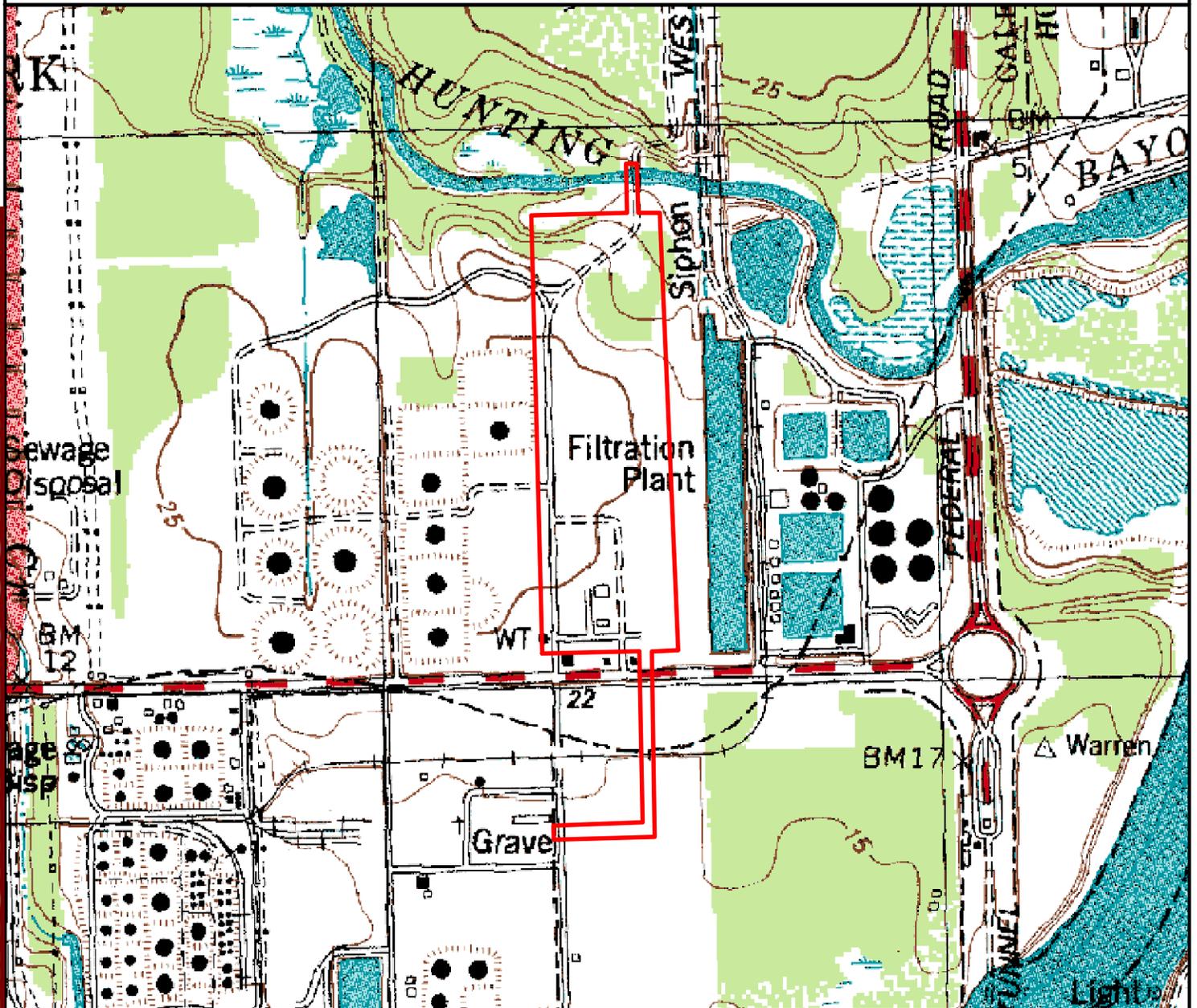
Background Resources: USGS 1 Meter DOQQ (2010) Pasadena (NW) ESRI Streetmap	Surveyor(s): Jayme Shiner PWS Bryan Whisenant	Project Number and Information: 1209 Galena Park Condensate Splitter Biological Assessment	 environmental consultants 3413 Hunter Road San Marcos Texas 78666  
GPS and Coordinate Type: Trimble Geo XH 6000 Series UTM NAD 1983 Zone 15 North	Map Created: 6/03/2012 by Jayme Shiner		

Figure 3
Project Area - Topographic Map
Galena Park Terminal Condensate Splitter Project
Harris County, Texas



 **Project Area**
 (~49.3 Acres)

US EPA ARCHIVE DOCUMENT

Background Resources:

USGS 24K DRG
 Pasadena
 ESRI Streetmap

Surveyor(s):

Jayme Shiner PWS
 Bryan Whisenant

Project Number and Information:

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GPS and Coordinate Type:

Trimble Geo XH 6000 Series
 UTM NAD 1983
 Zone 15 North

Map Created:

6/03/2012 by Jayme Shiner

WHITENTON
group environmental consultants

3413 Hunter Road San Marcos Texas 78666

0 500 1,000
 Feet



Galena Park Condensate Splitter Project

04/25/2012

Harris County, Texas

View: Southeast view of the proposed project area.



Galena Park Condensate Splitter Project

04/25/2012

Harris County, Texas

View: North aerial view of the proposed project area.



Galena Park Condensate Splitter Project

04/25/2012

Harris County, Texas

View: West aerial view of the proposed project area.



Galena Park Condensate Splitter
Project

05/17/2012

Harris County, Texas

View: East view of the proposed
project area.



Galena Park Condensate Splitter
Project

05/17/2012

Harris County, Texas

View: South view of the proposed
project area.



Galena Park Condensate Splitter
Project

05/17/2012

Harris County, Texas

View: East view of the proposed
project area.



An Intensive Cultural Resources Survey of the Proposed Galena Park Terminal Condensate Splitter Project in Harris County, Texas

By:

Russell K. Brownlow and Jennifer L. Cochran



HJN 110012 AR2 08

Prepared for:



Whitenton Group, Inc.
San Marcos, Texas

Prepared by:



Horizon Environmental Services, Inc.
Austin, Texas

DRAFT
Revised February 2013

An Intensive Cultural Resources Survey of the Proposed Galena Park Terminal Condensate Splitter Project in Harris County, Texas

By:

Russell K. Brownlow and Jennifer L. Cochran

Prepared for:



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

Lead Federal Agency:

US Environmental Protection Agency

Prepared by:



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

**Russell K. Brownlow, Principal Investigator
HJN 110012 AR2 08**

**DRAFT
Revised February 2013**

MANAGEMENT SUMMARY

On 10 May 2012, Horizon Environmental Services, Inc. (Horizon), conducted an intensive cultural resources survey of KM Liquids Terminals LLC's (KMLT) proposed Galena Park Terminal Condensate Splitter Project located in southeastern Harris County, Texas (Project Area). Overall, the Project Area totals approximately 49.3 acres. The Area of Potential Effect (APE) for the undertaking consists of the entire 49.3-acre Project Area. Although the Project Area is located entirely on private property and its development will utilize private funding, the undertaking will require a Greenhouse Gas (GHG) permit issued by the US Environmental Protection Agency (EPA). As a result, the undertaking also falls under the regulations of Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. At the request of Whitenton Group, Inc. (Whitenton), Horizon conducted the cultural resources survey on behalf of KMLT in compliance with Section 106 of the NHPA. The purpose of the survey was to determine if the development of the Project Area would have the potential to adversely affect any significant cultural resources listed on or considered eligible for listing on the National Register of Historic Places (NRHP).

The cultural resources survey of the Project Area resulted in entirely negative findings. No cultural materials were observed on the surface of the Project Area or within any of the 17 excavated shovel tests.

Based on the negative survey results, it is Horizon's opinion that the development of the Project Area will have no adverse effect on significant cultural resources. Horizon therefore recommends that KMLT be allowed to proceed with the proposed Galena Park Terminal Condensate Splitter Project, relative to the jurisdiction of the EPA and Section 106 of the NHPA. However, in the unlikely event that any cultural materials (including human remains or burial features) are inadvertently discovered at any point during construction, use, or ongoing maintenance of the Project Area, even in previously surveyed areas, all work at the location of the discovery should cease immediately, and the Texas Historical Commission (THC) and the EPA should be notified of the discovery.

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1.0 INTRODUCTION

This document reports the results of an intensive cultural resources survey of KM Liquids Terminals LLC's (KMLT) proposed Galena Park Terminal Condensate Splitter Project located in southeastern Harris County, Texas (Project Area; Figures 1-1 and 1-2). Overall, the Project Area totals approximately 49.3 acres. The Area of Potential Effect (APE) for the undertaking consists of the entire 49.3-acre Project Area. Although the Project Area is located entirely on private property and its development will utilize private funding, the undertaking will require a Greenhouse Gas (GHG) permit issued by the US Environmental Protection Agency (EPA). As a result, the undertaking also falls under the regulations of Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. At the request of Whitenton Group, Inc. (Whitenton), Horizon Environmental Services, Inc. (Horizon), conducted the cultural resources survey of the Project Area on behalf of KMLT in compliance with Section 106 of the NHPA. The purpose of the survey was to determine if the proposed development of the Project Area would have the potential to adversely affect any significant cultural resources listed on or considered eligible for listing on the National Register of Historic Places (NRHP).

The cultural resources investigations consisted of an archival review, an intensive pedestrian survey of the approximately 49.3-acre Project Area, and the production of a report suitable for review by EPA and the State Historic Preservation Officer (SHPO) in accordance with Section 106 of the NHPA, the Texas Historical Commission's (THC) Rules of Practice and Procedure, Chapter 26, Section 27, and the Council of Texas Archeologists' (CTA) Guidelines for Cultural Resources Management Reports. Russell Brownlow (Horizon's cultural resources director) served as the project's Principal Investigator Jared Wiersema (Horizon field technician) and Shana Dooley conducted the field investigations.

Horizon conducted the survey of the Project Area on 10 May 2012. This entailed intensive surface inspection and subsurface shovel testing efforts within the Project Area. The Texas State Minimum Archeological Survey Standards (TSMASS) require a minimum of 1 shovel test per 2.0 acres for projects between 11.0 and 100.0 acres in size. As such, a total of 23 shovel tests were necessary within the approximately 49.3-acre Project Area in order to comply with the TSMASS. Horizon excavated a total of 17 shovel tests within the Project Area, falling short of the TSMASS due to the fact that roughly the southern half of the Project Area was covered by thick artificial fill deposits that precluded effective shovel testing efforts.

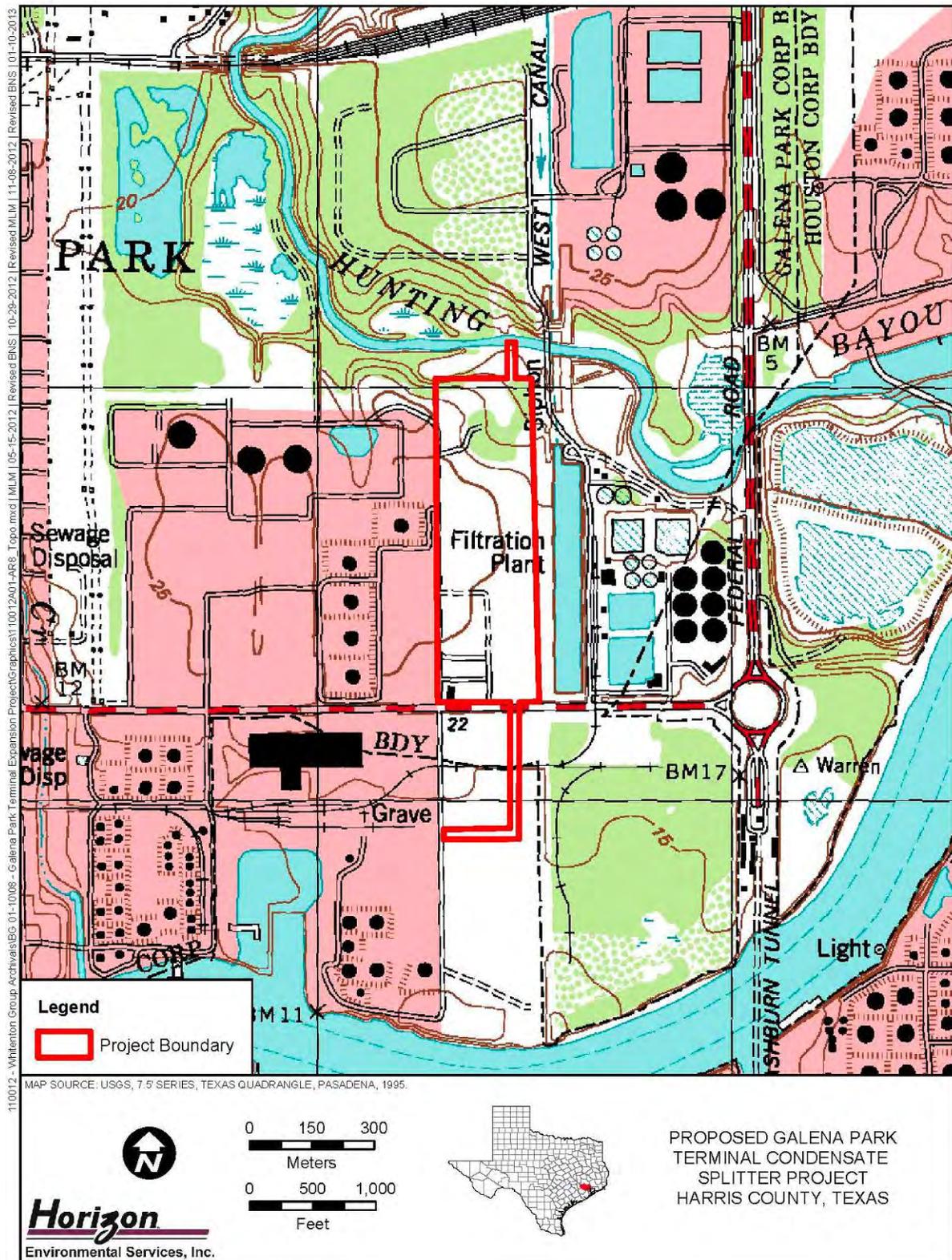


Figure 1-1. Topographic map with location of Project Area



Figure 1-2. Aerial photograph with location of Project Area

The cultural resources survey of the Project Area resulted in entirely negative findings. No cultural materials were observed on the surface of the Project Area or within any of the 17 excavated shovel tests.

Based on the negative survey results, it is Horizon's opinion that the development of the Project Area would have no potential to adversely affect significant cultural resources. Horizon therefore recommends that KMLT be allowed to proceed with the proposed Galena Park Splitter Project, relative to the jurisdiction of the EPA and Section 106 of the NHPA. However, in the unlikely event that any cultural materials (including human remains or burial features) are inadvertently discovered at any point during construction, use, or ongoing maintenance of the Project Area, even in previously surveyed areas, all work at the location of the discovery should cease immediately, and the THC and the EPA should be notified of the discovery.

US EPA ARCHIVE DOCUMENT

2.0 ENVIRONMENTAL SETTING

2.1 GENERAL DESCRIPTION

The approximately 49.3-acre Project Area is located within the boundaries of KMLT's existing Galena Park Terminal in southeastern Harris County, Texas. It is situated just south of Hunting Bayou, approximately 0.8 miles (1.3 km) west of the confluence of Hunting Bayou and Buffalo Bayou (see Figures 1-1 and 1-2). It can be found on the U.S. Geological Survey (USGS) 7.5-minute Pasadena, Texas, topographic quadrangle map (see Figure 1-1). On-site photographs of the Project Area are provided in Figures 2-1 through 2-5.

The Galena Park Terminal is a for-hire bulk petroleum storage terminal. Petroleum products and specialty chemicals are stored in various storage tanks and transferred in and out of the terminal tankage for external customers via pipeline, tank truck, railcar, and marine vessel. The facility consists of various storage tanks and associated piping, loading, and control equipment.

KMLT is proposing to construct and operate a new 100,000 barrels per day (bbl/day) condensate splitter at the existing Galena Park Terminal. The project will be constructed in two 50,000 bbl/day phases. The proposed condensate splitter will consist of 2 trains that will each process 50,000 bbl/day of hydrocarbon condensate material to obtain products suitable for commercial use. Construction of the second 50,000 bbl/day train will commence within 18 months of completion of the first 50,000 bbl/day train.

Construction of the proposed Galena Park condensate splitter unit, associated infrastructure, and auxiliary equipment will take place on KMLT property, within the existing Galena Park Terminal property boundary. The Project Area consists of the earth disturbance footprint associated with the undertaking, and the Area of Potential Effect (APE) for the undertaking consists of the entire 49.3-acre Project Area. Construction of the proposed condensate splitter, associated infrastructure, and auxiliary equipment will take place within the existing Galena Park Terminal. The project footprint will also include two new pipelines within one right-of-way that will connect the condensate splitter facility to the existing industrial facility immediately south of the Project Area. Earth disturbance activities will include the installation of 482 Auger Cast In Place (ACIP) Piles in Phase I and 384 in Phase II. The estimated depth of disturbance for the ACIP Piles is identified below.



Figure 2-1. Northwest corner of Project Area near Hunting Bayou facing south



Figure 2-2. Existing pipeline ROW within central portion of Project Area facing east



Figure 2-3. Modern industrial structure within Project Area



Figure 2-4. Existing valve site within northwestern portion of Project Area



Figure 2-5. View of southern half of Project Area from the air

- 12 (Phase 1 = 0, Phase II = 12) piles with 18" diameter and depth of 40 feet starting at 4 feet below final grade
- 224 (Phase 1 = 44, Phase II = 180) piles with 18" diameter and depth of 50 feet starting at 4 feet below final grade
- 462 (Phase I = 176, Phase II = 286) piles with 18" diameter and depth of 60 feet starting at 4 feet below final grade
- 239 (Phase I = 123, Phase II = 116) piles with 18" diameter and depth of 70 feet starting at 4 feet below final grade
- 79 (Phase 1 = 75, Phase II = 4) piles with 24" diameter and depth of 30 feet starting at 4 feet below final grade
- 64 (Phase I = 32, Phase II = 32) piles with 24" diameter and depth of 70 feet starting at 4 feet below final grade
- 24 (Phase I = 12, Phase II = 12) piles with 24" diameter and depth of 75 feet starting at 4 feet below final grade

The two pipelines will be built at a depth of approximately 4 feet below final grade.

2.2 CURRENT LAND USE

The Project Area consists of a portion of the existing storage terminal property that is relatively undeveloped compared to the majority of the property. At the time of the survey, the northern half of the Project Area contained mostly forested areas that were interrupted only by an existing pipeline right-of-way (ROW) that extends across the property, an existing pipeline valve site, and a small industrial building situated in roughly the center of the Project Area (see Figures 2-1 through 2-5). Several service roads associated with the storage terminal also extend through the Project Area. Roughly the southern half of the Project Area has been cleared in the past. The majority of the southern half of the Project Area is covered by areas of thick artificial fill deposits, while modern buildings associated with the operation of the facility are located in its southwestern corner (see Figures 1-2 and 2-5).

2.3 PHYSIOGRAPHY AND HYDROLOGY

The Project Area is situated just south of Hunting Bayou within the boundaries of the existing Galena Park Terminal. It encompasses the northern slope of an upland landform that extends to the north, down to the edge of the bayou. Elevations within the Project Area range between approximately 5.0 and 25.0 feet (1.5 and 7.6 m) above mean sea level. Hydrologically, the Project Area is situated within the San Jacinto River basin. The Project Area is drained to the north via overland sheet flow into Hunting Bayou. Hunting Bayou joins Buffalo Bayou approximately 0.8 miles (1.3 km) east of the Project Area. Buffalo Bayou flows a short distance to the northeast before meeting up with the San Jacinto River on the western edge of Burnet Bay.

2.4 SOILS

A total of 3 soil types are mapped within the boundaries of the Project Area. These soils are presented in Table 2-1 (NRCS 2012) and in Figure 2-6. As can be seen in Figures 1-2, 2-5, and 2-6, and in Table 2-1, roughly the southern half of the Project Area is covered with an expanse of artificial fill material that was placed at this location in 2008. This fill material, measuring approximately 6.0 to 10.0 feet (1.8 to 3.0 m) deep, consists of material (spoil) excavated during the construction of a ship dock (Dock 4) and associated loading berth at a separate location on the Galena Park Terminal property. The material was placed in the current Project Area because this location was determined to be the most appropriate available space within the Galena Park Terminal property at the time of construction of Dock 4.

Table 2-1. Soils mapped within the Project Area

SOIL NAME	SOIL TYPE	SOIL DEPTH (INCHES)	SETTING
Beaumont clay (Ba)	Clay	0 to 73: Clay	Clayey fluviomarine deposits of late Pleistocene age in depressions on flats
Midland silty clay loam (Md)	Silty clay loam	0 to 7: Silty clay loam 7 to 13: Silty clay 13 to 72: Clay	Loamy fluviomarine deposits of late Pleistocene age on meander scrolls
Midland-Urban land complex (Mu)	Silty clay loam (mixed/disturbed)	Disturbed soils typically composed of mixed Midland silty clay	Fill and disturbed soils in urban settings

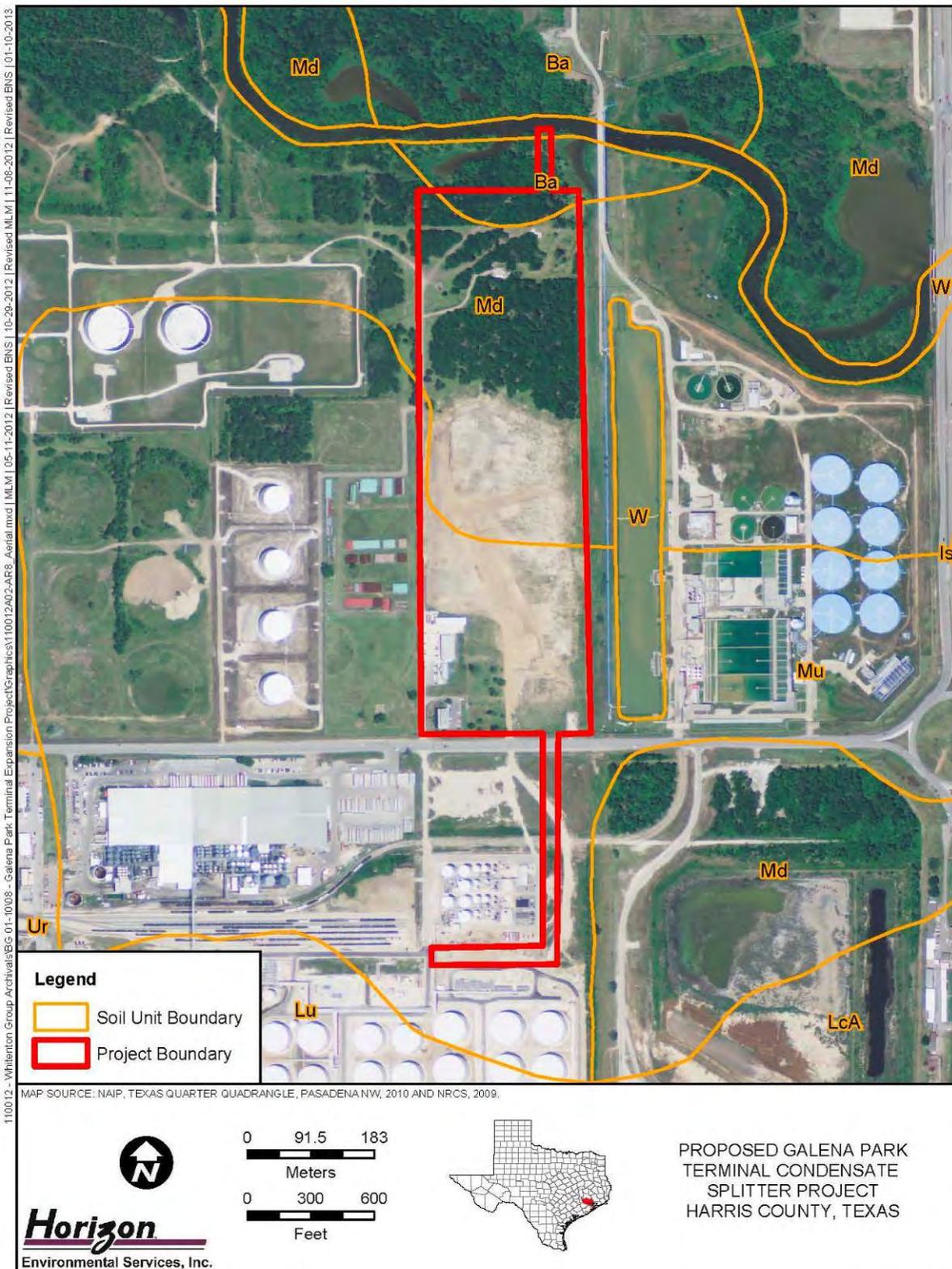


Figure 2-6. Soils mapped within Project Area

3.0 CULTURAL BACKGROUND

The Project Area is located within the Southeast Texas Archeological Region, a 21-county area extending from the Colorado River on the west to the Sabine River on the east and measuring about 200 km (124 mi) inland from the Gulf of Mexico coastline. Much of the archeological record in Southeast Texas represents an interface between the Southern Great Plains and the Southeastern Woodlands (Aten 1983, 1984; Patterson 1995; Story 1990). Further distinctions are often made between the inland and coastal margin subregions of Southeast Texas. These 2 subregions are somewhat culturally distinct, and the inland subregion has a much longer chronological record. The coastal margin of Southeast Texas comprises a zone about 25 km (16 mi) inland from the coast that covers the area influenced by Gulf tidal flows on the salinity of streams, lakes, and bays. Considerable ecological variability characterizes this subregion, including woodlands, coastal prairie, lakes, wetlands, marine coastline, and barrier islands. The inland subregion also encompasses considerable ecological diversity, including mixed woodlands, coastal prairies, and dense piney woods.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Although Spain claimed the Texas Gulf Coast, few Europeans visited the future Harris County between 1528 and 1821¹. It is possible that de Vaca ascended the San Jacinto River

¹ The following history of Harris County, Texas, derives from Bolton (1970), Freund (1954), Gray (1965), Henson and Ladd (1988), Henson (1986), Jenkins (1973), McComb (1981), Pomeroy (1994), Puryear and Winfield (1976), Sibley (1968), Taylor (1955), and Woods (1959), as summarized in *The Handbook of Texas Online*.

from Galveston Island around 1529 to trade with the woodland Indians, but his adventures failed to stimulate interest in the Texas coast. A few French traders from Louisiana visited Indians living on Spring Creek between the 1730s and 1745, but they established no settlements. A Spanish mission and presidio complex, El Orcoquisac, was maintained near the mouth of the Trinity from 1756 to 1771 to monitor and oppose the intrusion of foreigners. In 1746, Captain Joaquín de Orobio y Basterra from La Bahía visited the Orcoquisac villages along Spring Creek while looking for French traders. He reported the lack of roads or maps and on his return blazed a trail westward to find the Old San Antonio Road, on which he had traveled to Nacogdoches on his way to the lower Trinity and San Jacinto rivers. The first Anglo-Americans to explore Harris County were members of the various filibustering expeditions launched from New Orleans between 1815 and 1820 to aid the Mexican Republicans rebelling against Spain. Using Galveston Island and Bolivar Peninsula as a base, the men belonging to the expeditions and encampments of Louis Michel Aury, Francisco Xavier Mina, Jean Laffite, and James Long looked around the San Jacinto estuary for future home sites—their expected reward for freeing Mexico from Spain. Some of these men were among the pioneer settlers arriving by boat from Louisiana in early 1822, just after the Mexican War of Independence.

Responding to Stephen F. Austin's advertisements, the families wrongly assumed that the San Jacinto estuary was part of his *empresario* grant. Some moved to the Brazos River in 1824, but merchants and boatmen remained to exploit what turned out to be the best transportation system in Texas and to petition successfully for inclusion in the Austin grant. Since Galveston Island and the Gulf shore were forbidden to Anglo settlement, Harris County was the southeastern border of the colony. The pioneers found no Indians living in the future Harris County. In July 1824, a state land commissioner, the Baron de Bastrop, arrived and spent 2 months issuing 29 titles to settlers, even though surveys were incomplete. The pioneers, including Nathaniel Lynch, William Scott, and John R. Harris, chose sites along Buffalo Bayou, the San Jacinto River, and the San Jacinto estuary. Between 1828 and 1833, when Austin's colonization effort virtually ended, 23 more families secured titles elsewhere in the county, usually along watercourses. In 1826, John R. Harris laid out Harrisburg on his league where Brays Bayou joined Buffalo Bayou, the head of navigation. He opened a store and built a saw and grist mill, while his brothers captained vessels between there and New Orleans and even Tampico.

By 1833, Harrisburg was an established port of entry for immigrants and freight destined for the upper Brazos River communities of San Felipe and Washington. Moreover, it was the hub for east-to-west roads. Eastward from Harrisburg in 1830, travelers crossed the San Jacinto River on Lynch's Ferry on their way to Anahuac, Liberty, or Nacogdoches. Opposite Harrisburg, a road paralleled Buffalo Bayou heading northwest to a community on Spring Creek, then forked for the Brazos villages. A third important road followed the south bank of Brays Bayou for 24 km (15 mi) to a community on Oyster Creek near the site of present-day Stafford in Fort Bend County. This area was known as the San Jacinto District from 1824 until 1833, when it was renamed the Harrisburg District. From 1824 through 1827, Humphrey Jackson was the alcalde for the San Jacinto District, which stretched from Lynchburg on the San Jacinto River to the site of present-day Richmond on the west, and from Spring Creek to Clear Creek. Jackson reported to Stephen F. Austin until 1828, when the newly instituted *ayuntamiento* at

San Felipe relieved the *empresario* and *comisarios* were named. The final stage of development under the Mexican system occurred on 30 December 1835, when the General Council set the boundaries of Harrisburg Municipality.

Harrisburg Municipality was the home of both President David G. Burnet and Vice President Lorenzo de Zavala of the new Republic of Texas. They were elected by the delegates at Washington after midnight on 16 March 1836, and the next morning left for Harrisburg, where water transportation offered an escape if the Mexican army should win. On 25 March, the group reached Harrisburg, where the president conducted business for the next 2 weeks. Burnet and his bride had moved to Lynchburg from New Jersey in 1831 with equipment for a steam sawmill that he built on the San Jacinto River above Lynch's Ferry. Declining to claim a headright, he bought land from Lynch for his home on a small bay below the ferry. He was not chosen to represent his neighborhood in 1832, 1833, 1835, or 1836 because of his pro-Mexican views. Delegates, torn by rivalries, chose him because he was not a delegate. Zavala, a refugee from Santa Antonio López de Santa Anna's wrath, bought a house on the north side of Buffalo Bayou below Harrisburg in August 1835, and his New York-born second wife and 2 children joined him in December. The republic's officials evacuated Harrisburg by steamboat to Lynchburg on 12 April, when word arrived that Santa Anna's troops were crossing the Brazos below Richmond. The steamboat *Cayuga* later took the officials and their families to Galveston Island. A constant stream of refugees from the upper Brazos settlements had been crossing Harrisburg Municipality since mid-March en route to the US.

Santa Anna and his advance units reached Harrisburg at midnight on 14 April and, after a day of looting, set fire to the settlement on 16 April. The general dispatched a cavalry troop to Morgan's Point on 16 April that almost captured the Burnet family. The battle of San Jacinto took place on 20 and 21 April opposite Zavala's house on widow Peggy McCormick's farm, where perhaps 600 dead soldiers remained unburied when neither commander ordered interment.

Harrisburg County was formed by the First Congress on 22 December 1836. The lawmakers also named Andrew Briscoe chief justice, and the infant city of Houston the county seat and national capital. The county encompassed the territory of the old municipality plus Galveston Island (the mainland was attached to Brazoria County) until May 1838, when its modern boundaries were established. In December 1839, Congress changed the name to Harris County in honor of John R. Harris. The county briefly lost its northwest corner in 1841 when Spring Creek residents tried to form a separate county. The first county court, convened in February 1837, was composed of the chief justice (called the county judge after 1861), the sheriff, the clerk, and 2 justices of the peace who served as associate justices.

Harrisburg recovered from the Mexican Revolution slowly. By 1853, it had a steam mill and was the terminus for the Buffalo Bayou, Brazos, and Colorado Railway, which crossed the county to Stafford's Point to facilitate the shipment of cotton and sugar. Five other railroads followed before the Civil War. The Galveston, Houston, and Henderson connected the island to the mainland, while the Texas and New Orleans constructed tracks along the north side of Buffalo Bayou to Liberty and Orange, thus enabling Confederate troops from Harris County to reach the Neches River on their way to Virginia. The Houston and Texas Central ran west from

town to Cypress, Hockley, and Hempstead. The Houston Tap and Brazoria linked Houston with the Buffalo Bayou, Brazos, and Colorado south of town and had a line to Columbia to serve the Brazoria County sugar plantations.

Early settlers in Harris County were mainly southerners bringing their black slaves. Besides cultivating field crops, some of the African Americans worked the cattle on the open-range ranches, particularly in the area south of Buffalo Bayou, which remained ranching country into the early 20th century. By the 1840s, a number of Germans and French had immigrated to Harris County. Both groups included city-dwelling artisans, merchants, and farmers—some Catholic, some Protestant. Many of the immigrant agrarians settled north and west of Houston and established successful truck and dairy farms that drew Europeans through the turn of the century. Contrary to legend, few Mexican prisoners chose to remain in Harris County when all were released on 21 April 1837, by President Sam Houston. The 1850 US census revealed no Mexican-born males of the right age in Harris County or surrounding counties. A few Mexican families lived in Houston in the 1880s. It was the economic opportunities offered by the Houston Ship Channel and the railroads, combined with the unsettled political conditions following the Mexican Revolution, that brought Mexicans to Houston. Most settled in the city close to their work and the Catholic churches.

While the first settlers lived along the streams, those arriving after the Civil War chose sites along the railroads that crisscrossed Harris County. By 1890, land developers in the Midwest had purchased land along the new North Galveston, Houston, and Kansas City Railroad, which ran east from Houston along the south side of Buffalo Bayou towards Morgan's Point and south to the mouth of Clear Creek. They expected to attract other Midwesterners to raise fruit, berries, and vegetables or just to seek relief from cold winters. Pasadena, Deer Park, and La Porte were established in 1892, and Seabrook followed in 1900. South Houston, Genoa, and Webster developed along the Galveston, Houston, and Henderson Railroad after the 1870s. Around the turn of the century, Japanese were invited to the Webster area to develop rice farms on the flat prairies and also at a site on a branch line of the Gulf, Colorado, and Santa Fe Railway south of Houston that became Mykawa. Between 1911 and 1936, the Galveston-Houston Electric Railway, called the Interurban, ran parallel to the Galveston, Houston, and Henderson Railroad and provided 30-minute service from Webster to Houston.

In the 1960s, the land east of Webster became the home of the National Aeronautics and Space Administration (NASA) Manned Spacecraft Center, renamed the Lyndon B. Johnson Space Center in 1973. Houston quickly annexed the area. The development changed the rural aspect of the area when several new towns sprang up along the north shore of Clear Lake, the largest being Clear Lake City.

Northern Harris County developed similarly. After the Civil War, other railways such as the Houston and Great Northern, the Trinity and Brazos Valley, the Houston East and West Texas, and the Burlington-Rock Island entered north Harris County to converge on Houston. The lumbering and farming interests established small towns such as Spring and Tomball along the tracks. The population of Humble, near the Houston East and West Texas Railway, increased with the oil boom at Moonshine Hill in 1905.

Harris County east of the San Jacinto River remained an agricultural community focusing on rice culture in the 1890s. Its only commercial developments were small boatyards at Lynchburg and Goose Creek and a brick factory on Cedar Bayou that mushroomed during the 1880s to supply a building boom in Galveston. Between 1903 and 1907, oil was discovered on the eastern shore of the San Jacinto estuary at Goose Creek and Tabbs Bay. Migrant roughnecks and their families moved to the area and established a temporary boomtown amid the derricks between 1915 and 1917. The shantytown was replaced in 1917 by Pelly, which was built on private land above the noisy and dirty oil camp. In 1919, Ross Sterling and his Humble Oil and Refining Company (now ExxonMobil) built a refinery on the San Jacinto above the mouth of Goose Creek. The site was bordered by the Humble company town, Baytown, for workers, and a middle-class enclave, Goose Creek, for executives and others. Pelly and Goose Creek vied for dominance, and after Humble sold the company houses to the workers beginning in the late 1920s, the 3 towns consolidated to become the “Tri-Cities” in the 1930s and finally to be renamed Baytown in 1948. Eastern Harris County also had an electric interurban train, the Houston-North Shore Railroad, which in 1925 connected the 3 towns to Crosby and ran along the north side of Buffalo Bayou to downtown Houston.

The development of Harris County as an industrial power began in 1911, when voters approved the formation of the Harris County Ship Channel Navigation District. Authorized by Congress and approved by the state legislature, the district could improve the waterway and manage the waterfront within the county. It immediately issued bonds to widen and deepen the channel to make the Houston port accessible to oceangoing vessels. In 1914, the US Army Corps of Engineers finished deepening the existing 80-km- (50-mi-) long channel to 8 m (25 ft) from the Gulf through Galveston Bay and up the San Jacinto River and Buffalo Bayou to the district’s turning basin at the Port of Houston. By 1918, petroleum refineries began locating along Buffalo Bayou and the San Jacinto River, as did various other industries. Since that time, the channel has been deepened to 15 m (50 ft) and widened to accommodate larger vessels. The very profitable Harris County Navigation District owns the wharves and warehouses around the turning basin (about 3.2 km [2.0 mi] above old Harrisburg), the Long Reach docks, and various other facilities, including a bulk handling plant at Greens Bayou, the terminal railroad, and the container facility at the Bayport industrial complex below Morgan’s Point. In addition, in the 1950s, the district joined national and state governments to build the Washburn Tunnel under Buffalo Bayou from Pasadena to the north side and the Baytown-La Porte tunnel beneath the San Jacinto River to reduce the number of hazardous automobile ferries. Exports from the port include rice, wheat, grain sorghums, cotton, caustic soda, cement, and petroleum products. Imports include crude oil, iron ore, molasses, coffee, gypsum, and automobiles.

Another venture authorized by Harris County voters was the Harris County Domed Stadium, which was completed in 1965 and has been leased to the Houston Sports Association. The Astrodome, the first stadium of its kind, was touted as the “Eighth Wonder of the World.” The county also maintains 2 public hospitals in Houston and, since 1935, has worked to control flooding through the Harris County Flood Control District.

4.0 ARCHIVAL RESEARCH

Archival research conducted via the Internet at the THC's *Texas Archeological Sites Atlas* (Atlas) website indicated the presence of 11 previously recorded archeological sites, 1 cemetery, and 1 isolated grave within a 1.6-km (1.0-mi) review radius of the Project Area, while a review of the National Park Service's (NPS) National Register of Historic Places (NRHP) Google Earth map layer indicated the presence of no historic properties listed on the NRHP within the 1.6-km (1.0-mi) review radius. These documented cultural resources and their distances from the Project Area are summarized in Table 4-1 below, and their locations relative to the Project Area are presented in Figures 4-1 and 4-2. Based on the archival review, 10 of these 11 sites (41HR61, 41HR62, 41HR63, 41HR64, 41HR65, 41HR66, 41HR67, 41HR68, 41HR69, and 41HR70), 1 cemetery (41HR 309), and 1 isolated grave are considered to have undetermined NRHP eligibility status. For the purpose of the current cultural resources survey, these 10 sites and cemetery are considered as potentially eligible for inclusion in the NRHP. One of the 11 previously recorded sites (41HR308) has been determined to be ineligible for inclusion in the NRHP. As indicated by the information provided below, the isolated grave has been relocated from its original location and no longer falls within the 1.6-km (1.0-mi) review radius of the Project Area. As such, a NRHP eligibility determination for the isolated grave is not needed. No documented cultural resources, including any listed on the NRHP or potentially eligible for listing on the NRHP, are located within or immediately adjacent to the boundaries of the Project Area. Based on the Atlas database, the current Project Area has not been previously surveyed for cultural resources. However, 8 previous cultural resources surveys have been conducted within 1.6-km (1.0-mi) of the Project Area (Table 4-2) (NPS 2012; THC 2012).

Ten of the 11 previously recorded archeological sites (41HR61, 41HR62, 41HR63, 41HR64, 41HR65, 41HR66, 41HR67, 41HR68, 41HR69, and 41HR70) consist of 9 prehistoric campsites and 1 prehistoric shell midden located along the banks of Hunting Bayou. These 10 sites were originally recorded during a private survey conducted by Raymond Ring in 1958 (Ring 1994; THC 2012). The 10 sites were revisited and re-examined in 1973 during The Galveston Bay survey conducted by Paul McGruff and Mike Thomas. According to Ring (1994), extensive excavations were conducted on the prehistoric shell midden (41HR61) in 1958. Subsequent excavations were conducted on the remaining 9 prehistoric campsites (41HR62, 41HR63, 41HR64, 41HR65, 41HR66, 41HR67, 41HR68, 41HR69, and 41HR70) in 1963. Ring identified intact archaeological deposits and recovered numerous artifacts from the 10 sites.

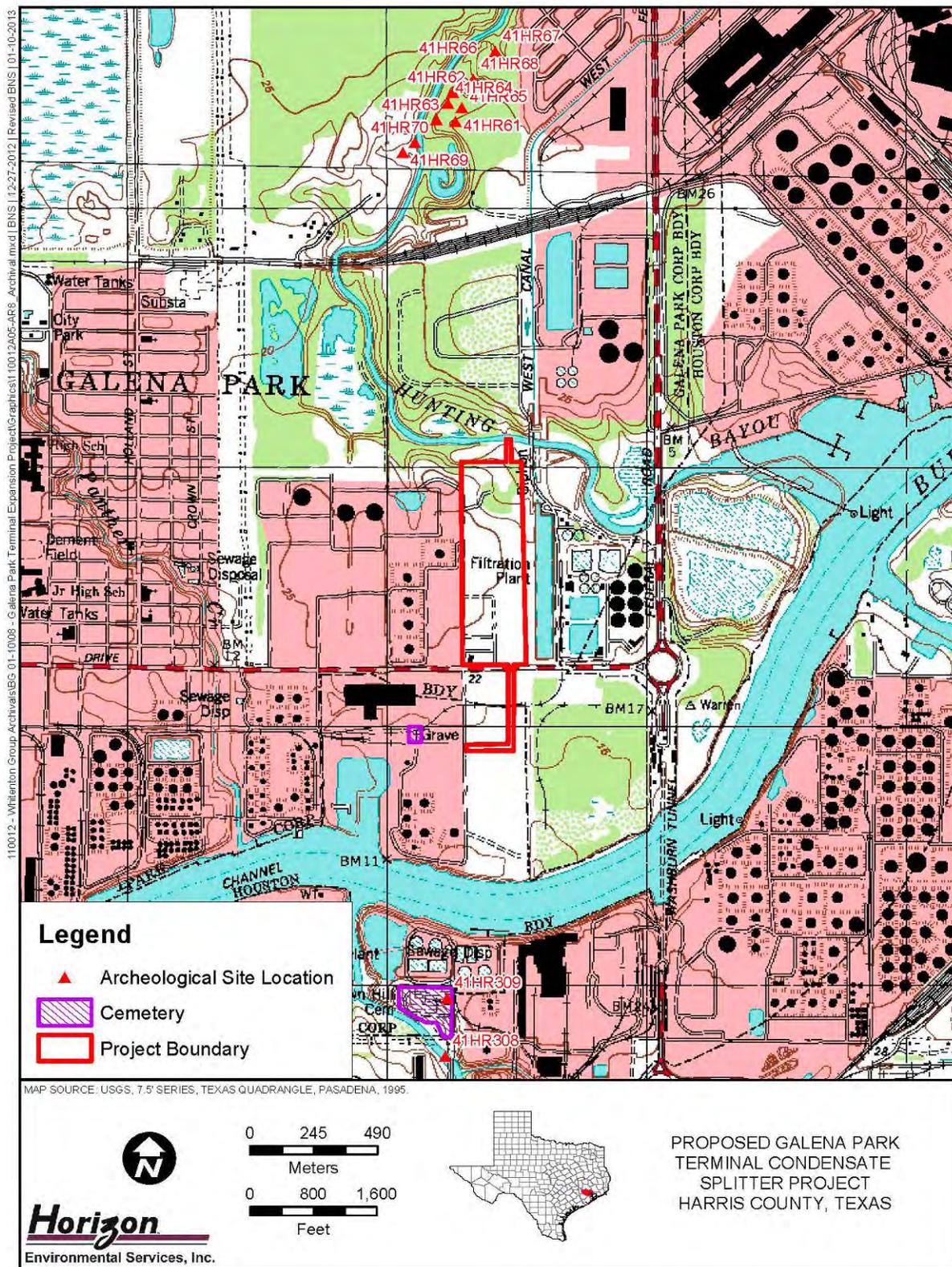


Figure 4-1. Location of documented cultural resources within 1.0 mile of Project Area



Figure 4-2. Aerial view of documented cultural resources within 1.0 mile of Project Area

Table 4-1. Summary of documented cultural resources within 1.0 mile of Project Area

Site Trinomial, Cemetery, or Historic Property	Site Type	NRHP Eligibility Status	Distance/Direction from Project Area	Potential to be Impacted?
Isolated Grave	Grave	Undetermined	0.3 km (0.2 mi) west	No (Relocated)
Crown Hill Cemetery (41HR309)	Cemetery	Undetermined	1.3 km (0.8 m) south	No
41HR308	Vince's Bridge (historic bridge burned during the Battle of San Jacinto)	Ineligible	1.5 km (0.9 m) south	No
41HR69	Prehistoric campsite	Undetermined	1.1 km (0.7 mi) north	No
41HR70	Prehistoric campsite	Undetermined	1.1 km (0.7 mi) north	No
41HR61	Prehistoric shell midden	Undetermined	1.3 km (0.8 m) north	No
41HR65	Prehistoric campsite	Undetermined	1.3 km (0.8 m) north	No
41HR63	Prehistoric campsite	Undetermined	1.3 km (0.8 m) north	No
41HR64	Prehistoric campsite	Undetermined	1.3 km (0.8 m) north	No
41HR62	Prehistoric campsite	Undetermined	1.5 km (0.9 m) north	No
41HR68	Prehistoric campsite	Undetermined	1.5 km (0.9 m) north	No
41HR67	Prehistoric campsite	Undetermined	1.5 km (0.9 m) north	No
41HR66	Prehistoric campsite	Undetermined	1.5 km (0.9 m) north	No

NRHP National Register of Historic Places

Table 4-2. Previous cultural resource surveys conducted within 1.0 mile of Project Area

Survey Name	Acres Surveyed	Survey Date	No. Sites Recorded within 1 Mile of Project Area	Site Nos. Recorded within 1 Mile of Project Area	Reference
Unnamed Private Survey Galveston Bay Survey	17.0	1958 1973	10	41HR61, 41HR62, 41HR63, 41HR64, 41HR65, 41HR66, 41HR67, 41HR68, 41HR69, 41HR70	Ring 1994
Unnamed USACE Linear Survey	8.4	1986	0	N/A	Not Available
Unnamed USACE Linear Survey	44.7	1986	0	N/A	Not Available
Unnamed EPA Survey	74.6	1979	0	N/A	Not Available
Unnamed EPA Survey	0.9	1979	0	N/A	Not Available
Unnamed EPA Survey	2.0	1979	0	N/A	Not Available
Pasadena Project USACE Survey	765.5	1976	2	41HR308, 41HR309	Not Available
Unnamed TxDOT Survey	2035.0	2005	0	N/A	Not Available

TxDOT Texas Department of Transportation

USACE Army Corps of Engineers

Cultural materials recovered include temporally diagnostic stone tools and ceramics, as well as preserved floral and faunal remains that were identified in intact, stratified deposits. Cultural features observed included 9 earthen mounds, several fire pits, and a hearth. A single human burial was also observed within the prehistoric shell midden. The radiocarbon samples taken from the sites, coupled with a chronological assessment of the stone tool and ceramic assemblages at the site, reflect a long occupation of the sites dating from ca. 1600 B.C to ca. A.D. 1600 (Ring 1994). The NRHP eligibility of these 10 sites could not be assessed based on limited survey-level data and lack of NRHP eligibility recommendations recorded on the Atlas website as presented by the original recorders of these sites. As such, these 10 sites were recommended as being of undetermined eligibility for inclusion in the NRHP.

Site 41HR308, located at the confluence of Vince and Little Vince Bayous, represents the presumed location of Vince's Bridge. The bridge was burned during the Battle of San Jacinto in order to prevent retreat by the Mexican army. No remnants of the bridge remain as the area has been completely modified by modern industrialization and road construction. The site is listed as ineligible for inclusion in the NRHP based upon the extensive ground disturbance activities which have diminished from the research value of the site (THC 2012).

Site 41HR309, situated approximately 91.5 m (300.0 ft) to the north of the confluence of Vince and Little Vince Bayous, represents the location of Crown Hill Cemetery. The cemetery was originally recorded by Ed Baker during the 1976 Pasadena Project USACE survey. According to the Atlas database, a Registered Texas Historical Marker (RTHL) for the Crown Hill Cemetery (41HR309) was placed north of the cemetery in 1990. The marker text reads:

Permanent settlement of this area began about 1891. Lot sales in the new town of Pasadena began in 1893, and the town was officially platted three years later. The first recorded burials in this vicinity occurred about 1894, although the exact locations of the graves are unknown. This graveyard, originally known as Pasadena Cemetery and the town's only community burial ground, was established in 1906 on a knoll overlooking Vince's Bayou and Buffalo Bayou. The first person buried here was E. P. Pomeroy, who died on October 24, 1906. Those interred here include many of Pasadena's early settlers and community leaders, and veterans of the Civil War, the Spanish American War, World War I, and World War II. The graveyard became known as Crown Hill Cemetery following World War I, possibly as a result of its proximity to the Crown Central Refinery. It has also been referred to as the Mexican Cemetery due to the numbers of Mexican-American farmers who were interred here beginning in the 1920s. Although surrounded by 20th-century industrial development, this cemetery survives as a link to the area's pioneer heritage

The NRHP eligibility of site 41HR309 could not be fully assessed based on survey-level data indicated on the THC's Atlas website and was recommended as being of undetermined eligibility for inclusion in the NRHP.

One isolated grave, situated approximately 0.2 km (0.1 mi) to the west of the Project Area, is indicated by its presence on the USGS 7.5-minute Pasadena, Texas, topographic quadrangle map (see Figure 4-1). No information on the isolated grave has been recorded on the THC's Atlas website. However, KMLT indicated that the isolated grave, originally located

within a portion of KMLT's existing facility, belonged to Virginia Jacobs. Since the 1930s, the industrial site's owners had maintained the gravesite. In 2008, KMLT needed to expand its plant in the area of Virginia Jacobs' grave, so the company applied for and was granted a court order to disinter Ms. Jacobs' remains and have her remains reinterred in the San Jacinto Memorial Park and Funeral Home, approximately 6.4 km (4.0 mi) to the northeast of the Project Area. Figures 4-3 and 4-4 are photographs of the relocation of the gravesite to the San Jacinto Memorial Park and Funeral Home and the new headstone purchased by KMLT, respectively. Appendix A presents the court order and disinterment permit granting KMLT permission to relocate the burial. Because the grave has been successfully relocated, a NRHP eligibility determination is not warranted in regard to the current undertaking given the grave's new location approximately 6.4 kilometers away from the Project Area.

Prehistoric archeological sites, such as those listed above in Table 4-1, are commonly found in upland areas and on alluvial terraces near stream/river channels or drainages. Given the presence of Hunting Bayou within the northern extent of the Project Area, coupled with the presence of numerous prehistoric sites on Hunting Bayou just north of the Project Area, it was Horizon's original opinion prior to any field investigations that there existed a moderate to high potential for undocumented prehistoric cultural deposits within any undisturbed areas adjacent to Hunting Bayou in the Project Area. In regard to historic-era resources, the lack of any visible standing structures within the limits of the Project Area, aside from the modern structures associated with the active storage terminal property boundary, suggested a decreased potential for any historic-era standing structures or associated cultural deposits within the Project Area.

Each of the 11 sites, 1 cemetery and 1 isolated grave shown in Table 4-1 is located at least 0.3 km (0.2 mi) from the Project Area, and most are located nearly 1.6 km (1.0 mi) from the Project Area. In regard to the 10 sites (41HR61, 41HR62, 41HR63, 41HR64, 41HR65, 41HR66, 41HR67, 41HR68, 41HR69, and 41HR70) of undetermined NRHP eligibility, these 10 sites are situated within dense vegetation along the banks of Hunting Bayou at least 1.1 km (0.7 mi) north of the Project Area. Elevations between these 10 sites and the Project Area are nearly level. Additionally, the land to the south of the 10 sites and north of the Project Area has been extensively modified during the modern industrialization of the area (see Figures 4-1 and 4-2). This existing industrialization south of the 10 sites and north of the Project Area includes a railroad system and spoil pile. Given the distances of the sites from the Project Area coupled with the nearly flat topography, dense vegetation, and modern industrialization between the 10 sites and the Project Area, it is Horizon's opinion that these 10 sites could not be seen from the Project Area and would have no potential to be affected by the proposed undertaking.

In regards to the 1 cemetery (41HR309) of undetermined NRHP eligibility, this burial location is situated 1.1 km (0.7 mi) south of the current Project Area. The cemetery (41HR309) is surrounded by land that has been extensively modified during the modern industrialization of the area (see Figures 4-1 and 4-2). This industrialization includes an existing sewage treatment facility as well as a portion of KMLT's existing facility. The cemetery (41HR309) and the Project Area are also separated by the Houston Ship Channel. As such, it is Horizon's opinion that the cemetery (41HR309) would suffer no adverse visual impact by the development of the Project Area.



Figure 4-3. Reinterment of Jacobs at San Jacinto Memorial Park and Funeral New Home



Figure 4-4. New headstone marker purchased by KMLT (facing north)

5.0 METHODOLOGY

A 2-person Horizon archeological field crew completed the intensive pedestrian survey of the Project Area on 10 May 2012. This entailed intensive surface inspection and subsurface shovel testing efforts within the Project Area. The TSMASS require a minimum of 1 shovel tests per 2.0 acres for projects between 11.0 and 100.0 acres in size. As such, a total of 23 shovel tests were necessary within the approximately 49.3-acre Project Area in order to comply with the TSMASS. Horizon excavated a total of 17 shovel tests within the Project Area, falling short of the TSMASS due to the fact that roughly the southern half of the Project Area was covered by thick artificial fill deposits that precluded effective shovel testing efforts. All excavated matrices were screened through 0.25-inch (6.0-millimeter [mm]) hardware mesh or were trowel-sorted if the dense clay soils prohibited successful screening.

The originally defined Project Area boundaries extended to the north, up to Hunting Bayou. As such, the majority of the excavated shovel tests were concentrated along the banks of the bayou where the potential for prehistoric cultural deposits was highest. However, subsequent boundary revisions shifted the northern boundary of the Project Area to the south, away from areas having an increased potential for prehistoric cultural deposits. As a result, several of the excavated shovel tests are located outside of the current Project Area boundaries on Figure 5-1.

Field notes were maintained on terrain, vegetation, soils, land forms, shovel tests, cultural material observed (if any), etc. Standardized shovel test forms were completed for every shovel test. These forms included location data, depth, soil type, and notations on any artifacts encountered. If any new archeological sites were recorded, standard site forms were to be completed and filed at the Texas Archeological Research Laboratory (TARL) for permanent housing. Similarly, if any previously recorded archeological sites were assessed, updated site forms were to be completed and filed at TARL.

A selective collection strategy was utilized during the survey efforts wherein only diagnostic cultural materials were to be collected for eventual curation at an approved facility or returned to the appropriate landowner. Non-diagnostic artifacts were to be tabulated and assessed in the field and placed back where they were found. Digital photographs with a photo log were completed as appropriate. The locations of all shovel tests were recorded via handheld GPS units utilizing the UTM coordinate system and the NAD 83 map datum. Shovel test locations are presented in Figure 5-1. Shovel test data are presented in Appendix B.

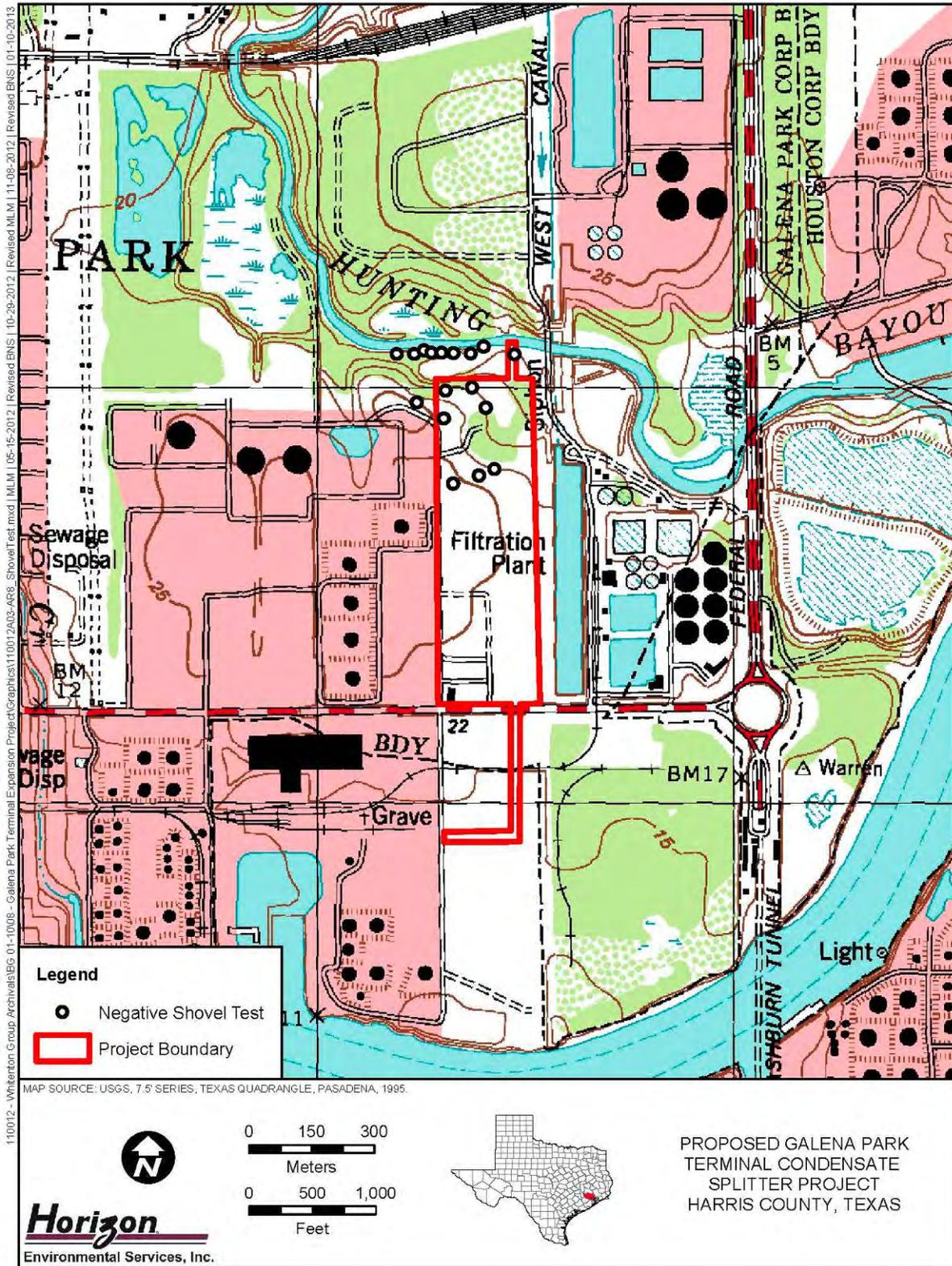


Figure 5-1. Topographic map with locations of shovel tests within Project Area

6.0 RESULTS AND RECOMMENDATIONS

6.1 RESULTS

The cultural resources survey of the Project Area resulted in entirely negative findings. No cultural materials were observed on the surface of the Project Area or within any of the 17 excavated shovel tests.

6.2 RECOMMENDATION

Based on the negative survey results, it is Horizon's opinion that the development of the Project Area will have no adverse effect on significant cultural resources. Horizon recommends KMLT be allowed to proceed with the proposed Galena Park Terminal Condensate Splitter Project, relative to the jurisdiction of the EPA and Section 106 of the NHPA. However, in the unlikely event that any cultural materials (including human remains or burial features) are inadvertently discovered at any point during construction, use, or ongoing maintenance of the Project Area, even in previously surveyed areas, all work at the location of the discovery should cease immediately, and the THC and the EPA should be notified of the discovery.

7.0 REFERENCES CITED

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(NRCS) US Department of Agriculture, Natural Resources Conservation Service

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- (THC) Texas Historical Commission
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Woods, H.

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APPENDIX A

**COURT ORDER AND DISINTERMENT PERMIT FOR THE RELOCATION OF THE
VIRGINIA JACOBS GRAVE**

DISINTERMENT PERMIT

DEPARTMENT OF STATE HEALTH SERVICES, TEXAS VITAL STATISTICS

Part I. Information relating to the deceased:

Full Name of Deceased: VIRGINIA JACOBS	Date of Death JULY 27, 1888
Place of Death: HARRIS COUNTY, HOUSTON TEXAS	State File Number
Name of Cemetery KINDER MORGAN PROPERTY	
City GALENA PARK	County HARRIS
Part II. Information relating to person in charge of disinterment	
Name of Funeral Director T. JERRY CASHION	License Number 7724
Name and Address of Funeral Home SAN JACINTO FUNERAL HOME 14659 INTERSTATE 10 EAST HOUSTON, TEXAS 77015	
Part III. Authorization	

Permission is granted to move the body from the present place of burial to:

SAN JACINTO MEMORIAL PARK

SECTION LOT SPACE
COURT OF HONOR 205 4

HARRIS COUNTY, STATE OF TEXAS

Date: 11/10/2008



Signature of State Registrar

Note: No separate burial-transit permit is required unless the body is being shipped by common carrier or is being moved across state lines. CAL.

VS - 2219 REV. 9/04. The penalty for knowingly making a false statement in this form can be 2 - 10 years in prison or fine of up to \$10,000. Section 195, Health and Safety Code.

APPENDIX B

SHOVEL TEST DATA

An Intensive Cultural Resources Survey of the Proposed Galena Park Terminal Condensate Splitter Project in Harris County, Texas

Shovel Test #	Easting	Northing	Depth (cmbs)	Soils	Artifacts
JW-1	285235	3292080	0-20	Gray brown silty clay	None
			20+	Yellow brown silty clay	None
JW-2	285193	3292080	0-10	Brown clay loam	None
			10-30	Dark gray silty clay	None
JW-3	285258	3292089	0-30	Brown silty clay	None
JW-4	285277	3292083	0-40	Light brown silty clay	None
			40+	Dark brown clay	None
JW-5	285301	3292083	0-30	Brown sandy loam	None
			30+	Brown silty clay	None
JW-6	285329	3292082	0-60	Gray brown silty clay	None
JW-7	285371	3292081	0-20	Gray brown clay	None
JW-8	285401	3292098	0-20	Gray brown silty clay	None
JW-9	285241	3291963	0-5	Grayish brown clay loam	None
			5-15+	Brown silty clay	None
JW-10	285310	3291992	0-30	Very dark brown clay	None
JW-11	285374	3292000	0-30	Very dark brown clay	None
JW-12	285407	3291951	0-30	Brown loamy clay	None
JW-13	285476	3292079	0-20	Gray brown silty clay	None
			20+	Gray brown clay	None
JW-14	285306	3291925	0-5	Brown clay loam	None
			5+	Gravelly brown clay loam	None
JW-15	285328	3291768	0-20	Very dark brown clay	None
JW-16	285390	3291787	0-25	Very dark brown clay	None
JW-17	285428	3291803	0-20	Very dark brown clay	None

WP = waypoint
 ST = shovel test
 cmbs = centimeters below surface

APPENDIX C

CURRICULUM VITAE FOR PRINCIPAL INVESTIGATOR

RUSSELL K. BROWNLOW
PRINCIPAL / CULTURAL RESOURCES DIRECTOR

TECHNICAL SPECIALTIES

- Cultural resource management (CRM);
- Prehistoric archeology of Texas, Oklahoma, and Louisiana;
- Compliance with the Antiquities Code of Texas (ACT), Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and the Native American Graves Protection and Repatriation Act (NAGPRA);
- Prehistoric lithic technology (flint knapping);
- Ethnohistory;
- Project management;
- Archeological survey, testing, and data recovery;
- Technical report writing

EDUCATION

- B.A., Anthropology / Archeology, The University of Texas at Austin, 1992
- M.A., Anthropology, The University of Houston, 1998

PROFESSIONAL REGISTRATIONS AND TRAINING

- Registered Professional Archeologist since 2001 (RPA ID# 11924)
- TxDOT pre-certified for Service 2.10.1 (Archeological Surveys, Documentation, Excavations, Testing, Reports, and Data Recovery Plans)
- Mine Safety and Health Administration (MSHA) certified through 11/23/12

PROFESSIONAL / TECHNICAL SOCIETIES

- Texas Archeological Society (TAS)
- Council of Texas Archeologists (CTA)
- Register of Professional Archeologists (RPA)
- Texas Association of Environmental Professionals (TAEP)

AWARDS

- Texas Historical Commission Award of Merit (2004) for exceptional field research, laboratory analysis, and report production associated with 41WM815 in Williamson County, Texas

PROFESSIONAL EXPERIENCE

- Horizon Environmental Services, Inc., Austin, Texas
 - 2000 to present
 - Horizon Principal / Cultural Resources Director / Principal Investigator / Project Manager
- Texas Archeological Research Laboratory, University of Texas at Austin
 - 1998 to 2000
 - Research Associate
- Archeological and Environmental Consultants, Inc., Austin, Texas
 - 1999
 - Project Archeologist
- Houston Museum of Natural Science, Houston, Texas
 - 1998
 - Consultant
- University of Houston, Department of Anthropology, Houston, Texas
 - 1997 to 1998
 - Teaching Assistant
- Espey, Huston & Associates, Inc., Austin, Texas (now PBS&J)
 - 1994 to 1998
 - Field Technician, Laboratory Technician, Crew Chief, Field Director
- Prewitt and Associates, Inc., Austin, Texas
 - 1993
 - Field Technician
- Texas Archeological Research Laboratory, University of Texas at Austin
 - 1992
 - Laboratory Technician

FIELDS OF EXPERIENCE

Mr. Brownlow has over 19 years of experience conducting archeological research for both public institutions and private consulting firms. Examples of his archeological project experience include the following:

- In excess of 200 cultural resources surveys completed for a wide array of projects within Texas, Oklahoma, and Louisiana;
- National Register of Historic Places and/or State Archeological Landmark eligibility testing on a minimum of 36 archeological sites;
- Data recovery/mitigation efforts on a minimum of 11 archeological sites;

- Excavation of human burials from at least 7 different archeological sites including a historic cemetery containing in excess of 431 human interments, a Caddoan cemetery containing 16 human interments, and a burned rock midden site containing at least 4 human interments;
- Archeo-Geophysical (remote sensing) sampling on 3 archeological sites;
- Authoring or co-authoring over 250 technical reports of archeological investigations;
- Preparation of several archeological avoidance plans for seismic projects;
- Countless desktop archival reviews to determine the potential for cultural resources on various properties for inclusion in non-archeological documents (i.e. Phase I Environmental Site Assessments, Categorical Exclusions, etc.);
- Section 106 and/or Antiquities Code of Texas consultation for hundreds of projects with various permitting agencies including the Texas Historical Commission, Texas Water Development Board, Texas Parks and Wildlife Department, US Army Corps of Engineers, US Fish and Wildlife Service, Oklahoma State Historic Preservation Office, the Louisiana Department of Culture, Recreation, and Tourism, as well as a vast array of Tribal Historic Preservation Officers;
- In addition to his cultural resources experiences, Mr. Brownlow has also prepared a variety of non-archeological documents includes numerous Categorical Exclusions (CEs), Phase I Environmental Site Assessments (Phase I ESAs), Environmental Reports (ERs), and Environmental Assessments (EAs). He has also contributed to the production of several Environmental Impacts Statements (EISs).

Types of projects in which Mr. Brownlow has participated in or managed cultural resources services include:

- Oil and gas exploration, development, and transportation;
- Ethanol production;
- Coastal and inland residential, commercial, and industrial land development;
- Solid waste landfills;
- Dredging activities;
- Surface lignite mines;
- Municipal planning;
- Reservoir development;
- Coastal port and channel improvements;
- Transportation corridors;
- Water and wastewater transportation and treatment;
- Electricity generation and transportation;
- University research;
- Military installations.

PRESENTATIONS

- Flint knapping and stone tool technology lecture for the 1997 spring semester Introduction to Archeology class at the Department of Anthropology, University of Houston.
- Flint knapping and stone tool technology lecture for the 1997 spring semester Archeology of Texas class at the Department of Anthropology, University of Houston.
- Flint knapping and stone tool technology lecture for the 1997 fall semester Introduction to Archeology class at the Department of Anthropology, University of Houston.
- Flint knapping and stone tool technology lecture for the 1997 fall semester Introduction to Physical Anthropology class at the Department of Anthropology, University of Houston.
- Two flint knapping demonstrations for the Brazoria County summer archeology programs sponsored by BCI Long Distance.
- Perdiz Arrow Point Origins for the TARL Brown Bag Lunch, 1998.
- Perdiz Arrow Point Origins for the Houston Archeological Society, 1998.
- Perdiz Arrow Point Origins for the Travis County Archeological Society, 1998.
- Flint knapping demonstration for the Austin French Legation's annual summer camp program, 1999.
- Data Recovery Investigations at the Holt Site (41HY341). "Burned Rock Midden" Symposium at the Annual Council of Texas Archeologists Spring Meeting, 2005.
- Yearly flint knapping demonstrations for Camp Mabry's annual "Muster Day" Event.
- Routine visits to various elementary school classes to conduct flint knapping demonstrations and present archeological career details for "career days".

ARTICLES

Brownlow, R.K.

- 2000 Excavations at Rice's Crossing (41WM815). *Current Archeology in Texas*. November 2000, Volume 2, No. 2. Texas Historical Commission. Austin, Texas.
- 2009 In Search of the Lost Community of Nottingham: Archival and Archo-Geophysical Investigations on Site 41GV71. *Current Archeology in Texas*. April 2009, Volume 11, No. 1. Texas Historical Commission. Austin, Texas.

TECHNICAL PUBLICATIONS

Espey, Huston & Associates (EH&A now PBS&J):

Brownlow, R.K.

- 1994 *Facilities Response Plan for Holly Street Power Plant, Austin, Texas*. EH&A Doc. No. 941257. Austin, Texas.

- 1995 *Facilities Response Plan for Decker Lake Power Plant, Austin, Texas*. EH&A Doc. No.950028. Austin, Texas.
- 1996 *Intensive Cultural Resource Survey of Proposed ORYX-MOYER 1-5 New 4-inch Pipeline Project*. EH&A Doc. No. 960270. Austin, Texas.

Schmidt, J.S., M.E. Cruse, and R.K. Brownlow

- 1995 *Cultural Resources Survey of Camp Swift, Bastrop County, Texas*. EH&A Doc. No. 951178. Austin, Texas.

Masters Thesis:

Brownlow, R.K.

- 1998 *Evaluating the Co-occurrence of Arrow Point Types in South Texas: Archaeological Excavations at the Batot-Hooker Site (41ME34), Medina County, Texas*. Masters Thesis presented to the Anthropology Department of the University of Houston. Houston, Texas.

Texas Archeological Research Laboratory (TARL):

Brownlow, R.K.

- 1999 Intensive Cultural Resource Survey of Fort Wolters Army National Guard Base, Parker and Palo Pinto Counties, Texas. *Studies in Archeology* 32. Texas Archeological Research Laboratory, The University of Texas at Austin.
- 2000 *Emergency Burial Salvage at 41PR88 on the Fort Wolters Training Facility, Parker Co., Texas*. Letter Report. Texas Archeological Research Laboratory, The University of Texas at Austin.
- 2000 Archeological Investigations at 41WM815, A Blackland Prairie Site, Williamson County, Texas. *Studies in Archeology* 36. Texas Archeological Research Laboratory, The University of Texas at Austin.
- 2001 National Register Eligibility of Four Sites at the Texas Army National Guard's Fort Wolters Facility, Parker Co., Texas. *Studies in Archeology* 37. Texas Archeological Research Laboratory, The University of Texas at Austin.

Contributing author in:

Takac, P.R., J.G. Paine, and M.B. Collins

- 2000 Reassessment of Ten Archeological Sites along the Houston Ship Channel – Morgan's Point to Buffalo Bayou, Harris County, Texas. *Studies in Archeology* 38. Texas Archeological Research Laboratory, The University of Texas at Austin.

Archeological and Environmental Consultants, Inc.:

Pertulla, T.K. and R.K. Brownlow

- 1999 An Archeological Survey of the Jett Road Water Project in Bexar County, Texas. *Letter Report of Investigations, No. 37.* Archeological & Environmental Consultants, Inc. Austin, Texas.

Horizon Environmental Services, Inc.:

Brownlow, R.K.

- 2000 *An Intensive Cultural Resources Survey of a Proposed Wal-Mart Site at the Northwestern Corner of the Intersection of U.S. Highway 183 and FM 1431, Cedar Park, Williamson County, Texas.* HJN 000255 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2001 *Backhoe Trench Investigations for a Proposed Wastewater Line Crossing Brushy Creek on the Ivie Tract, Williamson County, Texas.* HJN 010016 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2001 *Profile Documentation of Erosional Gullies in Borrow Pits Nos. 1 and 2 on Site 41WA255 for the Texas Department of Criminal Justice's Estelle Unit, Huntsville, Walker County, Texas.* Texas Antiquities Committee Permit No. 2509. HJN 000425 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2001 *An Intensive Cultural Resources Survey of Centennial Pipeline's Proposed Pump Stations A, B, and C, Bearegard, La Salle, and West Carroll Parishes, Louisiana.* HJN 000302 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2001 *An Intensive Cultural Resources Survey of the Proposed Centennial Pipeline Right-of-Way, Beauregard Parish, Louisiana.* HJN 000151 AR. Horizon Environmental Services, Inc. Austin, Texas.
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- 2001 *An Intensive Cultural Resources Survey of a Proposed 15-acre Leander Independent School District School Site Located on the Steiner Ranch Tract, Travis County, Texas.* Texas Antiquities Committee Permit No. 2583. HJN 010136 AR. Horizon Environmental Services, Inc. Austin, Texas.
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- 2001 *An Intensive Cultural Resources Survey of 22 Proposed Well Sites and Flow Lines on the Freeman Ranch and Tucker Leases, Texas County, Oklahoma.* HJN 010239 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2001 *An Intensive Cultural Resources Survey of 13 Proposed Well Sites and Flow Lines on the Freeman Ranch and Tucker Leases, Texas County, Oklahoma.* HJN 010239 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2001 *An Intensive Cultural Resources Survey of the Proposed Legacy Ridge Estates Residential Subdivision and Golf Course, Bonham, Fannin County, Texas.* HJN 010348 AR. Horizon Environmental Services, Inc. Austin, Texas.
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- 2001 *An Intensive Cultural Resources Survey of the approximately 25-acre United RV Campground, San Marcos, Hays County, Texas.* HJN 010382 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2001 *An Intensive Cultural Resources Survey of a Proposed Lower Neches Valley Authority 33-acre Water Treatment Plant Site and Associated Waterline Routes, Winnie, Chambers County, Texas.* HJN 010090. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey of the 4.5-mile Rainbolt Lateral Pipeline Right-of-Way, Robertson and Leon Counties, Texas.* HJN 010392 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey of the Proposed Widening of Ranch-to-Market Road 2243 (Alternates A and B), Leander, Williamson County, Texas.* Texas Antiquities Committee Permit No. 2722. HJN 010185 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey of 12 Proposed Well Sites and Flow Lines on the Freeman Ranch and Tucker Leases, Texas County, Oklahoma.* HJN 010239 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey of a Proposed 1.25-mile Natural Gas Pipeline Right-of-Way, Sweeny, Brazoria County, Texas.* HJN 020041 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey of a Proposed 12-acre Home Depot Site at the Rivery, Georgetown, Williamson County, Texas.* HJN 020027 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey for a Proposed 29-mile Crude Oil Pipeline Right-of-Way, Port Neches Route of the Cameron Highway Pipeline Project, Jefferson County, Texas.* HJN 010344 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey of the Proposed 27-acre Target in Bee Cave #2 Site, Bee Cave, Travis County, Texas.* HJN 020067 AR. Horizon Environmental Services, Inc. Austin, Texas.

- 2002 *An Intensive Cultural Resources Survey of The Rivery, A Proposed 125-acre Development Site in Georgetown, Williamson County, Texas.* HJN 020046 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey of the Buttercup Creek Channelization and Wetland Mitigation Project (30 Acres), Cedar Park, Williamson County, Texas.* HJN 010333 PA. Horizon Environmental Services, Inc. Austin, Texas.
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- 2002 *An Intensive Cultural Resources Survey of a Proposed 122-acre Target Store Site Located at Parmer Lane and Interstate Highway 35, Austin, Travis County, Texas.* HJN 010354 AR. Horizon Environmental Services, Inc. Austin, Texas.
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- 2002 *An Intensive Cultural Resources Survey of 11 Proposed Well Sites and Flow Lines on the Freeman Ranch and Tucker Leases, Texas County, Oklahoma.* HJN 010239 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey of the 197-acre El Camino Real Phase I Tract, A Proposed Subdivision Site in San Marcos, Hays County, Texas.* HJN 020123 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey of the Proposed 75-acre Greenshores Subdivision Tract Located in Northwest Austin, Travis County, Texas.* HJN 020145 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey of the 100-acre Wolf Tract, A Proposed Development Site in Georgetown, Williamson County, Texas.* HJN 020144 AR. Horizon Environmental Services, Inc. Austin, Texas.
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- 2002 *Archeological Monitoring Conducted during Texas Eastern Transmission's Replacement of Approximately 1600 feet of Pipe via Horizontal Directional Drill under the San Antonio River, Goliad County, Texas.* HJN 020169 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *Backhoe Trench Investigations Conducted on the 3.8-acre Hunt TDC No. 1 Well Site and Access Road, Anderson County, Texas.* Texas Antiquities Committee Permit No. 2935. HJN 020181. Horizon Environmental Services, Inc. Austin, Texas.

- 2002 *Backhoe Trench Investigations Conducted along the 8-mile Pinnacle Gregory A-1 Pipeline Right-of-Way, Anderson County, Texas.* Texas Antiquities Committee Permit No. 2916. HJN 020149 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey of a Proposed 8-mile EPGT Natural Gas Transmission Pipeline in Travis and Hays Counties, Texas.* HJN 020128 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey of a Proposed 6-acre Village 7 Sewer Treatment Plant #1 Located in The Woodlands, Harris County, Texas.* HJN 020207 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey of 13 Proposed Well Sites and Associated Flow Lines on the Freeman Ranch Lease, Texas County, Oklahoma.* HJN 010239 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *Cultural Resources Investigations Conducted along Sections of New Hope and Bagdad Roads for Proposed Widening Efforts, Cedar Park, Williamson County, Texas.* Texas Antiquities Committee Permit No. 2967. HJN 020185 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Terrestrial Cultural Resources Survey of the Proposed Crude Oil Pipeline Right-of-Way for the Cameron Highway Pipeline Project's Texas City Extension, Chambers County, Texas.* HJN 020077 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *Pipeline Realignment, Cameron Highway Oil Pipeline System New 24-inch Crude Oil Pipeline, Port Neches Extension, Jefferson County, Texas.* An Addendum to: *An Intensive Cultural Resources Survey for a Proposed 29-mile Crude Oil Pipeline Right-of-Way, Port Neches Route of the Cameron Highway Pipeline Project, Jefferson County, Texas.* HJN 020078 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey of the Proposed 1600-acre Belterra Subdivision Tract Located in Hays County, Texas.* HJN 020196 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey of a Proposed Orange County WCID No. 1 2-acre Water Well Site; 2-acre Water Storage Tank Site; and 37,400 Linear Feet of Associated Waterline Routes in Vidor, Orange County, Texas.* Texas Antiquities Committee Permit No. 2998. HJN 020233 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey of Extra Work Spaces Associated with Centennial Pipeline LLC's Proposed Horizontal Directional Drill of the Little River in Grant and La Salle Parishes, Louisiana.* HJN 020258 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2002 *An Intensive Cultural Resources Survey of 1 Proposed Well Site and 1 Proposed Flow Line on EOG Resources' Tucker Lease, Texas County, Oklahoma.* HJN 010239 AR. Horizon Environmental Services, Inc. Horizon Environmental Services, Inc. Austin, Texas.
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- 2003 *An Intensive Cultural Resources Survey of 1 Proposed Well Site and 1 Proposed Flow Line on EOG Resources, Inc.'s Tucker Lease, Texas County, Oklahoma.* HJN 010239 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2003 *An Intensive Cultural Resources Survey of 26 Proposed Well Sites and Associated Flow Lines on the Freeman Ranch and Tucker Leases, Texas County, Oklahoma.* HJN 010239 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2003 *An Intensive Cultural Resources Survey of the Jefferson County Drainage District No. 6's Proposed Mayhaw Diversion, Needmore Diversion, and Green Pond Detention Area, Jefferson County, Texas.* Texas Antiquities Committee Permit No. 3031. HJN 000418 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2003 *An Intensive Cultural Resources Survey of a Proposed Elevated Water Storage Tank Site and 2 Associated Waterline Easements, Cedar Park, Williamson County, Texas.* Texas Antiquities Committee Permit No. 3049. HJN 030012 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2003 *An Intensive Cultural Resources Survey of a Proposed 110-acre Sand and Gravel Mine and Sorting Plant for Riverside Aggregates, Austin County, Texas.* HJN 030023 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2003 *An Intensive Cultural Resources Survey of a Portion of the 47-acre Holt Property Located in San Marcos, Hays County, Texas.* HJN 030195 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2003 *An Intensive Cultural Resources Survey and Subsequent Testing of the Proposed Woodlands Southwest Detention Pond, The Woodlands, Montgomery County, Texas.* Texas Antiquities Committee Permit No. 3055. HJN 030019 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2003 *An Intensive Cultural Resources Survey of a Proposed 6-mile Natural Gas Pipeline for the UNOCAL Keystone Gas Storage Project, Winkler County, Texas.* HJN 000256. AR
- 2004 *An Intensive Cultural Resources Survey of a Proposed 31.18-acre Wal-Mart Site Located in Rockdale, Milam County, Texas.* HJN 040030. Horizon Environmental Services, Inc. Austin, Texas.
- 2004 *An Intensive Cultural Resources Survey of Proposed Oil/Gas Well Development on the Attwater's Prairie Chicken National Wildlife Refuge, Colorado County, Texas.* USFWS Special Use Permit #ATW-04-008. HJN 040088 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2004 *Data Recovery Investigations at the Holt Site (41HY341), San Marcos, Hays County, Texas.* HJN 040032 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2004 *An Intensive Cultural Resources Survey of a Proposed Water Transmission Line from High Island to Singing Sands, Galveston County, Texas.* Texas Antiquities Committee Permit No. 3298. HJN 020189 AR. Horizon Environmental Services, Inc. Austin, Texas.

- 2004 *Archeological Avoidance Plan: Proposed Seismic Survey, Brigham Oil and Gas, L.P., Alamo Project, Aransas, Calhoun, and Refugio Counties, Texas.* HJN 040006 AR. Horizon Environmental Services, Inc. Austin, Texas.
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- 2004 *An Intensive Cultural Resources Survey of 7 Proposed Well Sites on EOG Resources, Inc.'s Freeman Ranch and Tucker Leases, Texas County, Oklahoma.* HJN 010239 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2004 *National Register of Historic Places Eligibility Testing of 2 Sites (41WM650 and 41WM651) Located within the Cedar Park Town Center Development, Cedar Park, Williamson County, Texas.* HJN 040024 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2005 *Intensive Cultural Resources Survey of the Proposed Sierra Vista Substation Site and 138 kV Transmission Line, Webb County, Texas.* HJN 050144 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2005 *An Intensive Cultural Resources Survey of the Proposed 452-acre Park Lakes East Development near Humble, Harris County, Texas.* HJN 050131 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2005 *Archeological Monitoring of Scraping Investigations within the Port Bolivar Community Cemetery, Galveston County, Texas.* Texas Antiquities Committee Permit No. 3857. HJN 050057 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2005 *An Intensive Cultural Resources Survey of EOG Resources, Inc.'s Proposed Carthage Gas Unit No. 112 Alt Natural Gas Well Pad and Access Road, Panola County, Texas.* HJN 030169 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2005 *An Intensive Cultural Resources Survey for the Proposed Widening of Jefferson County Drainage District No. 6's Griffing Ditch, Beaumont, Jefferson County, Texas.* Texas Antiquities Committee Permit No. 3804. HJN 040240 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2005 *An Intensive Cultural Resources Survey of the USACE Jurisdictional Areas within a Proposed Ethanol Plant Facility in Hereford, Deaf Smith County, Texas.* HJN 050113 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2005 *Backhoe Trenching at 2 Proposed Lift Stations Located in Richmond, Fort Bend County, Texas.* Texas Antiquities Committee Permit No. 3712. HJN 050043 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2006 *An Intensive Cultural Resources Survey of the USACE Jurisdictional Areas Associated with the Proposed Realignment of Macho Creek, Duval County, Texas.* HJN 060199 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2006 *An Intensive Cultural Resources Survey of the USACE Jurisdictional Areas Associated with 3 Proposed Detention Ponds and 2 Proposed Road Crossings within the Proposed Headwaters of Barton Creek Development, Drippings Springs, Hays County, Texas.* HJN 040116 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2006 *An Intensive Cultural Resources Survey of the Area of Potential Effect within the 164-acre Webb Development, Austin, Travis County, Texas.* HJN 050068 AR. Horizon Environmental Services, Inc. Austin, Texas.

- 2006 *Cultural Resources Assessments of 4 Maintenance Locations along the Longhorn Partners Pipeline, L.P. in Schleicher County, Texas.* HJN 050175 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2006 *An Intensive Cultural Resources Survey of the Proposed Moore Street Detention Basin, Beaumont, Jefferson County, Texas.* Texas Antiquities Committee Permit No. 4028. HJN 060015 AR. Horizon Environmental Services, Inc. Austin, Texas.
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- 2006 *An Intensive Cultural Resources Survey of the Proposed Corley-Cartwright Detention Basin, Beaumont, Jefferson County, Texas.* Texas Antiquities Committee Permit No. 4030. HJN 060016 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2006 *An Intensive Cultural Resources Survey of the Proposed Ridgewood Detention Basin, Beaumont, Jefferson County, Texas.* Texas Antiquities Committee Permit No. 4029. HJN 060014 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2006 *Cultural Resources Assessments of 21 Maintenance Locations along the Longhorn Partners Pipeline, L.P. in Travis, Bastrop, and Fayette Counties, Texas.* HJN 050175 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2007 *An Intensive Cultural Resources Survey of 4 HDD Locations on the Proposed Pecan Pipeline Right-of-Way, Palo Pinto County, Texas.* HJN 060191 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2007 *An Intensive Cultural Resources Survey of 4 Additional HDD Locations on the Proposed Pecan Pipeline Right-of-Way, Palo Pinto County, Texas.* HJN 060191 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2007 *Cultural Resources Assessments of 53 Maintenance Locations along the Longhorn Partners Pipeline, L.P. ROW in Gillespie, Kimble, Schleicher, Crockett, Reagan, Upton, and Crane Counties, Texas.* HJN 050175 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2007 *An Intensive Cultural Resources Survey of 78 Archeological High Probability Areas between the Cedar Valley and Fort McKavett Pump Stations on the Longhorn Pipeline Right-of-Way in Hays, Blanco, Gillespie, Llano, Mason, Kimble, Menard, and Schleicher Counties, Texas.* Texas Antiquities Committee Permit No. 4576. HJN 050175 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2007 *An Intensive Cultural Resources Survey of Lake Travis ISD's 12.75-acre West Cypress Hills Elementary School Tract, Travis County, Texas.* Texas Antiquities Committee Permit No. 4729. HJN 070187 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2007 *An Intensive Cultural Resources Survey and Subsequent NRHP Eligibility Testing of Areas within the Proposed 238-acre Blanco Riverwalk Development, Hays County, Texas.* HJN 060195 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2007 *An Intensive Cultural Resources Survey of 12 Archeological High-Probability Areas along 42 Miles of Extra Work Spaces on the Longhorn Partners Pipeline Right-of-Way in Ward and Reeves Counties, Texas.* HJN 070176 AR. Horizon Environmental Services, Inc. Austin, Texas.

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- 2007 *An Intensive Cultural Resources Survey of the 15-acre Round Rock ISD Paloma Lake Tract, Round Rock, Williamson County, Texas.* Texas Antiquities Committee Permit No. 4713. HJN 070166 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2007 *An Intensive Cultural Resources Survey of 12 Cathodic Protection Beds along the Longhorn Pipeline Right-of-Way in Travis, Blanco, Gillespie, Mason, Crockett, Reagan, and Culberson Counties, Texas.* Texas Antiquities Committee Permit No. 4594. HJN 050175 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2007 *An Intensive Cultural Resources Survey of a Proposed HDD beneath an Abandoned Tram Road Owned by the US Forest Service in Nacogdoches County, Texas.* HJN 070193 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2007 *Cultural Resources Investigations on the Proposed 1060-acre Vizcaya Development, Spicewood, Travis County, Texas (Volume 1: Survey Level Investigations).* HJN 060231 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2007 *An Intensive Cultural Resources Survey of the Proposed 883-acre Siena Subdivision Property, Round Rock, Williamson County, Texas.* HJN 070065 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2008 *An Intensive Cultural Resources Survey of the Keechi Creek and Brazos River HDD Bore Pits on the Proposed Pecan Pipeline Right-of-Way, Palo Pinto County, Texas.* HJN 060191 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2008 *An Intensive Cultural Resources Survey of Orange County WCID No. 1's Oak Lane WWTP Improvements, Vidor, Orange County, Texas.* Texas Antiquities Committee Permit No. 4748. HJN 080006 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2008 *An Intensive Cultural Resources Survey of the Proposed 80-acre Arbol Grande on St. Charles Bay Subdivision Tract, Aransas County, Texas.* HJN 080045 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2008 *An Intensive Cultural Resources Survey of the Proposed Woodland Acres Flood Mitigation Project, Beaumont, Jefferson County, Texas.* Texas Antiquities Committee Permit No. 4972. HJN 080094 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2008 *Cultural Resources Investigations Conducted for the City of Anahuac's Proposed Water System Improvements, Anahuac, Chambers County, Texas.* Texas Antiquities Committee Permit No. 3856. HJN 050139 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2008 *An Intensive Cultural Resources Survey of the Proposed Houston Fuel Oil Terminal Barge Docks #7 and #8 on Carpenters Bayou, Harris County, Texas.* HJN 080106 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2009 *An Intensive Cultural Resources Survey of the Trinity Bay Conservation District's Proposed 90-acre Freshwater Impoundment Reservoir in Chambers County, Texas.* Texas Antiquities Committee Permit No. 5189. HJN 090009 AR. Horizon Environmental Services, Inc. Austin, Texas.

- 2009 *An Intensive Cultural Resources Survey of a Proposed TBCD Water Line and Sanitary Sewer Force Main ROW in Chambers County, Texas.* Texas Antiquities Committee Permit No. 5206. HJN 090039 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2009 *An Intensive Cultural Resources Survey of the Proposed 38.0-acre Hutto Lake Park Property, Hutto, Williamson County, Texas.* Texas Antiquities Committee Permit No. 5247. HJN 090049 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2009 *Cultural Resources Investigations along the Proposed LyondellBasell CVOS ETBE Pipeline Right-of-Way in Harris County, Texas.* HJN 090059 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2009 *An Intensive Cultural Resources Survey of Phase 2 of the Proposed Wild Horse Ranch Northwest Wastewater Interceptor Right-of-Way, Travis County, Texas.* HJN 090061 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2009 *An Intensive Cultural Resources Survey of M2 Midstream, LLC's proposed Blackstone 8-Inch Lateral Natural Gas Gathering Line, DeSoto Parish, Louisiana.* HJN 090055 AR 13. Horizon Environmental Services, Inc. Austin, Texas.
- 2009 *An Intensive Cultural Resources Survey of Louisiana Midstream Gas Services' proposed CHK LA Minerals 32 H-1 Natural Gas Gathering Line, DeSoto Parish, Louisiana.* HJN 080147 AR 107. Horizon Environmental Services, Inc. Austin, Texas.
- 2009 *Cultural Resources Investigations within a Proposed 27.0-acre US Army Reserve Training Center Survey Area, Humble, Harris County, Texas.* HJN 090108 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2009 *An Intensive Cultural Resources Survey of the Houston Fuel Oil Terminal Company's Proposed Ship Dock #4 on Buffalo Bayou, Harris County, Texas.* HJN 090101 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2009 *An Intensive Cultural Resources Survey of the Proposed 89.0-acre Lake Travis ISD Education Facilities Tract, Travis County, Texas.* Texas Antiquities Committee Permit No. 5419. HJN 090115 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2009 *Cultural Resources Investigations of a Proposed Reroute of the LyondellBasell CVOS ETBE Pipeline Right-of-Way in Harris County, Texas.* Texas Antiquities Committee Permit No. 5316. HJN 090059 AR. Horizon Environmental Services, Inc. Austin, Texas.
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- 2010 *An Intensive Cultural Resources Survey of Louisiana Midstream Gas Services' proposed Porter-Beach 26-12-1 Natural Gas Gathering Line in DeSoto Parish, Louisiana.* HJN 080147 AR 125. Horizon Environmental Services, Inc. Austin, Texas.
- 2010 *An Intensive Cultural Resources Survey of Louisiana Midstream Gas Services' proposed Gilliam 23-13-14 H-1 Natural Gas Gathering Line in DeSoto Parish, Louisiana.* HJN 080147 AR 130. Horizon Environmental Services, Inc. Austin, Texas.
- 2010 *An Intensive Cultural Resources Survey of Petrohawk Energy Corporation's Proposed Bolton 26-H1 Well Pad and Access Road in Bossier Parish, Louisiana.* HJN 100011 AR. Horizon Environmental Services, Inc. Austin, Texas.

- 2010 *An Intensive Cultural Resources Survey of Petrohawk Energy Corporation's Proposed Ratzburg 18H No.1 Well Pad and Access Road in Caddo Parish, Louisiana.* HJN 100029 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2010 *An Intensive Cultural Resources Survey of Louisiana Midstream Gas Services' proposed Nabors Properties 13 H-1 Natural Gas Gathering Line in DeSoto Parish, Louisiana.* HJN 080147 AR 124. Horizon Environmental Services, Inc. Austin, Texas.
- 2010 *An Intensive Cultural Resources Survey of Louisiana Midstream Gas Services' proposed Brush Bayou Natural Gas Gathering Line in Caddo Parish, Louisiana.* HJN 080147 AR 138. Horizon Environmental Services, Inc. Austin, Texas.
- 2010 *Archeological Avoidance Plan for the Proposed Union Grave 3-D Seismic Survey Project in Sabine, San Augustine, and Nacogdoches Counties, Texas.* HJN 100026 AR. Horizon Environmental Services, Inc. Austin, Texas.
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- 2010 *Archeological Avoidance Plan for the Proposed Nac East 3-D Seismic Survey Project in Nacogdoches, San Augustine, and Shelby Counties, Texas.* HJN 100032 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2010 *An Intensive Phase I Cultural Resources Survey of the Proposed TGG 36-inch Phase 3 Section 1 Natural Gas Gathering Line in Caddo and DeSoto Parishes, Louisiana.* HJN 100050 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2010 *An Intensive Phase I Cultural Resources Survey of Louisiana Midstream Gas Services' Proposed CHK LA Minerals 24-13-12 Natural Gas Gathering Line, DeSoto Parish, Louisiana.* HJN 080147 AR 140. Horizon Environmental Services, Inc. Austin, Texas.
- 2010 *An Intensive Phase I Cultural Resources Survey of Louisiana Midstream Gas Services' Proposed Mansfield Lateral 4A East Natural Gas Gathering Line, DeSoto Parish, Louisiana.* HJN 080147 AR 141. Horizon Environmental Services, Inc. Austin, Texas.
- 2010 *An Intensive Phase I Cultural Resources Survey of Louisiana Midstream Gas Services' Proposed Calhoun 9-13-12 Natural Gas Gathering Line, DeSoto Parish, Louisiana.* HJN 080147 AR 149. Horizon Environmental Services, Inc. Austin, Texas.
- 2010 *An Intensive Phase I Cultural Resources Survey of Petrohawk Energy Corporation's Proposed TBD 22-16N-10W Off-Unit Alt. No. 1 Well Pad and Access Road in Bienville Parish, Louisiana.* HJN 100057 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2010 *An Intensive Phase I Cultural Resources Survey of Talco Midstream Assets, Ltd's Proposed Country Club 29H No.2 Natural Gas Gathering Line, Caddo and DeSoto Parishes, Louisiana.* HJN 100058 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2010 *An Intensive Phase I Cultural Resources Survey of Petrohawk Energy Corporation's Proposed Weyerhauser 29H-1 and 32H-1 Well Pad Projects, DeSoto Parish, Louisiana.* HJN 100068 AR. Horizon Environmental Services, Inc. Austin, Texas.
- 2010 *An Intensive Phase I Cultural Resources Survey of Louisiana Midstream Gas Services' Proposed Wiggins 31-12-12 Natural Gas Gathering Line, DeSoto Parish, Louisiana.* HJN 080147 AR 152. Horizon Environmental Services, Inc. Austin, Texas.

- 2010 *An Intensive Phase I Cultural Resources Survey of Louisiana Midstream Gas Services' Proposed CHK LA Min 2-13-12 H-1 Natural Gas Gathering Line, DeSoto Parish, Louisiana.* HJN 080147 AR 154. Horizon Environmental Services, Inc. Austin, Texas.
- 2010 *An Intensive Phase I Cultural Resources Survey of Louisiana Midstream Gas Services' Proposed Keatchie 15-14-15 H-1 Natural Gas Gathering Line, DeSoto Parish, Louisiana.* HJN 080147 AR 155. Horizon Environmental Services, Inc. Austin, Texas.
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President



July 16, 2001

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The State Agency for Historic Preservation

A handwritten signature in black ink, appearing to read "Thurmond Cook", written over a horizontal line.

EXECUTIVE DIRECTOR, TEXAS HISTORICAL COMMISSION

A handwritten signature in black ink, appearing to read "May 7, 2004", written over a horizontal line.

DATE