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# Archaeological and Architectural Survey of the Apex Matagorda Energy Center Compressed Air Energy Storage Facility and Associated Infrastructure, Matagorda County, Texas

*Prepared by*  
Sarah E. Loftus, WSA  
Kathryn St. Clair, CP&Y  
Deidra A. Black, WSA  
James W. Karbula, WSA

*Prepared for*  
CH2M HILL Engineers, Inc.  
Five Penn Center West, Suite 300  
Pittsburgh, PA 15276



*Plowed agricultural fields that made up the majority of the survey area, view to the north.*

April 2013  
WSA Technical Report No. 2012-105



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Apex Matagorda Energy Center Compressed Air Energy  
Storage Facility and Associated Infrastructure,  
Matagorda County, Texas**

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*Prepared by*

Sarah E. Loftus, M.A., Principal Investigator  
Kathryn St. Clair, CP&Y, M.S., Architectural Historian  
Deidra A. Black, WSA, M.A., Principal Investigator  
James W. Karbula, WSA, Ph.D., Project Manager

*Submitted by*

James W. Karbula, Sarah E. Loftus, and Deidra A. Black

*Prepared for*

CH2M HILL Engineers, Inc.  
Five Penn Center West, Suite 300  
Pittsburgh, PA 15276

April 2013

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William Self Associates, Inc.  
206 W. Main Street, Suite 111  
Round Rock, TX 78664





## ABSTRACT

Report Title: *Archaeological and Architectural Survey of the Apex Matagorda Energy Center Compressed Air Energy Storage Facility and Associated Infrastructure, Matagorda County, Texas*

Report Date: April 2013

Report Number: WSA Technical Report No. 2013-02

Agency: U.S. Environmental Protection Agency, Region 6

Permit Number: none

Project Description: William Self Associates, Inc. (WSA), in support of CH2M HILL, Inc. (CH2M HILL), conducted background historic archival research and Phase I archaeological and architectural intensive pedestrian survey of the Apex CAES, LLC (Apex), Matagorda Energy Center (MEC), a 317 MW Compressed Air Energy Storage (CAES) facility located approximately ¼ of a mile south of the historic community of Clemville, Matagorda County, Texas, 5 miles northwest of Markham, Texas, and 70 miles southwest of Houston, Texas. The surveys were conducted under Section 106 of the National Historic Preservation Act (NHPA, 1992, as amended) in support of federal permitting associated with the U.S. Environmental Protection Agency (EPA), Region 6 Greenhouse Gas Permit Application under the Clean Air Act.

The archaeological area of potential effect (APE) represents approximately 61.3 acres of green-field construction, including one CAES plant site (43 acres), two water well locations (3.8 acres), one open-cut wastewater pipeline corridor (0.3 miles [0.48 km] long; 65 feet [19.8 m] wide; 2.5 acres), one compressed air pipeline corridor (0.21 miles [0.34 km] long; 75 feet [22.9 m] wide; 2.4 acres), and one freshwater/brine pipeline corridor (1.06 miles [1.71 km] long; 75 feet [22.9 m] wide; 9.65 acres) in Matagorda County, Texas. The survey methodology consisted of a 100 percent systematic archaeological pedestrian survey conducted at 20–30-m intervals over the entire archaeological APE, combined with systematic shovel testing along the linear pipeline corridors, and limited, judgmental shovel testing over the remainder of the project, due to the presence of plowed, eroded, ancient landforms heavily altered by modern oil and gas industry development. The survey covered approximately 61.3 acres and included 23 pedestrian transects and 49 negative shovel tests. One historic archaeological site, 41MG137, was identified as a low-density, historic artifact scatter with no associated features and no subsurface artifacts or components.

The architectural APE is defined as a ½-mile radius extending from the outer boundary of the 43-acre main plant facility footprint in all directions. The APE excluded below-ground components, such as the wastewater, freshwater/brine, and compressed air pipelines, and also the well locations. WSA conducted extensive archival research, developed a historic context, and conducted a field survey for historic structures more than 45 years old within the APE, accounting for viewshed from the 43-acre main plant facility. A Secretary of the Interior–qualified architectural historian identified and documented eight historic-age resources located on eight properties within the APE. These consist of one bridge, one industrial building, two houses, one barn, one culvert, one irriga-

tion ditch, and one pump house. Archival research indicates the irrigation ditch (Resource 7) and the pump house (Resource 8) are components of a larger historic-age irrigation system that extends beyond the APE. The NRHP eligibility of the irrigation system, and of its component features (Resources 7 and 8) as contributing elements to the potential NRHP eligibility of the larger irrigation system, cannot be determined at the survey level of effort within the ½-mile APE (see below). The MEC project will avoid the irrigation ditch (Resource 7) by spanning the ditch with the proposed freshwater/brine pipeline. There will be no impacts to the irrigation ditch (Resource 7). There are no proposed impacts to the pump house (Resource 8). In addition, one Official Texas Historic Marker (OTHM) is located along Farm-To-Market (FM) 1468 to indicate the location of the town of Clemville, Texas. There will be no project impacts to the historic marker.

Acres Surveyed: 61.3

Project Number: WSA Project No. 2012-105

Project Location: northwest Matagorda County, west of Bay City, Texas

Unevaluated Properties: 2

NRHP Eligible Properties: 0

NRHP Ineligible Properties: 7

NRHP Listed Properties: 0

Isolated Occurrences: 0

Total Project Resources: 9

Recommendations: Site 41MG137 is recommended not eligible for listing in the National Register of Historic Places (NRHP) or as a State Archeological Landmark (SAL). No further archaeological investigations are recommended for this site.

WSA respectfully recommends and requests SHPO concurrence that Resources 1–8, including Resources 7 (irrigation ditch) and 8 (pump house), are not individually eligible for listing in the NRHP. WSA recommends and requests SHPO concurrence that any potential for Resources 7 and 8 to be contributing elements to the NRHP eligibility of the historic-age irrigation system remains undetermined. WSA recommends and requests SHPO concurrence that Resources 7 and 8 are not eligible for listing in the NRHP as a rural historic district. WSA respectfully recommends and requests SHPO concurrence that due to project avoidance of these resources, construction and operation of the Apex MEC project will have no effect on Resources 7 and 8, nor on any of the other historic-age resources, under Section 106 of the NHPA.

WSA respectfully recommends and requests SHPO concurrence that there exists a low probability that NRHP-eligible archaeological or architectural historic properties or SALs located within the APE will be affected by the proposed construction of the 43-acre main plant site and associated facilities, due to the negative results of archaeological and architectural research, survey, analysis,

and subsurface testing, and due to project avoidance strategies for Resources 7 (irrigation ditch) and 8 (pump house).

WSA recommends and respectfully requests SHPO concurrence that construction of the proposed 61.3-acre Apex MEC project consisting of the CAES plant site (43 acres), two water well locations (3.8 acres), one open-cut wastewater pipeline corridor (0.3 miles [0.48 km] long; 65 feet [19.8 m] wide; 2.5 acres), one compressed air pipeline corridor (0.21 miles [0.34 km] long; 75 feet [22.9 m] wide; 2.4 acres), and one freshwater/brine pipeline corridor (1.06 miles [1.71 km] long; 75 feet [22.9 m] wide; 9.65 acres) be allowed to proceed under Section 106 of the NHPA, and that all Section 106 consultation for the proposed Apex MEC project be considered concluded and complete.



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## CHAPTER 1. MANAGEMENT SUMMARY

Apex CAES, LLC (Apex), proposes to construct the Matagorda Energy Center (MEC), a 317 MW Compressed Air Energy Storage (CAES) facility located approximately ¼ of a mile south of the historic community of Clemville, Matagorda County, Texas, 5 miles northwest of Markham, Texas, and 70 miles southwest of Houston, Texas (Figure 1). Pursuant to the Clean Air Act, MEC has applied for a permit under the U.S. Environmental Protection Agency's (EPA) Greenhouse Gas (GHG) Prevention of Significant Deterioration (PSD) Program to authorize construction of the facility. Under Section 106 of the National Historic Preservation Act (NHPA, 1992, as amended), federal agencies must consult with the Texas State Historic Preservation Office (SHPO) when any action the agency carries out, funds, or authorizes (such as through a permit) may affect cultural resources. At the request of CH2M HILL, Inc. (CH2M HILL), William Self Associates, Inc. (WSA), conducted a Phase I archaeology and historic structures survey, consistent with Section 106 of the NHPA. These investigations were conducted in support of federal permitting associated with the U.S. EPA, Region 6, GHG Permit Application. It is our understanding that the project will not cross over state-owned or -controlled property at any location or involve state funds, and will take place entirely on private lands.

The MEC will occupy approximately 61.3 acres of greenfield construction consisting of one project plant site, two well locations, one open-cut wastewater pipeline corridor, one compressed air pipeline corridor, and one freshwater/brine pipeline corridor (see Figure 1). The 43-acre plant will consist of above-ground components, including two 120-foot-tall exhaust stacks. The area of potential effect (APE) for the archaeological survey consisted of all areas subject to construction disturbance, including one CAES plant site (43 acres, latitude/longitude 96.141006W/28.989462N), two well locations (3.8 acres), one open-cut wastewater pipeline corridor (0.3 miles [0.48 km] long; 65 feet [19.8 m] wide; 2.5 acres), one compressed air pipeline corridor (0.21 miles [0.34 km] long; 75 feet [22.9 m] wide; 2.4 acres), and one freshwater/brine pipeline corridor (1.06 miles [1.71 km] long; 75 feet [22.9 m] wide; 9.65 acres). With the exception of the 43-acre plant, all components will be buried, confined to the surface, or in limited areas extend no more than 4 to 5 feet above ground. The architectural APE is defined as a ½-mile radius extending from the outer boundary of the 43-acre plant facility footprint in all directions (see Figure 1).

WSA conducted a background records and literature search for archaeological historic properties for the proposed project. WSA conducted systematic Phase I pedestrian survey and shovel testing within the archaeological APE. A 100 percent pedestrian survey was conducted of all project areas at 20–30-m transect intervals. Within the wastewater, compressed air, and freshwater pipeline corridors, shovel tests were excavated every 30 m along one transect within a 75–100-foot corridor (30 m in width or 50 feet [approx. 15 m] on either side of the centerline). Shovel tests were placed judgmentally within the two well locations and the 43-acre main plant facility, due to plowed agricultural fields and oil industry construction and disturbance. Deep, mechanical subsurface testing (backhoe trenching) was not conducted due to demonstrated ancient sediments exhibiting only thin Holocene sediment veneers. Approximately 61.3 acres were subject to pedestrian survey and shovel testing. Twenty-three pedestrian transects were walked, and 49 negative shovel tests were



excavated in support of pedestrian survey. One historic archaeological site, 41MG137, was identified as a low-density surface historic artifact scatter. The site is recommended not eligible for listing on the National Register of Historic Places (NRHP) or as a State Archeological Landmark (SAL). No further archaeological investigations are recommended for this site. WSA respectfully recommends and requests SHPO concurrence that site 41MG137 is not eligible for listing in the NRHP, and that no further archaeological investigations are warranted.

WSA conducted extensive archival research, developed a historic context, and conducted a field survey for historic structures more than 45 years old within the APE, accounting for viewshed from the 43-acre main plant facility. A Secretary of the Interior-qualified architectural historian identified and documented eight historic-age resources located on eight properties within the APE (Table 1). These consist of one bridge, one industrial building, two houses, one barn, one culvert, one irrigation ditch, and one pump house. These eight historic-age resources (Resources 1–8) are recommended not individually eligible for listing in the NRHP.

Archival research indicates Resources 7 and 8 are components of a larger historic-age irrigation system that extends beyond the APE. Architectural survey of the historic-age irrigation system was limited to the APE. The irrigation system is considered a structure composed of a series of features, including a pump house, check gates, and ditches. Though the identified features of a larger irrigation system are located within the APE, the integrity of these features as contributing elements to the potential NRHP eligibility of the irrigation system cannot be fully evaluated without assessing the entirety of the system, which extends outside the APE. The historic integrity of the system as a whole, rather than the integrity of any one individual component, would determine eligibility. With further research, the irrigation ditch (Resource 7) and pump house (Resource 8) may be considered significant features of a system that is considered eligible under Criteria A and C, but the physical boundaries and NRHP eligibility of the historic-age irrigation system is currently undetermined. As individual resources, the irrigation ditch and pump house are not considered historically significant under any of the criteria, as they individually lack historical association and context. The irrigation ditch (Resource 7) and the pump house (Resource 8) are not recommended as a rural historic district, as these resources lack historical and geographic continuity as part of an agrarian landscape due to numerous modern intrusions by the oil and gas industry.

An Official Texas Historical Marker (OTHM) was identified during the fieldwork. The OTHM is located along FM 1468 to indicate the location of the town of Clemville. There will be no project impacts to the OTHM.

Resource 7 (irrigation ditch) intersects the current proposed alignment of the freshwater/brine pipeline. The MEC project is committed to avoidance of the irrigation ditch (Resource 7) by means of a pipe rack placed on both sides of the ditch, at a minimum distance of 10 feet (3 m) from the edge of the ditch on each side, placing the pipeline over and spanning the ditch at an approximate height of 5 feet (1.5 m). There will be no impacts to Resource 7 (irrigation ditch). There are no proposed impacts to Resource 8 (pump house).

WSA respectfully recommends and requests SHPO concurrence that Resources 1–8, including Resources 7 (irrigation ditch) and 8 (pump house), are not individually eligible for listing in the

Table 1. List of identified project resources (architectural and archaeological).

Resource ID	Location	Type and Date	NRHP Eligibility and Criteria	Effects Recommendation
Resource 1	FM 1468 over Tres Palacios River	bridge; 1959	not eligible	no effect
Resource 2	north of FM 1468 and east of CR 417	industrial building; ca. 1930	not eligible	no effect
Resource 3	north of FM 1468	house; ca.1925	not eligible	no effect
Resource 4	north of FM 1468	house; ca.1925	not eligible	no effect
Resource 5	south of FM 1468 and east of CR 417	barn; ca. 1930	not eligible	no effect
Resource 6	FM 1468 over irrigation ditch	culvert; 1941	not eligible	no effect
Resource 7	south of FM 1468 and west of Willow Creek	irrigation ditch	not individually eligible; contribution to larger resource is undetermined	no effect
Resource 8	south of FM 1468 and east of CR 417	pump house structure	not individually eligible; contribution to larger resource is undetermined	no effect
41MG137	east of FM 417, 0.5 miles south of FM 1468	archaeological historic artifact scatter; early to mid-twentieth century	not eligible	no effect

NRHP. WSA recommends and requests SHPO concurrence that any potential for Resources 7 and 8 to be considered contributing elements to the NRHP eligibility of the historic-age irrigation system remains undetermined. WSA recommends and requests SHPO concurrence that Resources 7 and 8 are not eligible for listing in the NRHP as a rural historic district. WSA respectfully recommends and requests SHPO concurrence that due to project avoidance of these resources, construction and operation of the Apex MEC project will have no effect on Resources 7 and 8, nor on any of the other historic-age resources, under Section 106 of the NHPA.

WSA respectfully recommends and requests SHPO concurrence that there exists a low probability that NRHP-eligible archaeological or architectural historic properties, or SALs located within the APE will be affected by the proposed construction of the 43-acre main plant site and associated facilities, due to the negative results of archaeological and architectural research, survey, analysis, and subsurface testing, and due to project avoidance strategies for Resources 7 (irrigation ditch) and 8 (pump house).

WSA recommends and respectfully requests SHPO concurrence that construction of the proposed 61.3-acre Apex MEC project consisting of the CAES plant site (43 acres), two water well locations (3.8 acres), one open-cut wastewater pipeline corridor (0.3 miles [0.48 km] long; 65 feet [19.8 m] wide; 2.5 acres), one compressed air pipeline corridor (0.21 miles [0.34 km] long; 75 feet [22.9 m] wide; 2.4 acres), and one freshwater/brine pipeline (1.06 miles [1.71 km] long; 75 feet [22.9 m] wide; 9.65 acres) be allowed to proceed under Section 106 of the NHPA, and that all Section 106 consultation for the proposed Apex MEC project be considered concluded and complete.



## CHAPTER 2. INTRODUCTION

Apex proposes to construct the MEC, a 317 MW CAES facility located approximately ¼ of a mile south of the historic community of Clemville, Matagorda County, Texas, 5 miles northwest of Markham, Texas, and 70 miles southwest of Houston, Harris County, Texas (see Figure 1). CAES is a commercially available, economically attractive form of bulk energy storage for the electricity grid. CAES technology enhances the integration of renewable energy (wind and solar facilities) and conventional fossil fuel generation by storing energy during off-peak demand periods as compressed air in an underground cavern. The compressed air is released during peak demand periods to generate electricity.

At the request of CH2M Hill, WSA conducted a Phase I archaeological and architectural investigation, consistent with Section 106 of the NHPA. These investigations were conducted in support of federal permitting associated with the U.S. EPA, Region 6, GHG Permit Application. Survey investigations were consistent with the requirements of Section 106 (36 CFR 800) of the NHPA; the Texas Natural Resources Code Title 9, Chapter 191 (Antiquities Code of Texas); and the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (48 FR 44716-44742), and were conducted in accordance with the Archeological Survey Standards for Texas and the guidelines established by the Council of Texas Archeologists (CTA).

### Project Area Description

The MEC will occupy approximately 61.3 acres of greenfield construction that includes the plant site (latitude/longitude 96.141006W/28.989462N), two water well locations, a wastewater pipeline corridor, a compressed air pipeline corridor, and freshwater/brine pipeline corridor (see Figure 1). Current land use on the property consists of undeveloped, heavily grazed pasture land, row-crop farmland, and several pipeline rights-of-way (ROWs). The plant site is bounded by Hoffman Road/County Road (CR) 417 to the west. Land to the north and south of the property is primarily row-crop farmland. One small well pad is located along the northern boundary of the property. The surrounding land use is a mixture of industrial, commercial, farmland, and undeveloped property.

Apex proposes to convey facility wastewater from the plant site to a discharge point on the Tres Palacios River via pipeline. The proposed utility corridor for that pipeline will originate at the east-central boundary of the property and run approximately 0.3 miles (0.48 km) east to the Tres Palacios River, within Matagorda County, Texas (see Figure 1). The proposed alignment consists of a 50-foot (15.2-m) temporary construction easement, of which a 30-foot (9.1-m) easement would remain as permanent ROW. A compressed air pipeline will extend west of the property approximately 0.21 miles (0.34 km), and transport compressed air to and from the CAES storage cavern located immediately west of CR 417. Water required for cavern creation and facility operations will be obtained from the Texas Brine Company. Brine generated during cavern construction will be piped back to the Texas Brine Company via a 1.06-mile (1.71-km) pipeline with a 75-foot-wide (22.9-m) corridor to be constructed between a well location and the nearby saltwater/brine facility

(see Figure 1). The pipeline will originate at a proposed well location 2,000 feet (609.6 m) south of Farm to Market (FM) 1468 and 350 feet (106.7 m) west of CR 417. The proposed pipeline will run south from this point 525 (160.0 m) feet, then turn west for 2,420 feet (737.6 m) following an existing gravel road and fenceline. From that point, the pipeline will turn north 1,825 feet (556.3 m), following another existing fenceline. Then, the proposed pipeline will turn west and continue 890 feet (271.3 m) into the Texas Brine Company facility. Texas Brine Company will process the brine for sale to customers.

The APE for the proposed project totals approximately 61.3 acres and includes: one CAES plant site approximately 43 acres in size; two well locations totaling 3.8 acres; one open-cut wastewater pipeline corridor approximately 0.3 miles (0.48 km) long, 65 feet (19.8 m) wide, and 2.5 acres in total area that extends from the CAES plant site to the Tres Palacios River; one compressed air pipeline corridor 0.21 miles in length (0.34 km), 75 feet (22.9 m) in width, and 2.4 acres in extent; and one freshwater/brine pipeline corridor approximately 1.06 miles (1.71 km) long, 75 feet (22.9 m) wide, and 9.65 acres in area that extends between one well location and the Texas Brine facility located to the west of the project (see Figure 1). In general, the project area has been subject to extensive plowing as agricultural land, and has been disturbed by a number of oil-industry-related pipelines.

### **Summary of Work Performed**

WSA conducted a background records and literature search in the development of a historic context for the proposed project. WSA conducted background research of available publications, manuscripts, site records, and the Texas Archeological Sites Atlas (Atlas), an online resource hosted by the Texas Historical Commission (THC) that contains restricted cultural resources information. The purpose of the archival research was to identify any previously recorded archaeological sites, cemeteries, historic structures, markers, properties, and districts listed in the NRHP, as well as SALs in the proposed project area and within 1.0 mile (1.6 km) of the project area. In addition, prior to fieldwork, WSA examined U.S. Department of Agriculture (USDA) soil maps and U.S. Geologic Survey (USGS) geologic maps to determine the probability and relative depth of quaternary or Holocene alluvial deposits in the proposed project area. Archival research indicated the project area to exist on ancient non-depositional landforms with a thin capping of disturbed, Holocene aeolian and eroded sediments.

WSA conducted a complete, 100 percent archaeological pedestrian inventory with shovel testing of undisturbed areas within the APE. Field observation confirmed extensive plowing, disturbance, erosion, and recent modification of the ancient landform. As a result, no deep subsurface trenching was proposed or conducted. During survey, the archaeological crew used a Trimble GeoXT handheld sub-meter GPS unit to follow systematic transects within the survey corridor and to place shovel tests. Pedestrian survey was conducted by two archaeologists walking single transects spaced at 20–30-m intervals. Shovel tests were placed judgmentally throughout the block-shaped project areas due to greatly disturbed ancient landforms, a lack of Holocene sediment deposition, and good ground surface visibility. In the linear pipeline corridors, shovel tests were placed sys-

tematically to conform to the THC linear survey standards of 16 shovel tests per mile per 100-foot-width of ROW, in combination with intensive pedestrian survey. Twenty-three pedestrian transects were walked and 49 negative shovel tests were excavated in support of pedestrian survey. One historic archaeological site, 41MG137, was identified as a low-density surface artifact scatter of glass and ceramics. Shovel tests demonstrated the site contains no buried archaeological remains or artifacts. Artifacts were identified only on the plowed surface of the field. Due to the lack of buried deposits, field efforts were concentrated on observing and documenting visible surface artifacts. Artifacts were analyzed on-site and left in place. One historic-age irrigation ditch was recorded in the APE with no associated artifacts or other features. The irrigation ditch is classified as a historic-age resource for present purposes and is analyzed in conjunction with the architectural survey (see below). In the absence of collected artifacts, WSA will retain all project notes and records in-house, at its Austin office.

WSA conducted extensive archival research, developed a historic context, and conducted a field survey for historic structures more than 45 years old within the APE, accounting for viewshed from the 43-acre main plant facility. A Secretary of the Interior–qualified architectural historian identified and documented eight historic-age resources located on eight properties within the APE (Table 1). These consist of one bridge, one industrial building, two houses, one barn, one culvert, one irrigation ditch, and one pump house. Research indicates the irrigation ditch and pump house to be part of a larger historic-age irrigation system that was owned by either the Cooperative Canal Company, formed in 1909, or the Northern Irrigation Company, formed in 1902. This irrigation system supported extensive rice cultivation throughout the local area and extends outside the project APE. The irrigation ditch and pump house are evaluated in Chapter 7 (architectural investigations), each as individual historic-age resources, and analyzed to the extent practical as component features within the larger irrigation system, as observed within the confines of the APE. In addition, one OTHM was identified during the fieldwork. The OTHM is located along FM 1468 to indicate the location of the town of Clemville.

### **Project Organization**

Key project personnel consisted of Project Manager James Karbula of WSA, Principal Investigators Sarah Loftus and Deidra Black of WSA, and Architectural Historian Kathryn St. Clair of CP&Y, Inc. (CP&Y). Sarah Loftus, Deidra Black, and Brady Wink of WSA conducted archaeological field investigations. Kathryn St. Clair and Deidra Black conducted architectural surveys. Sarah Loftus, Kathryn St. Clair, Deidra Black, and James Karbula co-authored the synthesis report. WSA editors Maggie McClain and Melanie Medeiros conducted editing, formatting, and assembling of the report into InDesign, and performed report quality control. Trevor Self, WSA cartographer and GIS technician, is credited with GIS production of the report illustrations and plates. Resumes for key personnel are presented in Appendix A. Field surveys were conducted December 12–14, 2012, and March 12–14, 2013. Project report production occurred from March through April of 2013. All work met acceptable professional and safety standards. WSA and CP&Y personnel meet all qualifications necessary to carry out archaeological and architectural investigations in areas subject to

Section 106 (NRHP 1992, as amended), including the requirements listed under the Secretary of the Interior's Standards for Archaeology and Historic Preservation (36CFR 800).

### **Report Organization**

The orientation sections of the report are organized into an Abstract, Management Summary, and Introduction. Subsequent sections of the report body include a summary of the Regulatory Framework; Previous Investigations, Archaeological and Historic Background; and Environmental Background. The results of field investigations and analysis are presented in MEC Archaeological and MEC Architectural Investigations. The report body is concluded by a Conclusions and Recommendations section detailing project NRHP recommendations. This is followed by References Cited and Appendix A, which presents resumes of key personnel.

### CHAPTER 3. REGULATORY FRAMEWORK

The NHPA of 1966, as amended, requires that federal agencies take into account the effects of their undertakings on historic properties, defined as resources that are included in, or eligible for inclusion in, the NRHP. The NHPA established the NRHP, which is a list of documented districts, sites, buildings, structures, and objects of national, regional, or local significance. The National Park Service (NPS) established evaluation framework and guidelines to evaluate resources for historical significance. In addition to direct actions of the federal government, federal undertakings are projects involving a permit or license, funding, or other assistance or approval from a federal agency. Section 106 of the NHPA and its implementing regulations at 36 CFR Part 800 outline review procedures that ensure historic properties are considered in federal planning processes.

During the Section 106 process, the federal agency or its delegate must identify historic properties and determine the effect of the proposed project on them. In order to do so, it is first necessary to define and document the APE for the project. The APE is the geographic area within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The APE is influenced by the scale and nature of the undertaking and may be different for different kinds of effects caused by the undertaking. An area broader than the project footprint must be reviewed in order to consider areas where the project could directly, indirectly, or cumulatively affect historic properties. Agencies should consider the type of project proposed, including the height of above-ground structures, the surrounding landscape, and environment in order to determine an appropriate APE.

The federal agency must then determine the presence of properties within the APE that are listed in or eligible for listing in the NRHP. In Texas, the Atlas is utilized to determine the presence of previously documented historic properties within the project area. An archaeologist and/or architectural historian qualified under 36 CFR Part 61 can then determine the presence of historic-age resources within the project area during a field survey, and coordinate with the THC to determine if identified resources are considered eligible for inclusion in the NRHP. Historic-age resources are those that will be 50 years or older at the time of completion of the proposed project. The industry standard is to allow for a five-year construction period from the time of the architectural survey, thus defining the historic-age at 45 years older during field survey.

For properties to be considered eligible for listing in the NRHP, the NPS has developed evaluation criteria to determine historical significance of properties. The four evaluation criteria are as follows:

- Criterion A—that are associated with events that have made a significant contribution to the broad patterns of our history; or
- Criterion B—that are associated with the lives of persons significant in our past; or
- Criterion C—that embody distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

- Criterion D—that have yielded, or may be likely to yield, information important in prehistory or history

Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the NRHP. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

- Criterion Consideration A—religious property deriving primary significance from architectural or artistic distinction or historical importance; or
- Criterion Consideration B—building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
- Criterion Consideration C—birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life.
- Criterion Consideration D—cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or
- Criterion Consideration E—reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or
- Criterion Consideration F—property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or
- Criterion Consideration G—property achieving significance within the past 50 years if it is of exceptional importance.

In addition to the evaluation criteria, the NPS has defined a methodology to evaluate the physical quality of historical resources, or the historic integrity of resources. Historic integrity consists of seven components: location, design, setting, materials, workmanship, feeling, and association. Historic resources must retain integrity in a majority of these seven areas in order to be eligible for the NRHP, since having historic integrity allows a resource to physically demonstrate significant aspects of its past. Once a historic-age resource is identified and it meets one of four above-listed criteria or criteria considerations, then the quality of the resource should be evaluated by applying the aspects of integrity. If the resource meets the criteria and retains integrity, then the resource can be considered eligible for listing in the NRHP.

Once historic properties have been identified in the APE, the federal agency must determine the effect of the proposed undertaking on those historic properties. An effect occurs when an action alters the characteristics of a property that qualify it for listing in the NRHP, including changes to

the property's location, design, setting, materials, workmanship, feeling, and association. Effects can be direct or indirect, and can be physical, visual, audible, or economic. They may include a change in ownership or use. The assessment of effects may reach one of three outcomes:

- No historic properties affected means either there are no historic properties present in the APE, or the proposed project will have no effect on historic properties that are present. SHPO concurrence with this determination concludes the review process, and no further consultation is required.
- No adverse effect means that there are historic properties present in the APE, and while the proposed project will have an effect on them, it is not detrimental. SHPO concurrence with this determination concludes the review process, and no further consultation is required.
- Adverse effect means that the proposed project will have a detrimental impact on historic properties in the APE, such as the introduction of new elements in the property's setting that diminish its historic integrity. The federal agency must continue consultation and seek ways to avoid, minimize, or mitigate the effects to historic properties. Once such means of resolving adverse effects are agreed upon by the agency and consulting parties, they are formalized in a Memorandum of Agreement.

The Section 106 process also includes a requirement for the federal agency to notify the public of the proposed action, and consult with parties with a demonstrated interest in project, such as local interest groups, or county historical commissions (see Chapter 7).



## CHAPTER 4. PREVIOUS INVESTIGATIONS, ARCHAEOLOGICAL AND HISTORIC BACKGROUND

Available archaeological, historical, and architectural data were studied in preparation for conducting the survey, and research was carried out at the WSA office utilizing digital and physical resources. Data sources included the Atlas (THC 2012), Texas Archeological Research Laboratory (TARL) files downloaded through the Atlas, U.S. Bureau of Economic Geology (BEG) maps of Texas, USGS topographic maps, and the Central and Southern Planning Region archaeological planning document for Texas (Mercado-Allinger et al. 1996).

### Archival Research

A records and literature search was conducted for the proposed project area, assuming a 1.0-mile (1.6-km) archival radius from the proposed project elements. This included a search of the Atlas and WSA project files for information on previously conducted surveys or the presence of previously discovered prehistoric and historic archaeological sites, including properties or districts listed on the NRHP, as well as SALs, Historic Markers, and Registered Texas Historic Landmarks (RTHLs) that may be located within or adjacent to the proposed project area. WSA also examined USGS topographic maps for existing cemeteries and historic sites.

The records and literature search found four previously recorded archaeological sites and one previously conducted cultural survey within the archival search corridor. None of these overlap any of the proposed project elements (see Figure 1). Each is summarized below.

No other sites or surveys, and no cemeteries are located within 1.0 mile (1.6 km) of the current project APE as visible on the Atlas. No other cemeteries are visible on USGS 7.5-minute topographic quadrangle maps. No museums, neighborhood surveys, NRHP properties, historical markers, or other cultural resources are located within 1.0 mile (1.6 km) of the current project APE as visible on the Atlas.

#### Sites

*41MG51*

**Coordinates:** [REDACTED]

**Location:** Approx. 1 mile [REDACTED] west of the westernmost project element

**Date Recorded:** 1983

**Significance and Recommendations:** Significance not assessed

**Period:** Prehistoric, late Paleoindian through Middle Archaic

**Brief Site Discussion:** 41MG51 consists of seven isolated finds, including three dart points, spread over an area roughly 135 acres in size. The site was discovered in spoil piles for a ditch [REDACTED]. Three dart points were recorded, and include a Pedernales, a Plainview, and an untyped point. The remaining four artifacts are chert debitage.

*41MG131*

**Coordinates:** [REDACTED]

**Location:** Less than a mile [REDACTED] north of the northernmost project element, [REDACTED]  
[REDACTED]

**Date Recorded:** 2006

**Significance and Recommendations:** Significance assessed as not eligible for NRHP or SAL listing due to a lack of architecture and general paucity of artifactual material

**Period:** Historic

**Brief Site Discussion:** 41MG131 is a historic artifact scatter discovered in a plowed field. Recorded artifacts include whiteware, ironstone, porcelain, aqua and cobalt glass, milk glass, window glass, and brick fragments. The diagnostic materials suggest a general date for the site of early through mid-twentieth century. Any structure in the area would have been razed by 1943, based on aerial photographs.

*41MG132*

**Coordinates:** [REDACTED]

**Location:** Less than a mile [REDACTED] north of the northernmost project element, just north of FM 1468

**Date Recorded:** 2006

**Significance and Recommendations:** Significance assessed as not eligible for NRHP or SAL listing based on extensive alteration to the site and landscape in modern times, as well as better representations of historical occupation in the region

**Period:** Historic

**Brief Site Discussion:** 41MG132 consists of a grouping of historic features located north of FM 1468. The features include piers (pier and beam structure base), concrete culverts, posts, a bottle

and can dump, a general historic midden, a concrete pad, and possibly a privy. Artifacts included many large bottles and cans (judged as industrial deposition) and metal agricultural implement fragments. The site is within the area of the historic town of Clemville, founded in 1908 around an oil extraction industry. There are modern industrial features near and within the site.

41MG133

**Coordinates:** [REDACTED]

**Location:** Approx. 1 mile north of the APE.  
[REDACTED]

**Date Recorded:** 2006

**Significance and Recommendations:** Significance assessed as undetermined. Site is a potentially unique feature, and assessment would require archival deed and possibly oral historic research.

**Period:** Historic, early to mid-nineteenth century

**Brief Site Discussion:** 41MG133 is a canal and parallel berm leading to the Tres Palacios River. The site may be related to rice farming (1930s–1950s) or to early oil production (1900s–1920s), and may represent a unique feature in the area that would require further archival research to fully investigate. On aerial photos, this feature appears to continue to the south, likely at least as far as FM 1468.

## Surveys

*1997 Lower Colorado River Authority Survey*

**Linear Survey:** 4.2 miles (6.76 km) long

**Location:** 0.29 miles (0.47 km) north of the northernmost project element, along FM 1468

**Survey Details:** No further data is available from the Atlas regarding this survey.

## Culture History

The project area lies on the northeast end of the Southern Coastal Corridor Archeological Region as defined in Central and Southern Planning Region archaeological planning document for Texas, in the Colorado/Matagorda Subarea (Mercado-Allinger et al. 1996); this overlaps the Central Texas Coast as defined by Ricklis (1995). The culture history of the area can be broadly divided into

prehistoric and historic periods. The prehistoric period begins with the first introduction of humans in the area; the historic period begins with the first well-documented European arrivals in the area (Mercado-Allinger et al. 1996).

### Prehistoric Period

The prehistory of the Central Texas Coast is commonly discussed in terms of the Paleoindian, Archaic, and Late Prehistoric periods. These periods are differentiated based primarily on artifact assemblages, with dates that are heavily reliant on projectile point styles.

The Paleoindian period (11,000–7950 B.P.) is the earliest recognized period of human occupation in the region. Along this segment of the Texas coast, Paleoindian sites are scarce. Projectile points found in the area that date to this period include Clovis, Folsom/Midland, Scottsbluff, and Angostura types. In addition, megafauna remains have been found on the coast, some in context with stone tools (Mercado-Allinger et al. 1996). One reason behind the (apparent) site scarcity, in addition to generally small populations and perhaps a lack of identification, is that most coastal Paleoindian sites are now submerged under the Gulf of Mexico, inundated with water from the sea level rise that accompanied glacial retreat at the beginning of the Holocene (Ricklis 1995).

The Archaic period (7950–950 B.P.) in the region is marked by human adaptations to changing coastal ecoregions as sea levels stabilized following the end of the Pleistocene. The Archaic period is subdivided into the Early Archaic (7950–4450 B.P.), the Middle Archaic (4450–2950 B.P.), and the Late Archaic (2950–950 B.P.). While the Early and Late Archaic are well represented in the region, sites dating to the Middle Archaic are virtually absent along the Central Texas Coast (Mercado-Allinger et al. 1996).

The Early Archaic period is characterized by generally low populations that utilized large territories (Mercado-Allinger et al. 1996). Coastal occupations during the Early Archaic are often marked by dense but thin shell middens, typically overlooking bays and other drainages. Indeed, oysters are the most significant faunal remains in the archaeological record for this period. While bone of terrestrial creatures that may have been exploited decays quickly in the acidic soils of the region, the lack of fish otoliths, which typically preserve well, suggests fishing was not yet a major food economy for coastal inhabitants. Projectile points associated with the Early Archaic on the coast include Uvalde, Gower, Andice, and Early Triangular types. Tools made from shell, such as edge-flaked knives and scrapers, are first seen in the Early Archaic in this region (Ricklis 1995).

The Middle Archaic has not been identified at sites on the Central Texas Coast (Mercado-Allinger et al. 1996). There have been no radiocarbon assays that produced Middle Archaic dates, and projectile point styles that date to the Middle Archaic have not been found in central and southern Texas. This is likely not a product of sampling bias, because sites with otherwise complete, stratified occupation remains of the whole of the Archaic have no Middle Archaic anthropogenic materials in them. There exists in the whole of the Central Texas Coast a single site that may have evidence of an ephemeral Middle Archaic occupation, or it may be a later occupation atop a natural

shell lens deposited during the Middle Archaic. The reason behind the absence of human occupation of the coastline during this period is likely ecological. During the Middle Archaic, sea levels in Texas bays and estuaries fluctuated wildly, sometimes by several meters within one century. When sea levels fluctuate like this, the normally resource-rich estuaries and bays experience significant die-off and become relative food deserts; this lack of resources is likely the reason behind human abandonment of the coast during this time (Ricklis 1995).

The Late Archaic is well represented in the region; many Late Archaic sites show a broad marine and terrestrial subsistence strategy and repeated occupation, with sites especially overlooking bays. There are also a number of Late Archaic cemeteries in the area (Mercado-Allinger et al. 1996). The return of people to the Central Texas Coast corresponds with sea levels stabilizing at relatively modern levels; the stabilization meant resources again became abundant in the estuaries and bays. Large shell middens become common during the Late Archaic, some nearly 2 m thick. An important change from the Early Archaic assemblages of the Central Texas Coast is the presence of fish otoliths and other bones, showing evidence for fish as a significant resource for the first time in the region. This increase may be partly cultural and/or technological, but it is also partly ecological. The modern sea level was accompanied by the formation of barrier islands, which allowed for vegetation in the mainland bays and estuaries that served as spawning grounds for large populations of fish. Projectile points found at Late Archaic sites in the region include Kent, Ensor, Godley, Marcos, Catan, and Matamoros types; Clear Fork gouges, Olmos bifaces, knives, scrapers, shell tools, and worked bone artifacts are also found in Late Archaic assemblages in the area. Basketry also is evident in Late Archaic assemblages, mostly in the form of asphaltum and burned clay with impressions of baskets on them. The larger sites, locally specialized resources and tools, and cemeteries point to an increase in population and the emergence of well-defined group territories in the region during the Late Archaic (Ricklis 1995).

The Late Prehistoric period (950–250 B.P.) is defined by the arrival of the bow and arrow, as well as by the presence of pottery (Mercado-Allinger et al. 1996). The Late Prehistoric period is subdivided into Initial Late Prehistoric (950–700 B.P.) and Final Late Prehistoric (700–250 B.P.); this subdivision largely correlates to the Austin and Toyah phases in central and south Texas, including some similarities in projectile point types. On the Central Texas Coast, the Initial Late Prehistoric is marked by the presence of Scallorn and Fresno arrow points and sandy-paste pottery. The Final Late Prehistoric is marked by the presence of Perdiz arrow points, and by assemblages including small unifacial scrapers, alternately beveled knives, bowls, jars, constricted-neck ollas, and increased decoration of pottery, including with asphaltum. Clay pipes are also found in some Final Late Prehistoric contexts. The Rockport phase, defined by the presence of Rockport pottery, occurs in a limited geographic context of the Central Texas Coast during the Final Late Prehistoric. At the transition between the Initial and Final Late Prehistoric, mesic conditions allowed bison to travel within 40 km of the coastline, and for that brief time there are sites in the Central Texas Coast with evidence of seasonal bison hunting. Otherwise, the Late Prehistoric was a time of increased regional specialization, and sites show evidence that groups traveled set, seasonal paths between resource areas within their territories. These paths appear to have overlapped between groups during winter, when there is evidence of large aggregate camps on shorelines; this pattern continued

into the historic period and was recorded as a practice of early historic Karankawa groups in the area (Ricklis 1995).

## Matagorda County History

The project area is located in modern-day Matagorda County, near the southern limits of the historic community of Clemville, Texas. In Matagorda County, the historic period begins in the sixteenth century (Kleiner 2013), and is described in terms of European Exploration, Texas Revolution, Texas Statehood and American Civil War, and After the Civil War. The history of Clemville starts at the beginning of the twentieth century and is described in terms of Community, Irrigation Canals, and Oil (Kleiner 2013).

European exploration occurred during the sixteenth and seventeenth centuries. At the time of initial European exploration of the area, the area that is now Matagorda County was occupied by several groups of Karankawa, who spoke linguistically related languages and practiced a hunter-gatherer lifestyle. The first documented European exploration of the area was conducted by two Spaniards: the area was mapped in 1519 by Alonso Álvarez de Pineda, and was likely visited by Álvar Núñez Cabeza de Vaca around 1528. The interior was surveyed by Guido de Lavazares in 1558 and claimed for France. The Spanish expeditions of Llanos-Cárdenas and Alarcón passed through the area in 1718 and 1719, respectively. Although Spain made plans throughout the eighteenth century to settle the area and establish a port, little action was taken towards those goals. After the Mexican Revolution, Anglo-Americans, including members of the Austin colony, began to settle the area. The town of Matagorda was founded in 1829 as a military post to protect Anglo settlers from the indigenous population (Kleiner 2013).

During the Texas Revolution in 1835–1836, citizens of Matagorda largely participated on the Texan side of the conflict, and Matagorda County was formed as one of the first counties in Texas in 1836. Matagorda Bay served as the second largest port for Texas, after the Galveston-Houston port. This status allowed immigration to the area and the development of industry and transportation, linking it to the rest of Texas as well as the world. Cash-crop agriculture and livestock played a large role in the local economy through the early nineteenth century (Kleiner 2013).

Texas became a state in 1845. Shortly thereafter, cotton became a growing and dominant percentage of the agricultural economy of Matagorda County. Along with the cotton, a large number of slaves were brought to the area to work the plantations. As part of increasingly tense race relations in the county, plantation owners attempted to expel Mexican-born citizens because they felt they were a threat to their control of slaves. The population of the county voted in favor of secession in 1861. During the Civil War, there was a Confederate garrison in the county, and skirmishes with Union gunboats took place just offshore. Restrictions on foreign and domestic trade caused by the war greatly depressed the local economy (Kleiner 2013).

After the Civil War, most of the cotton planters left; although other cash crops, as well as cattle, still formed the base of the local economy, the total acreage under cultivation had greatly de-

creased. The decades after the Civil War saw a slow increase in agricultural production. This included a revival of cotton in the 1870s and a beef packing plant established in 1866. At the turn of the century, rice was introduced to the area, and by the 1910s it had become a major cash crop. The rise of rice was boosted by boll weevils destroying much of the cotton crop after the turn of the twentieth century. During the 1920s and through the 1930s, agriculture experienced a slow demise in Matagorda County. In the 1900s and 1910s, oil was discovered in the county, including at Clemville. Oil extraction and manufacturing slowly grew in the area during the 1920s, and then sped up in the 1930s as oil and land speculators drew people to the area. In the 1940s, a U.S. military base was established in the county, and German prisoners of war were imprisoned in facilities in the county. After World War II, farming continued to decline, though the population has continued to increase steadily, largely due to petroleum and other industry (Kleiner 2013).



## CHAPTER 5. ENVIRONMENTAL BACKGROUND

The current project area is located within the Coastal Prairie province of the Gulf Coastal Plain physiographic region of Texas, near the Gulf of Mexico (BEG 1996a). The underlying geology of the area is the Pleistocene-age Beaumont Formation (BEG 1987). The project area lies on the border of the Colorado River Basin and the Colorado-Lavaca River Basin (BEG 1996b), within the Tres Palacios River watershed; the Tres Palacios River eventually leads to Tres Palacios Bay, an extension of Matagorda Bay (USGS 1995a, 1995b).

The general topography of the area is mostly flat, with 0–1 percent slopes towards the east (USGS 1995a). The eastern end of the project area terminates at Tres Palacios River; in this area the river flows generally south. Otherwise, there are no natural moving bodies of water within the project area. There is a wetland that spans the width of the northern border of the project area, but it is likely wholly manmade and related to facilities immediately north of the northern project boundary.

The surface geology of the entire project area is mapped as Beaumont Formation (Qb) and is of Pleistocene age (BEG 1992). The USDA soil map of the area (USDA 1991) shows it entirely with Laewest clay, 0–1 percent slopes (LaA). This soil forms in Pleistocene bay and flood deposits, and is generally black and sticky (USDA 2012). It is likely, given the history of rice farming and oil extraction in the area, that much of the project area is heavily to wholly disturbed.



## CHAPTER 6. MEC ARCHAEOLOGICAL INVESTIGATIONS

### Research Design

The project greenfield construction and APE represents approximately 61.3 acres and includes one CAES plant site approximately 43 acres in size, two well locations (3.8 acres), one open-cut wastewater pipeline corridor (0.3 mile [0.48 km] long; 65 feet [19.8 m] wide; 2.5 acres) extending to the Tres Palacios River, one compressed air pipeline corridor (0.21 miles [0.34 km] long; 75 feet [22.9 m] wide; 2.4 acres), and one freshwater/brine pipeline corridor (1.06 mile [1.71 km] long; 75 feet [22.9 m] wide; 9.65 acres). WSA first conducted and coordinated with Texas 811 One-Call to locate and identify any buried utilities in the proposed survey areas.

The survey consisted of a 100 percent pedestrian survey along 20–30-m transects to identify any historic or prehistoric archaeological sites. As detailed in the Environmental Setting, only ancient soils are present in the project area, including the area adjacent to the Tres Palacios River. Ground surface visibility was generally high (near 90 percent) with a fairly high degree of disturbance. Therefore, shovel tests were placed judgmentally within the 43-acre plant site and well locations to sample project areas and any archaeological sites, and any areas of poor ground surface visibility. Shovel tests were only placed systematically within the linear wastewater and freshwater/brine pipeline corridors at 16 shovel tests per mile per 100-foot-width consistent with THC linear survey standards. A minimum of six shovel tests were placed to investigate identified archaeological sites per THC survey standards. No shovel tests were placed in inundated marsh areas or disturbed or developed areas. Deep mechanical backhoe trenching was not conducted due to shallow, disturbed soils.

In the event of an identified archaeological site, sufficient shovel tests were placed to assess site boundaries, content, and context. Any identified extant archaeological sites, historic features, or artifact concentrations were recorded, photographed, and mapped using a sub-meter GPS unit, and had they been found, subsurface artifacts in shovel tests would have been collected for further study, with landowner permission. In addition, WSA conducted limited archival and historical research to determine the historical importance of historic archaeological sites; detailed, historic archival research was not conducted.

### Results of Field Investigations

A pedestrian survey was carried out in transects of 20–30-m intervals, and 49 negative shovel tests were excavated within the project area (Figure 2, Table 2). In general, the APE is characterized by agriculture and oil and gas development, and a significant portion of the project area is located within a plowed field currently used for cotton production. Additionally, portions of the proposed corridor are crossed by underground pipeline corridors and the various above- and below-ground aspects of the Texas Brine Company facility. The western half of the project area has been subject

to previous ground surface disturbance likely associated with oil and/or gas development. The soil within the project area is defined as Laewest clay, which is a Pleistocene-age formation; this, coupled with the previous ground disturbance, made the potential for encountering intact archaeological deposits low. Nevertheless, one new archaeological site (41MG137) was identified on the ground surface (Figure 3; see Figure 2). The survey narrative is presented below from the eastern to the western end of the APE. This section is concluded by a discussion of site 41MG137, an early- to mid-twentieth-century historic surface artifact scatter that was likely associated with a residential domestic site that was occupied after 1920 and abandoned by the mid-1940s.

### Proposed Wastewater Pipeline Corridor

The proposed wastewater corridor extends from the location of the proposed CAES plant site east to the Tres Palacios River (see Figure 2). The corridor runs through a plowed cotton field with high (near 90 percent) ground surface visibility. Dark clay was visible on the surface. The area has been almost completely disturbed by agriculture and oil industrial activities. A road (CR 417) and an overhead utility line also cross the corridor where it passes north of an existing oil tank battery. An additional disturbance was an existing pipeline intersecting the proposed corridor near CR 417 (Photo 1). The field has been plowed all the way to the bank of the river. Five shovel tests (STs 1–4, ST 8) were placed at 100-m intervals along the proposed corridor, and an additional three tests (STs 5–7) were excavated at the bank of the river (Photo 2). The 100-m-interval shovel tests generally showed 20 cm of dark clay over confirmed late Pleistocene clay; the riverbank shovel tests showed 30 cm of brown sandy clay over mottled Beaumont Formation clay (see Table 2). All tests were negative for cultural materials, and no cultural resources were observed within the proposed wastewater corridor.

### 43-Acre CAES Plant Site

The proposed 43-acre CAES plant site block project area consists of a plowed cotton field that has otherwise been disturbed by petroleum pipeline construction. Surface visibility across the area was high, around 90 percent. A historic artifact scatter (41MG137) was discovered near the southwest corner of the project area and is elaborated upon below. The rest of the project area was subject to pedestrian survey with north–south transects spaced 30 m apart (see Figure 2). Multiple pipelines intersect the project area and represent significant subsurface disturbance. At least two pipelines traverse from the southeast to the northeast corners of the project area. Multiple, modern oil industrial facilities exist adjacent to the project area, west across CR 417. More pipelines appear to run east from those facilities across the project area. An oil battery is located adjacent to the southeast corner of the project area, and more pipelines appear to emanate from that area as well, and extend across the project area. The areas of known and probable buried pipelines were not subject to shovel testing due to disturbance and safety concerns. Two parallel linear depressions were observed in the eastern half of the proposed project area, running roughly northwest to southeast (Photo 3). They were investigated and determined to be depressions spaced 15–20 m



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Table 2. Shovel test results.

ST No.	Profile	Termination Depth (cm)	Reason for Termination	Site	Result
1	0-20 cm 10 YR 2/1 black clay	20	clay, late Pleistocene-age deposits	n/a	negative
2	0-20 cm 10 YR 2/1 black clay	20	clay, late Pleistocene-age deposits	n/a	negative
3	0-20 cm 10 YR 2/1 black clay	20	clay, late Pleistocene-age deposits	n/a	negative
4	0-20 cm 10 YR 2/1 black clay	20	clay, late Pleistocene-age deposits	n/a	negative
5	0-20 cm 10 YR 4/3 brown sandy clay; 20-30 cm heavily mottled (orange, grey, black) clay	30	clay, Disturbed	n/a	negative
6	0-20 cm 10 YR 4/3 brown sandy clay; 20-30 cm heavily mottled (orange, grey, black) clay	30	clay, Disturbed	n/a	negative
7	0-20 cm 10 YR 4/3 brown sandy clay; 20-30 cm heavily mottled (orange, grey, black) clay	30	clay, Disturbed	n/a	negative
8	0-20 cm 10 YR 2/1 black clay	20	clay, late Pleistocene-age deposits	n/a	negative
9	0-30 cm 10 YR 2/1 black clay	30	clay, late Pleistocene-age deposits	41MG137	negative
10	0-30 cm 10 YR 2/1 black clay	30	clay, late Pleistocene-age deposits	41MG137	negative
11	0-30 cm 10 YR 2/1 black clay	30	clay, late Pleistocene-age deposits	41MG137	negative
12	0-25 cm 10 YR 2/1 black clay	25	clay, late Pleistocene-age deposits	41MG137	negative
13	0-30 cm 10 YR 2/1 black clay	30	clay, late Pleistocene-age deposits	41MG137	negative
14	0-30 cm 10 YR 2/1 black clay	30	clay, late Pleistocene-age deposits	41MG137	negative

Table 2. Shovel test results.

ST No.	Profile	Termination Depth (cm)	Reason for Termination	Site	Result
15	0-30 cm 10 YR 2/1 black clay	30	clay, late Pleistocene-age deposits	41MG137	negative
16	0-30 cm 10 YR 2/1 black clay	30	clay, late Pleistocene-age deposits	41MG137	negative
17	0-30 cm 10 YR 2/1 black clay	30	clay, late Pleistocene-age deposits	41MG137	negative
18	0-30 cm 10 YR 2/1 black clay	30	clay, late Pleistocene-age deposits	41MG137	negative
19	0-25 cm 10 YR 2/1 black clay	25	clay, late Pleistocene-age deposits	41MG137	negative
20	0-30 cm 10 YR 2/1 black clay	30	clay, late Pleistocene-age deposits	41MG137	negative
21	0-20 cm 10 YR 2/1 black clay	20	clay, late Pleistocene-age deposits	n/a	negative
22	0-20 cm 10 YR 2/1 black clay	20	clay, late Pleistocene-age deposits	n/a	negative
23	0-30 cm 10 YR 2/1 black clay	30	clay, late Pleistocene-age deposits	n/a	negative
24	0-10 cm 10 YR 2/2 very dark brown clay loam; 10-20 cm 10YR 2/1 black clay	20	clay, late Pleistocene-age deposits	n/a	negative
25	0-20 cm 10 YR 2/1 black clay	20	clay, late Pleistocene-age deposits	n/a	negative
26	0-20 cm 10 YR 2/1 black clay	20	clay, late Pleistocene-age deposits	n/a	negative
27	0-20 cm 10 YR 2/1 black clay	20	clay, late Pleistocene-age deposits	n/a	negative
28	0-20 cm 10YR 2/1 black clay	20	clay, late Pleistocene-age deposits	n/a	negative

Table 2. Shovel test results.

ST No.	Profile	Termination			Site	Result
		Depth (cm)	Reason for Termination	Depth (cm)		
29	0–10 cm 10YR 5/2 grayish brown silty clay loam; 10–20 cm 10YR 5/2 grayish brown silty clay loam with orange and white calcium carbonate mottling, increase in clay, extremely compact	20	increase in clay, extremely compact	n/a	negative	
30	0–20 cm 10YR 2/1 black clay	20	clay, late Pleistocene-age deposits	n/a	negative	
31	0–20 cm 10YR 2/1 black clay	20	clay, late Pleistocene-age deposits	n/a	negative	
32	0–20 cm 10YR 2/1 black clay	20	clay, late Pleistocene-age deposits	n/a	negative	
33	0–30 cm 10YR 2/1 black clay	30	clay, late Pleistocene-age deposits	n/a	negative	
34	0–30 cm 10YR 2/1 black clay	30	clay, late Pleistocene-age deposits	n/a	negative	
35	0–25 cm 10YR 2/1 black clay, disturbed; 25–35 cm 10YR 3/1 very dark gray mottled clay, Beaumont Formation	35	clay, late Pleistocene-age deposits	n/a	negative	
36	0–25 cm 10YR 2/1 black clay, disturbed; 25–35 cm 10YR 3/1 very dark gray mottled clay, Beaumont Formation	35	clay, late Pleistocene-age deposits	n/a	negative	
37	0–20 cm 10YR 6/1 gray sandy clay, disturbed; 20–30 cm 10YR 6/1 gray mottled clay, Beaumont Formation	30	clay, late Pleistocene-age deposits	n/a	negative	
38	0–25 cm 10YR 7/4 very pale brown sand, disturbed; 25–35 cm 10YR 6/1 gray mottled clay, Beaumont Formation	35	clay, late Pleistocene-age deposits	n/a	negative	
39	0–10 cm 10YR 3/1 very dark gray mottled clay, disturbed, Beaumont Formation	10	clay, late Pleistocene-age deposits	n/a	negative	
40	0–10 cm 10YR 3/1 very dark gray mottled clay, disturbed, Beaumont Formation	10	clay, late Pleistocene-age deposits	n/a	negative	
41	0–10 cm 10YR 3/1 very dark gray mottled clay, disturbed, Beaumont Formation	10	clay, late Pleistocene-age deposits	ditch	negative	

Table 2. Shovel test results.

ST No.	Profile	Termination Depth (cm)	Reason for Termination	Site	Result
42	0-15 cm 10YR 3/1 very dark gray mottled clay, disturbed, Beaumont Formation	15	clay, late Pleistocene-age deposits	ditch	negative
43	0-15 cm 10YR 3/1 very dark gray mottled clay, disturbed, Beaumont Formation	15	clay, late Pleistocene-age deposits	ditch	negative
44	0-15 cm 10YR 3/1 very dark gray mottled clay, disturbed, Beaumont Formation	15	clay, late Pleistocene-age deposits	ditch	negative
45	0-25 cm 10YR 3/1 very dark gray mottled clay, disturbed, Beaumont Formation	25	clay, late Pleistocene-age deposits	ditch	negative
46	0-15 cm 10YR 2/1 black mottled clay, disturbed, Beaumont Formation	15	clay, late Pleistocene-age deposits	ditch	negative
47	0-20 cm 10YR 2/1 black clay, disturbed; 20-30 cm 10YR 3/1 very dark gray mottled clay, Beaumont Formation	30	clay, late Pleistocene-age deposits	n/a	negative
48	0-30 cm 10YR 2/1 black clay, disturbed; 30-40 cm 10YR 3/1 very dark gray mottled clay, Beaumont Formation	40	clay, late Pleistocene-age deposits	n/a	negative
49	0-20 cm 10YR 2/1 black clay, disturbed; 20-30 cm 10YR 2/1 black mottled clay, Beaumont Formation	30	clay, late Pleistocene-age deposits	n/a	negative





Photo 1. Project area, showing pipeline crossing of proposed wastewater corridor at CR 417, view to the southwest.



Photo 2. Tres Palacios River, view to the south.



Photo 3. Linear depressions running perpendicular to furrows in the 43-acre proposed plant location, view to the north.

apart that cut across the 30-cm-wide tilled furrows. These lines line up both with the agricultural field and with the oil tank batteries. Because there are historic agricultural earthworks in the area (site 41MG133), these were investigated as potential agricultural earthworks. However, they had no integrity as earthworks and they were minimal depressions, not much lower than the bottom of the plow furrows. In addition, review of historic aerial imagery indicates these depressions show up some time after 1965 and before 1995, putting them out of temporal context of the known historic agricultural earthworks in the area, and more likely associated with modern oil activities (Google Earth 2013). The only other noticeable feature was an emergent wetland identified in the northwest corner of the proposed plant site, just south of an existing, modern oil pad.

In addition to the 12 transects conducted in this project area, three shovel tests (STs 32–34) were excavated in addition to the tests associated with the site investigation. Additional tests were not placed because of the high level of disturbance from underground pipelines crossing the project area, the hazard of digging near pipelines, and the high degree of visibility coupled with Pleistocene clays at the surface. The shovel tests revealed 20–30 cm of dark clay over late Pleistocene-age clays (see Table 2). All tests were negative for cultural materials, and apart from site 41MG137, no cultural resources were observed in this survey area.

## Compressed Air Pipeline and Two Well Locations

The proposed location of the compressed air pipeline and two well locations, all west of CR 417, was free of agricultural disturbance, but had been disturbed by modern oil industry. Vegetation in these areas consisted of low-lying thorny brush (acacia family) and coastal grasses; ground visibility in the area was fairly low, near zero (Photo 4). There was a wetland observed at the southwest corner of this proposed project area. Multiple pipelines and a well head exist within the western well location; the well head is being used by a nearby oil industry facility. Two shovel tests (STs 28 and 29) were placed in the area of the western well location, taking care to avoid obvious pipelines (see Figure 2). These tests revealed 20 cm of dark clay over confirmed Pleistocene-age clay, and 20 cm of gray loam with increasing calcium carbonate content over impenetrable clay. The gray loam was found in the vicinity of the observed wetland. Four shovel tests (STs 22, 27, 30, and 31) were placed judgmentally in the air pipeline corridor, and four shovel tests (STs 23–26) were placed within the eastern proposed well location. These tests showed 20–30 cm of dark clay over confirmed late-Pleistocene-age clay. All shovel tests in this project area were negative for cultural materials. No cultural resources were observed in this survey area.



Photo 4. Looking toward proposed well pads along proposed compressed air line, view to the west.

## Proposed Freshwater/Brine Pipeline Corridor

The proposed freshwater/brine corridor extends from the location of a proposed well pad for the CAES facility and extends generally west, then north (see Figure 2). The corridor largely crosses through a decades-fallow rice field currently part of an oil extraction surface operation, and partly through the active Texas Brine Company facility (Photo 5). The vegetation in the project area was very thick, mostly consisting of knee-high brush and grasses, with the addition of a dense tree-enveloping thorny vine thicket on the southern 300 m of the south–north portion of the proposed corridor (Photo 6). Surface visibility was less than 10 percent, nearly zero in most areas. Where there was visibility, dark clay was visible on the surface. An existing subsurface pipeline and surface gravel road are located immediately south of the project corridor, south of the existing fence and property line (Photo 7). The final 508 m (0.3 mi) of the project corridor were wholly disturbed by subsurface pipelines and the above- and underground facilities of the Texas Brine Company. In addition, the 300 m (0.19 mi) of corridor south of the wholly disturbed portion was also disturbed in the western three-quarters by the same causes. This left approximately a half mile of corridor not disturbed by the subsurface pipelines and Texas Brine Company facilities, and an additional quarter mile that is 75 percent disturbed by those same agents. Fifteen shovel tests (STs 35–49) were excavated at 100-m intervals along the proposed corridor, as well as placed to test a historic



Photo 5. Some of the numerous underground disturbances and facilities of the Texas Brine Facility, view to the west.



Photo 6. Archaeologist preparing to enter the very thick, thorny brush located on the southern 300 m of the north-to-south portion of the corridor, view to the east.



Photo 7. Survey corridor from the east end of the east-to-west portion of the corridor, showing the gravel road and existing pipeline to the south of the survey corridor on the left side of the frame, view to the west.

irrigation feature/structure. The shovel tests generally showed 0 to 30 cm of black clay over mottled Beaumont Formation (Photo 8); the shovel tests closer to the historic canal generally showed 10–15 cm of black clay over mottled Beaumont Formation. The tests in the area of the wetland also showed a veneer to 25 cm of sand to sandy clay over the black clay (see Table 2). The majority of the tests are consistent with modest disturbance of the ancient soil mapped in the area; the tests within the wetland suggest a thin veneer of alluvium has been deposited atop the clayey soil, perhaps as part of the surface operation activities or rice field flooding. All tests were negative for cultural materials, and no cultural resources were observed within the proposed freshwater/brine pipeline corridor.

### Analysis of Historic Irrigation Ditch

The historic irrigation ditch consists of a canal with deflated berms (Photo 9). No artifacts or features aside from the ditch and associated berms were identified during survey investigations. The ditch is approximately 1–1.5 m deep and is 2 m wide with steep walls. The berms on either side of the ditch are less than 0.5 m tall from the surrounding ground surface and 4–5 m wide. When viewed on aerial images, the ditch originates at Willow Creek, to the west; it travels 1,969 feet (600 m) east, and then turns northeast and runs 2,772 feet (845 m) to FM 1468, where it has been direct-



Photo 8. Shovel Test 15, showing the black clay indicative of the ancient soil mapped in the area, view to the north.



Photo 9. The historic irrigation canal feature; the sandy bottom is a sandy veneer, likely historic–modern sediments deposited during irrigation episodes, view to the east.

ed through a culvert constructed in 1941. There is a trace of the culvert extending north-northeast 1,591 feet (485 m), as well as a diversion ditch starting at the culvert and extending 633 feet (193 m) north. South of FM 1468, the ditch appears fairly uniform on aerial images. Within the survey corridor, the ditch enters from the east, runs east for 443 feet (135 m), and then turns northeast and continues for 66 feet (20 m). Within the project corridor, the ditch extends 79 feet (24 m) north to south and 623 feet (190 m) east to west.

The irrigation ditch is likely part of the Northern Irrigation Company canals in the area; Northern operated from 1902 to 1947, and the canal was most likely constructed around 1910 (Griffin et al. 1984; Jenkins 2013). It is mostly disturbed north of FM 1468 by oil/gas extraction facilities. South of FM 1468, it is largely intact except for a few culverts and side-ditches that appear to be associated with modern oil extraction surface operation facilities and the Texas Brine Company facility.

The site environment is an artificial, intermittent water body located within a decades-fallow rice field that is currently used for oil extraction surface operations. The topography is a generally flat interfluvial area between Tres Palacios River and Willow Creek, with a 0–1 percent slope generally south-southeast. Vegetation observed on and around the canal included knee- to waist-high brush, 1-m-tall grasses, and small, scraggly trees.

The irrigation ditch was initially identified as a potential historic feature within the proposed freshwater/brine pipeline corridor during archival research. Based on the archival information, the ditch was surveyed during corridor examination to determine its extent within the project corridor, and

to identify any associated features and/or diagnostic artifacts. Six shovel tests (STs 41–46) were excavated to determine the presence or absence of intact buried deposits, artifacts, and/or associated features. These tests generally show 10–15 cm of dark clay over Beaumont Formation (see Table 2). All shovel tests excavated in assessment of the ditch were negative for cultural materials, intact buried deposits, or additional associated features. Due to lack of buried deposits and any artifacts, the majority of the data regarding the ditch comes from archival research. The ditch was photographed, mapped, and recorded on a Trimble GeoXT handheld sub-meter GPS unit. The boundary of the historic irrigation ditch was based on the presence or absence of its berms within the project corridor. As an isolated feature, the ditch does not maintain archaeological research value. The historic-age irrigation ditch is further studied and analyzed as a historic-age structure (Resource 7) within the architectural APE in Chapter 7.

### Analysis of Site 41MG137

Site 41MG137 is a scatter of historic artifacts that date from the early to mid-twentieth century, and are characteristic of a typical domestic site (Photo 10; see Figure 3). Based on the presence of Depression glass, it appears the site was likely occupied until the 1930s (Photo 11). By the mid-1940s, any structure that had been on the property was gone, as aerial imagery from that time shows no evidence of anything except agricultural fields (Google Earth 2013). The site is located



Photo 10. Overview of 41MG137 site location, view to the south.



Photo 11. Sample of glass artifacts observed at 41MG137.

within a flat (0–1 percent slope) agricultural field that is currently being used for cotton production (see Figure 2). The Tres Palacios River is the closest water source, and is located approximately 850 m to the east. Soils at the site are a sticky black (10YR 2/1) Laewest clay. The Laewest Series is part of the Beaumont Formation, and typically consists of very deep soils of Pleistocene age (USDA 2012). The site has been extensively plowed and is deflated; it is spread out over a large area spanning approximately 100 m north–south by 70 m east–west (see Figure 3). Ground surface visibility at the time of recording was excellent (approximately 90 percent).

The site was discovered during the pedestrian survey of the proposed 43-acre CAES plant site located in the APE. After initial identification, the site was further surveyed to determine the extent of the site boundary, and to identify any existing cultural features and/or diagnostic artifacts. Thirteen shovel tests (STs 9–21) were excavated to determine the presence or absence of intact, buried deposits and to aid in identifying the site boundary (see Figure 3). These tests generally showed 20–30 cm of dark clay over confirmed late Pleistocene-age clay (see Table 2). All shovel tests were negative for cultural materials. Due to the lack of buried deposits, field efforts were concentrated on observing and documenting visible surface artifacts. The site was photographed and mapped by compass and pace, and recorded with a Trimble GeoXT handheld sub-meter GPS unit. As all shovel tests were negative for intact, buried deposits, the boundary of the site was determined based on the extent of surface artifacts. No artifacts were collected.

Artifacts observed at the site included a variety of glass, ceramics, and metal artifacts that date from the early to mid-twentieth century. Curved (i.e., non-window) glass shards included amber,

aqua, colorless, cobalt blue, light green Depression glass, and milk glass. Aqua window glass was also observed, and is the only architectural element suggestive of a previous structure in the area. Ceramics included undecorated whiteware, undecorated ironstone, undecorated porcelain, Bristol glazed stoneware, and Bristol glazed stoneware with an interior Albany Slip. A few unidentifiable fragments of ferrous metal were also observed, including a threaded pipe collar and a chain.

The artifact assemblage suggests that 41MG137 is a domestic site that dates from the early to mid-twentieth century, and was likely occupied during the 1930s, based on the presence of Depression glass. The site is located approximately 800 m south of Clemville, an oil boom town named for Charles T. Clem, who was instrumental in encouraging early oil field developments in the area. Clemville received a post office in 1911, and thrived through the early 1930s (Hardin 2013). Site 41MG137 was likely occupied during this boom period. A review of historic maps indicates that there were no structures located in the area by 1943, suggesting that any occupation of the site had ceased, and any previously associated structures were razed prior to this time (Google Earth 2013).

Archival research indicates that 41MG137 is located on an original land grant that was issued to Henry Parker by the Mexican government in 1833 (Texas General Land Office [TGLO] 2012). The Texas Land and Cattle Company subsequently purchased the entire survey, which numbered some 4,428 acres, and in 1899 it was subdivided into multiple 160-acre lots (Matagorda County Deed Records, Volume 15, page 4). Many of these lots appear to have been purchased by land speculators, several of whom lived out of state. Site 41MG137 is located in the central part of the western half of Lot 4. Lot 4, along with several other lots in the Parker survey, appears to have been jointly owned by a group of investors, including Emma Irene Legge and her husband Robert T. Legge of San Francisco, California; Herbert Farjeon, also of San Francisco; Jacob Baldwin; C. M. Hudson; and L. C. Christian. As the result of settlement of a lawsuit that later ensued, James H. Burnham et al. vs. the Hardy Oil Company in 1917, C. M. Hudson became the sole owner of Lot 4. The Hudson family maintained ownership of the 160-acre lot until 1976 (Matagorda County Deed Records, Volume 562, page 112). The Hudsons, who were residents of Wharton County, also owned Lots 3, 15, and 22 of the original Parker survey, and site 41MG137 is likely associated with a member of the C. M. Hudson family, or a tenant associated with the oil fields. Preliminary archival research revealed no important associations between the Hudson family and the history of Matagorda County.

Based on the heavily disturbed nature of the artifact scatter and the lack of cultural features and intact buried deposits, the archaeological research value for site 41MG137 appears to be low. The site does not appear to have maintained sufficient integrity to be eligible for listing in the NRHP under Criterion D. The site exhibits no intact features and no subsurface lens of preserved archaeological materials, and is eroded on the surface. In addition, there are no known historical associations that would warrant eligibility under Criteria A or B. There are no architectural features present, and the artifact assemblage is typical of the site type, which precludes the site as eligible under Criterion C. Based on this analysis, site 41MG137 is recommended not eligible for listing in the NRHP or as a SAL.



## CHAPTER 7. MEC ARCHITECTURAL INVESTIGATIONS

### Research Design and Survey Methodology

The Atlas was reviewed to determine the presence of previously documented and recorded historic-age resources (defined as 45 years or older). No historic architectural resources were indicated on the Atlas within 1.0 mile (1.6 km) of the proposed project site (subject property). However, an OTHM was identified during fieldwork. The OTHM is located along FM 1468 to indicate the location of the town of Clemville.

Prior to fieldwork and additional research, the APE was established based on the proposed project footprint extent, and the height of the proposed infrastructure. No historic-age structures were identified on the subject property directly; however, an APE was established to encompass a viewshed area from which the proposed facility may be visible. Establishing a viewshed APE helps define the survey area to identify historic resources that may be indirectly affected by the proposed facility.

The project design consists of above-ground buildings, pipelines, and utility structures. The tallest structures proposed would be two 120-foot exhaust stacks. The height of these exhaust stacks was used to establish the radius of the potential viewshed surrounding the proposed subject property. Additionally, the surrounding environment, terrain, and setting were considered to determine the extent of the viewshed. The land-use around the proposed facility property is primarily for oil and gas operations, storage, and processing. Numerous buildings and structures relating to these industries are found adjacent to and within the near vicinity of the subject property. The APE is defined as a ½-mile radius extending from the outer boundary of the facility footprint in all directions (see Figure 2 for the APE and subject property map).

Online research was conducted at the *Handbook of Texas Online*, the Texas General Land Office (TGLO) website, U.S. Census Records, and websites specific to identified historical themes within the project area. The NPS database was researched to review documented historic irrigation systems.

Referencing aerial imagery, an initial field map was developed to determine the location of structures within the APE. This map was utilized as a starting point for the field survey effort. All public and private roads within the APE were driven to determine the presence of historic-age resources within the APE. A Secretary of the Interior–qualified architectural historian identified and documented eight historic-age resources within the APE. All of the resources were photographed from the public ROW except for a portion of Resource 7, which is a linear irrigation structure that traverses the subject property. The architectural historian photographed all structures and buildings on the properties that were visible from the ROW and noted architectural features of each. Historic maps dating from the 1950s, aerial photographs, and topographic maps indicate the presence of canal systems traversing the landscape well beyond the APE, and historical documents reference the irrigation canals in the area. As the research yielded information referencing an irrigation sys-

tem in the area dating from the early twentieth century, the architectural historian investigated the APE for any features associated with an irrigation system. It should be noted that the survey of the historic-age irrigation system was limited to the APE, and where property was accessible. The system expands beyond the APE, though the full extent, condition, and integrity of the system is unknown, and was not surveyed or determined during this investigation.

### **Clemville Village, Irrigation Canals, and Oil**

The project area is located in the area of the historic community of Clemville, Texas, and is situated on the H. Parker A-68 Abstract, and on the W. Hadden A-194 Abstract (TGLO 2012). In 1828, Henry Parker received a land patent for 4,428 acres. In 1847, William Hadden received a patent for 1,107 acres on adjacent land (TGLO 2012). The community was founded at the beginning of the twentieth century (Hardin 2013). At that time, the area consisted largely of farms, particularly rice farms; other industry included ranching, with the addition of oil in the 1910s (Smith 2004). In the 1910s, the community grew a modest amount and contained a post office, general store, hotels, machinists, and telephone service (Hardin 2013), as well as three schools and a church (Smith 2004). The population peaked shortly thereafter. Around 200 persons and 30 to 40 buildings existed in the community. This was maintained until the 1950s, when both people and buildings started to decline in number; the schools had already ceased being used in the 1930s (Hardin 2013). By the 1970s, two residences, the church, and a café were all that was left of the former community, and all were abandoned by 2000 (Smith 2004).

When the community of Clemville was established, rice was the major agricultural crop in the area (Hardin 2013). The rice industry of southeast Texas and southern Louisiana started at the end of the nineteenth century and grew quickly. Because commercial rice agriculture needs abundant and dependable depths and level of water, rice fields are irrigated with anthropogenic canals, some of which can be quite extensive. These canals can be fed by a combination of surface and well water. The canal systems may contain a number of features, including main canals, retention areas, side distribution canals, check gates, pumps, and culverts. At least two canal companies used the waters of Tres Palacios River in Matagorda County at the beginning of the twentieth century. One was the Cooperative Canal Company, which was formed in 1909 and bought by Farmers Canal Company soon afterwards. This canal system had on-going problems with salt water intrusion and downstream flow insufficient to meet demand; wells were used to supplement the insufficient flow and combat salt water intrusion (Griffin et al. 1984). The other company in the area was Northern Irrigation Company, which operated in Matagorda County from 1902 to 1947. The 30-plus miles of canals and 17,000 acres of land managed by Northern Irrigation Company was the largest in the county. One of the schools in Clemville may be the Northern School, established by the company. The canals that run through the project area are likely part of the Northern canal network, as the Northern Irrigation Company canals managed to survive a severe drought in the area in the 1910s, and appeared to successfully combat salt water intrusion (Jenkins 2013). The rice industry was in decline in Clemville after the Great Depression and was largely gone by the 1950s (Smith 2004).

Rice around Clemville was slowly replaced by oil. The 1910s saw the discovery of the Clemville Field, now the Markham Oil Field. This initial boom spurred development of the area and attracted speculators looking for the next Spindletop. The initial oil wells ran mostly dry by the end of a decade or two, but additional wells utilizing new methods caused a secondary, smaller boom in the 1930s. The town of Clemville is represented on a 1940 Census Map with a small cluster of buildings at the intersection of FM 1468 and CR 417. The 1940 census lists “oil field worker” as the primary occupation, outnumbering farming significantly. Oil extraction continues in the fields around what was once Clemville to this day. As the local population began to leave and the agricultural volume declined, oil and related industries became the majority economy in the area. The canal companies sold their land holdings to oil companies and, more recently, to the Texas Salt Brine Pipeline Company (Jenkins 2013; Smith 2004).

### **Current Land Use and Architecture in the Project Area**

The project area contains numerous oil and gas operations and associated infrastructure (Photos 12–17). Many of the former rice fields have been repurposed for oil and gas facilities, or are currently under development for use in these industries. Portions of the former irrigation system remain within the area. These systems, primarily the open-cut ditch features, traverse land that was once cultivated for rice crops. The ditches are relatively straight, and may have followed property

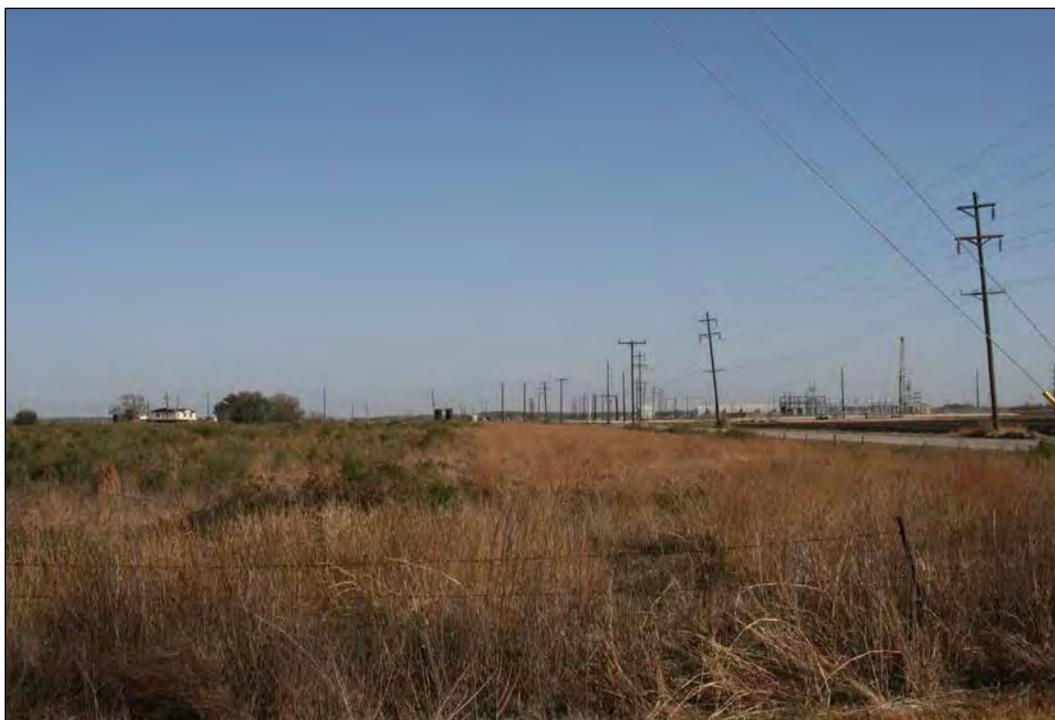


Photo 12. Project area from CR 417, view to the northwest.



Photo 13. Project area from CR 417, view to the southwest.



Photo 14. Project area from CR 417, view to the west.



Photo 15. Project area from CR 417, view to the southwest.



Photo 16. Project area from FM 1468, view to the south.



Photo 17. FM 1468, view to the east towards the former center of Clemville.

lines at one point. Current aerial images depict some of the irrigation system, and indicate that the system extends beyond the project area in all directions. Within the project area, the Tres Palacios River and Willow Creek would likely have been the water source for many of the irrigation canals near Clemville. There are some remaining agricultural fields near the project area, but many associated agricultural buildings are no longer extant. The few remaining domestic buildings near the project area date from the 1920s to the 1940s. A church once stood near the center of the community at the intersection of FM 1468 and CR 417, though it is no longer extant (Smith 2004). The typical historic-age architecture styles expressed in the area are modest frame vernacular folk houses and agricultural buildings. Though farming and ranching remains a consistent pursuit in this region and within portions of the project area, oil and gas facilities are the dominant feature of the landscape.

### Survey Results

The architectural survey of the APE resulted in the identification of eight historic-age buildings and structures within the APE (Figure 4). All eight of the identified historic-age structures are considered not individually eligible for listing in the NRHP. Of these eight, two of the resources (as separate features within an irrigation system or structure) could not be adequately evaluated for listing in the NRHP as contributing features to a system, as the system(s) extend outside the APE. Individually, these features would not be considered historically significant, as they once functioned as part of an integrated system or structure. These resources may be contributing fea-



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tures to a historically significant irrigation structure, should additional associated features within the irrigation structure be identified outside the APE. With further research, these features (7 and 8), as part of a larger structure, may be considered eligible for listing in the NRHP under Criterion A for their association with the agricultural development and irrigation engineering in the region. The other six identified resources lack historical significance.

### Resource 1: Bridge

**Location:** Carries FM 1468 over Tres Palacios River

**Construction Date:** 1959 (Texas Department of Transportation); National Bridge Inventory (NBI) is #131580034610026

**NRHP Eligibility Status:** Not Eligible

**Description:** The steel and concrete slab bridge consists of six spans across the Tres Palacios River. The pier configuration is composed of concrete pile bents supporting concrete bent caps (Photos 18–20). This substructure supports the concrete slabs that provide the asphalt deck for a roadbed. Full-height concrete abutments slope down toward the Tres Palacios River. The deck is 24 feet wide curb-to-curb. A metal guard rail is mounted into the concrete curb on the bridge and



Photo 18. Resource 1, view to the east.



Photo 19. Resource 1, view to the south.



Photo 20. Resource 1, view to the southwest.

supported with wooden posts along the approach roadway. The bridge is void of a sidewalk or date stamp/plaque.

**Historical Significance:** According to the Texas Department of Transportation (TxDOT), the bridge was constructed in 1959 and is not considered eligible for listing in the NRHP (Shondra Mace, TxDOT Environmental Services Division-History Division, March 16, 2013, personal communication to Kathryn St. Clair). The bridge is not associated with any known significant event in history, and is not considered a particularly unique design or type. The bridge is also not known to be associated with a notable person. Since integrity is the ability to convey significance, a discussion of integrity is not applicable for this resource; therefore, the bridge is recommended not eligible for listing in the NRHP under Criteria A, B, or C.

**Conclusion:** The bridge is not considered historically significant under Criteria A, B, or C. Therefore, it is recommended not eligible for listing in the NHRP.

## Resource 2: Industrial Building

**Location:** North of FM 1468 and east of CR 417

**Construction Date:** ca. 1930 (estimated)

**NRHP Eligibility Status:** Not Eligible

**Description:** Rectangular in footprint, the one-story industrial building is sheltered with an end-gabled, standing-seam metal roof. Also clad in standing-seam metal siding, the building fenestration is composed of multi-light, metal-framed windows and some single-light replacement windows. A large roll-top door provides vehicle or equipment entry into the east elevation. Two single-entrance doors are located on the south elevation. One additional structure is on the property. A round holding tank with numerous pipes attached is located east of the industrial building (Photos 21–23). The function or construction date of the tank is unknown.

**Historical Significance:** Constructed in the 1930s, the facility is owned by Enterprise Crude Pipeline, LLC, and a sign on the building indicates it is the Markham Station Facility. Though the facility is associated the oil and gas industry of the area, the industrial building and associated tank do not convey the significance of association with important events in our history. Since integrity is the ability to convey significance, a discussion of integrity is not applicable for this resource. Therefore, the industrial building and tank have little to no significance for its association with events or themes in history under Criterion A.

The industrial building and tank are not associated with persons of known historical significance. Research does not indicate that Enterprise Crude Pipeline is particularly historically significant. Since integrity is the ability to convey significance, a discussion of integrity is not applicable for this resource. Therefore, the industrial building and tank are recommended not eligible for listing in the NRHP under Criterion B.



Photo 21. Resource 2, view to the northeast.



Photo 22. Resource 2, view to the northeast.



Photo 23. Resource 2, view to the northeast.

The facility is not a particularly unique or distinct architectural style or design. It is not known to be a work of a master. Since integrity is the ability to convey significance, a discussion of integrity is not applicable for this resource. The industrial building and tank are recommended not eligible for listing in the NRHP under Criterion C.

**Conclusion:** The industrial building and associated tank are not considered historically significant under Criteria A, B, or C. Therefore, they are recommended not eligible for listing in the NRHP.

### Resource 3: Residence

**Location:** North of FM 1468 and east of CR 417

**Construction Date:** ca. 1925 (estimated)

**NRHP Eligibility Status:** Not Eligible

**Description:** The one-story, frame vernacular house is sheltered by an end-gabled, corrugated metal roof. Supported on brick and concrete piers, the house is clad in asbestos shingles over lapped wood siding. A partially enclosed front porch extends the length of the façade. Numerous window types comprise the fenestration, with six-over-six, wood-framed sash windows being the predominant type. A shed-roof addition extends from the rear elevation. This extension may have been an open porch at one time. The house is vacant and in very poor condition (Photos 24–27). A



Photo 24. Resource 3, view to the southeast.



Photo 25. Resource 3, view to the north.



Photo 26. Resource 3, view to the northeast.



Photo 27. Shed behind Resource 3, view to the northeast.

frame shed with a front-gabled roof and shed-roofed addition is located behind the house (the shed was partially visible from the public ROW).

**Historical Significance:** Constructed in the 1920s, the house was once located near the center of the Clemville community. The house is not known to be associated with important events in our history. Since integrity is the ability to convey significance, a discussion of integrity is not applicable for this resource. Therefore, it has little to no significance for its association with events or themes in history under Criterion A.

The house and shed are not associated with persons of known historical significance. Since integrity is the ability to convey significance, a discussion of integrity is not applicable for this resource. Therefore, the house and shed are recommended not eligible for listing in the NRHP under Criterion B.

The house and shed are not a particularly unique or distinct architectural style or design. It is not known to be a work of a master. Since integrity is the ability to convey significance, a discussion of integrity is not applicable for this resource. The house and shed are recommended not eligible for listing in the NRHP under Criterion C.

**Conclusion:** The house and shed are not considered historically significant under Criteria A, B, or C. Therefore, they are recommended not eligible for listing in the NRHP.

#### Resource 4: Residence

**Location:** North of FM 1468 and east of CR 417

**Construction Date:** ca. 1925 (estimated)

**NRHP Eligibility Status:** Not Eligible

**Description:** The one-story, frame vernacular house is an L-plan with a front-gabled ell. The front door is flanked by two four-over-four, wood sash windows (one is enclosed in plywood). Asbestos shingles over vertical wood planking clads the house. A corrugated metal roof shelters the house. The house is in very poor condition, and further architectural details are indistinguishable (Photos 28–29).

**Historical Significance:** Constructed in the 1920s, the house was once located near the center of the Clemville community. The house is not known to be associated with important events in our history. Since integrity is the ability to convey significance, a discussion of integrity is not applicable for this resource. Therefore, it has little to no significance for its association with events or themes in history under Criterion A.

The house is not associated with persons of known historical significance. Since integrity is the ability to convey significance, a discussion of integrity is not applicable for this resource. Therefore, the house is recommended not eligible for listing in the NRHP under Criterion B.



Photo 28. Resource 4, view to the north.



Photo 29. Resource 4, view to the northeast.

The house is not a particularly unique or distinct architectural style or design. It is not known to be a work of a master. Since integrity is the ability to convey significance, a discussion of integrity is not applicable for this resource. The house is recommended not eligible for listing in the NRHP under Criterion C.

**Conclusion:** The house is not considered historically significant under Criteria A, B, or C. Therefore, it is recommended not eligible for listing in the NRHP.

#### Resource 5: Barn

**Location:** South of FM 1468 and east of CR 417; near banks of the Tres Palacios River

**Construction Date:** ca. 1930 (estimated)

**NRHP Eligibility Status:** Not Eligible

**Description:** Constructed ca. 1930, the frame barn is enclosed in standing-seam metal siding and sheltered with an end-gabled, standing-seam metal roof (Photos 30–31). The barn may have been a hay barn at one time. A large vehicle opening provides access into the southern end.



Photo 30. Resource 5, view to the northeast.



Photo 31. Resource 5, view to the northwest.

**Historical Significance:** The barn may have been constructed to support agricultural activities (rice farming) on the property in the 1930s. The barn is associated with farming operations in this rural community. Farming is a consistent theme of this rural landscape, and this particular parcel does not necessarily convey significance of patterns of history or agricultural themes. Additional, associated outbuildings are no longer extant on the farm property. The barn is no longer part of a cohesive group of structures or an agricultural landscape. Since integrity is the ability to convey significance, a discussion of integrity is not applicable for this resource. Therefore, it has little to no significance for its association with events or themes in history under Criterion A.

The barn is not associated with persons of known historical significance. Since integrity is the ability to convey significance, a discussion of integrity is not applicable for this resource. Therefore, the barn is recommended not eligible for listing in the NRHP under Criterion B.

The barn is not a particularly unique or distinct architectural style or design. It is not known to be a work of a master. The barn is a typical, function design void of architectural details. Since integrity is the ability to convey significance, a discussion of integrity is not applicable for this resource. The barn is recommended not eligible for listing in the NRHP under Criterion C.

**Conclusion:** The barn is not considered historically significant under Criteria A, B, or C. Therefore, it is recommended not eligible for listing in the NRHP.

## Resource 6: Culvert

**Location:** FM 1468 and west of CR 417

**Construction Date:** 1941 (survey plate on culvert)

**NRHP Eligibility Status:** Not Eligible

**Description:** The concrete box culvert carries an irrigation ditch under FM 1468. Concrete, flared-wing walls support the embankments of the ditch (Photos 32–34). The culvert is marked with a metal survey plate stating “Texas Highway Department 1941 Contractor.”

**Historical Significance:** Constructed in the 1940s, the concrete box culvert retains a metal survey benchmark plate embedded in the concrete abutment. There is no indication of the culvert as being associated with the Works Progress Administration (WPA), and TxDOT does not have any records of this structure as a WPA structure (Shondra Mace, TxDOT Environmental Services Division-History Division, March 16, 2013, personal communication to Kathryn St. Clair). The culvert is not known to be associated with important events in our history. Since integrity is the ability to convey significance, a discussion of integrity is not applicable for this resource. Therefore, it has little to no significance for its association with events or themes in history under Criterion A.



Photo 32. Resource 6, view to the northwest.



Photo 33. Resource 6, view to the northeast.



Photo 34. Resource 6, ditch extending from culvert, view to the south.

The culvert is not associated with persons of known historical significance. Since integrity is the ability to convey significance, a discussion of integrity is not applicable for this resource. Therefore, the culvert is recommended not eligible for listing in the NRHP under Criterion B.

The culvert is not a particularly unique or distinct architectural style or design. It is not known to be a work of a master. Since integrity is the ability to convey significance, a discussion of integrity is not applicable for this resource. The culvert is recommended not eligible for listing in the NRHP under Criterion C.

**Conclusion:** The culvert is not considered historically significant under Criteria A, B, or C. Therefore, it is recommended not eligible for listing in the NRHP.

### Resource 7: Irrigation Ditch

**Location:** South of FM 1468 and west of CR 417

**Construction Date:** ca. 1911 (estimated)

**NRHP Eligibility Status:** Not individually eligible; undetermined as a contributing element to the potential NRHP eligibility of a historic-age irrigation system.

**Description:** The irrigation ditch that traverses the project area extends from the culvert identified as Resource 6 and runs at an approximately 45-degree angle to the southwest, where it turns due west and connects with Willow Creek outside the APE. The feature is an open-cut, earthen ditch that is interconnected with other similar irrigation ditches near the APE. No additional features directly associated with the ditch were identified within the APE. The ditch runs under the oil and gas utility roads via metal pipe culverts (Photos 35–38). No pumps, check gates, stand pipes, etc., are directly connected above-ground with this structure.

**Historical Significance:** An irrigation system is considered a structure composed of a series of features, including a pump house, check gates, and ditches. The NPS defines a structure as “a functional construction made for purposes other than human shelter.” Other canal systems in Texas, such as the Franklin Canal in El Paso County, were listed in the NRHP as a structure with multiple resources.

It is not likely that this ditch, as part of a larger irrigation system, would be considered a rural historic district, as the components do not have a “continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development” (NPS 2002). The irrigation system does not have continuity with the farmland it once served, and there is not a concentration of sites, buildings, or structures that are united historically. Therefore, the system as a whole would likely be considered a historic structure, and not a district.

The irrigation ditch identified within the APE is likely part of what once was the Cooperative Canal Company, formed in 1909 or the Northern Irrigation Company, formed in 1902. Irrigation ditches were integral to the success of the rice farming in the region, as they enabled farmers to irrigate



Photo 35. Resource 7, view to the east.



Photo 36. Resource 7, view to the northeast.



Photo 37. Resource 7, view to the west.



Photo 38. Resource 7, view to the northwest.

fields from natural water sources. Agriculture pre-dated the oil and gas industry in the region, and was the foundation of the economy for early settlements. The irrigation ditch is potentially eligible for listing in the NRHP under Criterion A, as part of a larger system, for its association with the agricultural development in the area.

The identified irrigation ditch is not known to be associated with the lives of significant persons in the areas of engineering, agriculture, or community planning. The irrigation ditch is not considered eligible for listing in the NRHP under Criterion B.

Irrigation systems may be considered eligible for listing in the NRHP under Criterion C in the area of engineering, if the structure embodies enough distinctive characteristics to be considered a representative of its type, period, or method of construction. For irrigation systems, the structure must retain a high degree of integrity, and must be compared to other systems to determine its significance. The ditch, as part of a larger system, may be considered eligible for listing in the NRHP under Criterion C.

**Integrity Discussion:** Though the identified features of a larger irrigation system are located within the APE, the integrity of this irrigation ditch cannot be fully evaluated without assessing the entirety of the system, which extends outside the APE. With further research, the irrigation ditch may be considered a significant feature of a system that is considered eligible for listing in the NRHP under Criteria A and C. As an individual resource, the irrigation ditch is not considered historically significant under any of the criteria, as it would lack historical association and context. Below is a discussion of the historic integrity of the resource, and how integrity would be applied if the irrigation ditch were to be evaluated as a system. Because integrity could not be fully evaluated for this resource, an eligibility recommendation for this resource could not be made, as part of a larger system. As the ditch identified within the APE is part of a larger system, it is not prudent to comprehensively evaluate the integrity of the structure during this study, but rather provide comments on the integrity that can be noted at this time.

For structures to be considered eligible for listing in the NRHP, they must “include all of the extant basic structural elements, and parts of the structures cannot be considered eligible if the whole structure remains” (NPS 2002). The historic integrity of the system as a whole, rather than the integrity of any one individual component, will determine eligibility. An irrigation system should have a water source, a means to divert and convey water into the system, and capacity to distribute and control water through the network, and to deliver water to the farmland (Knight 2009). Irrigation systems may have components that lack individual distinction, but as a system, may convey the overall historical significance of the structure. Irrigation resources considered eligible for listing in the NRHP under Criterion A must retain a sufficient level of historic integrity to express the structure’s connection with the historic context (Knight 2009). As the function of an irrigation system relates directly to its agricultural context, it is important that it retain integrity of setting, feeling, and association (Knight 2009).

To determine the integrity of the system, the presence of character-defining features of the system and all associated features should be identified. The integrity of design is undetermined, as the system was not fully evaluated and extends beyond the APE. Should most of the components be

extant and in fair or good condition, then the integrity of design would be retained. Similarly, the integrity of materials could not be assessed on the entire system as direct property access was not available, and the components could not be evaluated. Workmanship is the physical evidence of craftsmanship, and is closely linked to materials in a vernacular setting. The integrity of workmanship for all the components of the system could not be assessed due to limited access; however, the portion of the ditch viewed within the APE appeared relatively unaltered (had not been lined, for example).

The integrity of setting depends on whether the existing setting conveys the historical significance of the resource during the period of significance of the resource. The irrigation system is currently surrounded by oil and gas operations, with some agricultural fields. However, the overall agricultural landscape setting is compromised by the significant industrial development. The canal system retains the integrity of location, although it has lost the integrity of association, setting, and feeling. The irrigation system (the part evaluated within the APE) is no longer in operation and is not associated with agricultural functions. The modern intrusions diminish the ability to retain integrity of association, setting, and feeling. A canal outside the context of agricultural lands does not convey historical significance due to the compromised setting. In addition, the irrigation ditch cannot convey historical significance as contributing to the agricultural development of an area as an individual segment or structure.

**Conclusion:** The ditch as an individual resource is not considered historically significant under Criteria A, B, or C. Therefore, as an individual resource, it is recommended not eligible for listing in the NRHP. The irrigation system that this ditch is associated with may, with further research and survey, be considered eligible for listing in the NRHP under Criteria A, C, or both. However, this particular ditch as a feature of an irrigation system (the system would be considered a structure) may not be considered a contributing feature to a historically significant irrigation system, as this particular feature lacks integrity due to the compromised agricultural setting and lack of association.

#### Resource 8: Pump House

**Location:** South of FM 1468 and east of CR 417

**Construction Date:** ca. 1915 (estimated)

**NRHP Eligibility Status:** Not individually eligible; undetermined as a contributing element to the potential NRHP eligibility of an historic-age irrigation system.

**Description:** The small, frame pump house is perched on the bank of the Tres Palacios River (Photos 39–41). The gabled-roof structure appears to have metal equipment inside; likely a diesel-powered engine based on the presence of a gas tank adjacent to the structure. A bermed, open-cut ditch leads from the pump house to the road (CR 417). Near the road is a small metal check gate. It is unknown whether the water pump is functional. The pump house, attached ditch, and check



Photo 39. Resource 8, view to the northeast.



Photo 40. Resource 8, check gate, view to the east.



Photo 41. Resource 8, bermed ditch, view to the east.

gate are all considered component features of the historic-age irrigation system, and are identified as Resource 8.

**Historical Significance:** Constructed ca. 1915, the pump house likely siphoned water from the Tres Palacios River, where the water was then channeled through a series of canals that bisected early twentieth-century rice fields. One such channel is directly connected to the pump house. This channel is an open-cut, earthen-lined, bermed ditch that runs from the creek and perpendicular to CR 417. It is likely that the ditch was interconnected with other ditches, and the pump house supplied water to the interconnected system. The pump house, ditch, and check gate are associated with a larger irrigation system that was likely integral to the agricultural development and success in the Clemville community. The pump house and associated features may be considered eligible for listing in the NRHP under Criterion A.

The identified pump house, ditch, and check gate are not known to be associated with the lives of significant persons in the areas of engineering, agriculture, or community planning. The features are not considered eligible for listing in the NRHP under Criterion B.

Irrigation systems may be considered eligible under Criterion C in the area of engineering if the structure embodies enough distinctive characteristics to be considered a representative of its type, period, or method of construction. For irrigation systems, the structure must retain a high degree of integrity, and must be compared to other systems to determine its significance. The features, as part of a larger system, may be considered eligible for listing in the NRHP under Criterion C.

**Integrity Discussion:** Though the identified features of a larger irrigation system are located within the APE, the integrity of these features cannot be fully evaluated without assessing the entirety of the system, which extends outside the APE. With further research, the pump house and associated features may be considered a significant component of a system that is considered eligible under Criteria A and C. As an individual resource, these features are not considered historically significant under any of the criteria, as they would lack historical association and context. Below is a discussion of the historic integrity of the resource, and how integrity would be applied if the pump house were to be evaluated as a system. Because integrity could not be fully evaluated for this resource, an eligibility recommendation for this resource could not be made. As the pump house identified within the APE are part of a larger system, it is not prudent to comprehensively evaluate the integrity of the features during this study. General comments regarding the noted integrity are discussed below.

For structures to be considered eligible for listing in the NRHP, they must “include all of the extant basic structural elements, and parts of the structures cannot be considered eligible if the whole structure remains” (NPS 2002). The historic integrity of the system as a whole, rather than the integrity of any one individual component, will determine eligibility. An irrigation system should have a water source, a means to divert and convey water into the system, and capacity to distribute and control water through the network, and to deliver water to the farmland (Knight 2009). Irrigation systems may have components that lack individual distinction, but as a system, may convey the overall historical significance of the structure. Irrigation resources considered eligible for listing in the NRHP under Criterion A must retain a sufficient level of historic integrity to express the structure’s connection with the historic context (Knight 2009). As the function of an irrigation system relates directly to its agricultural context, it is important that it retain integrity of setting, feeling, and association (Knight 2009).

To determine the integrity of the system, the presence of character-defining features of the system and all associated features should be identified. The integrity of design is undetermined, as the system was not fully evaluated and extends beyond the APE. Should most of the components be extant and in fair or good condition, then the integrity of design would be retained. Similarly, the integrity of materials could not be assessed on the entire system as direct property access was not available, and the components could not be evaluated. Workmanship is the physical evidence of craftsmanship, and is closely linked to materials in a vernacular setting. The integrity of workmanship for all the components of the system could not be assessed due to limited access. The pump house is not likely functional, though this could not be confirmed.

The integrity of setting depends on whether the existing setting conveys the historical significance of the resource during the period of significance of the resource. The period of significance of this resource may be defined as 1910–1940, during the period of operation of the irrigation companies. The irrigation system is currently surrounded by oil and gas operations, with some agricultural fields. However, the overall agricultural landscape setting is compromised by the significant industrial development. The canal system retains the integrity of location, although it has lost the integrity of association, setting, and feeling. The modern intrusions diminish the ability to retain

integrity of association, setting, and feeling. The structure cannot convey historical significance as contributing to the agricultural development of an area as an individual segment or feature.

**Conclusion:** This groups of features as an individual resource is not considered historically significant under Criteria A, B, or C. Therefore, as an individual resource, it is recommended not eligible for listing in the NRHP. The irrigation system that this pump house, ditch, and check gate are associated with may, with further research and survey, be considered eligible for listing in the NRHP under Criteria A, C, or both. However, these particular features of an irrigation system (the system would be considered a structure) may not be considered contributing features to a historically significant irrigation system, as these particular features lack integrity due to the compromised agricultural setting and lack of association.

### **Recommendation of Effects**

Following the Section 106 process and the NRHP guidelines for evaluating historic properties, an architectural historian identified no historic-age resources that are individually considered eligible for listing in the NRHP. Two resources, 7 and 8, may be component features of a larger irrigation system that may be considered eligible for listing in the NRHP as a historically significant structure. However, the resources identified may not be considered significant features to such an eligible structure, as they lack integrity as features.

Resource 7 (the irrigation ditch) intersects the current proposed alignment of the freshwater/brine pipeline. Should the resource be considered a significant feature of an NRHP-eligible structure, the MEC project is committed to avoidance of the irrigation ditch (Resource 7) by means of a pipe rack placed on both sides of the ditch, at a minimum distance of 10 feet (3 m) from the edge of the ditch on each side, placing the pipeline over and spanning the ditch at an approximate height of 5 feet (1.5 m). There will be no impacts to Resource 7 (irrigation ditch). There are also no proposed impacts to Resource 8 (pump house), as this resource is not located on the subject property. Therefore, the proposed project will have no effect on Resources 7 and 8.

The proposed project would also have no effect on Resources 1–6, as these resources are not considered eligible for listing in the NRHP.

One OTHM is located along FM 1468 to indicate the location of the town of Clemville, Texas. The proposed project will have no effect on the historic marker.

### **Consulting Parties**

In addition to the THC, the following consulting parties are recommended for inclusion in the Section 106 of the NHPA.

- Matagorda Historical Commission
- Matagorda County Museum

## CHAPTER 8. CONCLUSIONS AND RECOMMENDATIONS

WSA, in support of CH2M HILL, conducted archaeological and architectural reconnaissance and intensive pedestrian survey of all MEC project elements consistent with Section 106 of the NHPA. The survey was conducted under and was consistent with the requirements of Section 106 (36 CFR 800) of the NHPA (1992, as amended), as required by EPA permitting associated with a GHG Permit Application. The survey was also conducted in conformance with the Texas Natural Resources Code Title 9, Chapter 191 (Antiquities Code of Texas), and survey guidelines established by the CTA. The APE for archaeological cultural resources consisted of approximately 61.3 acres of greenfield construction consisting of the CAES plant site (43 acres), two water well locations (3.8 acres), one open-cut wastewater pipeline corridor (0.3 miles [0.48 km] long; 65 feet [19.8 m] wide; 2.5 acres), one compressed air pipeline corridor (0.21 miles [0.34 km] long; 75 feet [22.9 m] wide; 2.4 acres), and one freshwater/brine pipeline corridor (1.06 miles [1.71 km] long; 75 feet [22.9 m] wide; 9.65 acres). The architectural APE is further defined as an additional ½-mile radius extending from the outer boundary of the 43-acre plant facility footprint in all directions.

WSA conducted a background records and literature search for archaeological historic properties for the proposed project. WSA conducted systematic Phase I pedestrian survey and shovel testing within the archaeological APE. A 100 percent pedestrian survey was conducted of all project areas at 20–30-m transect intervals supported by both systematic and judgmental shovel testing. A total of approximately 61.3 acres was subject to pedestrian survey and shovel testing. Twenty-three pedestrian transects were walked, and 49 negative shovel tests were excavated in support of pedestrian survey. One new historic archaeological site, 41MG137, was identified as a low-density surface historic artifact scatter. The site is recommended not eligible for listing in the NRHP or as a SAL. No further archaeological investigations are recommended for this site. WSA respectfully recommends and requests SHPO concurrence that site 41MG137 is not eligible for listing in the NRHP and that no further archaeological investigations are warranted. One historic-age earthen irrigation ditch was identified crossing the APE (discussed below).

The architectural APE is defined as a ½-mile radius extending from the outer boundary of the 43-acre main plant facility footprint in all directions. The APE excluded below-ground components, such as the wastewater, compressed air, and freshwater/brine pipelines, and also the well locations. WSA conducted extensive archival research, developed a historic context, and conducted a field survey for historic structures more than 45 years old within the APE, accounting for viewshed from the 43-acre main plant facility. A Secretary of the Interior–qualified architectural historian identified and documented eight historic-age resources located on eight properties within the APE. These consist of one bridge, one industrial building, two houses, one barn, one culvert, one irrigation ditch, and one pump house. Archival research indicates the irrigation ditch (Resource 7) and the pump house (Resource 8) are components of a larger historic-age irrigation system that extends beyond the APE. The NRHP eligibility of the irrigation system, and of its component features (Resources 7 and 8) as contributing elements to the potential NRHP eligibility of the larger irrigation system, cannot be determined at the survey level of effort within the ½-mile APE (see below). The MEC project will avoid the irrigation ditch (Resource 7) by spanning the ditch with the proposed

freshwater/brine pipeline. There will be no impacts to the irrigation ditch (Resource 7). There are no proposed impacts to the pump house structure (Resource 8). In addition, one OTHM is located along FM 1468 to indicate the location of the town of Clemville, Texas. There will be no project impacts to the historic marker.

Site 41MG137 is recommended not eligible for listing in the NRHP or as a SAL. No further archaeological investigations are recommended for this site.

WSA respectfully recommends and requests SHPO concurrence that Resources 1–8, including Resources 7 (irrigation ditch) and 8 (pump house), are not individually eligible for listing in the NRHP. WSA recommends and requests SHPO concurrence that any potential for Resources 7 and 8 to be contributing elements to the NRHP eligibility of the historic-age irrigation system remains undetermined. WSA recommends and requests SHPO concurrence that Resources 7 and 8 are not eligible for listing in the NRHP as a rural historic district. WSA respectfully recommends and requests SHPO concurrence that due to project avoidance of these resources, construction and operation of the Apex MEC project will have no effect on Resources 7 and 8, nor on any of the other historic-age resources, under Section 106 of the NHPA.

WSA respectfully recommends and requests SHPO concurrence that there exists a low probability that NRHP-eligible archaeological or architectural historic properties, or SALs located within the APE will be affected by the proposed construction of the 43-acre main plant site and associated facilities, due to the negative results of archaeological and architectural research, survey, analysis, and subsurface testing, and due to project avoidance strategies for Resources 7 (irrigation ditch) and 8 (pump house).

WSA recommends and respectfully requests SHPO concurrence that construction of the proposed 61.3-acre Apex MEC project consisting of the CAES plant site (43 acres), two water well locations (3.8 acres), one open-cut wastewater pipeline corridor (0.3 miles [0.48 km] long; 65 feet [19.8 m] wide; 2.5 acres), one compressed air pipeline corridor (0.21 miles [0.34 km] long; 75 feet [22.9 m] wide; 2.4 acres), and one freshwater/brine pipeline corridor (1.06 miles [1.71 km] long; 75 feet [22.9 m] wide; 9.65 acres) be allowed to proceed under Section 106 of the NHPA, and that all Section 106 consultation for the proposed Apex MEC project be considered concluded and complete.

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2012 Laewest Series. Electronic database, [https://soilseries.sc.egov.usda.gov/OSD\\_Docs/L/LAEWEST.html](https://soilseries.sc.egov.usda.gov/OSD_Docs/L/LAEWEST.html), accessed March 11, 2013.



**APPENDIX A. RESUMES OF KEY PERSONNEL**



**EDUCATION**

Current      Doctoral Candidate (ABD), Anthropology Department, Syracuse University  
2007          M.A. Anthropology, Syracuse University  
2006          M.A. Managing Archaeological Sites, University College London (Graduated with Distinction)  
2003          B.A. Anthropology with a Minor in Art History, University of Houston

**PROFESSIONAL EXPERIENCE**

- Over ten years of experience performing all phases of cultural resources surveys and National Register of Historic Places (NRHP) testing and data recovery projects in both professional and academic settings. I have extensive experience with archival research. I also have experience conducting historic architecture surveys, and have been involved in the production of related reports. The majority of my experience is in Texas, but I also have experience working in Oklahoma, California, Arkansas, Louisiana, Florida, Missouri, West Virginia, New York and Minnesota.

**2012-Present: Archaeologist, William Self Associates, Inc., Austin, Texas**

- Primary role as project archaeologist and field director.
- Responsibilities include supervision of temporary field staff for Austin office projects, coordinate with regional manager on projects, and report writing.
- Assists in coordination with local, state, federal, and SHPO regulatory staff in a variety of compliance settings under Section 106 of the National Historic Preservation Act (NHPA), NEPA, and the Texas Antiquities Code (TAC)
- Recently served as principal investigator and primary author for:
  - Apex Matagorda Project, Matagorda Co. (TX)

**2010-2011: Maxwell School, Anthropology Department, Syracuse University, Syracuse, New York**

- Teaching Assistant, Maureen Schwarz Ph.D. Professor, Syracuse University, Instructor: ANT 111, Introduction to Cultural Anthropology, Fall 2010
- Teaching Assistant, Douglas Armstrong Ph.D. Maxwell Professor of Teaching Excellence, Syracuse University, Instructor: ANT/HST 145, Introduction to Historical Archaeology, Spring 2011

**2008-2010: PBS&J (now Atkins North America Inc.), Austin, Texas**

- Primary role as project archaeologist and principal investigator. Also provided support for a variety of technical activities including the coordination of historic architecture surveys and the production of archival and technical reports.
- Responsibilities included project organization and direction, supervision of field personnel, archival research, report writing and production
- Served as principal investigator/field director/primary author:
  - NRHP testing of historic sites 41FT592, 41FT600, and 41FT619 and archival research for 41FT574 located in Luminant's Turlington Mine, Freestone Co. (TX)
  - Data recovery of site 41ML296, Texas Sports Hall of Fame, Waco, McClellan Co. (TX)
    - Held Texas Antiquities Permit for this project
- Served as project archaeologist/field director/primary author for:
  - NRHP testing of historic sites 41RT530, 41RT537 and 41RT538 located in Luminant's Kosse Mine, Limestone Co. (TX)
  - Lundelius-McDonald Water Quality Control Project, Travis Co. (TX)
- Served in support role as historic archaeologist and archival researcher alongside architectural historians for:
  - Cultural Resources Survey of South Henderson Deposit for Luminant, Rusk Co. (TX)
  - Proposed Loop 9 Southeast (TXDOT and TTA), Dallas, Ellis, and Kaufman Co. (TX)
  - Interstate 45 South from FM1764 to Galveston Causeway (TXDOT), Galveston, Galveston Co. (TX)
  - Proposed Farm-to-Market Road 2348 (TXDOT), Mount Pleasant, Titus Co. (TX)
  - Hidalgo International Bridge Trade Corridor Connector, Hidalgo Co. (TX)
  - Proposed Turk to Southeast Texarkana and Sugarhill Transmission Lines, Hempstead, Miller, and Little River Co. (AR)

**2006-2008: Center for Big Bend Studies, Sul Ross University, Alpine, Texas**

- Primary role as field archaeologist and provided report production assistance
  - Tranquil Rock Shelter Excavation, O2 Ranch, Brewster Co. (TX) Rough Cut Rock Shelter Excavation, O2 Ranch, Brewster County, Texas
  - Cerro Chino Petroglyph Site Excavation, Pinto Canyon Ranch, Presidio Co. (TX)
  - Big Bend National Park Project, Brewster Co. (TX)

#### **2002-2012: Field Technician, Multiple Locations**

- Primary role as field technician at multiple companies.
- Responsibilities included field excavation and data recording for survey and excavation projects.
- Project locations throughout Texas, Oklahoma, Florida, West Virginia, and Missouri including
  - Numerous Cultural Resource Surveys and NRHP Testing, Harris County Flood Control District (HCFCD), Moore Archaeological Consultants, Harris County, Texas, (2001-2003)
  - Expansion of Highway 287/385, Oklahoma Department of Transportation, Cargill, Cimarron County, Oklahoma, (2003)
  - Camp Gruber Maneuver Training Center, Lopez Garcia Group, Muskogee County, Oklahoma(2003)
  - Data Recovery for East Grand Forks Levee Construction, GLARC, Polk County, Minnesota (2004)
  - Avon Park Air Force Base Survey, Parsons, Florida (2004)
  - Mark Twain National Forest Survey, Parsons, Missouri (2004)
  - Falcon Reservoir Survey, Lopez Garcia Group, Zapata, Texas (2004)
  - National Park Service and MAR Associates, Canaan Valley, West Virginia (2004)
  - California High Speed Rail Development Historic Resources Survey(San Jose – San Francisco), California (2009)

#### **SELECT REPORTS**

2012 *Archaeological Survey of an Apex Bethel Energy Center Compressed Air Energy Storage Facility, Water Wells and Pipeline Areas, Matagorda County, Texas.* WSA Technical Report No. (in Press). William Self Associates, Inc. Austin, Texas.

2011 *NRHP Testing of Historic Sites 41RT530, 41RT537 and 41RT538 located in Luminant's Kosse Mine,* (Primary Author with Brandy Harris). PBS&J, Austin, Texas.

2010 *Testing of Historic Sites 41FT592, 41FT600, and 41FT619 and Archival Research for 41FT574 Located within the First Five-Year Area of Luminant's Turlington Mine,* (Primary Author with Brandy Harris). PBS&J, Austin, Texas.

2009 *Interim Report for NRHP Testing of Historic Sites 41RT530, 41RT537, and 41RT538 located in Luminant's Kosse Mine,* (Primary author with Brandy Harris). PBS&J, Austin, Texas.

2009 *Interim Report for NRHP Testing of Historic Sites 41FT592, 41FT600, and 41FT619 and Archival Research for 41FT574 Located within the First Five-Year Area of Luminant's Turlington Mine,* (Primary author with Brandy Harris and Amy McWhorter). PBS&J, Austin, Texas.

2008 *A Cultural Resources Survey for the Lundelius-McDaniel Water Quality Control Project, Travis County, Texas,* (Primary author with Julie Shipp). PBS&J, Austin, Texas.

2008 *Interim Report for Texas Sports Hall of Fame Expansion Data Recovery Investigation.* PBS&J, Austin, Texas.

#### **CONFERENCE PAPERS**

2011 Sarah Loftus and Brandy Harris, *Blunt: A lost community at Turlington Mine.* Society for Historical Archaeology Annual Conference, Austin, Texas.

2012 Sarah Loftus, *Postemancipation Community Transitions on the Benjamin Walter Jackson Plantation, Anderson County, Texas.* Texas Archaeological Society Annual Conference, Tyler, Texas.

#### **AWARDS**

Ottis Lock Endowment Research Grant (East Texas Historical Association)  
 Roscoe Martin Graduate Award for Dissertation Research (Syracuse University)  
 The Maxwell School, Syracuse University, Dean's Summer Research Grant Award

#### **PROFESSIONAL REGISTRATIONS**

Society for Historical Archaeology (SHA), Texas Archeological Society (TAS)

**Education**

- Master of Science, Architectural Studies, University of Texas, Austin, 2002
- Bachelor of Science, BioEnvironmental Science, Texas A&M University, College Station, 1997

**Certifications**

- Secretary of the Interior (36 CFR Part 61) Qualified Architectural Historian
- TxDOT Precertification Employee Sequence Number: 12647  
Categories: 2.7.1, 2.8.1, 2.11.1

**Years with CP&Y: 1.5**

**Years with Others: 10**

**Affiliations**

- SAH – Society of Architectural Historians
- VAF- Vernacular Architecture Forum
- Heritage Society of Austin
- Preservation Texas

**Training/Seminars**

- Section 106 Training- Advisory Council for Historic Preservation
- ODOT Training for Cultural Resource Consultants
- Federal Highway Administration: NEPA and NRHP Training
- Federal and State Preservation Tax Credit training: Preservation Texas
- FHWA TNM 2.5 Traffic Noise Analysis 40 hour course
- FHWA Section 4(f) Workshop

**Background and Experience**

Kathryn St. Clair has over eleven years of experience in conducting historic property investigations. She is experienced with the theories and practices of historic preservation and is well versed in Section 106 and the National Environmental Policy Act, Section 4(f), and meets the criteria for professional qualifications for an Architectural Historian as defined by the National Park Service. Kathryn’s technical expertise includes large-scale and corridor studies, historic resource surveys, contextual documentation, property identification and assessment to determine National Register eligibility, assessment of effect for Section 106 and NEPA compliance, National Register and HABS/HAER documentation, building condition assessments, rehabilitation and master plans, historic structure reports, developing programmatic agreements and mitigation plans, and all components of Section 106 consultation process. In addition, Ms. St. Clair has worked with numerous SHPO and federal agency offices throughout the Mid-Atlantic, Mid-West and Southwest regions. Her relevant project experience follows:

**Architectural Surveys and Section 106 Documentation**

**Bulverde Road Drainage Improvements- Bexar County, San Antonio, Texas.** Conducted preliminary research and a field survey to determine the presence of historic-age resources within the project area. A reconnaissance survey report was prepared and submitted to the County for review.

**SH 29 Architectural Reconnaissance Survey and Resource Inventory- ODOT, Stephens County, Oklahoma:** Surveyed and identified an eight-mile portion of the SH 29 corridor to identify architectural resources 45 years or older. Tasks included conducting preliminary research of the project area, completing Oklahoma Historic Preservation Resource Identification Forms for resources, and completing a survey report for ODOT. The project was submitted and approved by ODOT and the Oklahoma Historical Society.

**White Sands Missile Range Historic Structures Survey, White Sands, New Mexico:** Prepared Historic Cultural Property Inventory Forms for 165 Cold-War era structures for the Department of the Army on the White Sands Missile Range. Preparation of the forms included architectural descriptions and NRHP-eligibility recommendations.

**SH-79 Bridge over the Red River, Jefferson County, Oklahoma and Clay County, Texas:** Conducted the Section 106 consultation process with ODOT and TxDOT for the historic camelback pony truss bridge crossing over the Red River. The project includes an adverse effects finding and subsequent mitigation.

**SH 76 from SH 119 to Bell Road- ODOT, Garvin and McClain Counties, Oklahoma:** Conducted an architectural survey along an eight-mile roadway corridor for the Oklahoma Department of Transportation. Surveyed and identified an eight-mile portion of the SH 29 corridor to identify architectural resources 45 years or older. The project was submitted and approved by ODOT and the Oklahoma Historical Society.

**Reconnaissance Survey for FM 546 from SH5 to west of CR317- McKinney, Texas.** Conducted a Research Design and subsequent Reconnaissance survey report for a roadway improvement project in McKinney, Texas. The report included research, historical context, the identification and evaluation of historic-age resources, and the assessment of effects of the proposed undertaking on historic resources. The project was coordinated with TXDOT and the Texas Historical Commission.

**Reconnaissance Survey for the US 377 Relief Route- Cresson, Texas.** Conducted a Research Design and subsequent Reconnaissance survey fieldwork and report for a proposed new roadway bypass around the town of Cresson, Texas. The final report included research, historical context, the identification and evaluation of historic-age resources, and the assessment of effects of the proposed undertaking on historic resources. The project was coordinated with TXDOT and the Texas Historical Commission.

**Large-Scale and Corridor Architectural Survey Projects**

**Tarrant County Regional Water District Architectural Survey – Tarrant, Ellis, Johnson, Navarro, Anderson and Henderson Counties, Texas:** Completed an architectural reconnaissance survey for over 150 miles along a proposed water pipeline corridor spanning multiple counties. Consultation has been ongoing with the Water District and the associated environmental planning groups and will be coordinated with the Texas Historical Commission (THC).



*Kathryn St. Clair*  
Architectural Historian

**Utilities International Gas Pipeline Corridor- UTI, LLC, Wayne, Pennsylvania.** Conducted an architectural survey, historic resource evaluation and effects recommendations for UTI, LLC and the National Park Service. The survey included affects assessments on the Appalachian Trail and numerous historic farmsteads within the APE.

**FEMA Mississippi Post-Katrina Demolition Grant Program-FEMA, Louisiana and Tennessee (statewide).** Identified and assessed numerous (100+) structures across the states for historical significance prior to demolition grant assistance following the Katrina hurricane destruction. Provided Section 106 consultation and organized public notification and involvement efforts for FEMA Algiers, LA office.

**City of Alexandria Flood Mitigation Historic Resource Survey; Alexandria, Virginia.** Conducted a survey of 80+ historic structures within a proposed flood mitigation zone and assessed affects for the historic City of Alexandria. The buildings

#### Section 4(f) Analysis

**Oklahoma Department of Transportation- SH-33 Bridge over Cottonwood Creek Section 106 Coordination, Section 4(f) Evaluation and Mitigation Plan:** Conducting a historic resource survey, Section 106 coordination, public involvement, Section 4(f) evaluation and mitigation plan for a complex historic bridge replacement project. The 1939 NRHP-eligible bridge is located within an NRHP-listed district, and within the viewshed of an NHL-listed district. The proposed bridge approach also includes the taking of a public park.

**Maryland State Highway Administration- MD 5 from MD 243 to MD 245 in Leonardtown, MD:** Conducted a survey, NRHP-evaluation and Section 4(f) analysis on one NRHP-eligible American Four-Square house dating from 1910 that was located within the APE of the project corridor. A small amount of ROW was required that encroached on the historic boundary of the house, including a portion of a stone sidewalk. The analysis resulted in a De Minimis finding in coordination with the Maryland Historical Trust and FHWA.

**Maryland State Highway Administration- Edgewood II: MD28 and MD 198 from MD 97 to MD 195:** Conducted a corridor survey and Section 4(f) analysis on a NRHP-eligible property. The c.1850 house was located along a portion of a proposed toll road corridor, the Inter County Connector (ICC). The landscaping was considering a contributing element to the historical significance of the property. A portion of the landscaping within the historic boundary was required for the ICC. However, the analysis resulted in a De Minimis finding in coordination with the Maryland Historical Trust and FHWA.

#### Additional Projects

**Fernow Experimental Forest, National Forest Service, Parsons, West Virginia.** Conducted a survey of CCC constructed park resources including bridges, culverts, dams, reservoirs, and structures for planning purposes of the USFS. Determined architectural and historical significance of the resources and prepared an evaluation and historical context report.

**St. Paul Train Station; St. Paul, Minnesota.** Prepared an architectural analysis and effects of proposed security upgrades recommendation of the train station for Amtrak and the Minnesota Historical Society.

**Divide Creek Homestead; Silt, Colorado.** Prepared architectural assessment of a 1920s farm complex for USACE and the Colorado Office of Historic Preservation.

**Providence Post Office; Providence, Rhode Island.** Prepared a historical evaluation, documentation and affects assessment for the 1962 Post Office building renovation project. Prepared for USPS and the Rhode Island Historical Society.

**SH 589 from I-50 to I-90 in Taylorville, Maryland.** Conducted an architectural survey of the roadway corridor for the Maryland State Highway Administration. Coordinated with the Maryland Historical Trust (SHPO).

**SH 97 from Stone Road to Crowl Road in Westminster, Maryland.** Conducted an architectural survey and resource evaluation for historic resources along the 5.7 mile corridor for the Maryland State Highway Administration.

**Perry Elementary School; Glen Burnie, Maryland.** Conducted an architectural assessment and determination of eligibility of the 1953 school for the Maryland State Highway Administration.

#### Environmental Studies and NEPA Documentation

**Ada West EA – Chickasaw Nation, Ada, Oklahoma.** Completed portions of an EA for the Bureau of Indian Affairs on this project to construct a casino. After an agency kick off meeting was attended in Ada, began preparation of the Biological, Hazardous Materials, Air Quality, and Noise sections of the EA.

**C5/C28 Environmental Document - San Antonio Water System, Bexar County, Texas.** Wrote the Phase I ESA for an approximately 36,000 LF gravity sewer line located in downtown San Antonio in Bexar County. CP&Y is currently waiting on a funding decision to determine if we will prepare a TWDB Environmental Information Document.

**San Antonio Regional Outfall Phase I Environmental Site Assessment, San Antonio, Texas.** Completed a Phase I ESA for an eight mile wastewater pipeline rehabilitation project in San Antonio, Texas.

**SH-79 Bridge over the Red River, Waurita, Oklahoma.** Completed the Phase I ESA for the project area that expanded into Jefferson County, Oklahoma and Clay County, Texas.



**EDUCATION**

2007	M.A.	Anthropology, Texas State University- San Marcos
2001	B.A.	Anthropology, University of Texas, Austin
2001	B.A.	Archaeology, University of Texas, Austin

**PROFESSIONAL EXPERIENCE**

**William Self Associates, Inc., Austin, Texas**

**Senior Archaeologist, 2010-Present**

- Over 10 years experience, 4 supervisory, in south-central, south, and midwest United States, especially Texas.
- Primary role as project archaeologist and field director.
- Responsibilities include supervision of temporary field staff for projects managed through and completed by the Austin office, coordinate with regional management on projects, and report writing.
- Assists in coordination with local, state, federal, and SHPO regulatory staff in a variety of compliance settings under Section 106 of the National Historic Preservation Act (NHPA), NEPA, and the Texas Antiquities Code (TAC), and other applicable State codes
- Recently served as Project Archaeologist/Field Director for:
  - AGL Resources, Golden Triangle Storage Facility Project, Phase 2 Excavations, Jefferson Co. (TX)
    - Included supervision of both staff and volunteers
  - U.S. Department of Agriculture, Ouachita National Forest, Jones Creek Watershed Inventory (AR)
  - U.S. Department of Agriculture Ouachita National Forest, Broken Bow Inventory (OK)
  - U.S. Department of Agriculture Ouachita National Forest, Ouachita National Forest, South Irons Inventory (AR)
  - Denbury-Conroe 88 mile Pipeline Project (TX)
  - Tim Glendening Associates, City of Baytown wastewater treatment plant project, Harris Co (TX)
    - Held Texas antiquities permit for this project
  - Brown & Gay Engineers (BGE), Flewellen Creek Enhancement Project, Fort Bend Co (TX)
  - CH2M Hill, APEX CAES Bethel Dome Project, Anderson Co (TX)
  - Brown & Gay Engineers (BGE), KMTP 127 30-inch Pipeline Replacement Project, Wharton Co (TX)
  - Tim Glendening Associates, Ocean Drive Reconstruction Project, Calhoun Co (TX)
    - Held Texas antiquities permit for this project
  - CP&Y, Inc., FM 471 Culebra Road Widening Project, Bexar County (TX)
    - Held Texas antiquities permit for this project

**SWCA Environmental Consultants, Austin, Texas**

**Crew Chief, 2008-2009**

- Responsibilities included supervision of field personnel, site recording, mobile data management
- Served as Crew Chief for:
  - Keystone XL Pipeline Archaeological Survey in Oklahoma and Texas
  - Ammonite Seismic Survey of Northwest Louisiana

**GTI Environmental, Inc., Austin, Texas**

**Project Archaeologist, 2007-2008**

- Primary role as Project Archaeologist and Field Director
- Responsibilities included project organization, report writing.
- Served as Project Archaeologist/Field Director for:
  - USFW Inks Dam Shore Stabilization, Burnet Co (TX)
  - City of Donna/International Bridge Corporation 8' Water Line near FM493 (TX)
  - USFW 16 acre Complex at Lake Anahuac, Chambers Co (TX)
  - Spectra Energy Moss Bluff Project, Liberty Co (TX)
  - Hydrostatic Test of Spectra 24" Gas Pipeline and 3LN151 Site Integrity Assessment, Lonoke Co (AR)

**Multiple Environmental Services firms**

**Field Technician, 2002-2010**

- Primary role as field technician at multiple companies.
- Responsibilities included field excavation and data recording for survey and excavation projects.
- Project locations throughout Texas as well as Arkansas, Mississippi, Ohio, and Michigan
  - East Texas Counties include: Harris, Nacogdoches, Rusk, Sabine, Shelby, San Augustine, Shelby
  - Mississippi Counties include: Coahoma, Quitman, Panola
  - Arkansas Counties include: Union, Bradley, Cleveland, Drew, Lincoln, Jefferson, Lonoke, White

Deidra A Black, M.A., RPA (continued)

**SELECT PUBLICATIONS and REPORTS**

2012 *The Lucas Gusher/Spindletop Oil Field National Historic Landmark Phase 2 Archaeological Investigation of the Golden Triangle Storage Project 90-Acre Central Storage Site, Beaumont, Jefferson County, Texas* (Second author with James W. Karbula and Suzanne L. Trussell) Technical Report No. 2012-13. William Self Associates, Austin, Texas.

2012 *Archaeological Investigations of the Koch Helena Gathering System Crude Oil Pipeline, KAS and Drees Segments, Karnes County, Texas* (primary author with James W. Karbula) Technical Report No. 2012-29. William Self Associates, Austin Texas.

2012 *Cultural Resources Survey of the City of Baytown Wastewater Treatment Plant, Harris County, Texas* (sole author). Technical Report No. 2012-01. William Self Associates, Austin, Texas

2011 *Final Summary Report: Cultural Resources Survey for Bell County East to TNP 1, Bell, Milam, and Robertson Counties, Texas.* (second author with James Karbula). Power Engineers Project No. 120618, WSA Technical Report No. 2010-57. Power Engineers Inc., Boise, Idaho.

2011 *Cultural Resources Status Report of the Proposed Koch Pipeline Company, LP, 24-mile Pipeline Project, Bee and Karnes Counties, Texas* (sole author) Technical Report No. 2011-29. William Self Associates, Austin, Texas

2011 *Archaeological Survey of the Koch Pipeline Company 60-mile Pipeline Project, Bee and San Patricio Counties, Texas* (sole author) Technical Report No. 2011-40. William Self Associates, Austin, Texas

2010 *Intensive Archaeological Survey of 647 Acres in the Jones Creek Watershed of the Poteau Ranger District, USDA Ouachita National Forest, Scott County, Arkansas.* (second author with J. Karbula, J. Gillentine and M. Palmison). Technical Report No. 2010-85. William Self Associates, Austin, Texas.

2009 *Cultural Resources Inventory of the Keystone XL Pipeline Project: Gulf Coast Segment in Oklahoma: Payne, Lincoln, Okfuskee, Creek, Seminole, Hughes, Coal, Atoka, and Bryan Counties, Oklahoma: Addendum A* (contributing author with L. Acuña, S. Carpenter, J. Low, K. Lawrence). SWCA Environmental, Austin, Texas.

2008 *An Intensive Archaeological Survey: U.S. Fish & Wildlife Service Inks Dam Shore Stabilization, Burnet County, Texas* (second author with S. Iruegas, V. Moore, and M. Iruegas). Phase 1 CRM Report. GTI Environmental, Austin, Texas

2008 *An Intensive Archaeological Survey: City of Donna/International Bridge Corporation New 8'Waste Water Line near FM493 at La Cruz Resaca/ Main Floodway* (second author with S. Iruegas, V. Moore, and M. Iruegas). Phase 1 CRM Report. GTI Environmental, Austin, Texas

2008 *Canton Treated Effluent Line Project from Canton to the Tuscarawas River: Intensive Archeological Survey Canton, Perry, and Bethlehem Townships, Stark County, Ohio* (second author with S. Iruegas, S. Nash, V. Moore, and M. Iruegas). Phase 1 CRM Report. GTI Environmental, Austin, Texas

2008 *Marathon Pipeline Samaria Detroit 20-Inch Crude Pipeline Heavy Oil Upgrade Project: National Register Testing for site 20MR809 Monroe County, Michigan* (contributing author with S. Iruegas, S. Nash, V. Moore, and M. Iruegas). Phase 2 CRM Report. GTI Environmental, Austin, Texas

2008 *Marathon Pipeline Samaria-Detroit 20-Inch Crude Pipeline Heavy Oil Upgrade Project: Supplemental Intensive Archeological Survey Monroe County, Michigan* (contributing author with S. Iruegas, S. Nash, V. Moore, and M. Iruegas). Phase 1 CRM Report. GTI Environmental, Austin, Texas

2008 *An Intensive Archaeological Survey: U.S. Fish and Wildlife Service 16-Acre Complex at Lake Anahuac, Chambers County, Texas* (second author with S. Iruegas, S. Nash, V. Moore, and M. Iruegas). Phase 1 CRM Report. GTI Environmental, Austin, Texas

2008 *Spectra Energy Moss Bluff Project, Liberty County, Texas* (second author with S. Iruegas, S. Nash, V. Moore, and M. Iruegas). Phase 1 CRM Report. GTI Environmental, Austin, Texas

2008 *Hydrostatic Test of Spectra 24-inch Gas Pipeline and 3LN151 Site Integrity Assessment, Lonoke County, Arkansas* (second author with S. Iruegas, S. Nash, V. Moore, and M. Iruegas). Phase 1 CRM Report. GTI Environmental, Austin, Texas

2006 "Uncovering Ancient Hunter Gatherers at Aquarena Springs" (sole author) in *Texas Archeology Quarterly Newsletter*. Fall 2006.

**AWARDS**

E. Mott Davis Award for Excellence in Public Outreach, 2012

**PROFESSIONAL REGISTRATIONS**

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



**EDUCATION**

2000	Ph.D.	Anthropology, University of Texas, Austin
1989	M.A.	Anthropology, University of Texas, San Antonio
1986	B.A.	English, University of Texas, San Antonio

**PROFESSIONAL EXPERIENCE**

**William Self Associates, Inc., Austin, Texas**

Regional Project Director and Principal Investigator, 2008–Present

- Supervised all aspects of Austin office including all business relations, staff, and facility management.
- Serves as regional project director and principal investigator on major survey and data recovery projects in the Southern region.
- Responsibilities include the coordination and management of all projects, including development and tracking of project schedules and budgets, supervision of staff in both the office and the field, staff allocation, writing and review of reports, preparation of budgets, technical scopes, and business development proposals, and acting as a point of contact for clients for the Austin office
- Coordinates with local, state, federal, and SHPO regulatory staff in a variety of compliance settings under Section 106 of the National Historic Preservation Act (NHPA), NEPA, and the Texas Antiquities Code (TAC)
- Over 16 years of supervisory experience as cultural resource director documenting cultural resources in the Southern region, especially throughout Texas
- Holds a New Mexico State Archaeology Permit, has held Archaeological Resource Protection Act Permits (ARPA, Texas, and New Mexico) and is listed on the Texas, New Mexico, Oklahoma and Louisiana SHPO lists
- Recently served as regional project director/principal investigator for:
  - AGL Resources, Golden Triangle Storage project (TX)
  - Naismith Engineers, Koch Helena Gathering System and Drees Segment (TX)
  - Tim Glendening Associates, City of Baytown Wastewater Treatment Plant Expansion (TX)
  - U.S. Department of Agriculture, Ouachita National Forest, Jones Creek Watershed Inventory (AR)
  - U.S. Department of Agriculture, Ouachita National Forest, Broken Bow Watershed Inventory, (OK)
  - CH2M Hill, Denbury Conroe 88-mile Pipeline project (TX)
  - National Park Service, Lake Veterans Dam Project, Chickasaw National Recreation Area (OK)
  - CH2M Hill, Koch Industries 60 and 24-mile Pipeline projects (TX)
  - Brown & Gay Engineers (BGE), KMTP Line 127 30-inch Pipeline Replacement project (TX)
  - Power Engineers, Oncor BCE TNP 1 Transmission Line project (TX)
  - CH2M Hill, USIBWC Rio Grande Canalization Levee Rehabilitation project (TX, NM)

*AGL Resources, Golden Triangle Storage project, 2008–2013*

- Beaumont, Jefferson County, Texas
- Served as principal investigator and project manager for archival research, survey, and mitigation of ca. 1900 industrial and residential remains at the Spindletop Oil Field, a National Historic Landmark
- Identified archeological sensitivity zones of intact Spindletop remains, conducted Section 106 SHPO and FERC coordination, developed and executed project avoidance strategies, directed mitigation of impacted areas, and prepared project reports
- Cultural resources encountered in the project area include: late nineteenth-century industrial and residential remains related to the NHL Spindletop Oil Field
- Received the Texas Historical Commission Award of Merit in Archaeology 2011 for excellence in field investigations, reporting and public involvement on the Golden Triangle Storage Project, and the 2012 Council of Texas Archeologists E. Mott Davis Award for Excellence in Public Outreach.

**Hicks & Company, Austin, Texas**

Program Manager and Principal Investigator, September 1996–December 2007

- Directed numerous prehistoric and historic survey, testing, and data recovery projects subject to NHPA Section 106 and Texas Antiquities Code (TAC) compliance in virtually all areas of Texas.
- Responsible for reporting results of company archaeological projects.

US EPA ARCHIVE DOCUMENT

- Example projects include:
  - Survey, testing, and data recovery of the Davis Springs Branch Site (41WM989), which documented 7000 years of prehistoric occupation, two burned rock middens, and an extensive series of marsh sediments containing pollen, resulting in a 5000 year sequence of paleoenvironmental data;
  - Section 106 compliance under the Exclusive Development Agreement (EDA) for the design-build of SH 130, Austin, Texas, which included data recovery of the Berdoll Site (41TV2125) resulting in documentation of 4-m deep Early Archaic camp dated at 8200 BP including numerous features and faunal materials;
  - Data recovery of 5 city block area in downtown Austin, Texas in advance of the New City Hall project. Functioned as principal investigator for excavations of extensive late 19<sup>th</sup> century urban remains in Austin's famous red light district known as "Guytown", a notorious boarding house, saloon, gambling and prostitution area. Resulted in the discovery and designation of the subterranean Schneider beer vaults as a City of Austin Historic Landmark. Dr. Karbula received the THC 2003 Award of Merit in Archaeology and the E. Mott Davis Award for outstanding public involvement on the project.

### **SELECTED PUBLICATIONS and REPORTS**

2012 *The Lucas Gusher/Spindletop Oil Field National Historic Landmark Phase 2 Archaeological Investigations of the Golden Triangle Storage Project 90-acre Central Storage Site, Beaumont, Jefferson County, Texas* (senior author with D. Black and S. Trussell). WSA Technical Report No. 2012-13. William Self Associates, Austin, Texas.

2012 *Archaeological Investigations of the Koch Helena Gathering System Crude Oil Pipeline, KAS and Drees Segments, Karnes County, Texas* (second author with D. Black). WSA Technical Report 2012-29. William Self Associates, Inc. Austin.

2011 *The Berdoll Site: An Early Archaic Camp on Onion Creek, Travis County, Texas.* (senior author with J. Campbell and B. Jones). *Bulletin of the Texas Archeological Society* 82:135-173.

2011 *Final Summary Report: Cultural Resources Survey for Bell County East to TNP 1, Bell, Milam, and Robertson Counties, Texas.* (senior author with Deidra Black). Power Engineers Project No. 120618, WSA Technical Report No. 2010-57. Power Engineers Inc., Boise, Idaho.

2011 *Intensive Archaeological Survey of 647 Acres in the Jones Creek Watershed of the Poteau Ranger District, USDA Ouachita National Forest, Scott County, Arkansas.* (senior author with D. Black, J. Gillentine and M. Palmison). Technical Report No. 2010-85. William Self Associates, Austin, Texas.

2010 *Golden Triangle Storage Project: Phase 1 Cultural Resources Final Report.* (senior Author with E. Stinchcomb). Technical Report No. 2008-21. William Self Associates, Austin, Texas.

2010 *National Park Service Archaeological Survey Of Areas To Be Impacted By The Rehabilitation Of The Veterans Lake Dam Within The Platt Historic District Chickasaw National Recreation Area, Veterans Lake, Sulphur, Oklahoma.* (second author with E. Stinchcomb and D. Stone). Technical Report No. 2009-54. William Self Associates, Austin, Texas.

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### **PROFESSIONAL MEMBERSHIPS**

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